ZTELEC GROUP
Powered Green & Reliability

INTEGRATED (POWER) TRANSFORMER

Selection Guide

河南中天宇光电气装备有限公司

ZTELEC YUGUANG ELECTRIC TECHNOLOGY (HENAN) CO.,LTD

Content

Content

Founded in 1958, Henan Zhongtian Electric Equipment Group (hereinafter referred to as Ztelec Group) was formerly owned by the Ministry of Light Industry. Ztelec Group adheres to the core value concept of “Vision, Innovation, and Responsibility” and takes “Power the world with green and reliability” as its own responsibility. Focusing on production and manufacturing for over 50 years, the group has developed into an integrated group company specializing in four industries: Electric equipment, Composite materials, Enamelled copper wires, and Photovoltaic energy. Ztelec Group is represented by 5 manufacturing bases across 4 cities (Xuchang, Guiyang, Chengdu, and Dongguan) in China, with more than 1500 employees worldwide.

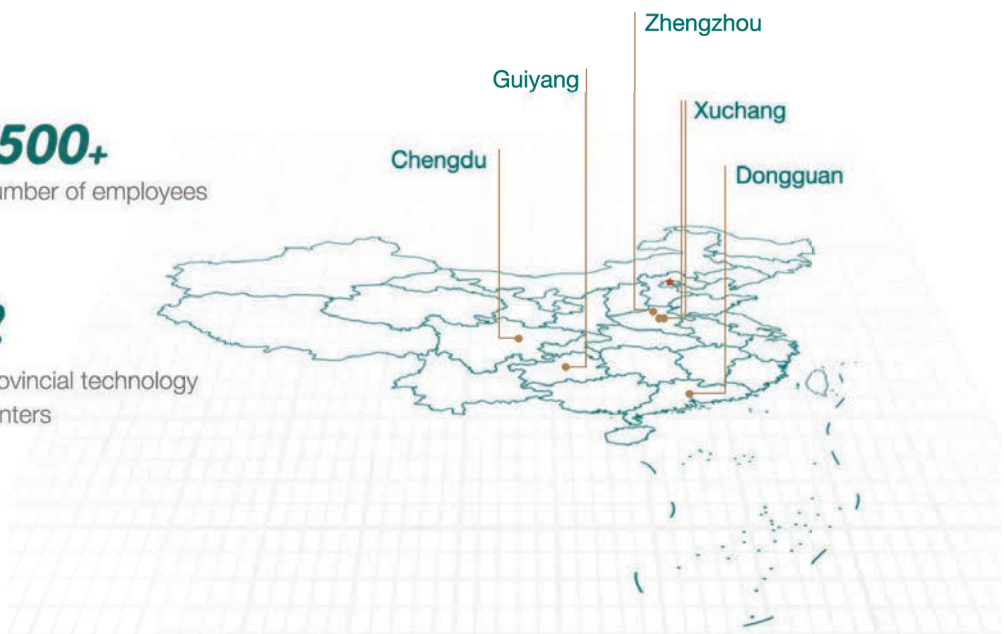
Ztelec is focusing on manufacturing MV and LV power generation, transmission, and distribution equipment, as well as PV equipment, including flexible solar panels, energy storage system, energy management devices, and substations. Ztelec owns 1 national postdoctoral research station and 2 provincial technology centers. It closely cooperates with the National Advanced Materials Laboratory of Beihang University and the Institute of Plasma of the Chinese Academy of Sciences to promote intelligent manufacturing levels and digital transformation. Ztelec is a Chinese enterprise committed to the global development, promoting an open technology and partner ecosystem, and actively practicing the common values of meaning, inclusiveness, and empowerment.

5
Manufacturing base

1500+
Number of employees

1
National postdoctoral research station

2
Provincial technology centers



02
Sustainability at Ztelec

The continuous improvement of the economy and environment in our community and the enhancement of the life quality of our staff and their families are the sustained aims of Ztelec.

In order to achieve these aims, Ztelec has made great efforts toward the balance between economic development and environmental protection, including how to design and manufacture products, how to refine products and services provided, how to cooperate with local suppliers and evaluate risks and opportunities, and how to fulfill its responsibilities.

03 Our purpose

Decentralized setup
Full division accountability
Performance management

Values
People
Leadership

Boundary management
Word-of-Mouth
SNS & share

Risk and contingency
Processes regulation
Internal control

+ Our culture

Customer First

- Partner with our customers
- Listen first
- Always smile and show enthusiasm

Embrace Changes

- More choices, more joy
- Believe there is always a better way
- Learn from failures as well as successes

Devotion

- Grow faster with more sharing
- Proud of your team
- Speak up and ask for help

Care with Respect

- Take care of our people as well as their families
- Respect and value differences
- Speak directly and act with integrity

04 Industrial development history

We introduced complete testing equipment and manufacturing machines, and started to produce power equipment, including 10kV and 35kV oil-immersed transformers and 10kV switchgear.

2003

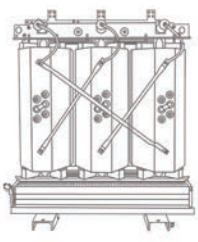
国家电网 STATE GRID

Won multiple bids with a total amount of approximately $6 million for the power transmission and transformation projects from the State Grid Corporation of China.

2009

2010

Started the production of S11 and S13 series cast resin dry-type transformers. Achieved significant progress in developing the S15 series of high-efficiency amorphous alloy transformers.



2006

Successfully obtained ISO9001:2008 and ISO14001 certifications; the full series of 6kV, 10kV, and 35kV transformers passed the “type test” and “special test” conducted by the Suzhou Electrical Appliance Research Institute.

Through the cooperation with CNOOC, developed transformers for offshore power supply system under marine operation environment.

2012

Successfully passed the audit of SAM supplier management system from Schneider Electric and became their supplier in the field of Variable frequency transformer.

2017

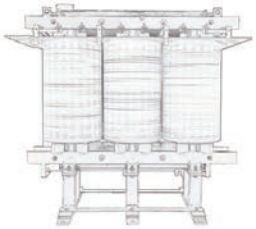
Began to provide container-type or box-type step-up integrated equipment for energy storage power stations (CESS), which integrates 35kV high-voltage switchgear, low-voltage switchgear and dry-type isolation transformers.

2022

2023

2014

It has gradually formed four product production lines, including oil immersed transformer, dry type transformer, high and low voltage switch gear, and box type substation. Meanwhile, started the sample making and market development of mining transformer, open type transformer and variable frequency transformer.



2019

Started batch production of traction transformer for railway, prefabricated photovoltaic intelligent substation and photovoltaic power generation system equipment.

05 Flexible & High efficient manufacture

Respond quickly to the customer's special requirements regarding environment, appearance, efficiency, delivery time, transportation, special quality requirements, and others. Provide personalized design and shorten the delivery cycle time.

Organize production in accordance with GB and international (IEC and IEEE) standards, implement a full-process control concept from raw material warehousing control to finished product inspection, focus on customers' experiences and core needs, and provide products and services that exceed customers' expectations

+ Maufacturing equipment

1 Vacuum casting system

2 Cut-to-length line for core sheets

3 Vacuum drying equipment

4 Winding equipment

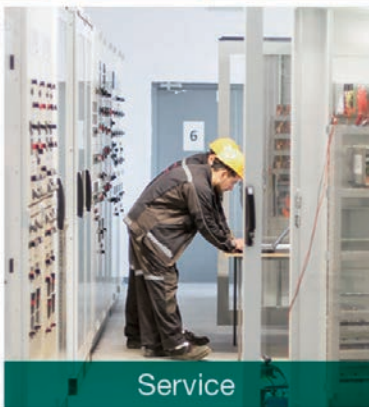
+ Implementation of TQM and Systerm

After introducing the lean production concept, we established 50 lean improvement quality criteria. Each process is provided with operation instructions and standardized operation criteria to implement the production plan, using timely management to improve communication efficiency and continuously shorten delivery time. The Toyota Production System (TPS), with a core focus on production process management (MPS), has gradually been developed by connecting sales, materials, planning, supply chain, services, and other areas.


Kanban System


Design


Test


Service

06 Testing

Regular Tests

- Voltage ratio measurement
- Applied withstand voltage test
- Induced withstand voltage test
- Partial discharge measurement
- No load loss and current measurement
- Winding resistances measurement
- Insulation resistance test
- Load loss and short circuit impedance measurement
- Transformer oil test

Type Tests

On customer requirements

- Temperature rise test
- Lightning impulse test
- Noise level test

Special Tests

On customers' requirements, below parameters can be checked

- Zero-sequence impedance
- No-load voltage harmonic
- Parallel capacity of windings
- Anti-corrosion protection checking
- Short circuit test

07 Installation and Service

Warehouse

+ In the warehouse, transformers should be protected from the pollution of water droplets, dust and sand. If provided with plastic cover, the transformer should be covered during storage.

Transport

+ The transformer is equipped with safety transport devices. The transformer without shell shall be lifted with lifting lugs, the medium and small dry transformers with shell shall be lifted with lifting rings, and the large transformer shall be lifted with special lifting device for foundation channel steel.

Shipping

+ The product is ready for shipping either by truck or sea freight once it has passed the tests.We take care of all official doucments, depending on destinations and delivery terms. We also provide different packaging for special applications or conditions.

Installation

+ We supply the installation guide and user manual for each transformer. Under normal conditions, check the transformer once a year and clear the dust by vacuum cleaner. The frequency of cleaning depends on the running conditions.

Service

+ When some parts need to be replaced or any information is required, the main parameters on the nameplate must be provided, especially the serial number. We provide stock in regular quantities of spare parts, in case of customer needs.

08 Customer cases

Subway Line 01, Zhengzhou 2014

Xinzheng Airport Terminal

A carrier rocket with Shenzhou-11 spacecraft, CASA, 2016

SAIF 225MW Gas Turbine Combined Cycle Power Project, Pakistan

Yuzhou Peak Photovoltaic Power Station Project

Khutul, "CEMENT-SHOKHO" JSC, Mongolia, 2015

Other achievements (in no particular order)

Aerospace and military projects:

+ Xinxiang Aviation Industry Group
+ Guilin Aerospace Electronics Co., Ltd.
+ Guizhou Aerospace Electric Co., Ltd.
+ AVIC Chengdu Aircraft Industry Group

Wind and light new energy projects:

+ Mahayana Wind Power Project
+ Mingyang Electric Co., Ltd.
+ Xuchang City Public Traffic Power Charging Construction

Automation field:

+ Huichuan Technology Co., Ltd.
+ Hekang New Energy Technology Co., Ltd.
+ Wolong Electric Group Co., Ltd.
+ Leadford Electric Technology Co., Ltd.
+ Shandong Xinfeng Electronics Technology Co., Ltd.
+ Shenzhen Kumark Drier & Automation
+ Shanghai Dongfang Electric

Metallurgy and petrochemical:

+ Shenhua Group
+ Yongfeng Iron and Steel Group Co., Ltd.
+ Harbin Electric Wind Energy Co., Ltd.
+ China Pingmei Shenma Group
+ China Shenhua Coal
+ Anyang Iron and Steel
+ State Grid Henan Electric Power Company

Business school program:

- Xinzheng South China City
- Xinzheng Wuyue Plaza
- The main venue of the National Peasant Games
- Zhengshang Stock Business Centers
- Jianye Group
- Yongwei Group
- CRCC No.18 Bureau Group
- Country Gradend Holdings Group
- Henan National University Science Park

Industrial manufacturing project:

- Puyang Longfeng Power Plant
- Xuchang Jinhui Stainless Steel Group Co., Ltd.
- Henan Zhigu Industrial Park
- Vietnam Tinh Bac Ninh Solar Project
- Philippine Paper Mill Powering System
- Geely Automobile Zhejiang Intelligent Plant

Pulp & Paper:

- Huatai Group
- Chenming Group
- Hengan Group
- Yinge Group
- Lee & Man Paper Mill
- Henli Group
- Yilin Paper Mill

09 Certificates & Patents

36 National Patents Granted -Validated

(Innovations in core technologies, product design, and manufacturing excellence)

Global Compliance & Certification-Certified by ISO, CE, CB,

and International Standards

ZTELEC GROUP
Powered Green & Reliability

ZTELEC is a top brand group company strongly supported by our own R&D team.

Box type substation

Prefabricated substation
(Box-type substation)

Overview

Box-type substations, also known as prefabricated substations, provide power directly to users. They are prefabricated indoor and outdoor compact power distribution equipment that integrates high-voltage switchgear (high-voltage room), distribution transformer (transformer room) and low-voltage power distribution device (low-voltage room) according to a certain wiring scheme. The functions of voltage reduction and low-voltage power distribution are organically combined, and the substation is installed in a fully enclosed, movable steel structure box with moisture, dust, and fire resistance, making it particularly suitable for urban and rural power grid construction and reconstruction.

The high-voltage room is the power supply side, generally 35kV, 20kV or 10kV incoming lines, including high-voltage busbars, circuit breakers or fuses, voltage transformers, arresters, etc. The transformer is located in the transformer room and it is the main equipment of the box-type substation. The transformer room includes transformers, which are the main equipment of the substation. The low-voltage room includes low-voltage busbars, low-voltage circuit breakers, metering devices, etc. The lines are led out from the low-voltage busbars to power users.

Box-type transformers are divided into "triangle" and "rectangular" type according to the structure layout; "terminal type" box-type substations and "ring network" box-type substations according to the high-voltage power supply mode. Both sides of the bottom of the box are equipped with push-pull lifting devices, which can facilitate lifting, transportation and installation. The high and low voltage room can adopt standard structure or screen-mounted or framed structure. The former structure is highly complete and the latter has a compact overall size.

Implementation standards

IEC 62271-202: High-voltage switchgear and control equipment – Part 202: HV/LV prefabricated substations
IEC 61439-1: Low-voltage switchgear and control assemblies – Part 1: General rules
IEC 60076-11: Power transformers – Part 11: Dry-type transformers
IEC 60529: Degrees of protection provided by enclosures (IP Code)
GB 1094.1-2013: Power transformers Part 1: General
GB 1094.2-2013: Power transformers Part 2: Temperature rise
GB 1094.3-2003: Power transformers - Part 3: Insulation levels, insulation tests and air gaps for external insulation
GB 3906-2006: 3.6kV-40.5kV AC metal-enclosed switchgear and controls
GB/T 11022-2011: Common technical conditions for high-voltage switchgear and controls standards
GB 7251.1-2013: Low voltage packages and controls Part 1: General
GB 14048.1-2006: Low-voltage switchgear and controls Part 1: General
GB/T17467-2010: HV/LV prefabricated substations

Features

+ Compact size, easy to move and install, with a small footprint for flexible deployment;
+ Reasonable structure distribution, can be made into "triangle" and "rectangular" type according to demand;
+ Each functional room is independent of each other, and maintenance and replacement of parts are convenient and fast;
+ The shell is naturally ventilated, which can reduce the heat during operation;
+ Can be used in various environments with high protection level.

Environmental conditions

a The altitude is below 1000m;

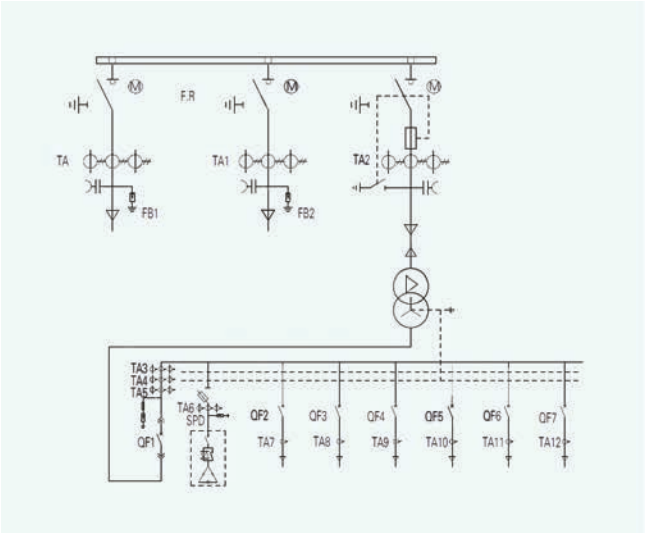
b Ambient temperature: -25℃ ~ +40℃ ;

c Relative humidity: the daily average humidity is not more than 95%, and the monthly average is not more than 90%.

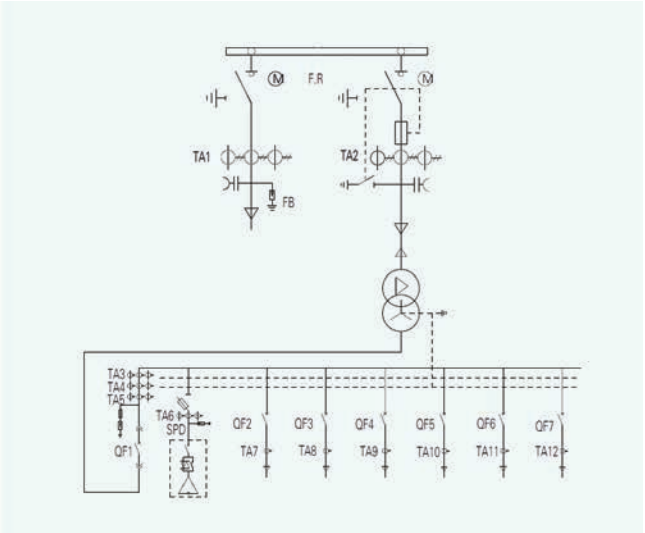
Note: If it is out of the above conditions, you need to negotiate with the manufacturer.

A typical one-line diagram

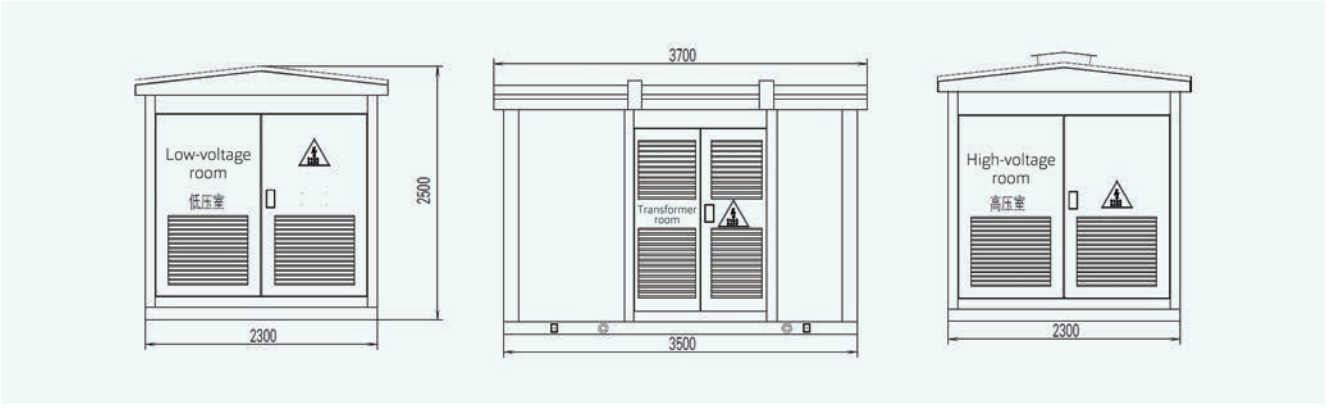
Primary single line diagram of ring network substation

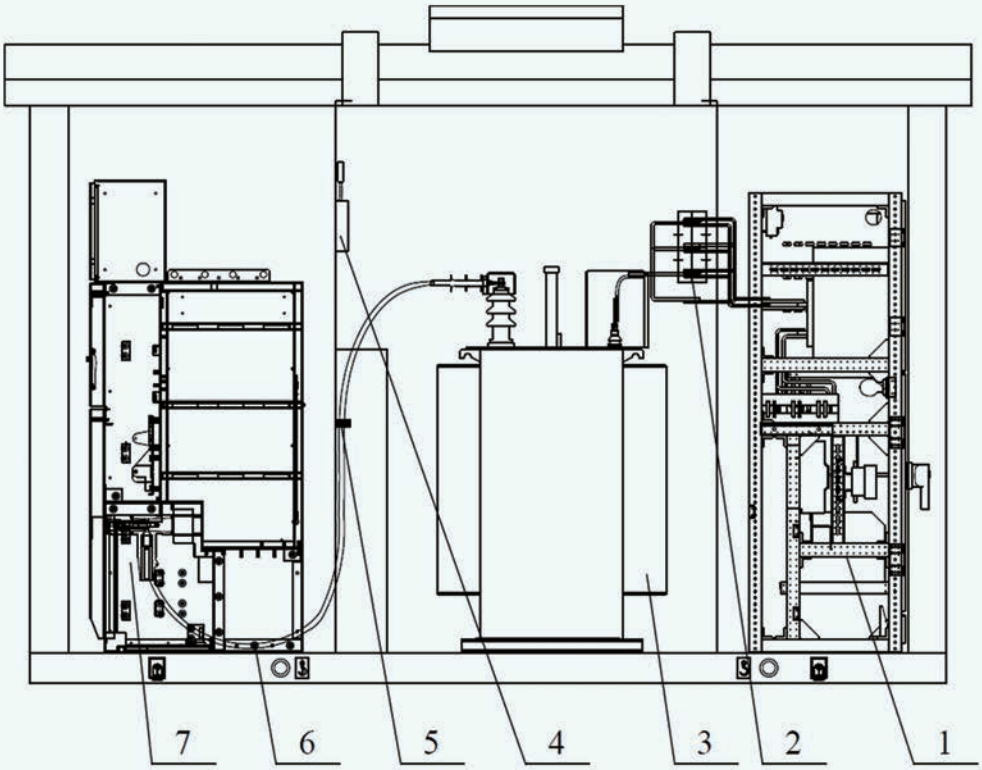


Primary one-line diagram of terminal type substation



Box boundary drawing: (take 630kVA as an example)





1. Low voltage switchgear
2. Insulated busbar frame
3. Transformer
4. Box-type transformer shell
5. Cable clamp
6. 10kV high voltage cable
7. High voltage switchgear

New energy (photovoltaic/wind) power generation special box transformer

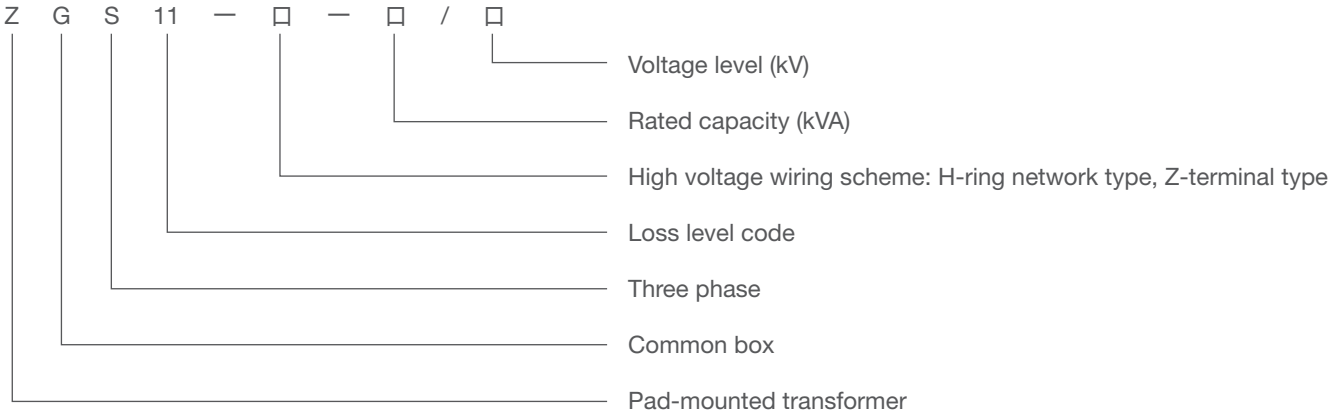
Overview

As a production method of clean energy, new energy power generation has developed rapidly at home and abroad. ZGS series new energy (photovoltaic/wind) power generation combined transformer is a pad-mounted transformer, which combines transformer body, oil-immersed load switch, oil-immersed fuse, switchgear, low voltage power distribution device and other supporting equipment. The high and low voltage chambers and transformers are arranged in a triangular shape. It can simultaneously meet various configuration requirements such as user energy metering, reactive power compensation, low-voltage shunt, etc. It is suitable for terminal power supply systems of 35kV and below, with a capacity range of 500-5000kVA. The enclosure protection level can reach IP54 or above, and it is suitable for photovoltaic and wind farms on land, water and sea.

Implementation standards

GB 1094.1-2013: Power transformers Part 1: General
GB 1094.2-2013: Power transformers Part 2: Temperature rise
GB 1094.3-2003: Power transformers - Part 3: Insulation levels, insulation tests and air gaps for external insulation
GB 1094.5-2008: Power transformers - Part 5: Ability to withstand short circuits
GB/T 11022-2011: Common technical conditions for high-voltage switchgear and controls standards
GB 7251.1-2013: Low voltage packages and controls Part 1: General
GB 50150-2006: Electric device installation engineering - Electrical equipment handover test standard
JG/T 10217-2013: Pad-mounted transformer

Type description



Features

+ Small size, compact structure, small footprint, convenient transportation and installation;
+ Low loss, low noise, low temperature rise, strong overload capacity, strong resistance to sudden short circuit;
+ Fully enclosed, fully insulated structure, safe and reliable operation;
+ The wiring method is flexible and the operation is convenient, which can be used in both the terminal system and the ring network system;
+ The transformer body is installed on the outside of the box, with good heat dissipation and convenient maintenance;
+ The box is treated with cold-rolled steel plate electrophoretic spray paint (plastic), which is corrosion-resistant and has strong mechanical properties;

Environmental conditions

a The altitude is below 4000m;

b Ambient temperature -45℃ ~ +45℃ ;

c Pollution level: III

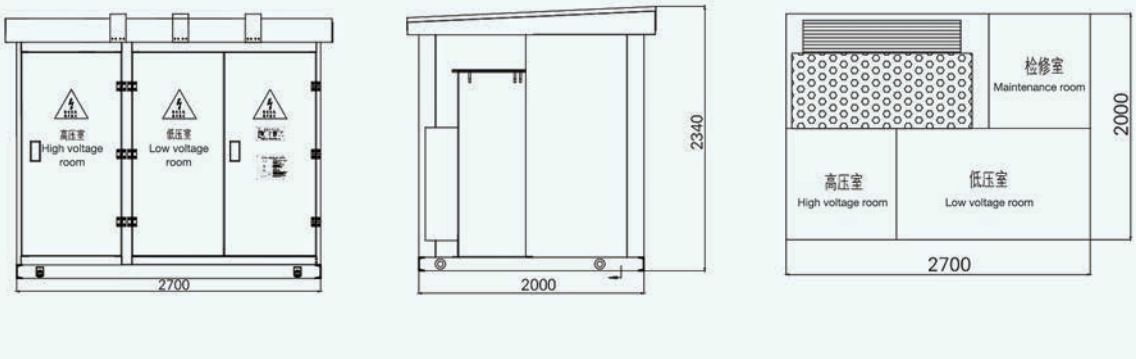
d Relative humidity: the daily average humidity is not more than 95%, and the monthly average is not more than 90%;

Technical parameters

No.	Name		Unit	Data
1	Rated voltage	HV	kV	10、20、35
		LV	kV	0.315 ~ 0.5
2	Rated capacity		kVA	630 ~ 5000
3	No-load voltage regulation		±2×2.5%	±2×2.5%
4	Vector group			Dyn11、Dyn11yn11、Yd11d11
5	Insulation level	Lightning impulse withstand voltage	kV	75、125、200
		Power frequency withstand voltage (HV)	kV	35、55、85
		Power frequency withstand voltage (LV)	kV	5
		Secondary control loop		2.0
6	Noise level		dB	60
7	Protection class			Oil tank IP68, high and low voltage chamber IP54

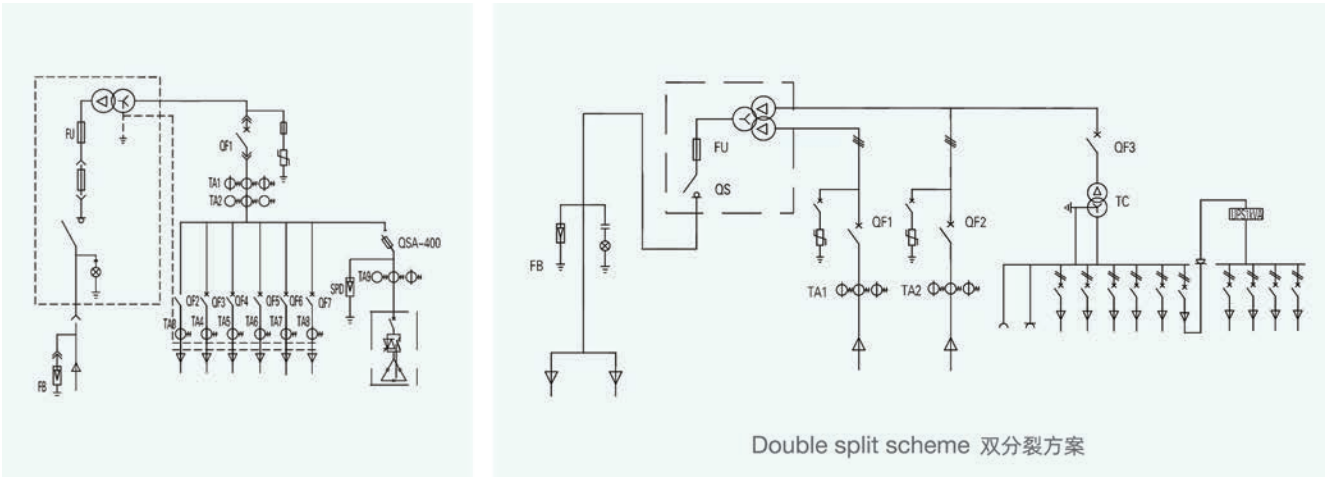
Note:Due to continuous product improvement, the dimensions provided in this sample are for reference only. If necessary, our company can design and produce according to user requirements. Please contact us promptly.

Box boundary drawing: (take 630kVA as an example)

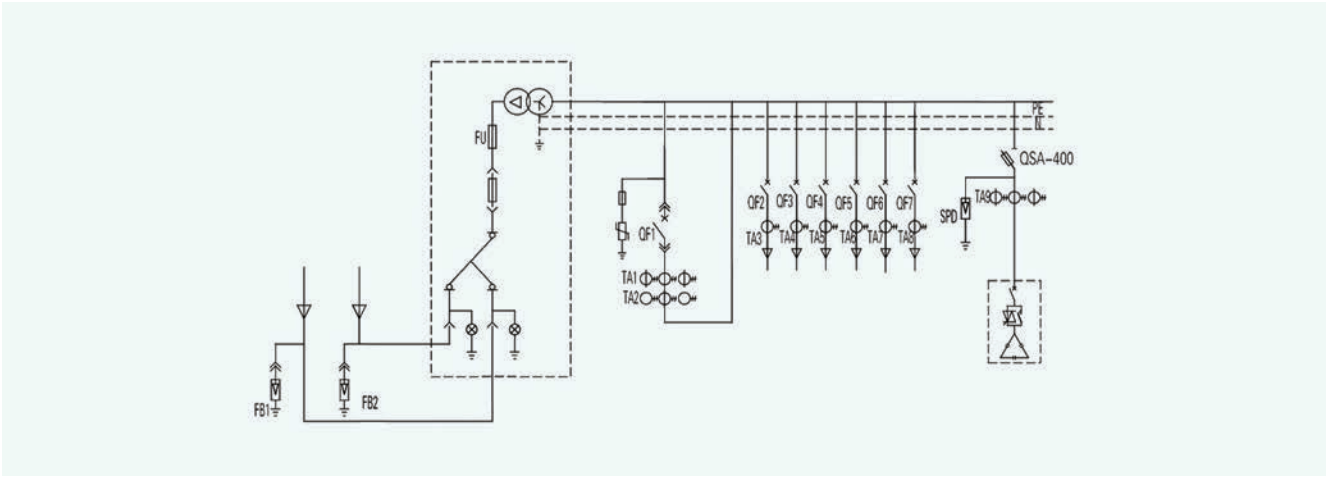


Primary single-line diagram (typical scheme)

1. Primary one-line diagram of terminal type substation



2. Primary single-line diagram of ring network substation



Special box transformer for new energy (photovoltaic, wind) power generation

Overview

This kind of box transformer is also suitable for new energy (photovoltaic/wind) power generation. The transformer room, high - voltage room and low - voltage room are arranged in a rectangular shape and high voltage fuses and load switches are moved from the inside of the transformer tank and placed in the high voltage room. The transformer adopts an external oil storage tank structure and the oil level is clear at a glance, and it is more convenient to fill and drain oil. The capacity range can be expanded to 6300kVA, and the external transformer is more convenient for maintenance. The protection level of the fuel tank is IP68, and the protection level of the high and low voltage rooms is IP54, which can be used in various harsh environments.

Environmental conditions

a The altitude is below 4000m;

b Ambient temperature -45℃ ~ +45℃ ;

c Pollution level: III

d Relative humidity: the daily average humidity is not more than 95%, and the monthly average is not more than 90%;

Note: If it is out of above conditions, please negotiate with the manufacturer.

Implementation standards

GB 1094.1-2013: Power transformers Part 1: General

GB 1094.2-2013: Power transformers Part 2: Temperature rise

GB 1094.3-2003: Power transformers - Part 3: Insulation levels, insulation tests and air gaps for external insulation

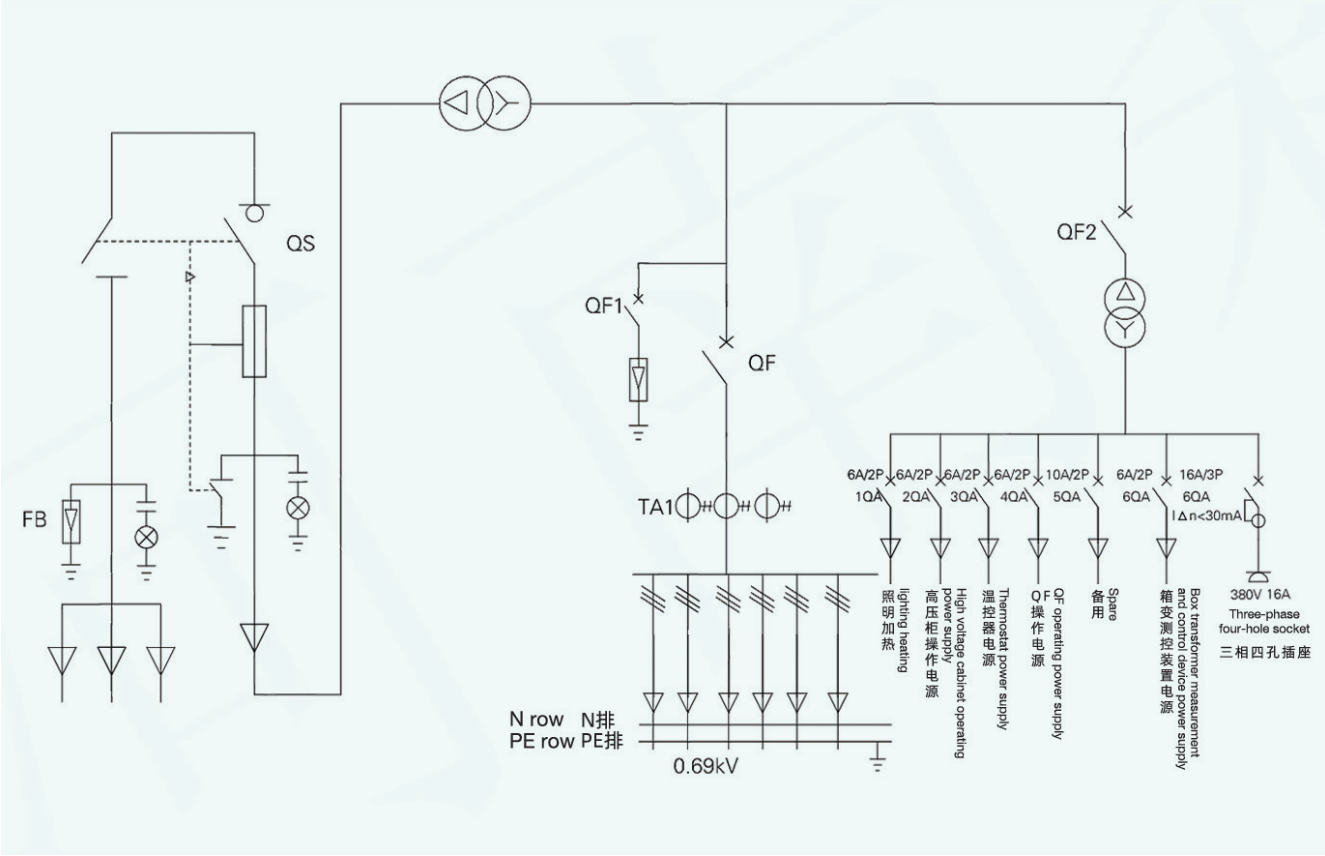
GB 1094.5-2008: Power transformers - Part 5: Ability to withstand short circuits

GB/T 11022-2011: Common technical conditions for high-voltage switchgear and controls standards

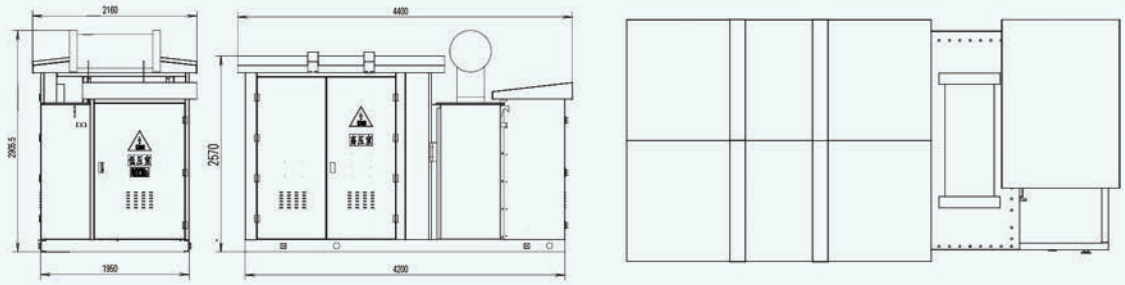
GB 7251.1-2013: Low voltage packages and controls Part 1: General

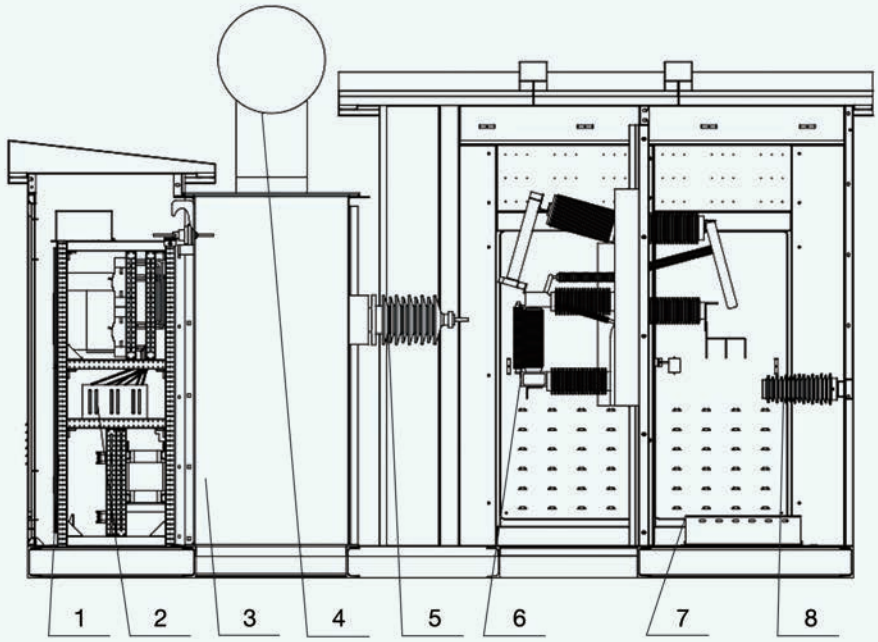
GB 50150-2006: Electric device installation engineering - Electrical equipment handover test standard

Primary single-line diagram (typical scheme)



Structure and boundary dimensions





1. Low voltage switchgear
2. Insulated busbar frame
3. Transformer
4. Oil conservator
5. High voltage bushing
6. Vacuum load switch
7. Cable clamp bracket
8. Post insulators

Pad-Mounted
transformer

Overview

As a professional manufacturer of pad-mounted transformers, we offer units with high voltages of up to 35 kV and ratings of up to 2000 kVA. Pad-Mounted Transformer: Reliable Power Distribution Solutions for Modern Infrastructure, Our Pad-Mounted Transformers are engineered to deliver efficient, safe, and reliable power distribution for a wide range of applications. Designed for both urban and rural settings, these transformers are the ideal choice for underground power systems, ensuring seamless energy delivery to residential, commercial, and industrial facilities.

Features

+ Robust Construction: Built to withstand harsh environmental conditions, our pad-mounted transformers are encased in durable, corrosion-resistant enclosures, ensuring long-term performance even in extreme weather;
+ Compact Design: With a space-saving footprint, these transformers are perfect for areas with limited space, such as urban neighborhoods, commercial complexes, and industrial parks;
+ High Efficiency: Optimized for energy efficiency, our transformers reduce power losses and operational costs, making them a sustainable choice for modern power grids;
+ Safety First: Equipped with advanced safety features, including tamper-proof designs and fault protection systems, our transformers ensure safe operation for both equipment and personnel;
+ Customizable Solutions: Available in a range of kVA ratings and configurations, our pad-mounted transformers can be tailored to meet specific project requirements, whether for single-phase or three-phase systems.

Implementation standards

IEC 60076: General requirements for power transformers

IEC 61330: Safety standard for high/low voltage prefabricated substations

IEEE C57: General requirements covering the safety and performance of liquid-immersed distribution, power and regulator transformers.

Technical parameters

Rated Capacity (kVA)	Voltage & Tap range			Vector Group	No load loss (kW)	Load Loss (kW)	No load current (%)	Impedance (%)
	HV (kV)	HV Tap Range (%)	LV (kV)					
50	6 6.3 10 10.5	±2×2, 5±5	0.4	Dyn11 Yyn0	0.100	0.91/0.87	1.04	4.0
63					0.110	1.09/1.04	0.96	
80					0.130	1.31/1.25	0.96	
100					0.150	1.58/1.50	0.88	
125					0.170	1.89/1.80	0.88	
160					0.200	2.31/2.20	0.80	
200					0.240	2.73/2.60	0.80	
250					0.290	3.20/3.05	0.72	
315					0.340	3.83/3.65	0.72	
400					0.410	1.52/4.30	0.64	
500					0.480	5.41/5.15	0.64	
630					0.57	6.20	0.48	4.5
800					0.700	7.50	0.48	
1000					0.83	10.3	0.48	
1250					0.97	12.0	0.40	
1600					1.17	14.5	0.40	
2000					1.36	18.3	0.32	5.0

Note:Due to continuous product improvement, the dimensions provided in this sample are for reference only. If necessary, our company can design and produce according to user requirements. Please contact the company in time.

Mode of connection

Guide to radial and loop feed transformers

A transformer is called a loop feed transformer because its bushing configuration is tailored toward a loop distribution system.

The same applies to transformers we classify as radial feed—their bushing layout is typically suited toward radial systems. Both radial and loop systems aim to accomplish the same thing: sending medium voltage power from a common source (usually a substation) to one or more step-down transformers serving a load.

A loop feed transformer can accommodate both radial and loop distribution systems, whereas radial feed transformers almost always appear in radial systems.

Radial feed is the simpler of the two. Imagine a circle with several lines (or radians) proceeding from one center point, as shown in Figure 1. This center point represents the source of power, and the squares at the end of each line represent step-down transformers. In this setup, each transformer is fed from the same point in the system, and if the power source is interrupted for maintenance, or if a fault occurs, the entire system goes down until the issue is resolved.

Order Information

Normal use conditions for the product

a Environment temperature: highest temperature 40℃ , lowest -30℃ .

b Elevation: no more than 1000m.

c Relative humidity: daily average≤95%, monthly average≤90%.

d Maximum wind speed (outdoor): 35m/s (10m above the ground and average value over 10 min).

e Anti-earthquake performance (withstand): 8.

Order Information

In order to provide you with better service, the following data are required when ordering.

- + Specification and type
- + High voltage
- + Low voltage
- + Coil material
- + Phases
- + Tapping range
- + Rated frequency
- + Vector group
- + Insulation grade
- + Ambient environment

Note: Please specify your requirements for special products.

Global Service

24/7 availability of our engineers

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