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**中国西电集团公司**  
CHINA XD GROUP





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## BRIEF INTRODUCTION

Founded in 1959, China XD Group Corporation (hereinafter referred to as XD Group) is a major research, producing and inspection base for high and ultra-high voltage AC/DC transmission and transformation equipment. In addition, it is a unique enterprise group which is capable of manufacturing complete set of power transmission and distribution equipment.

At present, XD Group owns over 40 wholly-owned enterprises or holding enterprises. In April 2008, China XD Electric Co., Ltd (hereinafter referred to as CHINA XD, Stock Code 601179) was raised and founded. The primary industrial company, independent companies and joint venture companies which manufacture XD product and components are established in Xi'an, Shanghai, Changzhou, Guangzhou, Malaysia and Egypt etc.

Being a large state-owned enterprise in power transmission and transformation industry in China, product of XD Group involves 13 major types, over 380 series and more than 760 kinds. Manufacturing and technology research of high voltage, ultra high voltage, AC/DC transmission and transformation equipments is the core business of XD Group while the power transmission and transformation equipments with voltage of 110kV and higher are the most competitive products with major types followed

### HVAC T&D Products Manufacturing Scope

[12kV- 1100kV] :

- Power and Special Transformers
- Dry-type Distribution Transformers
- Instrument transformers
- Reactors
- GIS, GCB ,
- Disconnectors
- CT, VT, CVT
- Zinc Oxide Surge Arresters
- Insulators
- Bushings
- Shunt, Series, Coupling, Equalizing, Filter Capacitors
- HV & LV Switchboards, Power Distribution Equipments

### HVDC Transmission Products and Service Scope

[ $\pm 50\text{kV} - \pm 800\text{kV}$ ] :

- System Research ,Design, System Simulating
- Thyristor Valves
- Converter Transformers
- Smoothing Reactors
- Filter Reactors
- Shunt, Filter Capacitors
- CT, VT
- Switchgear
- Control & Protection for filter
- Zinc Oxide Surge Arresters
- Polymeric Post Insulators
- HVDC Bushings for Converter Transformer and Smoothing Reactor

As one of China's biggest power transmission and distribution engineering contractors, we offer a comprehensive line of products and services: complete sets of high voltage AC/DC transmission and distribution equipment; complete turn-key projects, from civil works, design, engineering, equipment supply, installation, testing, commissioning to excellent after-sales service for substations and transmission lines.

Products and technologies with "XD" as the trade mark have been exported to over 40 countries and regions, including like Germany, U.S., Singapore and Hong Kong and are winning accolades in Southeast Asia, South Asia and even as far as Middle East and Africa.

Up to now, XD Group has established sales agencies and trading companies in Hong Kong, Malaysia, Thailand, the Philippines, India, Indonesia, Vietnam, Uzbekistan and Egypt respectively.

As an enterprise owned by China XD Group, Xi'an Electric Engineering Co., Ltd. ("Xi'an Electric" for short) is engaging in international trade and project contracts. While our strengths lie in the manufacture of high and ultra-high voltage transmission and distribution equipment and the contracting of large-scale turn-key projects, we also provide professional international trading services, effective and customized solutions and designs to suit the individual needs of our clients in electrical system, telecommunications, electric railway transport, metallurgical and architectural sectors







ISO14001:2004



ISO9001:2008



OHSAS18001:1999

With 50 years' dedication, XD has been evolving into a leading enterprise in the electric field, and it now possesses advanced and updated design technology, experienced professional teams, and top-ranking facilities of the world, strict and efficient management system as well as first-class measuring & testing methodology. XD is able to provide our customer with 800kV/1100kV transformer which researched and developed by self-owned intellectual property rights of XD.



800~1100kV Power Transformer(Two-Winding)

| Type           | Rated voltage (kV)      |     | Connecting symbol | Outline dimensions (L×W×H mm) |
|----------------|-------------------------|-----|-------------------|-------------------------------|
|                | H.V                     | L.V |                   |                               |
| DFP-260000/750 | 800/ $\sqrt{3}$ -2×2.5% | 20  | lio               | 8176 × 6487 × 13487           |
| DFP-240000/750 | 800 $\sqrt{3}$ ±2×2.5%  | 22  | lio               | 8176 × 6713 × 13487           |
| DFP-200000/900 | 900/ $\sqrt{3}$         | 20  | lio               | 7125 × 6264 × 14277           |

800~1100kV Auto Power Transformer(Two-Winding)

| Type               | Rated voltage (kV) |                          |     | Connecting symbol | Outline dimensions (L×W×H mm)                 |
|--------------------|--------------------|--------------------------|-----|-------------------|-----------------------------------------------|
|                    | H.V                | M.V                      | L.V |                   |                                               |
| ODFPS-1000000/1000 | 1050/ $\sqrt{3}$   | 520/ $\sqrt{3}$ ±4×1.25% | 110 | laoio             | 16492 × 12646 × 18795<br>16490 × 9080 × 18795 |







Since XD started design in 1978 and manufactured the first batch of 500 kV power transformer in China in 1980, XD has supplied the worldwide customers with various types of large transformers including 500 kV step-up transformers and auto-transformers, etc. With the constant development in past twenty years, XD has accumulated rich experiences on designing and manufacturing of 500 kV power transformer, and had a reliable ability to manufacture high quality of the products to meet the requirements of customers.



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500kV Power Transformer(Two-Winding)

| Type             | Rated voltage (kV)      |         | Connecting symbol | Outline dimensions<br>(L×W×H mm) |
|------------------|-------------------------|---------|-------------------|----------------------------------|
|                  | H.V                     | L.V     |                   |                                  |
| DFP-240000/500   | 550/ $\sqrt{3}$ -2×2.5% | 20      | YNd11             | 5620×7270×10830                  |
| SFP-160000/420   | 420±2×2.5%              | 15      | YNd11             | 11600×5150×10900                 |
| SFP10-370000/420 | 420±2×2.5%              | 20      | YNd1              | 17300×7010×9350                  |
| SFPZ-800000/500  | 500±8×1.25%             | 20      | YNd1              | 14200×7870×7800                  |
| SFP-400000/500   | 550-2×2.5%              | 20      | YNd11             | 13380×5670×11500                 |
| S-40000/500      | 500±2×2.5%              | 10.5    | YNyn10+d          | 11120×5900×11660                 |
| SFPFZ-250000/410 | 410±12×1%               | 33-33   | YNd5-d5           | 12500×6800×9300                  |
| SFFZ-63000/500   | 525±8×1.25%             | 6.3-6.3 | YNynoyno+d        | 11900×7920×12080                 |
| SSP-H-667000/500 | 500-2×2.5%              | 20      | Ynd11             | 16850×6620×8330                  |

500kV Auto Power Transformer(Two-Winding)

| Type                | Rated voltage (kV)       |                         |      | Connecting symbol | Outline dimensions<br>(L×W×H mm) |
|---------------------|--------------------------|-------------------------|------|-------------------|----------------------------------|
|                     | H.V                      | M.V                     | L.V  |                   |                                  |
| ODFPS-150000/500    | 500/ $\sqrt{3}$ ±8×1.25% | 220/ $\sqrt{3}$         | 22   | la0l0             | 9025×8188×10098                  |
| ODFPSZ-400000/500   | 515/ $\sqrt{3}$          | 230/ $\sqrt{3}$ ±10×1%  | 63   | la0l0             | 10610×8890×10987                 |
| ODFPSZ10-315000/400 | 400±8×1.25%              | 220                     | 33   | Yna0d11           | 21320×7220×9350                  |
| ODFSZ-200000/500    | 525/ $\sqrt{3}$ ±8×1.25% | 231/ $\sqrt{3}$         | 23   | la0l0             | 10130×8410×10180                 |
| ODFSZ-79000/500     | 500/ $\sqrt{3}$ ±8×1.25% | 220/ $\sqrt{3}$         | 11   | la0l0             | 7900×5860×10236                  |
| ODFPS-334000/500    | 525/ $\sqrt{3}$          | 242/ $\sqrt{3}$ ±4×2.5% | 34.5 | la0l0             | 9234×8316×10427                  |
| ODFS-250000/500     | 525/ $\sqrt{3}$          | 230/ $\sqrt{3}$ ±2×2.5% | 36   | la0l0             | 8240×8570×11100                  |
| ODFPS-167000/500    | 525/ $\sqrt{3}$          | 230/ $\sqrt{3}$ ±2×2.5% | 35   | la0l0             | 7699×5950×10998                  |
| OSFPSZ-H-250000/400 | 400±10×1.25%             | 230                     | 22   | Ynao+d            | 17510×9200×11400                 |





# 330kV POWER TRANSFORMER



XD started to research and manufacture 330 kV power transformer in 1970s and supplied the step-down transformers, communication transformers and generator transformers of SFP9-370MVA/330kV, SSP7-360MVA/330kV, OSFPSZ9-240MVA/330kV for the northwest 330kV network in China. The 330kV transformer made by XD occupies above 60% of total capacity of 330kV transformer in China. XD has become the main supplier of 330kV transformers in the domestic market.



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Specification of 330 kV Power Transformer(with two winding)

| Type             | Rated voltage (kV)                |     | Connecting symbol | Outline dimensions<br>(L×W×H mm) |
|------------------|-----------------------------------|-----|-------------------|----------------------------------|
|                  | H.V                               | L.V |                   |                                  |
| SFP10-400000/330 | $363 \pm 2 \times 2.5\%$          | 24  | YNd11             | 11980 × 5067 × 7557              |
| SFP10-400000/330 | $363 \pm 2 \times 2.5\%$          | 20  | YNd11             | 12034 × 5299 × 9846              |
| SFP10-400000/330 | $363 \pm 2 \times 2.5\%$          | 20  | YNd11             | 11980 × 5067 × 7557              |
| SFP9-370000/330  | $363 \pm 2 \times 2.5\%$          | 20  | YNd11             | 14224 × 5057 × 9825              |
| DFP-240000/330   | $363/\sqrt{3} \pm 2 \times 2.5\%$ | 20  | YNd11             | 6539 × 6680 × 9726               |
| SFP9-370000/330  | $363 \pm 2 \times 2.5\%$          | 20  | YNd11             | 14980 × 5017 × 10089             |
| SFP10-400000/330 | $363 \pm 2 \times 2.5\%$          | 24  | YNd11             | 11980 × 5067 × 7557              |
| SFP-720000/330   | $363 \pm 2 \times 2.5\%$          | 22  | YNd11             | 13236 × 6869 × 9885              |
| SFP-760000/330   | $363 \pm 2 \times 2.5\%$          | 22  | Ynd11             | 13636 × 6846 × 9880              |

Specification of 330kV Power Transformer(with three winding)

| Type                | Capacity<br>(MVA) | Rated voltage (kV)        |                                    |     | Connecting symbol | Outline dimensions<br>(L×W×H mm) |
|---------------------|-------------------|---------------------------|------------------------------------|-----|-------------------|----------------------------------|
|                     |                   | H.V                       | M.V                                | L.V |                   |                                  |
| OSFPS-240000/330    | 240/240/72        | $345 \pm 2 \times 2.5\%$  | 242                                | 35  | Yna0d11           | 13200 × 5836 × 7943              |
| OSFPS-240000/330    | 240/240/72        | $345 \pm 2 \times 2.5\%$  | 121                                | 35  | Yna0d11           | 14490 × 4593 × 8322              |
| OSFPSZ-240000/330   | 240/240/72        | $345 \pm 8 \times 1.25\%$ | 121                                | 35  | Yna0d11           | 14816 × 4800 × 8677              |
| OSFPSZ-240000/330   | 240/240/65        | 345                       | $242/\sqrt{3} \pm 6 \times 1.67\%$ | 10  | Yna0d11           | 14400 × 10840 × 9135             |
| OSFSZ-360000/330    | 360/360/120       | $345 \pm 8 \times 1.25\%$ | 121                                | 35  | Yna0d11           | 17191 × 7520 × 8806              |
| OSFPSZ-H-360000/330 | 360/360/90        | 345                       | $121 \pm 8 \times 1.25\%$          | 35  | Yna0d11           | 15670 × 7190 × 8230              |





# 220kV POWER TRANSFORMER



In 1969, XD produced its first 360MVA/220 kV power transformer for Danjiangkou hydroelectric power plant in Hubei province that was the largest transformer in China at that time. Since then, XD has for more than thirty years been making unremitting efforts to improve the technology of 220 kV power transformers and has already developed to be a leading supplier in the country.

By extensively applying the structure of full folding plate of pressed arch-type tank of 110 kV power transformer to 220kV power transformer, XD makes the structure of 220 kV products more reasonable, more compact and the outward appearance substantially, which enjoys high reputation in the market. Besides, this structure is more convenience for customers in the aspects of assembling and lifting core for site inspection.

## Structure characteristics

- ✓ The tank is of bell type with the structure of full folding plate type, having an excellent exterior.
- ✓ Advanced core stacking technology with full-bevel joint, without hole and the upper yoke is adopted to control the tightening force of the core more effectively , reasonably, lower losses and noise.
- ✓ The core is fixed to the tank in all directions to guarantee it against impact during the transportation.
- ✓ The updated reliability program for electric calculation, the qualitative , quantitative analysis for distribution of the electric field intensity and the oil flow of the winding, are adopted



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to ensure the sufficient electric strength.

- √ Advanced technologies for the active part include complete assembly with multi-winding and drying under constant pressure, which ensure the winding to shrink uniformly with minimum restoration and effectively improve the electric strength and the ability to withstand short circuit.
- √ High density of paper cylinder is used in internal diameter side of the winding close to the core, which results in a structure without clearance between the core and the winding that strengthens the strength of withstanding short-circuit impulse of winding.

Specification of 220kV Power Transformer(Two-Winding)

| Type              | Rated voltage (kV)                |         | Connecting symbol | Outline dimensions (L×W×H mm) |
|-------------------|-----------------------------------|---------|-------------------|-------------------------------|
|                   | H.V                               | L.V     |                   |                               |
| DF10-140000/220   | $242/\sqrt{3} \pm 2 \times 2.5\%$ | 21      | li0               | 6352×7549×7926                |
| SFPZ10-400000/220 | $220 \pm 8 \times 1.25\%$         | 20      | YNd11             | 12161×7404×6977               |
| SFP10-400000/220  | $242 \pm 2 \times 2.5\%$          | 20      | YNd11             | 9820×6530×8000                |
| SFPZ10-350000/220 | $235 \pm 10 \times 1.5\%$         | 21      | YNd11             | 18152×6940×6880               |
| SFP10-370000/220  | $242 \pm 2 \times 2.5\%$          | 20      | YNd11             | 9392×5756×7051                |
| SFP10-420000/220  | $242 \pm 2 \times 2.5\%$          | 20      | YNd11             | 10625×6240×8200               |
| SFP10-260000/220  | $242 \pm 2 \times 2.5\%$          | 15.75   | YNd11             | 12720×4312×6685               |
| SFP10-240000/220  | $242 \pm 2 \times 2.5\%$          | 18      | YNd11             | 12720×5100×6466               |
| SFP10-250000/220  | $242 \pm 2 \times 2.5\%$          | 15.75   | Ynd11             | 12330×4908×6668               |
| SFP10-380000/220  | $242 \pm 2 \times 2.5\%$          | 20      | YNd11             | 10850×6194×7897               |
| SFFZ-63000/220    | $230 \pm 8 \times 1.25\%$         | 6.3-6.3 | YNyn0-yn0+d11     | 7890×6263×7320                |
| SFFZ-50000/220    | $220 \pm 8 \times 1.25\%$         | 6.3-6.3 | YNyn0-yn0+d11     | 7640×6100×7300                |
| SFFZ-40000/220    | $230 \pm 8 \times 1.25\%$         | 6.3-6.3 | YNyn0-yn0+d11     | 7300×5950×7470                |
| SFP-H-160000/220  | $242 \pm 2 \times 2.5\%$          | 13.8    | YNd11             | 10950×6961×7055               |
| SSP-H-180000/220  | $242 \pm 2 \times 2.5\%$          | 15.75   | YNd11             | 11065×5400×7420               |

Specification of 220kV Power Transformer(Three-Winding)

| Type               | Capacity (MVA) | Rated voltage (kV)        |      |      | Connecting symbol | Outline dimensions (L×W×H mm) |
|--------------------|----------------|---------------------------|------|------|-------------------|-------------------------------|
|                    |                | H.V                       | M.V  | L.V  |                   |                               |
| SFSZ-240000/220    | 240/240/72     | $220 \pm 8 \times 1.25\%$ | 117  | 37   | Ynyn0d11          | 11565×8360×7365               |
| SFSZ-180000/220    | 180/180/90     | $220 \pm 8 \times 1.25\%$ | 121  | 10.5 | Ynyn0d11          | 10480×7830×7650               |
| SFSZ-150000/220    | 150/150/75     | $230 \pm 8 \times 1.25\%$ | 121  | 10.5 | Ynyn0d11          | 11410×7120×7587               |
| SFPSZ-K-180000/220 | 180/180/35     | $230 \pm 8 \times 1.25\%$ | 38.5 | 6.3  | Ynyn0yn0          | 12200×5740×7200               |
| SFPSZ-K-180000/220 | 180/180/90     | $230 \pm 8 \times 1.25\%$ | 115  | 10.5 | Ynyn0d11          | 12730×14340×7330              |
| SFSZ-K-150000/220  | 150/150/75     | $230 \pm 8 \times 1.25\%$ | 121  | 10.5 | Ynyn0d11          | 11460×7430×7561               |
| OSFSZ-120000/220   | 120/120/60     | $230 \pm 8 \times 1.25\%$ | 115  | 37   | Ynyn0d11          | 10120×6080×6678               |
| OSS-150000/220     | 150/150/75     | $230 \pm 2 \times 2.5\%$  | 117  | 37   | YNa0yn0+d11       | 12475×7390×7300               |
| OSFSZ9-180000/220  | 180/180/72     | $220 \pm 8 \times 1.25\%$ | 117  | 37   | YNa0yn0+d11       | 10300×5990×6790               |
| SFPS-H-125000/220  | 125/62.5/125   | $242 \pm 2 \times 2.5\%$  | 35   | 13.8 | Ynyn0d11          | 12460×6180×7282               |
| SFPSZ-H-180000/220 | 180/180/90     | $220 \pm 8 \times 1.25\%$ | 115  | 35   | Ynyn0d11          | 13320×6476×7279               |





# 220kV COMBINED POWER TRANSFORMER



## Structure characteristics of 220kV combined power Transformer

- √ The separate parts of a combined transformer share a common set of cooling system, conservator and piping system. For on-load regulating transformer, there is only one set of on-load regulating mechanism, the occupied area of the transformer on site is only slightly larger than that of the traditional transformer.
- √ In delta connection, LV leads of the combined transformer, firstly connected to be a delta type in corrugated lead pipe on the top of the tank, are brought out from LV. bushing then. Thus compared with the method before, this way to connect the leads can save 50% of workload and assembly period on site.
- √ The tertiary leads of the step-down transformer can be directly brought out to connect with the overhead line of the substation and be connected to form delta type outside. Such simple structure, resulting in a convenient assembly, makes it easy to carry out a split-phase test and to supervise the condition of the transformer.
- √ Corrugated pipe is used to connect oil piping of three single-phase transformer which is installed on the special steel pedestal supplied by XD. Convenient installation can also avoid the relative displacement caused by the difference of the property of the construction on site.
- √ The structure of single-phase three-limb core makes flux distribution uniform, thus substantially decreases the flux leakage, help avoid partial over-heat, and strengthen the ability of withstanding short circuit of the transformer.
- √ Together with other special technical measures, the technology to stack core without upper yoke effectively lower the noise, which of the transformer with blowers normally is lower than 70db and which of the main body is lower than 65db. It is very important for the substation in the mountain area or the boost substation inside the cavity of the hydroelectric power station to have a low noise.



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## Specification of 220kV Combined Power Transformer(Two-Winding)

| Type                                  | SSP9-X-75 MVA/220 kV<br>Three-phase two-winding<br>combined transformer | SSP10-X-130 MVA/220 kV<br>Three-phase two-winding<br>combined transformer | SSP9-X-110 MVA/220 kV<br>Three-phase two-winding<br>combined transformer |
|---------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Ratio of voltage (kV)                 | $242 \pm 2 \times 2.5\%/10.5$                                           | $242 \pm 2 \times 2.5\%/13.8$                                             | $242 \pm 2 \times 2.5\%/13.8$                                            |
| Connection group                      | YNd11                                                                   | YNd11                                                                     | YNd11                                                                    |
| Winding combination                   | H--L                                                                    | H--L                                                                      | H--L                                                                     |
| No-load current (%)                   | 0.5                                                                     | 0.4                                                                       | 0.5                                                                      |
| No-load loss (kW)                     | 53                                                                      | 90                                                                        | 82                                                                       |
| On-load loss (kW)                     | 226                                                                     | 362.5                                                                     | 327.3                                                                    |
| Impedance (%)                         | 13.32                                                                   | 13.245                                                                    | 13.4                                                                     |
| Weight of active part (kg)            | 3 × 33150                                                               | 3 × 37500                                                                 | 3 × 38220                                                                |
| Transport weight<br>(kg)              | 3 × 35000<br>(filling with nitrogen)                                    | 3 × 44500<br>(filling with nitrogen)                                      | 3 × 38000<br>(filling with nitrogen)                                     |
| Transport dimension<br>(L × W × H mm) | 3300 × 2480 × 2950                                                      | 3530 × 2840 × 3380                                                        | 3253 × 2680 × 3200                                                       |

## Specification of 220kV Combined Power Transformer (Three-Winding)

| Type                                  | SFPS8-X-120 MVA/220 kV<br>Three-phase three-winding<br>combined transformer |      |      | OSFPSZ8-X-120 MVA/220 kV<br>Three-phase three-winding<br>combined auto-transformer |      |      | SFPSZ8-X-120 MVA/220 kV<br>Three-phase three-winding<br>combined transformer |       |       | SFPS9-H-150 MVA/220 kV<br>Three-phase three-winding<br>combined transformer |       |      |
|---------------------------------------|-----------------------------------------------------------------------------|------|------|------------------------------------------------------------------------------------|------|------|------------------------------------------------------------------------------|-------|-------|-----------------------------------------------------------------------------|-------|------|
| Ratio of voltage(kV)                  | $242 \pm 2 \times 2.5\%/121/38.5$                                           |      |      | $220 \pm 8 \times 1.25\%/115/37$                                                   |      |      | $220 \pm 8 \times 1.25\%/115/35$                                             |       |       | $220 \pm 8 \times 1.5\%/121/10.5$                                           |       |      |
| Connection group                      | YNyn0d11                                                                    |      |      | YNa0d11                                                                            |      |      | YNyn0d11                                                                     |       |       | YNyn0d11                                                                    |       |      |
| Winding combination                   | H--M                                                                        | H--L | M--L | H--M                                                                               | H--L | M--L | H--M                                                                         | H--L  | M--L  | H--M                                                                        | H--L  | M--L |
| No-load current(%)                    | 0.3                                                                         | 0.3  | 0.3  | 0.5                                                                                | 0.5  | 0.5  | 0.23                                                                         | 0.23  | 0.23  | 0.3                                                                         | 0.3   | 0.3  |
| No-load loss(kW)                      | 100                                                                         | 100  | 100  | 60                                                                                 | 60   | 60   | 105                                                                          | 105   | 105   | 110                                                                         | 110   | 110  |
| On-load loss(kW)                      | 480                                                                         | 150  | 100  | 320                                                                                | 240  | 250  | 470.7                                                                        | 140.2 | 98.24 | 498                                                                         | 167   | 116  |
| Impedance(%)                          | 13.5                                                                        | 23   | 8    | 9                                                                                  | 32   | 20   | 13.91                                                                        | 23.43 | 7.9   | 14.47                                                                       | 24.65 | 7.9  |
| Weight of active part(kg)             | 3 × 33630                                                                   |      |      | 3 × 22357                                                                          |      |      | 2 × 38370 + 39075                                                            |       |       | 3 × 43800                                                                   |       |      |
| Transport weight<br>(kg)              | 3 × 38430<br>(filling with nitrogen)                                        |      |      | 3 × 30000<br>(filling with nitrogen)                                               |      |      | 2 × 43365 + 43870<br>(filling with nitrogen)                                 |       |       | 2 × 51860 + 52550<br>(filling with nitrogen)                                |       |      |
| Transport dimension<br>(L × W × H mm) | 3815 × 2980 × 3482                                                          |      |      | 4390 × 2680 × 3115                                                                 |      |      | 3800 × 3210 × 3480                                                           |       |       | 4300 × 3350 × 3650                                                          |       |      |





# 110kV POWER TRANSFORMER

Based on the digestion and absorption of the importing technique, XD designs and manufactures series of 110kV power transformers with the characters of low loss, low noise, good ability of withstanding short-circuit and high operating reliability. New series of 110kV power transformers by XD have various types of structures that will be suitable for the requirements in different operational environment, such as city network, agriculture network, indoor and outdoor, etc.

Since 1992, XD has supplied nearly 700 units of new series 110kV transformer and 300units new series 110kV transformer have been exported to Malaysia, Thailand, Indonesia, Indian, China Hong Kong special administrative region and so on.

Specification of 110kV Power Transformer(Double-Winding)

| Type             | Rated voltage (kV)                        |                          | Connecting symbol | Noa-load loss (kW) | Load loss (kW) | No-load current(%) | Impedance (%) | Total weight(t) | Total weight(t) | Outline dimensions (L × W × H mm) |
|------------------|-------------------------------------------|--------------------------|-------------------|--------------------|----------------|--------------------|---------------|-----------------|-----------------|-----------------------------------|
|                  | H.V                                       | L.V                      |                   |                    |                |                    |               |                 |                 |                                   |
| SF10-6300/110    | 110<br>115<br>121<br>$\pm 2 \times 2.5\%$ | 6.3<br>6.6<br>10.5<br>11 | YNd11             | 7                  | 34.9           | 0.4                | 10.5          | 17.9            | 21.6            | 4910 × 4200 × 4340                |
| SF10-8000/110    |                                           |                          | YNd11             | 8.4                | 42.5           | 0.4                | 10.5          | 18.1            | 23.3            | 4140 × 3720 × 4800                |
| SF10-10000/110   |                                           |                          | YNd11             | 9.8                | 50.2           | 0.4                | 10.5          | 18              | 23.5            | 4750 × 3990 × 4480                |
| SF10-12500/110   |                                           |                          | YNd11             | 11.6               | 59.5           | 0.3                | 10.5          | 19              | 23.6            | 4730 × 3240 × 4350                |
| SF10-16000/110   |                                           |                          | YNd11             | 14                 | 73.1           | 0.3                | 10.5          | 25.2            | 29.8            | 4870 × 3560 × 4490                |
| SF10-20000/110   |                                           |                          | YNd11             | 16.6               | 88.4           | 0.3                | 10.5          | 28.9            | 32.6            | 5250 × 3937 × 4680                |
| SF10-25000/110   |                                           |                          | YNd11             | 19.6               | 104.6          | 0.3                | 10.5          | 32.6            | 42              | 5050 × 3590 × 5350                |
| SF10-31500/110   |                                           |                          | YNd11             | 23.3               | 125.8          | 0.2                | 10.5          | 37.3            | 43.1            | 5080 × 4300 × 5055                |
| SF10-40000/110   |                                           |                          | YNd11             | 27.9               | 147.9          | 0.2                | 10.5          | 43.5            | 54.5            | 5420 × 4920 × 5630                |
| SF10-50000/110   |                                           |                          | YNd11             | 32.9               | 183.6          | 0.2                | 10.5          | 46.7            | 58.3            | 5760 × 4380 × 5870                |
| SF10-63000/110   |                                           |                          | YNd11             | 39.1               | 221            | 0.2                | 10.5          | 54.6            | 65.5            | 5830 × 4520 × 5885                |
| SF10-75000/110   |                                           |                          | YNd11             | 44.6               | 246            | 0.2                | 10.5          | 61              | 73.5            | 5970 × 4600 × 5900                |
| SFP10-75000/110  |                                           |                          | YNd11             | 44.6               | 248            | 0.2                | 10.5          | 63              | 76.5            | 6000 × 4760 × 5610                |
| SFP10-80000/110  |                                           |                          | YNd11             | 46.7               | 273            | 0.2                | 10.5          | 65.7            | 84.1            | 6980 × 4390 × 6435                |
| SFP10-90000/110  |                                           |                          | YNd11             | 51                 | 289            | 0.2                | 10.5          | 72              | 78.7            | 7130 × 3860 × 6000                |
| SFP10-150000/110 |                                           | 15.75                    | YNd11             | 74.6               | 424            | 0.2                | 10.5          | 100.8           | 114.5           | 9410 × 3450 × 6213                |
| SFP10-240000/110 |                                           | 13.8                     | YNyn0             | 106                | 603            | 0.2                | 10.5          | 125.3           | 153             | 8500 × 5750 × 6400                |

Specification of 110kV Power Transformer(Three-Winding)

| Type             | Rated voltage (kV)                        |                                            |                          | Connecting symbol | No-load loss (kW) | Load loss (kW) | No-load current (%) | Impedance voltage% |           | Transportation weight(t) | Total weight (t) | Outline dimensions (L × W × H mm) |
|------------------|-------------------------------------------|--------------------------------------------|--------------------------|-------------------|-------------------|----------------|---------------------|--------------------|-----------|--------------------------|------------------|-----------------------------------|
|                  | H.V                                       | M.V                                        | L.V                      |                   |                   |                |                     | Step-up            | Step down |                          |                  |                                   |
| SFS10-6300/110   | 110<br>115<br>121<br>$\pm 2 \times 2.5\%$ | 35<br>36.6<br>38.5<br>$\pm 2 \times 2.5\%$ | 6.3<br>6.6<br>10.5<br>11 | YNyn0d11          | 8.4               | 41.5           | 0.4                 | 17.5%              | 10.5%     | 20.2                     | 23.3             | 4950 × 3320 × 3610                |
| SFS10-8000/110   |                                           |                                            |                          | YNd11d11          | 10.1              | 53.6           | 0.4                 |                    |           | 23.1                     | 26.2             | 4970 × 3360 × 3640                |
| SFS10-10000/110  |                                           |                                            |                          | YNyn0d11          | 11.9              | 62.9           | 0.3                 |                    |           | 25.9                     | 29.6             | 5020 × 3410 × 3690                |
| SFS10-12500/110  |                                           |                                            |                          | YNyn0d11          | 14                | 74             | 0.3                 |                    |           | 31.5                     | 35.3             | 5080 × 3430 × 3740                |
| SFS10-16000/110  |                                           |                                            |                          | YNyn0d11          | 16.9              | 90.1           | 0.3                 | 10.5%              | 17.5%     | 33.6                     | 37.8             | 5140 × 3490 × 3780                |
| SFS10-20000/110  |                                           |                                            |                          | YNyn0d11          | 20                | 106.3          | 0.25                |                    |           | 39.3                     | 44.6             | 5300 × 3670 × 4200                |
| SFS10-25000/110  |                                           |                                            |                          | YNyn0d11          | 23.6              | 125.8          | 0.25                |                    |           | 44.5                     | 51               | 6106 × 4877 × 4941                |
| SFS10-31500/110  |                                           |                                            |                          | YNyn0d11          | 28                | 148.8          | 0.2                 |                    |           | 50                       | 60               | 6430 × 4420 × 5060                |
| SFS10-40000/110  |                                           |                                            |                          | YNyn0d11          | 33.5              | 178.5          | 0.2                 | 6.5%               | 6.5%      | 55.4                     | 65.6             | 6600 × 4570 × 5160                |
| SFS10-50000/110  |                                           |                                            |                          | YNyn0d11          | 39.6              | 212.5          | 0.1                 |                    |           | 65                       | 76               | 6910 × 4620 × 5280                |
| SFPS10-63000/110 |                                           |                                            |                          | YNd11d11          | 46.9              | 255            | 0.1                 |                    |           | 79                       | 88.3             | 7330 × 4860 × 5800                |
| SFPS10-75000/110 |                                           |                                            |                          | YNyn0d11          | 53.5              | 290.6          | 0.1                 |                    |           | 83                       | 92               | 7800 × 4990 × 6100                |

Specification of 110kV Power Transformer(Double-Winding)

| Type             | Rated voltage (kV)                       |      | Connecting symbol | Noa-load loss (kW) | Load loss (kW) | No-load current(%) | Impedance (%) | Total weight(t) | Total weight(t) | Outline dimensions (L × W × H mm) |
|------------------|------------------------------------------|------|-------------------|--------------------|----------------|--------------------|---------------|-----------------|-----------------|-----------------------------------|
|                  | H.V                                      | L.V  |                   |                    |                |                    |               |                 |                 |                                   |
| SFZ10-6300/110   | 110 ± 8 × 1.25%                          | 6.3  | YNd11             | 7.6                | 34.9           | 0.4                | 10.5          | 18.2            | 21.5            | 4955 × 3485 × 4630                |
| SFZ10-8000/110   |                                          |      | YNd11             | 9.1                | 42.5           | 0.4                | 10.5          | 21.1            | 25.6            | 5010 × 3770 × 4680                |
| SFZ10-10000/110  |                                          |      | YNd11             | 11                 | 50.2           | 0.3                | 10.5          | 24              | 30.5            | 5100 × 3880 × 4620                |
| SFZ10-12500/110  |                                          |      | YNd11             | 12.7               | 59.5           | 0.3                | 10.5          | 26              | 32              | 5200 × 4040 × 4650                |
| SFZ10-16000/110  |                                          |      | YNd11             | 15.4               | 73.1           | 0.2                | 10.5          | 28.4            | 36.7            | 5430 × 4130 × 4860                |
| SFZ10-20000/110  |                                          |      | YNd11             | 18.2               | 88.4           | 0.2                | 10.5          | 32.2            | 39              | 6340 × 4250 × 5000                |
| SFZ10-25000/110  |                                          |      | YNd11             | 21.2               | 104.6          | 0.2                | 10.5          | 37.5            | 45.5            | 6600 × 4600 × 5660                |
| SFZ10-31500/110  |                                          |      | YNd11             | 25.6               | 125.8          | 0.2                | 10.5          | 44.5            | 53.5            | 6600 × 4600 × 5720                |
| SFZ10-40000/110  |                                          |      | YNd11             | 30.7               | 147.9          | 0.2                | 10.5          | 48.5            | 60              | 7120 × 4720 × 5750                |
| SFZ10-50000/110  |                                          |      | YNd11             | 36.3               | 183.6          | 0.1                | 10.5          | 62              | 71              | 7400 × 4900 × 4950                |
| SFZ10-63000/110  |                                          |      | YNd11             | 43.3               | 221            | 0.1                | 10.5          | 74.5            | 83.5            | 7500 × 4530 × 5460                |
| SFZ10-75000/110  |                                          | 10.5 | YNd11             | 50                 | 270            | 0.1                | 10.5          | 81              | 92              | 7200 × 4900 × 6170                |
| SFZ10-80000/110  |                                          |      | YNd11             | 73                 | 300            | 0.1                | 10.5          | 85              | 96              | 7250 × 6090 × 6150                |
| SFZ10-90000/110  |                                          |      | YNd11             | 60                 | 315            | 0.1                | 10.5          | 92.5            | 105.2           | 6000 × 5270 × 5835                |
| SFZ10-100000/110 |                                          |      | YNd11             | 65                 | 316            | 0.1                | 10.5          | 100             | 119             | 8300 × 5360 × 5977                |
| SFZ10-150000/110 |                                          |      | YNd11             | 79                 | 420            | 0.1                | 14.5          | 121.3           | 148.7           | 8200 × 5480 × 5750                |
| SFZ10-50000/132  | 132 <sup>+3</sup> <sub>-11</sub> × 1.75% | 6.3  | YNyno             | 21.3               | 230.4          | -                  | 27%           | -               | 93              | -                                 |

Specification of 110kV Power Transformer(Three-Winding)

| Type              | Rated voltage (kV) |            |     | Connecting symbol | No-load loss (kW) | Load loss (kW) | No-load current (%) | Impedance voltage% |           | Transportation weight(t) | Total weight (t) | Outline dimensions (L × W × H mm) |
|-------------------|--------------------|------------|-----|-------------------|-------------------|----------------|---------------------|--------------------|-----------|--------------------------|------------------|-----------------------------------|
|                   | H.V                | M.V        | L.V |                   |                   |                |                     | Step-up            | Step down |                          |                  |                                   |
| SFSZ10-6300/110   | 110 ± 8 × 1.25%    | 35         | 6.3 | YNyn0d11          | 9.1               | 41.5           | 0.4                 | 17.5%              | 10.5%     | 22.6                     | 25.8             | 5430 × 3970 × 4510                |
| SFSZ10-8000/110   |                    |            |     | YNd11d11          | 11                | 53.6           | 0.4                 |                    |           | 25.7                     | 29.5             | 5490 × 4010 × 4570                |
| SFSZ10-10000/110  |                    |            |     | YNyn0d11          | 13                | 62.9           | 0.4                 |                    |           | 29                       | 33               | 5890 × 4300 × 4670                |
| SFSZ10-12500/110  |                    |            |     | YNyn0d11          | 14.9              | 74             | 0.4                 |                    |           | 31.5                     | 37.5             | 5980 × 4430 × 4870                |
| SFSZ10-16000/110  |                    |            |     | YNyn0d11          | 18.4              | 90.1           | 0.35                |                    |           | 36.7                     | 42.5             | 6000 × 4260 × 5200                |
| SFSZ10-20000/110  |                    | 36.6       | 6.6 | YNyn0d11          | 21.8              | 106.3          | 0.35                | 10.5%              | 17.5%     | 43.3                     | 51.6             | 7060 × 4560 × 4940                |
| SFSZ10-25000/110  |                    |            |     | YNyn0d11          | 25.7              | 125.8          | 0.3                 |                    |           | 50                       | 59.5             | 7130 × 4360 × 5110                |
| SFSZ10-31500/110  |                    | ± 2 × 2.5% | 11  | YNyn0d11          | 30.6              | 148.8          | 0.3                 | 6.5%               | 6.5%      | 52.7                     | 63.5             | 7260 × 4400 × 5290                |
| SFSZ10-40000/110  |                    |            |     | YNyn0d11          | 36.6              | 178.5          | 0.2                 |                    |           | 67.5                     | 83.5             | 7380 × 4950 × 5510                |
| SFSZ10-50000/110  |                    |            |     | YNyn0d11          | 43.6              | 212.5          | 0.2                 |                    |           | 70                       | 90               | 8100 × 5100 × 6000                |
| SFSZ10-63000/110  |                    |            |     | YNd11d11          | 51.5              | 255            | 0.2                 |                    |           | 75                       | 102              | 9000 × 5400 × 6350                |
| SFSZ10-75000/110  |                    |            |     | YNyn0d11          | 58.5              | 290.7          | 0.1                 |                    |           | 97.6                     | 112.8            | 8000 × 5510 × 6850                |
| SFSZ10-80000/110  |                    |            |     | YNyn0d11          | 70                | 352            | 0.1                 |                    |           | 84.5                     | 100.5            | 7850 × 5130 × 5600                |
| SFSZ10-100000/110 |                    |            |     | YNyn0d11          | 69                | 360            | 0.1                 |                    |           | 100.6                    | 118.4            | 7890 × 5400 × 5910                |





# 35-110kV FURNACE TRANSFORMER



Technical parameter sheet for furnace transformer(According to ZBK41002-87)

| Type              | Primary Voltage (kV)                 | Secondary Voltage (V) | connecting symbol | Rated capacity for reactor (kvar) | Transportation weight (t) | Total Weight (t) | Track gauge (mm) | Outline dimensions (L× W × H mm) |
|-------------------|--------------------------------------|-----------------------|-------------------|-----------------------------------|---------------------------|------------------|------------------|----------------------------------|
| HSK-1250/6/10     | 6<br>6.3<br>10<br>10.5<br>11<br>(35) | 210,180,121,104       | D-Y ,d0-11        | 200                               | 8                         | 9.5              | 1505 × 1505      | 3950 × 2870 × 3240               |
| HSK-2500/6/10     |                                      | 220,190,127,110       |                   | 280                               | 11.3                      | 13.1             | 1505 × 1505      | 4170 × 3020 × 3530               |
| HSK-3150/6/10     |                                      | 220,190,127,110       |                   | 350                               | 12.55                     | 16.9             | 1505 × 1505      | 4470 × 3120 × 3770               |
| HSK-4000/6/10     |                                      | 240,210,139,121       |                   | 340                               | 17.2                      | 19.5             | 1505 × 1505      | 3835 × 1930 × 4110               |
| HSK-5000/6/10     |                                      | 240,210,139,121       |                   | 430                               | 20                        | 21               | 1505 × 1800      | 4500 × 2000 × 4100               |
| HSK-6300/6/10     |                                      | 260,240,210,139       |                   | 360                               | 23.4                      | 27.8             | 1505 × 2000      | 4850 × 3200 × 4120               |
| HSK-8000/6/10     |                                      | 260,240,210,139       |                   | 460                               | 32                        | 35               | 2000 × 1435      | 5000 × 3200 × 4400               |
| HSSPZ-10000/35    | 35                                   | 280~240,240~110       | D,d0              |                                   | 38.31                     | 42.6             | 2000 × 1435      | 4800 × 3500 × 4800               |
| HSSPZ-12500/10/35 | 38.5                                 | 314~270,270~116       | YN,d11            |                                   | 48.5                      | 52.6             | 2000 × 2000      | 4500 × 3935 × 4840               |
| HSSPZ-16000/35    |                                      | 353~305,305~137       | Y,d11             |                                   | 54.2                      | 59.2             | 2000 × 2000      | 4700 × 4200 × 5300               |
| HSSPZ-20000/35    | 35                                   | 392~340,340~158       | D,d0              |                                   | 63.8                      | 70               | 2000 × 2000      | 5500 × 4200 × 5350               |
| HSSPZ-25000/35    | 38.5                                 | 436~380,380~184       | Y,d11             |                                   | 85                        | 93               | 1435 × 2000      | 6630 × 4200 × 5400               |
| HSSPZ-30000/35    | 35                                   | 650~350               | Y,d11             |                                   | 60.9                      | 67               | 2000 × 1435      | 5100 × 3865 × 5100               |

# Technical parameter sheet for furnace transformer

| Type              | Rated capacity (kVA) |        | Primary Voltage (kV) | Secondary Voltage (V) | Tertiary Voltage (V) | connecting symbol | Transportation weight (t) | Total Weight (t) | Track gauge (mm) | Outline dimensions (L× W× H mm) |
|-------------------|----------------------|--------|----------------------|-----------------------|----------------------|-------------------|---------------------------|------------------|------------------|---------------------------------|
|                   | 1,2P-S               | 1,2P-T |                      |                       |                      |                   |                           |                  |                  |                                 |
| HGS-400/6/10      | 400                  | 100    | 6                    | 500-425               | 232-197              | Y yn0 y0          | 3.5                       | 3.5              | 820×820          | 3000×1450×2490                  |
| HGS-500/6/10      | 500                  | 125    |                      | 500-425               | 232-199              | Y yn0 y0          | 3.7                       | 3.7              | 820×820          | 3000×1550×2580                  |
| HGS-630/6/10      | 630                  | 125    |                      | 750-638               | 288-245              | Y yn0 y0          | 4.4                       | 4.4              | 1070×1070        | 3560×1600×2620                  |
| HGS-1000/6/10     | 1000                 | 200    | 10                   | 1000-850              | 381-324              | Y yn0 y0          | 5.47                      | 5.47             | 1070×1210        | 3060×1960×2650                  |
| HGS-1600/6/10     | 1600                 | 250    | 10.5                 | 1050-576              | 525-333              | D-Y yn1-0 y1-0    | 7.2                       | 9                | 1505×1210        | 3640×2655×3150                  |
| HGS-2000/6/10     | 2000                 | 315    | 11                   | 1050-576              | 525-333              | D-Y yn1-0 y1-0    | 7.5                       | 9.5              | 1505×1210        | 3660×2575×2900                  |
| HGS-3150/6/10     | 3150                 | 500    | 35                   | 2000-170              | 653-554              | D-Y yn1-0 y1-0    | 9.3                       | 10.76            | 1505×1550        | 3640×2990×3490                  |
| HGS-4000/6/10     | 4000                 | 500    |                      | 2000-170              | 600-510              | D-Y yn1-0 y1-0    | 10                        | 11.5             | 1505×1550        | 3600×4554×3550                  |
| HGSFPZ-5000/10/35 | 5000                 |        |                      | 3146-1185             |                      | D-Y yn1-0         | 15.36                     | 17.4             | 1505×1550        | 4600×3200×3855                  |
| HSSPZ-20000/35    | 20000                |        | 35                   | 290-160               |                      | Y d11             | 48.4                      | 56.6             | 2000×1435        | 6000×3500×5060                  |
| HSSPZ-20000/35    | 20000                |        | 36.5                 | 345-219               |                      | Y d11             | 46                        | 55               | 2000×1435        | 3900×3270×5155                  |
| HSSPZ-25000/35    | 25000                |        | 35                   | 400-240               |                      | Y d11             | 53                        | 62               | 2000×1435        | 5250×3670×5385                  |
| HKSSP-12500/35    | 12500                |        | 35                   | 156-140               |                      | D d0              | 28.28                     | 30.74            | 1530×1530        | 4620×2400×5050                  |
| HDSP-2750/6.3     | 2750                 |        | 6.3                  | 110-40                |                      | I i0              | 10.5                      | 11.3             | 1070×1070        | 2960×1715×3925                  |
| HSSPZ-32000/35    |                      |        | 35                   | 650-500-350           |                      | Yd11              | 57.9                      | 64.3             | 2000×1435        | 5150×3850×5200                  |
| HSSPZ-35000/35    | 7000                 |        | 35                   | 570-510-330           |                      | Yd11              | 58.5                      | 62.4             | 2000×1435        | 5100×3580×5310                  |
| HSSPZ-38000/35    | 7000                 |        | 35                   | 640-540-360           |                      | Yd11              | 66                        | 71.5             | 2000×1435        | 5190×4000×5180                  |
| HSSPZ-40000/35    | 8000                 |        | 35                   | 680-580-440           |                      | Yd11              | 66.5                      | 72.8             | 2000×1435        | 5250×3980×5670                  |
| HSSPZ-35000/35    |                      |        | 35                   | 646-520-322           |                      | D do              | 79                        | 84.5             | 2000×1435        | 5380×4420×5200                  |
| HSSPZ-50000/35    | 12500                |        | 35                   | 950-740-470           |                      | Yd11              | 62.9                      | 92.9             | 2000×1500        | 5870×4220×5625                  |
| HSSPZ-60000/35    |                      |        | 35                   | 760-600-440           |                      | Yd11              | 73.5                      | 106              | 2000×2000        | 4900×4220×6480                  |





# GENERATOR TRANSFORMER



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

Generator transformer in power plant

Generator transformer is the key equipment for electric power generation and power transmission. The generator transformer, designed and manufactured by XD, fully complies with requirements of power design with its excellent performances of low



loss, low noise, low partial discharge, good ability of short-circuit withstand and reliable operation. The voltage class covers a range from 110 kV to 500 kV with the biggest capacity of 420 MVA for three-phase transformer. XD also provides single-phase generator transformer and various types of combined transformers capable of overcoming transportation conditions. XD can provide varied products to match all kinds of thermal-generating set and hydro-generating set, such as 200MW, 250MW, 300MW and 600MW, etc. Among them, two new types of generator transformers of SFP10-370 MVA/220 kV and SFP9-420 MVA/220 kV have passed the appraisal for new products given by National Machinery Department and National Power Department. The specification and the performance of SFP10-400 MVA/500 kV power transformer have reached to the world advanced.

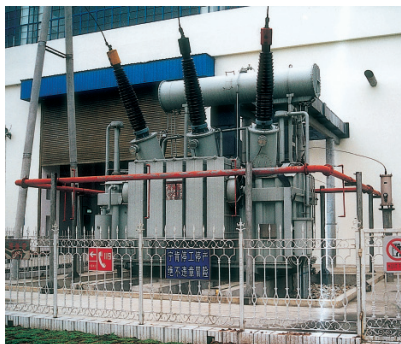
## Double split transformer in power plant

In order to meet the requirements of power plant for safety electric generation, XD specially designs and manufactures the radial double split transformer with low voltage, which enhances the ability of short circuit withstand of the transformer and the starting/spare transformer used in power plant.

The voltage class covers a range from 35 kV to 220kV with the capacity from 31.5 MVA to 63 MVA. Recently, XD has developed 50 MVA/330 kV axial double-split low voltage starting/spare transformer. XD is also continuously working on the development of 330kV radial double split transformer.

## Operating characteristics of low voltage transformer

- √ High short-circuit impedance between two LV windings, but the respect impedances between two LV windings and HV winding are equal and low.
- √ Split factor K is more than 4.5 normally
- √ Small unbalance between turns and good ability of short-circuit withstand.
- √ One of windings can work separately with high reliability.
- √ HV winding is located between two LV windings with balance force, which enhances the ability of short-circuit withstand.





# RECTIFIER TRANSFORMER



ISO14001:2004



ISO9001:2008



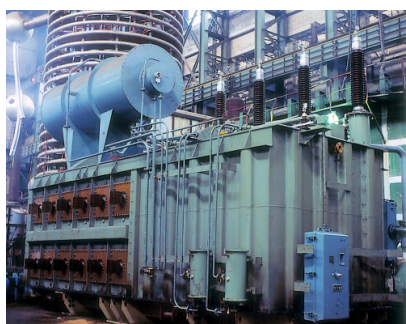
OHSAS18001:1999

XD has long history to manufacture rectifier transformer with advanced technique, various specifications, stable and reliable quality. In 1970s, the company firstly manufactured the large direct-drop rectifier transformer in China. In 1980s, XD cooperated with the foreign manufacturers and absorbed the advanced technology, technique widely. It produced the high quality of the products reaching to the international advanced level for the customers. In 1996, the first set of 220 kV direct-drop rectifier transformer in China, which was made by XD, was put into operation successfully at Yunnan Aluminum Plant.



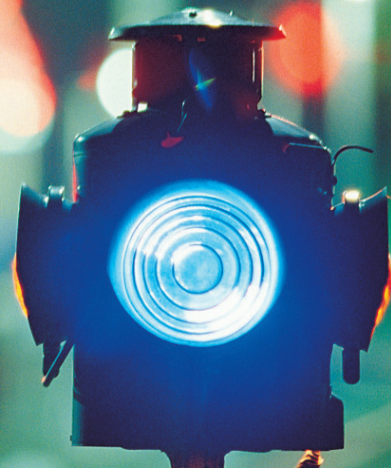
## Specification of Large Rectifier Transformer

| Type                    | Rated capacity (MVA) | DC voltage (V) | DC current (A) | Number of impulse wave | Rectifier type                    | Number of unit per group |
|-------------------------|----------------------|----------------|----------------|------------------------|-----------------------------------|--------------------------|
| ZHSFPTB-110 MVA/220 kV  | 110                  | 1220           | 2 × 37000      | 12                     | Three-phase bridge type rectifier | 4                        |
| ZHSTPTB-88 MVA/220 kV   | 89.3                 | 1180           | 2 × 33000      | 12                     |                                   | 6                        |
| ZHSFPTB-86 MVA/220 kV   | 80.84                | 920            | 2 × 37500      | 12                     |                                   | 4                        |
| ZHSFPTB-70.5 MVA/220kV  | 70.5                 | 880            | 2 × 34000      | 12                     |                                   | 4                        |
| ZHSFPT-12.6 MVA/66 kV   | 12.6 60HZ            | 80-300         | 2 × 50000      | 12                     |                                   | 1                        |
| ZHSTB-90 MVA/110 kV     | 45.23                | 920            | 2 × 20000      | 12                     |                                   | 4                        |
| ZHSTB-50 MVA/35 kV      | 24.04                | 315            | 2 × 31500      | 12                     |                                   | 2                        |
| ZHST-80 MVA/110kV       | 37.5                 | 920            | 2 × 17000      | 12                     |                                   | 3                        |
| ZHST-70 MVA/110 kV      | 33.9                 | 800            | 2 × 18000      | 12                     |                                   | 3                        |
| ZHST-40 MVA/35 kV       | 20.2                 | 800            | 2 × 11000      | 12                     |                                   | 2                        |
| ZHST-25 MVA/35 kV       | 11.8                 | 420            | 2 × 12000      | 12                     |                                   | 2                        |
| ZHSSPTKB-13.7 MVA/35 kV | 13.7/2 × 9.648       | 225            | 2 × 26000      | 12                     | Dual WYE adverse rectifier        | 1                        |
| ZHSSPTKB-13.6 MVA/35 kV | 13.6/2 × 9.525       | 210            | 2 × 275000     | 12                     |                                   | 1                        |
| ZHSSPTKB-13 MVA/35 kV   | 13/2 × 9.073         | 200            | 2 × 275000     | 12                     |                                   | 1                        |
| ZHSTK-31.5 MVA/110 kV   | 12.85/18.1           | 300            | 36000          | 6                      |                                   | 3                        |
| ZHSSPK-12.5 MVA/35 kV   | 11.54/16.35          | 400            | 25000          | 6                      |                                   | 2                        |
| ZHSTK-10 MVA/35 kV      | 3.6/5.5              | 120            | 25000          | 6                      |                                   | 3                        |





# 35-110kV TRACTION TRANSFORMER



The 3 phase /2 phase impedance matching balance connected traction transformer for electrification railway line we produced is fit for the running condition of frequent short-circuit, short period of severe over-load and unsymmetrical loading of 3 phase and an area of outdoor with an altitude of less than 1000 meter or 2500 meter.

This new type traction transformer is greatly improved both in structure and performance with an unsymmetrical structure. Compared with the internationally used Scott connected transformer, the transformer is also improved and therefore different, and meeting with the general and special demand of railway electrification.

Single-phase traction transformoc

| Type | Rating (kVA) | Voltage combination     | No-load loss (kW) | load loss (kW) | No-load current (%) | Short-circuit impedance (%) | Vector of connection |
|------|--------------|-------------------------|-------------------|----------------|---------------------|-----------------------------|----------------------|
| QYD  | 8000         | (110 ± 2x2.5%)<br>/27.5 | 8                 | 39             | 0.9                 | 8.4                         | li0                  |
|      | 10000        |                         | 9                 | 45             | 0.85                | 8.4                         |                      |
|      | 12500        |                         | 10                | 54             | 0.8                 | 8.4                         |                      |
|      | 16000        |                         | 12                | 62             | 0.75                | 8.4                         |                      |
|      | 20000        |                         | 16                | 74             | 0.7                 | 10.5                        |                      |
|      | 25000        |                         | 18                | 85             | 0.65                | 10.5                        |                      |
|      | 31500        |                         | 21                | 100            | 0.6                 | 10.5                        |                      |
|      | 40000        |                         | 24                | 122            | 0.55                | 10.5                        |                      |
|      | 20000        | (220 ± 2x2.5%)<br>/27.5 | 21                | 76             | 0.75                | 10.5                        |                      |
|      | 25000        |                         | 24                | 88             | 0.7                 | 10.5                        |                      |
|      | 31500        |                         | 28                | 105            | 0.65                | 10.5                        |                      |
|      | 40000        |                         | 34                | 125            | 0.6                 | 10.5                        |                      |

Single-phase 2X27.5kV traction transformer

| Type | Rating (kVA) | Voltage combination     | No-load loss (kW) | load loss (kW) | No-load current (%) | Short-circuit impedance (%) | Vector of connection |
|------|--------------|-------------------------|-------------------|----------------|---------------------|-----------------------------|----------------------|
| QYD  | 16000        | (110 ± 2x2.5%)<br>/27.5 | 16                | 65             | 0.9                 | 8.4                         | li0i0                |
|      | 20000        |                         | 19                | 78             | 0.85                | 8.4                         |                      |
|      | 25000        |                         | 22                | 90             | 0.8                 | 8.4                         |                      |
|      | 31500        |                         | 28                | 108            | 0.75                | 8.4                         |                      |
|      | 40000        |                         | 32                | 130            | 0.7                 | 8.4                         |                      |
|      | 50000        |                         | 38                | 152            | 0.65                | 8.4                         |                      |
|      | 63000        |                         | 45                | 180            | 0.6                 | 10.5                        |                      |
|      | 31500        | (220 ± 2x2.5%)<br>/27.5 | 30                | 100            | 0.8                 | 10.5                        |                      |
|      | 40000        |                         | 35                | 118            | 0.75                | 10.5                        |                      |
|      | 50000        |                         | 48                | 158            | 0.7                 | 12                          |                      |
|      | 63000        |                         | 53                | 175            | 0.65                | 12                          |                      |
|      | 75000        |                         | 60                | 190            | 0.6                 | 12                          |                      |

Impedance matched balance Traction transformer

| Type | Rating (kVA) | Voltage combination    | No-load loss (kW) | load loss (kW) | No-load current (%) | Short-circuit impedance (%) | Vector of connection |
|------|--------------|------------------------|-------------------|----------------|---------------------|-----------------------------|----------------------|
| QYS  | 10000        | (110 ±2x2.5%)<br>/27.5 | 12.5              | 61             | 0.9                 | 10.5                        |                      |
|      | 12500        |                        | 14.5              | 73             | 0.85                | 10.5                        |                      |
|      | 16000        |                        | 17                | 89             | 0.8                 | 10.5                        |                      |
|      | 20000        |                        | 19.5              | 106            | 0.75                | 10.5                        |                      |
|      | 25000        |                        | 22.5              | 125            | 0.7                 | 10.5                        |                      |
|      | 31500        |                        | 26.5              | 149            | 0.65                | 10.5                        |                      |
|      | 40000        |                        | 30                | 177            | 0.6                 | 10.5                        |                      |
|      | 50000        |                        | 36.5              | 220            | 0.55                | 10.5                        |                      |
|      | 63000        | (220 ±2x2.5%)<br>/27.5 | 45                | 265            | 0.5                 | 10.5                        |                      |
|      | 31500        |                        | 33                | 170            | 0.8                 | 10.5                        |                      |
|      | 40000        |                        | 40                | 200            | 0.75                | 10.5                        |                      |
|      | 50000        |                        | 46                | 240            | 0.7                 | 10.5                        |                      |
|      | 63000        |                        | 56                | 280            | 0.65                | 10.5                        |                      |
|      | 75000        |                        | 62                | 320            | 0.6                 | 10.5                        |                      |



ISO14001:2004



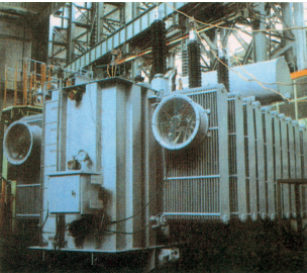
ISO9001:2008



OHSAS18001:1999

Traction transformer with Vv connnection

| Type | Rating (kVA) | Voltage combination    | No-load loss (kW) | load loss (kW) | No-load current (%) | Short-circuit impedance (%) | Vector of connection |
|------|--------------|------------------------|-------------------|----------------|---------------------|-----------------------------|----------------------|
| QYS  | 10000+10000  | (110 ±2x2.5%)<br>/27.5 | 19                | 90             | 0.8                 | 8.4                         | Vv0/Vv6              |
|      | 10000+12500  |                        | 20                | 100            | 0.8                 | 8.4                         |                      |
|      | 12500+12500  |                        | 21                | 110            | 0.8                 | 8.4                         |                      |
|      | 12500+16000  |                        | 23                | 120            | 0.75                | 8.4                         |                      |
|      | 16000+16000  |                        | 26                | 130            | 0.75                | 8.4                         |                      |
|      | 16000+20000  |                        | 30                | 140            | 0.7                 | 8.4/10.5                    |                      |
|      | 20000+20000  |                        | 33                | 150            | 0.7                 | 8.4/10.5                    |                      |
|      | 20000+25000  | (220 ±2x2.5%)<br>/27.5 | 35                | 160            | 0.65                | 8.4/10.5                    |                      |
|      | 25000+25000  |                        | 38                | 172            | 0.65                | 8.4/10.5                    |                      |
|      | 25000+31500  |                        | 52                | 195            | 0.6                 | 10.5                        |                      |
|      | 31500+31500  |                        | 56                | 210            | 0.6                 | 10.5                        |                      |
|      | 31500+40000  |                        | 62                | 230            | 0.5                 | 10.5                        |                      |
|      | 40000+40000  |                        | 68                | 250            | 0.5                 | 10.5                        |                      |





# 10~1000kV REACTOR



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

As the main product of China XD Group shunt reactor has reasonable structure and mature and advanced technique. At present, more than 300 units of the reactors are operating on the electric network all over the country, such as Gezhouba Hydro power plant, Three Gorges project and the project of "power of western area transmit to eastern area", etc. Besides the adoption of core structure with yoke frame, the reactor has the following advantages:

- √ Low total losses. Total losses of each unit have been lowered to below 100kW.
- √ No partial overheating.
- √ Low noise and small vibration, high reliability, all the values of performance are better than the same type of products at abroad.

10~1000kV Shunt Reactor

| Type             | Rated capacity<br>(Mvar) | Rated voltage(kV) | Outline dimensions<br>(L×W×H mm) |
|------------------|--------------------------|-------------------|----------------------------------|
| BKS-15000/11     | 15                       | 11                | 6100×3250×4375                   |
| BKS-20000/35     | 20                       | 36                | 5875×5400×4635                   |
| BKS-45000/35     | 45                       | 34.5              | 6250×4140×5260                   |
| BKS-60000/66     | 60                       | 66                | 8310×5480×5495                   |
| BKS-80000/132    | 80                       | 132               | 7060×5460×6570                   |
| BKS-20000/138    | 20                       | 138               | 4750×4990×6590                   |
| BKS-80000/161    | 80                       | 161               | 4050×5200×6115                   |
| BKS-50000/230    | 50                       | 230               | 8160×6870×6895                   |
| BKS-100000/230   | 100                      | 230               | 8200×9030×7660                   |
| BKD-10000/220    | 10                       | $242/\sqrt{3}$    | 4510×4460×6560                   |
| BKD-20000/330    | 20                       | $363/\sqrt{3}$    | 4600×6150×8270                   |
| BKD-30000/330    | 30                       | $363/\sqrt{3}$    | 4600×6150×8350                   |
| BKD-21000/400    | 21                       | $400/\sqrt{3}$    | 4755×6580×10300                  |
| BKS-100000/400   | 100                      | 400               | 9150×8165×8068                   |
| BKDFPT-50000/500 | 50                       | $550/\sqrt{3}$    | 8040×5480×10550                  |
| BKDCN-50000/500  | 50                       | $550/\sqrt{3}$    | 5320×6800×10240                  |
| BKD-30000/500    | 30                       | $550/\sqrt{3}$    | 5240×6460×10175                  |
| BKD-40000/500    | 40                       | $550/\sqrt{3}$    | 5320×6600×10150                  |
| BKD-50000/500    | 50                       | $550/\sqrt{3}$    | 5095×6700×10230                  |
| BKD-60000/500    | 60                       | $550/\sqrt{3}$    | 5630×6955×10290                  |
| BKD-70000/500    | 70                       | $550/\sqrt{3}$    | 5500×7600×10425                  |
| BKDF-200000/1000 | 200                      | $1100/\sqrt{3}$   | 11332×12170×18605                |
| BKDF-240000/1000 | 240                      | $1100/\sqrt{3}$   | 12200×10250×18600                |
| BKDF-320000/1000 | 320                      | $1100/\sqrt{3}$   | 10540×13420×18420                |
| BKD-70000/750    | 70                       | $800/\sqrt{3}$    | 9610×7850×12703                  |
| BKD-100000/750   | 100                      | $800/\sqrt{3}$    | 9385×8020×12415                  |
| BKD-140000/750   | 140                      | $800/\sqrt{3}$    | 11250×7970×13875                 |

Smoothing Reactor

| Type               | Outline dimensions (L×W×H mm) |
|--------------------|-------------------------------|
| PKDFP-120-3000-120 | 8500×6500×6500                |
| PKDFP-500-3000-290 | 10760×13865×13210             |
| PKDFP-1-3600-2.2   | 3860×2820×4220                |





# 800-1100kV GIS

System Voltage: 72.5kV~1000kV SF<sub>6</sub> Gas Insulated Switchgears (GIS)



## 1100kV FEATURES

- √ The general layout configuration of 1100kV GIS was designed based on the concept of man-machine friendly and environment-friendly modern industry designs. It was horizontally and lowly placed with a height of 1.3m to the ground from the product center. For the man-machine friendly point, no operation platform was required and camber design was adopted for the external enclosure, which is favorable for electric field optimization and allowing the product layout simple and nice;
- √ Based on modulus idea, developing four-break CB with proven 550kV CB interrupter units in series; based on the integrative innovation method, developing new CB of low operation power, high reliability and massive production; innovatively designing the operation principle of “opening immediately after closing” for the CB closing resistor switch, furtherly to ensure the reliability of resistor from the working principle view;
- √ At this voltage level, it was the first time to place the interrupter and the closing resistor in parallel independently in individual gas compartment, which either eliminated the CB's unfavorable effect to the closing resistor, or reduced the enclosure size and the SF<sub>6</sub> gas, beneficial for the environment protection;
- √ Excellent insulation configuration; the insulation level of the whole device to the ground fulfilled the factor 1.1 as required in the technical specification of the contact; all dielectric tests have been passed at first try; Developing high-performance DS, ES and corresponding mechanisms with simpler structure, fewer parts, more excellent performance and higher commonability;
- √ Developing high current-carrying capability busbar of 8000A and flexible-layout busbar connection, which met connection requirements for various busbar arrangements;
- √ epoxy-casting process, mould design and manufacturing technique for big size insulators and insulation supports;
- √ Developing manufacturing process for big size welded enclosure, foundry enclosure and extra-length conductor with big diameter.



ISO14001:2004



ISO9001:2008



OHSAS18001:1999



## 800kV FEATURES

- √ CB equipped with hydraulic or pneumatic mechanisms with various options.
- √ DS equipped with opening and closing resistor, which effectively reduces the overvoltage caused during operation and restrain VFTO in GIS.
- √ 1100kV design criteria was adopted with quite large internal and external dielectric margin; lightning impulse voltage of 2400kV, 2688kV, switching impulse voltage of 1550kV, 1860kV, power frequency voltage of 960kV, 1230kV, fulfilling requirements at 3000m altitude.
- √ The products has high asymmetrical short-circuit breaking capability, fulfilling the short-circuit breaking requirement at direct current time constant of 120ms with d.c.component up to 81%.
- √ High current-carrying capability CB rated current 5000A, rated current for other components 6300A

## RATINGS

Main Technical Data for 800/1100kV GIS ( Based on IEC )

|                                                                     |              |              |
|---------------------------------------------------------------------|--------------|--------------|
| Rated voltage                                                       | 800kV        | 1100kV       |
| Rated frequency                                                     | 50/60Hz      | 50/60Hz      |
| Rated current                                                       | 5000A        | 6300A        |
| Rated short-time withstand current                                  | 50kA         | 50kA         |
| Rated peak withstand current                                        | 135kA        | 135kA        |
| Rated duration of short current                                     | 3s           | 2s           |
| Rated lightning impulse withstand voltage(peak value)               |              |              |
| phase to earth                                                      | 2100kV       | 2400kV       |
| Across isolating distance                                           | 2100(+650)kV | 2400(+900)kV |
| Rated switching impulse withstand voltage(peak value)               |              |              |
| phase to earth                                                      | 1550kV       | 1800kV       |
| Across isolating distance                                           | 1300(+650)kV | 1675(+900)kV |
| Rated short-time power frequency withstand voltage(effective value) |              |              |
| phase to earth                                                      | 960kV        | 1100kV       |
| Across isolating distance                                           | 960(+460)kV  | 1100(+635)kV |



# 550kV HGIS

System Voltage: 72.5kV~1100kV SF<sub>6</sub> Gas Insulated Switchgears (GIS)



## FEATURES

### ✓ *High reliability*

550kV HGIS has the following features: good applicability to environment and anti-earthquake characteristics, small size, reliable breaking property and operating mechanism, minimum work at site.

### ✓ *Good applicability*

It has little disassembly and transportation units and short period of installation and its operating mechanism and SF<sub>6</sub> measuring position are low, therefore it is easy to use, maintain and daily check.

### ✓ *Excellent economy*

The price of 550kV HGIS is about 80% that of 550kV GIS, and the assembling area is 45% that of conventional open-type switchyard only, so it has an excellent economy.



ISO14001:2004

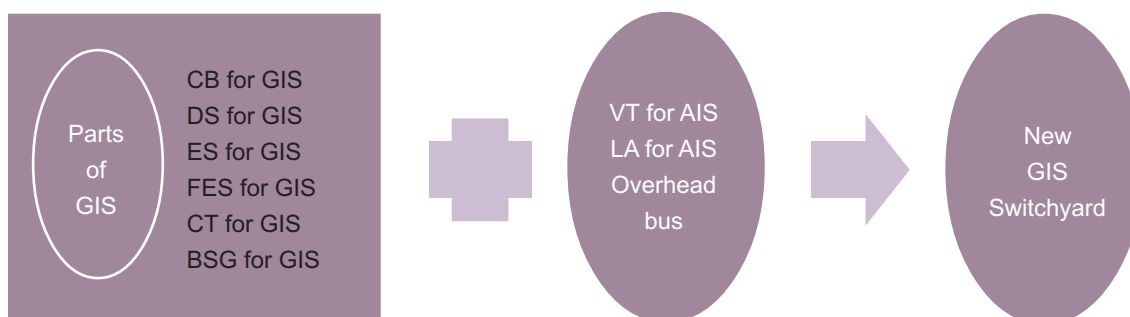


ISO9001:2008



OHSAS18001:1999





## RATINGS

The main technical data of 550kV HGIS are the same as that of 550kV GIS.

- √ Rated voltage: 550kV;
- √ Rated current: 4000A, 5000A, 6300A;
- √ Rated frequency: 50Hz/60Hz;
- √ Rated lightning impulse withstand voltage: phase-to-earth/across open switching device and isolating distance  
Across breaks: 1675/1675(+450);
- √ Rated switching impulse withstand voltage: 1300/1300(+450);
- √ Rated power-frequency withstand voltage: 790/740(+318);
- √ Rated short-durating withstand current: 50kA, 63kA;
- √ Rated peak withstand current: 125kA, 171kA;
- √ Rated duration of short circuit: 3s;
- √ Operating mechanism: Hydraulic mechanism or pneumatic mechanism for CB; motor and spring mechanism for DS, ES, FES;





# 550kV GIS

System Voltage: 72.5kV~1000kV SF<sub>6</sub> Gas Insulated Switchgears (GIS)



## FEATURES

### ✓ Stable breaking properties

Under 0.4MPa SF<sub>6</sub> pressure, the CB (circuit breaker) has the breaking capability of 63kA rated short breaking current, 120ms time constant of DC attenuation, 1080A breaking capacitive current, 1470kV recovery voltage peak and no re-striking. The disconnector can break and make the bus charge current with very low VFTO to ensure the operation safety of GIS and related equipments; quick earthing switch has the capability of strongly breaking and making the static inductive current and electromagnetic inductive current; its static inductive current is 50A and inductive voltage is 50kV for breaking and making; its electromagnetic inductive current is 200A and inductive voltage is 50kV for breaking and making.

### ✓ Reliable operating mechanism

CB can be provided with hydraulic and pneumatic operating mechanism with simple structure and stable performance which are made by “XD” Group; CB can be continuously operated without examination and repair and up to 5000 times of mechanical operation therefore its mechanical life is very long; the examination and repair period for operating products are usually 12 years with little maintenance or without maintenance so the product has long period for examination and repair and high reliability.

### ✓ High insulating reliability

under lock pressure of SF<sub>6</sub>, the rated lightning impulse voltage is 1675KV, rated switching impulse withstand voltage is 1300kV and power frequency withstand voltage is 790kV which are higher than those of the IEC standard.



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

√ *Higher current carrying capacity*

it can meet the requirement of 5000A current for long time (the current in temperature-rise test is  $1.1 \times 5000$ ) and can withstand the electrodynamics force and thermal stress with 171kA peak current and 63kA short time current and 3s duration withstand time.

## RATINGS

Main Technical Data for 550kV GIS ( Based on IEC )

| Item                       |                                            | Unit  | Ratings                                                                                      | Remarks                     |
|----------------------------|--------------------------------------------|-------|----------------------------------------------------------------------------------------------|-----------------------------|
|                            |                                            |       | 550kV                                                                                        |                             |
| Applied ambient conditions | Installation                               |       | Indoor or outdoor                                                                            |                             |
|                            | Ambient temperature                        | ℃     | -30~40                                                                                       |                             |
|                            | The average value of the relative humidity | %     | ≤ 90                                                                                         | over a period of one month  |
|                            | Altitude                                   | m     | 1000~3000                                                                                    |                             |
|                            | Creepage distance                          | cm/kV | 1.7, 2.1, 2.5                                                                                | Calculated to rated voltage |
| Technical Data             | Rated current                              | A     | 4000/5000/6300                                                                               |                             |
|                            | Rated short-time withstand current (3s)    | kA    | 50/63                                                                                        |                             |
|                            | Rated peak withstand current               | kA    | 125/171                                                                                      |                             |
|                            | Rated frequency                            | Hz    | 50/60                                                                                        |                             |
|                            | Rated lightning impulse withstand voltage  |       | 1675/1675(+450)                                                                              |                             |
|                            | Rated switching impulse withstand voltage  |       | 1300/1300(+450)                                                                              |                             |
|                            | Rated power-frequency withstand voltage    |       | 790/740(+318)                                                                                |                             |
|                            | Rated duration of short circuit            |       | 3s                                                                                           |                             |
|                            | Operating mechanism                        |       | Hydraulic mechanism or pneumatic mechanism for CB; motor and spring mechanism for DS,ES,FES; |                             |
| Earthquake intensity       | Horizontal acceleration                    | g     | 0.4                                                                                          | Accelerated simultaneously  |
|                            | Vertical acceleration                      | g     | 0.2                                                                                          |                             |





# 252kV~363kV GIS

System Voltage: 72.5kV~1100kV SF<sub>6</sub> Gas Insulated Switchgears (GIS)



## 363kV FEATURES

### ✓ *High breaking reliability*

The circuit breakers become more reliable as the number of breaks is reduced to One.

### ✓ *High insulating reliability*

The power frequency withstand test and partial discharge test have been done on all insulating parts, such as insulating spacers, tubes and insulating rod etc, and the values of the partial discharge are lower than the requirements by IEC.

### ✓ *Good applicability*

It is characterized by a compact construction and small occupation of space since equipped with the circuit breaker of single break, the expenses for the foundation or the building are reduced.

### ✓ *Minimum work at installing site*

The advanced processing devices and all-round quality control system have been adopted in manufacture of the GIS. The GIS is assembled and tested against the conditions of installing site, packed in transport unit after tested, for easy and convenient transport and minimizing work at site.

### ✓ *Lower leakage of SF<sub>6</sub> gas*

The mode of separated monitoring is used in the SF<sub>6</sub> gas system of GIS, doing away with SF<sub>6</sub> valves and SF<sub>6</sub> piping system. New self-sealed adapters and SF<sub>6</sub> gas densimeters are used to get rid of the possibility of SF<sub>6</sub> leakage outside the GIS, lowering the SF<sub>6</sub> gas leakage.



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

## 252kV/300kV FEATURES

### √ *Safety and reliability*

All of live parts of the GIS are sealed in a metal enclosure. The SF<sub>6</sub> gas in the enclosure works not only as insulating medium, but also as arc-extinguishing one for CB. The operators are free from the danger of electric shock and the GIS with minimized maintenances.

### √ *Strong resistance to environment*

All of live parts of the GIS are sealed in a metal enclosure, it is therefore unaffected not only by weather, but also by pollution and higher elevation.

### √ *Minimum work at installing site*

The advanced processing devices and an all-round quality control system have been adopted in the manufacture of the GIS. The GIS is assembled and tested against the conditions of installing site, packed in transport unit after tested, for easy and convenient transport and minimizing work at site.

### √ *Reliable conductivity*

The self-reliance contact fingers are used in the conductive circuit of the CB. By their own elastic force, those contact fingers press tightly the conductive parts without some other springs so that no disintegration of the springs occurs. The CB has a long life electrically (20 times in opening full capability and 2000 times in opening rated working current).

### √ *Small loss of eddy current*

Almost all the parts of the GIS are made up of aluminum (Except VT and LA) so that the GIS has a light weight, strong anti-corrosion ability and smaller loss of eddy current.

### √ *High insulating reliability*

The power frequency withstand test and partial discharge test have been done on those parts, and the values of the partial discharge are lower than the requirements by IEC.

## RATINGS

Main Technical Data ( Based on IEC )

|                                                         |                         |          |          |          |
|---------------------------------------------------------|-------------------------|----------|----------|----------|
| Applied ambient conditions Rated voltage                |                         | 252kV    | 300kV    | 363kV    |
| Rated frequency (Hz)                                    |                         | 50/60    | 50/60    | 50/60    |
| Rated current (A)                                       |                         | 4000     | 4000     | 4000     |
| Rated short-time withstand current (kA)                 |                         | 50/63    | 40       | 50/63    |
| Rated peak withstand current (kA)                       |                         | 125/160  | 100      | 125/160  |
| Rated duration short circuit (s)                        |                         | 3        | 3        | 3        |
| Rated short-time power frequency withstand voltage (kV) |                         |          |          |          |
| Toground                                                |                         | 460      | 460      | 510      |
| Across breaks                                           |                         | 395+145  | 460+145  | 510+210  |
| Rated switching impulse withstand voltage(kV)           |                         |          |          |          |
| Toground                                                |                         | ---      | 850      | 950      |
| Across breaks                                           |                         | ---      | 700+245  | 950+295  |
| Rated lightning impulse withstand voltage(kV)           |                         |          |          |          |
| Toground                                                |                         | 950      | 1050     | 1175     |
| Across breaks                                           |                         | 1050+170 | 1050+170 | 1175+295 |
| Earthquake severity (g)                                 | Horizontal acceleration | 0.4g     |          |          |
|                                                         | Vertical acceleration   | 0.2g     |          |          |



# 145/126/72.5kV GIS

System Voltage: 72.5kV~1100kV SF<sub>6</sub> Gas Insulated Switchgears (GIS)



## FEATURES

### ✓ Superior interrupting capability

The GIS is characterized by three-phase-in-one enclosure, light weight, high conductivity, loss-free of eddy current and good hermetization. The circuit Breaker equipped by new type interrupter structure have superior breaking capability and high reliability.



International production licence of 145kV GIS obtained after a successful test in CESI.



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

√ *Top reliable operating mechanism*

The Circuit Breaker is equipped with a spring operating mechanism that is featured by low operating energy and minimized maintenance work, and the disconnectors and earthing switches with motorized spring mechanisms or motor mechanisms.

√ *Minimized maintenance work*

Since the spring operating mechanism requires neither compressed air nor hydraulic fluid, inspection and maintenance work is minimized. Also, these breakers seldom require inspection since SF<sub>6</sub> gas deterioration and arcing contact wear owing to arc breaking are negligible.

√ *Minimum operating noise*

Since no gas is exhausted from these breakers and no compressed air is used in the spring operating mechanism, operating noise is so low that these breakers can be used in residential areas.

√ *Reliable earthquake-withstand capability*

These simple-structured SF<sub>6</sub> circuit breakers are substantially resistant to seismic shock because of their lowered center of gravity.

√ *Oil-free and air-free*

Since all operating mechanisms are motor spring types, hence neither compressed air supply system nor oil is requested, thus achieving oil-free and air-free, and the service is more reliable and safe.

## RATINGS

Main Technical Data for 72.5~145kV GIS ( Based on IEC )

|                                                                 |                         |                                            |             |             |
|-----------------------------------------------------------------|-------------------------|--------------------------------------------|-------------|-------------|
| Applied ambient conditions Rated voltage                        |                         | 72.5kV                                     | 126kV       | 145kV       |
| Rated frequency                                                 |                         | 50/60Hz                                    | 50/60Hz     | 50/60Hz     |
| Rated current                                                   |                         | 1250, 1600, 2000, 3150A(Main busbar 4000A) |             |             |
| Rated short-time withstand current                              |                         | 31.5, 40kA                                 |             |             |
| Rated peak withstand current                                    |                         | 80, 100kA                                  |             |             |
| Rated duration of short-circuit                                 |                         | 3s                                         |             |             |
| Rated lightning impulse withstand voltage(peak value)           |                         |                                            |             |             |
| Phase-to-earth,across open swithing device and between phases   |                         | 325kV                                      | 550kV       | 650kV       |
| Across the isolating distance                                   |                         | 375kV                                      | 630kV       | 750kV       |
| Rated short-time power frequency withstand voltage(r.m.s value) |                         |                                            |             |             |
| Phase-to-earth,across open swithing device and between phases   |                         | 140kV(1min)                                | 230kV(1min) | 275kV(1min) |
| Across the isolating distance                                   |                         | 160kV                                      | 265kV       | 315kV       |
| Earthquake intensity                                            | Horizontal acceleration | 0.4g                                       |             |             |
| (Accelerated simultaneously)                                    | Vertical acceleration   | 0.2g                                       |             |             |





# HVDC PRODUCTS



China XD Group is the largest base for manufacturing complete sets of HVDC equipments in China. Since the 1980s, China XD Group has been involved in the introduction of technology and the manufacture of equipment in all seven (7) China both completed and ongoing HVDC transmission engineering projects.

Voltage Level:  $\pm 50\text{kV} - \pm 800\text{kV}$

Manufacturing Scope:

- ✓ System Research & Design, DC System Simulating, Voltage Transformer, DC Switchgear
- ✓ Thyristor Valves
- ✓ Converter Transformer, Smoothing and Filter Reactor
- ✓ Filter, Shunt Capacitor; Equalizing Capacitor for Thyristor Valves



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

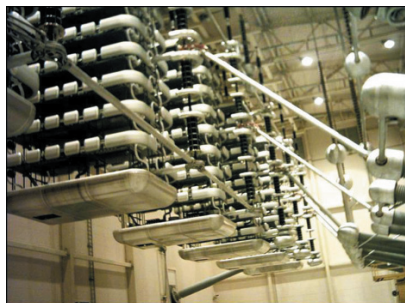




- √ DC Zinc Oxide Surge Arresters, Polymeric Post Insulator
- √ HVDC Bushings for Converter Transformer and Smoothing Reactor
- √ DC Current Transformer
- √ Control and Protection for Filter

#### Mile stone projects:

- √ Ningbo-Zhoushan DC transmission project
- √ Tianshengqiao,Guiyang-Guangdong DC transmission project
- √ Three Gorges-Changzhou DC transmission project
- √ Guizhou-Guangdong DC transmission project
- √ Back to Back project from central to Northwest China
- √ Lingbao Back to Back project
- √ Three Gorges-Shanghai DC transmission project







ISO14001:2004



ISO9001:2008



OHSAS18001:1999

The products of XD cover 35kV~1000kV porcelain-housed MOA, 6kV~750kV polymeric MOA, 66kV-750kV GIS MOA, special MOA such as MOA for high altitude or heavy pollution regions, 3-phases combined MOA for limiting inter-phase and phase-to-ground voltage surges, 6kV~35kV harmonic suppressor, non-linear resistors for electric locomotives, monitors and discharge counters for MOA etc.

## Features of MOA by XD

- √ Superior protective performance  
The metal oxide resistors made by XD possess superior nonlinear volt-ampere characteristics and high energy capacity, making a great protective margin of discharge voltages at steep, lightning and switching current surges, and have remarkable effect for limiting voervoltage.
- √ Reliable sealing performance





During the whole MOA service life, the reliable sealing is ensured by application of weatherproof materials, specific sealing

design, slight positive pressure design patented and high-sensitive helium mass spectrometric detecting technology.

✓ Excellent ageing performance

XD resistors characterized by superior ageing-proof performance, high overvoltage absorption capability, stable electrical characteristics, resulting to reliable service performance.

✓ Secure pressure relief capability

Pressure relief device, specially designed for power utilities, has reliable pressure relief capability which ensures safe relief inner pressure of MOA in event of failure to prevent any other failure.

✓ High mechanical strength.

The bending stress of the product surge arrest should be more than the stress of both the wire tension and wind-force, possessing more than 2.5 times allowance. The bending stress possess more than 1.67 times allowance relative to seismic force. The aseismatic products can stand 9 degree seismic intensity.

## Main products

- 1) 35kV~1000kV porcelain housed gapless MOA
- 2) 66kV~750kV GIS gapless MOA
- 3) 6kV~750kV polymeric gapless MOA
- 4) 35kV~500kV polymeric line type MOA with series gaps
- 5) Complete set of gapless MOA for DC transmission project
- 6) Gapless MOA for electrified railway
- 7) Discharge counters and monitors for MOA.
- 8) Cable protector
- 9) Harmonic suppressors for 6kV~35kV power systems





# 40.5-550kV LIVE TANK TYPE CIRCUIT BREAKER



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

## FEATURES

### √ Superior interrupting capability

These breakers can cope with all known switching duty. The severe rate of rise of the recovery voltage by a short-line fault and the high recovery voltage peak by out-of-phase interruption are both cleaned by the efficiently designed interrupter. In magnetizing current switching, the overvoltage is less than twice the applied voltage. No restrike or reignition occurs in charging current switching.



√ *Reliable insulating and current-carrying capability*

Because of the isolation of the insulating medium (SF<sub>6</sub> gas) from the atmosphere, the breakers have a reliable insulating capability. SF<sub>6</sub> gas does not deteriorate with age and it protects the insulators in the gas space. It also protects the contacts from oxidization and other chemical reactions as SF<sub>6</sub> gas is stable and inert when used with most materials.

√ *Reduced maintenance work*

The unit construction of the breakers minimizes inspection and maintenance work. Since the reliable operating mechanism seldom require inspection.

## RATINGS

Main Technical Data of 40.5~550kV Live Tank Type CB (Based on IEC)

| Rated voltage (kV)                                      | 40.5              | 72.5                     | 126                | 145           | 252                    | 300    | 363                   | 550         |
|---------------------------------------------------------|-------------------|--------------------------|--------------------|---------------|------------------------|--------|-----------------------|-------------|
| Rated frequency (Hz)                                    | 50/60             |                          |                    |               |                        |        |                       |             |
| Rated current (A)                                       | 1600/2000         | 2500                     | 2000 / 2500 / 3150 |               | 4000                   | 4000   | 3150                  | 3150 / 4000 |
| Rated breaking current (kA)                             | 25 / 31.5         | 25 / 31.5                | 31.5 / 40          | 31.5 / 40     | 40/50                  | 40     | 40                    | 50/63       |
| Making current (kA)                                     | 63/80             | 63/80                    | 80 / 100           | 80 / 100      | 100/125                | 100    | 100                   | 125 / 160   |
| Rated short-time withstand current 3s (kA)              | 25/31.5(4s)       | 31.5(4s)                 | 31.5 / 40(4s)      | 31.5 / 40(4s) | 40/50(4s)              | 40(3s) | 40(3s)                | 50/63(3s)   |
| Rated peak withstand current (kA)                       | 63/80             | 63/80                    | 80 / 100           | 80 / 100      | 100/125                | 100    | 100                   | 125 / 1601  |
| Specific creepage distance (mm/kV)                      | 25                | 25                       | 25/31              | 25/31         | 25/31                  | 25     | 25/31                 | 20/25       |
| Rated short-time power-frequency withstand voltage (kV) |                   |                          |                    |               |                        |        |                       |             |
| To earth                                                | 95                | 160                      | 230                | 275           | 460                    | 460    | 510                   | 740         |
| Rated lightning impulse withstand voltage (kV)          |                   |                          |                    |               |                        |        |                       |             |
| To earth                                                | 185               | 350                      | 550                | 650           | 1050                   | 1050   | 1175                  | 1675        |
| Close time (ms)                                         | ≤ 100             | ≤ 150                    | ≤ 100              | ≤ 100         | ≤ 100                  | ≤ 100  | ≤ 100                 | ≤ 100       |
| Open time (ms)                                          | ≤ 70              | ≤ 30                     | ≤ 30               | ≤ 30          | ≤ 30                   | ≤ 30   | ≤ 25                  | ≤ 20        |
| Breaking time (ms)                                      | ≤ 60              |                          |                    |               |                        | ≤ 50   | ≤ 50                  | ≤ 40        |
| Rated reclose operating dudy                            | O-0.3s-CO-180s-CO |                          |                    |               |                        |        |                       |             |
| Rated pressure of SF <sub>6</sub> gas(MPa)              | 0.45              | 0.5(31.5kA)<br>0.4(25kA0 | 0.50               |               | 0.60                   |        |                       |             |
| Leakage of SF <sub>6</sub> gasr(%/year)                 | ≤ 1%              |                          |                    |               |                        |        |                       |             |
| Number of breaks per pole                               | 1                 |                          |                    |               |                        |        | 2                     |             |
| Close resistande(Ω /phase)                              | -----             |                          |                    |               |                        |        | 400 ± 20              |             |
| Equipped mechanism                                      | Spring            |                          |                    |               | Spring<br>or Hydraulic | Spring | Pneumaticor Hydraulic |             |
| Weight of a CB (kg)                                     | 1000              | 1200                     | 1400               | 1400          | 3500                   | 4000   | 7200                  | 10000       |





# 40.5-800kV DEAD TANK TYPE CIRCUIT BREAKER



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

## FEATURES

Besides those advantages the live tank type SF<sub>6</sub> circuit breaker possesses, the dead tank type SF<sub>6</sub> circuit breaker has excellent anti-seismic and pollution-resisting capabilities. It is also characterized by a compact construction and small occupation of space due to the current transformer that is equipped to the dead breaker. The dead tank type SF<sub>6</sub> circuit breaker is suitably used to such places where earthquake often takes place and severe pollution exists, and also to higher elevation area.



# RATINGS

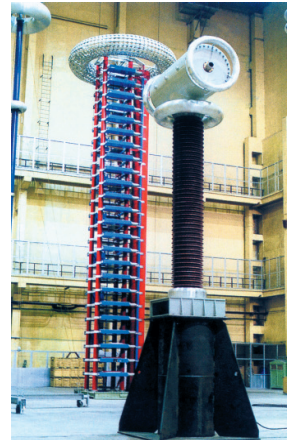
Main Technical Data of 40.5~550kV Dead Tank Type CB (Based on IEC)

|                                                                 |                   |         |                |      |                |                      |         |      |
|-----------------------------------------------------------------|-------------------|---------|----------------|------|----------------|----------------------|---------|------|
| Rated voltage (kV)                                              | 40.5              | 72.5    | 126            | 145  | 252            | 363                  | 550     | 800  |
| Rated frequency (Hz)                                            | 50/60             |         |                |      |                |                      |         |      |
| Rated current (A)                                               | 1250/2000         |         | 1600/2000/3150 |      | 1250/2000/3150 | 4000                 | 5000    | 5000 |
| Rated breaking current (kA)                                     | 40                | 31.5/40 |                | 31.5 | 40/50          | 50/63                | 50/63   | 50   |
| Making current (kA)                                             | 100               | 80      |                |      | 100/125        | 125                  | 135/171 | 135  |
| Rated short-time withstand current (kA)                         | 40                | 31.5    |                |      | 40/50          | 50/63                | 50/63   | 50   |
| Rated peak withstand current (kA)                               | 100               | 80      |                |      | 100/125        | 125/160              | 135/171 | 135  |
| Specific creepage distance (mm/kV)                              | 25/31             |         | 25/31          |      | 25/31          | 25/31                | 25      | 25   |
| Rated short-time power-frequency withstand voltage (kV)         |                   |         |                |      |                |                      |         |      |
| To earth                                                        | 95                | 160     | 230            | 270  | 460            | 520                  | 790     | 960  |
| Rated lightning impulse withstand voltage (kV)                  |                   |         |                |      |                |                      |         |      |
| To earth                                                        | 185               | 350     | 550            | 650  | 1050           | 1175                 | 1675    | 1550 |
| Close time (ms)                                                 | ≤ 110             |         | ≤ 110          |      | ≤ 110          | ≤ 100                |         |      |
| Open time (ms)                                                  | ≤ 30              |         | ≤ 30           |      | ≤ 30           | ≤ 50                 | ≤ 25    | ≤ 25 |
| Breaking time (ms)                                              | ≤ 60              |         | ≤ 60           |      | ≤ 60           |                      | ≤ 40    | ≤ 50 |
| Rated operating sequence                                        | O-0.3s-CO-180s-CO |         |                |      |                |                      |         |      |
| Close-open time (ms)                                            | 40 ± 5            |         |                |      |                |                      |         |      |
| Leakage of SF <sub>6</sub> gas per year(%)                      | < 0.5             |         |                |      |                | 0.5                  |         |      |
| Number of breaks per pole                                       | 1                 |         |                |      |                | 1/2                  | 1/2     | 2    |
| Close resistance (Ω / pole)                                     | — —               |         |                |      |                | 0/400                | 0/400   | 572  |
| Type of mechanism                                               | Spring            |         |                |      |                | Pneumatic /Hydraulic |         |      |
| Note:The closing resistance of 363kV and 550kV CB is selective. |                   |         |                |      |                |                      |         |      |





# SF<sub>6</sub> GAS CURRENT TRANSFORMER



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

## Brief Introduction

XD is a large scale backbone enterprise, established in 1950's, which became production base of China high voltage apparatus with development and production experience of H.V. current transformer more than 40 years. The company has developed and manufactured SF<sub>6</sub> gas insulated current transformer with voltage of 35-500kV, of which 220kV, 500kV SF<sub>6</sub> gas insulated CT may be provided with transient protective winding (TYP class). Additionally, the Company manufactures busbar type CTs for GIS and T-GCB as well as  $\pm$  500kV current transformers for D.C. transmission. The technical performance of current transformer, developed by the Company, with transient protective feature of class X and TPY, and current transformer, reach advanced international level.

Type LVQB1-330W2 current transformer, used in high altitude, large primary current (5000A) system, was developed, with top quality, excellent performance and superior technology to meet the urgent requirement of transmission project construction of Northwestern 750kV Power Networks.

## Environmental Condition

- √ Altitude above sea level:  $\leq$  1000m
- √ Average relative humidity monthly: 95%
- √ Max. wind velocity:  $\leq$  34m/s (corresponding to wind pressure of 700Pa)

- √ Pollution class: III class(25mm/kV)
- √ Ambient temperature: -35℃~40℃,temperature difference daily is not more than 30℃.
- √ Max.temperature difference daily: 30K
- √ Intensity of seismic-resist: 8 degree
- √ Max.radiance from sun: 1000w/m<sup>2</sup>
- √ When product is used under the condition out of above range, user and manufacturer shall consult to confirm.

#### Main Technical Data

| Item                                                    | LVQB1-110W2                                    | LVQB-220W2                                     | LVQB-330W2                                     | LVQB1-330W2                                        |
|---------------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|----------------------------------------------------|
| Highest voltage of equipment                            | 126kV                                          | 252kV                                          | 363kV                                          | 363kV                                              |
| Rated frequency                                         | 50Hz                                           | 50Hz                                           | 50Hz                                           | 50Hz                                               |
| Rated primary current                                   | 200~2500A                                      | 300~3150A                                      | 300~3150A                                      | 5000A                                              |
| Rated secondary current                                 | 1A/5A                                          | 1A/5A                                          | 1A/5A                                          | 1A                                                 |
| Rated output                                            | 30~50VA                                        | 30~60VA                                        | 30~60VA                                        | 30~60VA                                            |
| Accuracy degree value                                   | one is 0.5(0.2)class,another three are P class | one is 0.5(0.2)class,another three are P class | one is 0.5(0.2)class,another three are P class | four is 0.2S class, three are 5P class,two are TPY |
| Rated short-time withstand current and duration         | [40kA(series 31.5kA)]/3s                       | [50kA(series 31.5kA)]/3s                       | [50kA(series 31.5kA)]/3s                       | 63kA/3s                                            |
| Rated peak withstand current(peak)                      | [100kA(series 80kA)]                           | [125kA(series 80kA)]                           | [125kA(series 80kA)]                           | 160kA                                              |
| Rated short-time power frequency withstand voltage(rms) | 185kV                                          | 395kV                                          | 510kV                                          | 460(510)kV1min                                     |
| Rated lighting impulse withstand voltage(peak)          | 450kV                                          | 950kV                                          | 1175kV                                         | 1175kV                                             |
| Rated switching impulse withstand voltage(peak)         | /                                              | /                                              | 950kV                                          | 950kV                                              |
| Partial discharge level                                 | less than 5pC at 87kV                          | less than 5pC at 175kV                         | less than 5pC at 251kV                         | less than 5pC at 251kV                             |
| Pressure test of SF6 gas at zero gauge pressure         | 95kV,5min                                      | 189kV,5min                                     | 230kV,5min                                     | 230kV,5min                                         |
| Rated SF6 gas pressure(at20℃)                           | 0.40MPa                                        | 0.40MPa                                        | 0.50MPa                                        | 0.50MPa                                            |
| Rated SF6 gas refilling(alarming)pressure(at20℃)        | 0.35MPa                                        | 0.35MPa                                        | 0.45MPa                                        | 0.45MPa                                            |

| Item                                                    | LVQBT1-220W2                                                             | LVQBT2-330W2                                                          | LVQBT1-500W2                                                          |
|---------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|
| Highest voltage of equipment                            | 252kV                                                                    | 363kV                                                                 | 550kV                                                                 |
| Rated frequency                                         | 50Hz                                                                     | 50Hz                                                                  | 50Hz                                                                  |
| Rated primary current                                   | 600,1200,1250,2500A                                                      | 300~3150A                                                             | 1250,1500,2000,3000,4000A                                             |
| Rated secondary current                                 | 1A/5A                                                                    | 1A/5A                                                                 | 1A                                                                    |
| Rated output                                            | 30~60VA                                                                  | 30~60VA                                                               | 30~60VA                                                               |
| Accuracy degree value                                   | one is 0.5(0.2)class,another three are P class                           | one is 0.5(0.2)class,another three are P class                        | four is 0.2S class, three are 5P class,two are TPY                    |
| Accuracy class and rated output                         | 0.5(0.2)class:40VA FS5;5P class:40-50VA<br>ALF=20;TPY class:10VA Kssc=15 | 0.5(0.2)class:50VA FS5;5P class:50VA<br>ALF=20;TPY class:15VA Kssc=15 | 0.5(0.2)class:50VA FS5;5P class:50VA<br>ALF=20;TPY class:10VA Kssc=15 |
| Rated short-time withstand current and duration         | 50kA/3s                                                                  | 50kA(series 31.5kA)/3s                                                | 63kA/3s                                                               |
| Rated peak withstand current(peak)                      | 125kA                                                                    | 125kA(series 80kA)                                                    | 160kA                                                                 |
| Rated short-time power frequency withstand voltage(rms) | 395kV                                                                    | 510kV                                                                 | 740kV                                                                 |
| Rated lighting impulse withstand voltage(peak)          | 950kV                                                                    | 1175kV                                                                | 1675kV                                                                |
| Lighting chopped wave impulse withstand voltage(peak)   | 1093kV                                                                   | 1352kV                                                                | 1930kV                                                                |
| Rated switching impulse withstand voltage(peak)         | /                                                                        | 950kV                                                                 | 1250kV                                                                |
| Radio interference level                                | Less than 2500uV at 160kV                                                | Less than 2500uV at 230kV                                             | Less than 2500uV at 350kV                                             |
| Partial discharge level                                 | Less than 5pC at 175kV                                                   | less than 5pC at 251kV                                                | less than 5pC at 380kV                                                |
| Pressure test of SF6 gas at zero gauge pressure         | 189kV,5min                                                               | 230kV,5min                                                            | 350kV,5min                                                            |
| Rated SF6 gas pressure(at20℃)                           | 0.40MPa                                                                  | 0.50MPa                                                               | 0.50MPa                                                               |
| Rated SF6 gas refilling(alarming)pressure(at20℃)        | 0.35MPa                                                                  | 0.45MPa                                                               | 0.45MPa                                                               |



# CAPACITOR VOLTAGE TRANSFORMER



## FEATURES:

- ✓ High insulation level and reliable operation
- ✓ New type of damper is easy to damp Ferro-resonance which covered all kind of frequency. Each CVT would be equipped with a quick-saturated reactor to prevent ferro-resonance, meanwhile, adopted lower magnetic flux density in intermediate transformer. The ferro-resonance test would be done in the routine test to make sure each CVT could prevent any kind of ferro-resonance.
- ✓ Good transient response performance, when a short circuit of the primary terminal occurred, the secondary residual voltage could be lower than 5% within 20s.

√ With XD' patented technology, our CVT could be used to measure the harmonic of power system

#### Main Technical Data and Dimensions for 40.5~1000kV CVT

| Type                         | Rated capacitance (uF) | Rated voltage (kV) | Accuracy and max. Output of Burden | BIL (kV)       | Creepage distance (mm/kV) | Height (mm)               | Weight (kg)               | the number of coupling capacitors |
|------------------------------|------------------------|--------------------|------------------------------------|----------------|---------------------------|---------------------------|---------------------------|-----------------------------------|
| TYD35/ $\sqrt{3}$ - 0.01FH   | 0.01                   | 35/ $\sqrt{3}$     | 0.2/25;0.5/25;3P/100               | 95/200/-       | 31                        | 1650                      | 570                       | 1                                 |
| TYD35/ $\sqrt{3}$ - 0.02FH   | 0.02                   | 35/ $\sqrt{3}$     |                                    |                | 31                        |                           |                           |                                   |
| TYD66/ $\sqrt{3}$ - 0.02FH   | 0.005                  | 66/ $\sqrt{3}$     |                                    |                | 31                        |                           |                           |                                   |
| TYD110/ $\sqrt{3}$ - 0.01H   | 0.01                   | 110/ $\sqrt{3}$    | 0.5/150;3p/100                     | 230/550/-      |                           | 1900/1900/2070            | 465/500/515               | 1                                 |
|                              |                        |                    | 0.2/75;0.5/75;3p/100               |                |                           |                           | 640/640/655               |                                   |
| TYD110/ $\sqrt{3}$ - 0.015H  | 0.015                  | 110/ $\sqrt{3}$    | 0.2/100;0.5/100;3p/100             |                |                           | 2000/2000/2170            | 640/640/655               | 1                                 |
| TYD110/ $\sqrt{3}$ - 0.02H   | 0.02                   | 110/ $\sqrt{3}$    | 0.2/75;0.5/75;3p/100               |                |                           |                           | 614/614/630               | 1                                 |
|                              |                        |                    | 0.2/150;0.5/200;3p/100             |                |                           |                           | 614/614/630               |                                   |
| TYD220/ $\sqrt{3}$ - 0.005H  | 0.005                  | 220/ $\sqrt{3}$    | 0.5/150;3p/100                     | 460/1050/-     |                           | 3160/3160/3500            | 655/725/755               | 2                                 |
|                              |                        |                    | 0.2/75;0.5/75;3p/100               |                |                           |                           | 865/865/896               |                                   |
| TYD220/ $\sqrt{3}$ - 0.0075H | 0.0075                 | 220/ $\sqrt{3}$    | 0.2/100;0.5/100;3p/100             |                |                           | 3260/3260/3600            | 865/865/895               | 2                                 |
| TYD220/ $\sqrt{3}$ - 0.01H   | 0.01                   | 220/ $\sqrt{3}$    | 0.2/75;0.5/75;3p/100               |                |                           |                           | 840/840/870               | 2                                 |
|                              |                        |                    | 0.2/150;0.5/200;3p/100             |                |                           |                           | 840/840/870               |                                   |
| TYD330/ $\sqrt{3}$ - 0.005H  | 0.005                  | 330/ $\sqrt{3}$    | 0.2/100;0.5/100;3p/100             | 600/1390/1120  | 27.5/31                   | 4770/5070                 | 1265/1630                 | 3                                 |
|                              |                        |                    | 0.2/150;0.5/200;3p/100             |                |                           |                           | 1300/1645                 |                                   |
| TYD330/ $\sqrt{3}$ - 0.0075H | 0.0075                 | 330/ $\sqrt{3}$    | 0.2/100;0.5/150;3p/100             |                |                           |                           | 1265/1645                 | 3                                 |
| TYD330/ $\sqrt{3}$ - 0.01H   | 0.01                   | 330/ $\sqrt{3}$    | 0.2/100;0.5/150;3p/100             | 640/1390/1120  |                           | 5070                      | 1645                      | 3                                 |
| TYD500/ $\sqrt{3}$ - 0.005H  | 0.005                  | 500/ $\sqrt{3}$    | 0.2/50;0.5/50;3p/100               | 800/1800/1300  | 31                        | 6280                      | 2200/2251                 | 3                                 |
|                              |                        |                    | 0.2/100;0.5/100;3p/100             |                | 27.5/31                   |                           |                           |                                   |
| TYD500/ $\sqrt{3}$ - 0.01H   | 0.01                   | 500/ $\sqrt{3}$    | 0.2/100;0.5/100;3p/100             |                |                           | 6688                      | 2506                      | 3                                 |
| TYD765/ $\sqrt{3}$ - 0.005H  | 0.005                  | 765/ $\sqrt{3}$    | 0.2/100;0.5/150;3p/100             | 1100/1700/2400 | 31                        | 8260/9060                 | 2825/2930                 | 4                                 |
| TYD1000/ $\sqrt{3}$ - 0.005H | 0.005                  | 1000/ $\sqrt{3}$   | 0.2/15;0.5/3p/15;0.5/3p/15;3p/15   | 1300/2600/1860 | 27.5/31                   | 10174(capacitor divider)  | 4126(capacitor divider)   | 4                                 |
|                              |                        |                    |                                    |                | 27.5                      | 550(Electromagnetic unit) | 295(Electromagnetic unit) |                                   |



ISO14001:2004



ISO9001:2008



OHSAS18001:1999



# COUPLING CAPACITOR



## AMBIENT CONDITION

Operation altitude should be less than 2000m above sealevel, or based on the requirement, maximum wind velocity should be less than 150 km/h, and earthquake should be less than magnitude 8.



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

MAIN TECHNICAL DATA

- √ Carrier frequency is 30~50kHz.
- √ In an effectively earthed neutral system, the withstand voltage of capacitor could be 1.2 times of the rated voltage continuously and 1.5 times of rated voltage within 30s. In a non-effectively earthed neutral system, the withstand voltage of capacitor could be 1.9 times for 8 hours.
- √ Capacitance tolerance of capacitor is within +10%~-5% of rated value.
- √ Tangent of loss angle (20): < 0.0015.
- √ Distance creepage ( according to the maximum system voltage ):  
Distance creepage of the coupling capacitor without His less than 25kV/mm  
Distance creepage of the coupling capacitor without His less than 17kV/mm.
- √ Insulation level of coupling capacitor conforms to IEC 358.
- √ The stray capacitance of low voltage terminal to earth is less than 200 pF and the stray conductance is less than 20 uS.

Table 3 Rating and Dimensions for 40.5~550kV Coupling Capacitor

| Serial No. | Type              | Rated capacitance (uF) | Rated voltage (kV) | BIL (kV)   | Creepage distance (mm/kV) | Height (mm)    | Weight (kg) | the number of coupling capacitors |
|------------|-------------------|------------------------|--------------------|------------|---------------------------|----------------|-------------|-----------------------------------|
| 1          | OFF110√3 - 0.01H  | 0.01                   | 110√3              | 230/550/-  | 22/27.5/31                | 1540/1540/1712 | 230/262/277 | 1                                 |
| 2          | OFF110√3 - 0.02H  | 0.02                   | 110√3              | 230/550/-  | 22/27.5/31                | 1540/1540/1712 | 262/262/277 | 1                                 |
| 3          | OFF220√3 - 0.005H | 0.005                  | 220√3              | 460/1050/- | 22/27.5/31                | 2810/2810/3150 | 420/487/517 | 2                                 |
| 4          | OFF220√3 - 0.01H  | 0.01                   | 220√3              | 460/1050/- | 22/27.5/31                | 2810/2810/3150 | 487/487/517 | 2                                 |
| 5          | ZOAF500 - 0.01H/  | 0.01/                  | 500                | DC1000/    | 55                        | 8675           | 3050        | 4                                 |
|            | ZOAF500 - 0.05H   | 0.05                   |                    | 1425/1175  |                           |                |             |                                   |





# SHUNT CAPACITOR DEVICES



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

Shunt capacitor complete sets products covered the  $\pm 800\text{kV}$ ,  $\pm 500\text{kV}$  DC converter station projects and  $110\text{kV}\sim 750\text{kV}$  AC substation. With advances in technology, both of the appearance and quality of capacitor has been greatly upgraded by international advanced design concepts.

In the complete sets design, we already have  $500\text{kV}$  level parallel sets of compensation and filtering of design experience, including mechanical structural design, insulate structural design, protection and noise control, and so on. XD has the experience of producing  $500\text{ kV}$ , capacity of  $400\text{ mvar}$  compensation and filtering sets of devices. It has been successful operation in power system.

After independent innovation, digestion and absorption of foreign advanced technology for many years, XD has made great progress in design, manufacturing process and quality control.



Based on the environmental condition of state grid, we designed the shunt capacitor by advanced technology and manufactured the shunt capacitor by advanced technique to make the products reliable. The shunt capacitor of XD has the following advantage: small deviation, low loss, low temperature increase, good discharge performance, strong anti-overload capacity and etc.

## Main technical performance

- √ Capacitor deviation range from 0 to 5%, series-series deviation is less than 2%, phase deviation is less than 2% percent.
- √ 1.10  $U_n$  in frequency allowed over-voltage under long-term of steady-state operation, running in this state, including all the harmonic components, the peak voltage should be not more than  $1.2\sqrt{2} U_n$ .
- √ Allowed running under over-voltage and high harmonics caused RMS should not be more than 1.30 in steady state current, if the capacitor is with the biggest deviations, this value could reach up to 1.43 in.
- √ The sets adopt no rekindle breaker, the MOA and the series reactor, restrictions on over-voltage and high harmonics and flow.
- √ Large-capacity capacitors within the device unit adopt capacitor inner-fuse protection.
- √ Capacitor unit in the main device used inner fuse as the main protection, it also can be configured outer fuses, voltage differential, the opening triangular voltage protection, current bridge protection, neutral line imbalance current or voltage protection as backup protection. In addition, the device also has over-current protection, phase bus between short-circuit protection over-voltage protection, and loss voltage protection.
- √ Group started devices can be switching automatically by voltage or power factor for individual capacitors. When it comes to capacitors fast break group, could allowed voltage or active load automatic on-off cycle, switching to the substation which its main transformer could adjust its voltage with load, the installation of a micro-Processor according to conditions, regulating transformer tap-off and on-off capacitors.

## Structure Introduction

Shunt capacitor device is mainly composed of the high-voltage Switch Cabinet, shunt capacitors, capacitor bracket, series reactor, MOA, discharge counter, fuse protection unit, discharge coil, aluminum bus, pillar insulator, earthed switch and etc. Double-star connection also includes a neutral line imbalance of current or voltage transformer, it should connect control panel, protect panel and switching panel during the automatic switching.

Switch Cubicle a switching device with re-ignite vacuum circuit breaker or SF<sub>6</sub> circuit breaker and it can also be allocated less oil breaker also. In the connection of adopt circuit breaker and sub-circuit breaker condition, the circuit breaker should have the capability of break all the capacitors and short-circuit current which connected with the circuit breakers.

In the condition of fuses connected with capacitors in series, when the capacitors have a part of breakdown internal series capacitors, the active fuse breaks the failure capacitor from whole capacitors quickly. This action could prevent the expansion of failure effectively. In the parallel discharge coil capacitor circuit condition, the remaining voltage of capacitor will drop from  $\sqrt{2}U_n$  to 50V within 5s upon the capacitor bank shunt down.

The parallel MOA in the capacitor circuit will limit the overvoltage caused by the switching capacitor.

Series reactor in capacitor circuit inhibits the harmonics, reduce the closing inrush current. The inrush current from 0.1% to 1% will be limited by the reactance ratio of series reactor. If the restraining harmonic is more than 5 times, the inrush current should be from 4.5% to 6%. If the restraining harmonic is more than 3 times, the inrush current should be from 12% to 13%.





# SOLID CORE POST INSULATOR AND PORCELAIN BUSHING



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

XD Porcelain specializes in manufacturing two categories of products with solid core post insulator and porcelain bushing for electric appliances.

Solid core post insulator enjoys merits as below: even porcelain texture, compact, high intensity and tolerance, small dispersion, large creepage distance, good electrical performance and superior appearance. In addition, Sonca pursues miniaturization and lightness based on assured quality. The product's voltage grade is 72.5kV-1100kV and the intensity grade is 6kN-25kN. The main porcelain bushings for electric appliances are those for SF<sub>6</sub> circuit breaker and transformer instrument. The porcelain part, made from high-strength alumina materials, boasts high intensity and tolerance, small dispersion, high thermal stability, superior bending strength and inner hydraulic strength, as well as excellent exterior and working reliabilities. The voltage grade is 72.5kV-1100kV.





#### Technical Innovations

- ✓ Solid core post insulator  $\pm 500\text{kV}$
- ✓ Triarticulated or quartered single-pole solid core post insulator 800kV
- ✓ Quartered or quintuple single-pole solid core post insulator 1100kV
- ✓ Integral molding porcelain bushing by dry process for SF<sub>6</sub> circuit breaker 252kV
- ✓ Hollow porcelain bushing for 1100kV capacitor voltage transformer
- ✓ Support porcelain bushing for 1100kV porcelain strut circuit breaker
- ✓ 363kV-550kV GIS bushing

#### Summary of Productive Capacity

| Name of Production Line                        | Voltage Grade                           | No.of line | Annual Output (piece) |
|------------------------------------------------|-----------------------------------------|------------|-----------------------|
| solid core post insulators line by wet process | 72.5kV - 126kV                          | 1          | 40000                 |
| solid core post insulators line by dry process | 126kV - 1100kV                          | 3          | 70000                 |
|                                                | $\pm 500\text{kV}$ - $\pm 800\text{kV}$ |            |                       |
| Porcelain bushings line by wet process         | 72.5kV - 252kV                          | 2          | 40000                 |
| Porcelain bushings line by wet process         | 252kV - 1100kV                          | 1          | 3000                  |
| Porcelain bushings line by dry process         | 252kV - 550kV                           | 2          | 10000                 |







China XD Group is dedicated in the field of research, application, development and manufacture of high and ultra-high voltage Disconnecter. It has been in close communication, coordination and cooperation with both domestic and international R&D organizations and well-known electrical machinery manufacturers. After 50 years of dedication, China XD Group now possesses internationally advanced and updated design technology, well-experienced professional teams, top-ranking equipment in the world, and strict and efficient managing and monitoring methodology, evolving into an extraordinary expertise in this field.

### Enuironmeatal Conditions

1. Altitude above the sea level is not more than 1000m, and not more than 2500m in special condition.
2. Ambient temperature: - 40℃~40℃
3. Maximum wind speed: 35m/s (corresponding to wind speed of 700Pa)
4. Earthquake accelerate: horizontal 3.92m/s<sup>2</sup>  
vertical 1.96m/s<sup>2</sup> (corresponding to earthquake of magnitude 9)
5. Pollution class: III class (heavy pollution), IV class (in special condition)
6. Icing thickness: 20mm
7. Maximum intensity of sunlight: 1000W/m<sup>2</sup>(fine weather,at noon)

### GW4 Series H.V.Disconnector

| Item                                                    |                | GW4-126   |      | GW4A-252   |      |      |
|---------------------------------------------------------|----------------|-----------|------|------------|------|------|
| Rated voltage                                           | kV             | 126       |      | 252        |      |      |
| Rated current                                           | A              | 1250      | 2000 | 1250       | 2000 | 2500 |
| Rated frequency                                         | Hz             | 50        |      | 50         |      |      |
| Rated short-time withstand current and duration         | kA/s           | 31.5/3    | 40/3 | 31.5/4     | 40/3 | 50/3 |
| Rated peak withstand current (peak)                     | kA             | 80        | 100  | 80         | 100  | 125  |
| Rated short-time power frequency withstand voltage(rms) | to earth       | 185(+70)  |      | 395(+145)  |      |      |
|                                                         | between breaks | 230(+70)  |      | 460(+145)  |      |      |
| Rated lightning impulse withstand voltage(peak)         | to earth       | 550       |      | 1050       |      |      |
|                                                         | between breaks | 550(+100) |      | 1050(+200) |      |      |
| Rated busbar transferring current                       | A              | 1600      |      | 2000       |      |      |

### GW7 Series H.V.Discnnector

| Item                                                       |                | GW7-126<br>GW7-126(G) |                 | GW7A-252<br>GW7A-252(W) |           |      |      |      | GW7-363<br>GW7-363(W) |            |      |      | GW7-550<br>GW7-550(W) |            |      |
|------------------------------------------------------------|----------------|-----------------------|-----------------|-------------------------|-----------|------|------|------|-----------------------|------------|------|------|-----------------------|------------|------|
| Rated voltage                                              |                | kV                    | 126/145         |                         | 252       |      |      |      |                       | 363        |      |      |                       | 550        |      |
| Rated current                                              |                | A                     | 1250            | 2000                    | 1250      | 1600 | 2000 | 2500 | 3150                  | 1600       | 2000 | 3100 | 4000                  | 2500       | 3150 |
| Rated frequency                                            |                | Hz                    | 50              |                         | 50        |      |      |      |                       | 50         |      |      |                       | 50         |      |
| Rated short-time withstand current and duration            |                | kA/s                  | 31.5/3          | 40/3                    | 31.5/4    |      | 40/3 |      | 50/3                  | 50/3       |      |      |                       | 50/3       |      |
| Rated peak withstand current (peak)                        |                | kA                    | 80              | 100                     | 80        |      | 100  |      | 125                   | 125        |      |      |                       | 125        |      |
| Rated short-time power<br>frequency withstand voltage(rms) | to earth       | kV                    | 185/275,230/275 |                         | 395,460   |      |      |      |                       | 510        |      |      |                       | 680        |      |
|                                                            | between breaks |                       | 210/315,265/315 |                         | 460,530   |      |      |      |                       | 580        |      |      |                       | 800        |      |
| Rated lightning impulse<br>withstand voltage(peak)         | to earth       | kV                    | 450/650,550/650 |                         | 950,1050  |      |      |      |                       | 1175       |      |      |                       | 1550       |      |
|                                                            | between breaks |                       | 520/750,630/750 |                         | 1050,1200 |      |      |      |                       | 1175(+205) |      |      |                       | 1550(+315) |      |
| Rated switching impulse<br>withstand voltage               | to earth       | kV                    | -               |                         | -         |      |      |      |                       | 950        |      |      |                       | 1175       |      |
|                                                            | between breaks |                       | -               |                         | -         |      |      |      |                       | 850(+295)  |      |      |                       | 1050(+450) |      |
| Switching capacitive current                               |                | A                     | 1               |                         | 2         |      |      |      |                       | 1          |      |      |                       | 1          |      |
| Switching inductive current                                |                | A                     | 0.5             |                         | 1         |      |      |      |                       | 0.7        |      |      |                       | 0.7        |      |
| Switching busbar transferring current                      |                | A                     | -               |                         | 2000      |      |      |      |                       | 1600       |      |      |                       | 2500       |      |

## GW10/GW11 H.V.Disconnector

| Item                                                    |                | GW10A-126 |      | GW10A/11A-252 |      |      | GW10A/11A-363 |      | GW10A/11A-550 |
|---------------------------------------------------------|----------------|-----------|------|---------------|------|------|---------------|------|---------------|
| Rated voltage                                           | kV             | 126       |      | 252           |      |      | 363           |      | 550           |
| Rated current                                           | A              | 1250      | 1600 | 2500          | 4000 | 5000 | 4000          | 5000 | 4000          |
| Rated frequency                                         | Hz             | 50        |      | 50            |      |      | 50            |      | 50            |
| Rated short-time withstand current and duration         | kA/s           | 31.5      |      | 50, 63        |      |      | 50, 63        |      | 63            |
| Rated peak withstand current (peak)                     | kA             | 80        |      | 125, 160      |      |      | 125, 160      |      | 160           |
| Rated short-time power frequency withstand voltage(rms) | to earth       | 230       |      | 460           |      |      | 510           |      | 740           |
|                                                         | between breaks | 265       |      | 460(+145)     |      |      | 510(+210)     |      | 740(+315)     |
| Rated lightning impulse withstand voltage(peak)         | to earth       | 550       |      | 1050          |      |      | 1175          |      | 1675          |
|                                                         | between breaks | 630       |      | 1050(+200)    |      |      | 1175(+215)    |      | 1675(+450)    |
| Rated switching impulse withstand voltage               | to earth       | -         |      | -             |      |      | 950           |      | 1300          |
|                                                         | between breaks | -         |      | -             |      |      | 850(+295)     |      | 1175(+450)    |
| Switching capacitive current                            | A              |           |      | 1             |      |      | 1             |      | 2             |
| Switching inductive current                             | A              |           |      | 0.5           |      |      | 0.5           |      | 0.7           |

## UHV Disconnector Environmental Conditions:

- Altitude above sea level is not more than 3000m
- Ambient temperature: -35℃ to + 40℃
- Maximum temperature difference: 32k
- Maximum wind speed: 34m/s
- Maximum intensity of sunlight: 1000w/m<sup>2</sup>
- Relative humidity: Daily Average ≤ 95%,  
Monthly Average ≤ 90%
- Earthquake accelerate: Horizontal: 3m/s<sup>2</sup>, Vertical: 2m/s<sup>2</sup>
- Icing thickness:10mm
- Pollution class: III class

## 800kV/1100kV H.V.Disconnector

| Item                                                                             |                           | GW45-800   | GW□-800 | GW□-1100   | GW□-1100 |
|----------------------------------------------------------------------------------|---------------------------|------------|---------|------------|----------|
| Rated voltage                                                                    | kV                        | 800        |         | 1100       |          |
| Rated current                                                                    | A                         | 4000,5000  |         | 4000       |          |
| Rated short-time withstand current and duration                                  | kA/s                      | 50/3       |         | 50/3, 63/3 |          |
| Rated peak withstand current (peak)                                              | kA                        | 125        |         | 125, 160   |          |
| Rated short-time power frequency withstand voltage(rms)                          | to earth                  | 960        |         | 1100       |          |
|                                                                                  | between breaks            | 960(+460)  |         | 1100(+635) |          |
| Rated lightning impulse withstand voltage(peak)                                  | to earth                  | 2100       |         | 2400       |          |
|                                                                                  | between breaks            | 2100(+650) |         | 2400(+900) |          |
| Rated switching impulse withstand voltage                                        | to earth                  | 1550       |         | 1800       |          |
|                                                                                  | between breaks            | 1300(+650) |         | 1675(+900) |          |
| Capability of switching current                                                  | Capacitive current        | 2          |         | 2          |          |
|                                                                                  | Inductive current         | 1          |         | 1          |          |
| Disconnector switching electromagnetically and electrostatically induced current | Electrostatic induction   | 32kV/25A   |         | 25kV/25A   |          |
|                                                                                  | Electromagnetic induction | 20kV/160A  |         | 25kV/200A  |          |





# COMMUNICATION CABLE



ISO14001:2004



ISO9001:2008



OHSAS18001:1999

## Long-Distance Symmetrical Communication Cable

XD has three kinds of Long-Distance symmetrical Communication Cable.

1. High-frequency cable: used for transmitting analog communication signal of 156kHz and below.
2. Low-frequency cable: Be suitable for audio-frequency communication and be used for the communication trunk line, railway dispatch and branch and the entrance and branch of long-distance communication line.
3. High and Low-frequency cable: used for multiple, long-distance communication line, jelly filling will be adopted for the core of this cable. It has excellent water and moisture-proof properties. It is suitable for use in moisture environment. When the cable is highly Al-shielded, it can be buried along the electrification railway line in other Strong power interference section.

### Description

|             |                                                                                                                                                                          |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HEYFL03(02) | Physically foamde skin-foam-skin PE insulation,aluminum sheath,(PE) PVC sheath,symmetncal long-distance communi cation cable.                                            |
| HEYFL23(22) | Physically foamed skin-foam-skin PE insulation,aluminum sheath steel tape armour,PE(PVC) sheath, symmetncal long-distance communication cable.                           |
| HEYFL23(22) | Physically foamed skin-foam-skin; or foam-skin PE insulated, jelly filling, aluminium shesth, PE(PVC) sheath, long-distance,symmetrical communication cable.             |
| HEYFL23(22) | Physically foamed skin-foam-skin or foam-skin PE insulated, jelly filling, aluminium shesth, steel tape armour, PE(PVC), long-distance, symmetrical communication cable. |

| Category               | Conductor Diameter(mm)    |     |
|------------------------|---------------------------|-----|
|                        | 0.9                       | 1.2 |
|                        | Number of quad            |     |
| High-frequency         | 1、3、4、7                   |     |
| Low-High-frequency     | 1、3、4、7、12、14、15、17、19、24 | 4.7 |
| High and low frequency | 7、14、17、19                | 7   |

## Digital Transmission Long-Distance Symmetrical Communication Cable

The cable can be used for railway electrification communication trunk line. The digital transmission quad is used for PCM primary group(2.048Mb/s)digital communication system. Low-frequency quad is used for audio-frequency communication.  $\phi$  0.6mm and  $\phi$  0.7mm pairs are used for signal, alarm, telemetry, remote control and audio-frequency communication

### Description

| Type          | Name                                                                                                                                                     | Laying place                                                                                 |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| HESYFL02-1000 | Physicay foamed skin-foam-skin PE insulation Al sheath PVC sheath digital transmission long-distance symmetrical communication cable                     | Overhead,duct,burled,cable trench.                                                           |
| HESYFL03-1000 | Physicay foamed skin-foam-skin PE insulation Al sheath PE sheath digital transmission long-distance symmetrical communication cable                      |                                                                                              |
| HESYFL22-1000 | Physicay foamed skin-foam-skin PE insulation Al sheath steel tape armoring PVC sheath digital transmission long-distance symmetrical communication cable | Burried,eletrifcation railway line, in the place interfered heavily by strong electric field |
| HESYFL23-1000 | Physicay foamed skin-foam-skin PE insulation Al sheath steel tape armoring PE sheath digital transmission long-distance symmetrical communication cable  |                                                                                              |

## Optical Fiber Cable

The optical fiber cable is suitable for railway long-distance communication trunk line and area communication. Single-mode fiber is used for PCM four group communication system. The digital quad is used for 1MHz&PCM primary group communication system, low-frequency quad for audio-frequency communication, 0.7mm pair for signal transmission.

### Description

| Type        | Size(core)                                                                       | Laying place                                                             |
|-------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| GDL03 GDL02 | 4 × 2B1T(204.205.206)B+4 × 4 × 0.9                                               | Fixedly laid on land, used for aerial, channel, tunnel and being buride, |
| GDL23 GDL22 | 9 × 4 × 0.9+10 × 2 × 0.7(8 fiber 13 quads)                                       |                                                                          |
| GDL33       | 4 × 2B1T(204.205.206)B+4 × 4 × 0.9 + 9 × 4 × 0 + 5 × 2 × 0.7( 8 fibers 6 quads ) |                                                                          |

## Computer Controlled Cable

The cable is suitable for the connecting of computer wire equipment which controlled by power plant, connecting equipment in the Electro Magnetic Interference area, connecting for the instrument under 500v AC or 1000v DC.

### Description

| Type    | Name                                                                                                                 |
|---------|----------------------------------------------------------------------------------------------------------------------|
| DJYVP   | Copper core, PE insulation, pair twisting unit, shielding, PVV sheath, computer controlled cable                     |
| DJYBP22 | Copper core, PE insulation, pair twisting unit, shielding, steel tape armoring PVC sheath, computer controlled cable |



## Local communication cable

### Description

| Type   | Name                                                                                                                                                                                  | Laying place                                                                |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| HYA    | Local telephone cable with copper core solid polyolefin insulation laminated Al-PE composite sheath                                                                                   | for duct,aerial                                                             |
| HYP A  | Local telephone cable with copper core foam-skin polyolefin insulation laminated Al-PE composite sheath                                                                               | for duct,aerial                                                             |
| HYAT   | Local telephone cable with copper core solid polyolefin insulation laminated Al-PE composite sheath                                                                                   | for duct,aerial                                                             |
| HYPAT  | Local telephone cable with copper core foam-skin polyolefin insulation laminated Al-PE composite sheath                                                                               | for duct,aerial                                                             |
| HYAC   | Local telephone cable with copper core solid polyolefin insulation (non-filled)Self-support                                                                                           | for aerial                                                                  |
| HYAT53 | Copper core solid polyolefin insulation filled type laminated AL-PE composite Sheath single conugated steel tape longitudinally wrapping armoring PE sheath lical communication cable | Buried                                                                      |
| HYL23  | Copper core solid polyolefin insulation aluminum sheath double steel tapes Armoring PE sheath local communication cable                                                               | Buried in duct capable of withstanding strong power interence and corrosion |
| HYAG   | Local telephone cable with copper core solid polyolefin insulation isolated type Laminated Al-PE composite sheath                                                                     | for duct,aerial                                                             |
| HYPAG  | Local telephone cable with copper core foam-skin polyolefin insulation isolted type Laminated Al-PE composite sheath                                                                  | for duct,aerial                                                             |
| HYAT23 | Local telephone cable with copper core solid polyolefin insulation filled type, Laminated Al-PE composite sheath double steel tapes armoring PE sheath                                | for buried                                                                  |

| Type                | Nominal diameter of conductor |         |         |        |        |        |        |        |
|---------------------|-------------------------------|---------|---------|--------|--------|--------|--------|--------|
|                     | 0.32                          | 0.4     | 0.5     | 0.6    | 0.63   | 0.7    | 0.8    | 0.9    |
| Nominal No.of pairs |                               |         |         |        |        |        |        |        |
| HYA                 | 600~3600                      | 5~2400  | 5~1800  | 5~1000 | 5~900  | 5~700  | 5~600  | 5~400  |
| HYP A               | 2000~4000                     | 5~2700  | 5~2000  | 5~1600 | 5~1200 | 5~900  | 5~800  | 5~600  |
| HYAT                | 600~3000                      | 5~2000  | 5~1200  | 5~900  | 5~700  | 5~600  | 5~400  | 5~300  |
| HYPAT               | 600~3200                      | 5~2000  | 5~1800  | 5~1000 | 5~900  | 5~700  | 5~600  | 5~400  |
| HYAC                |                               | 5~300   | 5~300   | 5~200  | 5~150  | 5~150  | 5~100  | 5~100  |
| HYAG<br>HYPAG       |                               | 20~200  | 20~200  | 20~200 | 20~200 | 20~200 | 20~200 | 20~200 |
| HYAT53              | 600~2400                      | 10~1800 | 10~1000 | 10~600 |        | 10~500 | 10~300 | 10~200 |
| HYL23               |                               | 100~600 | 50~400  | 50~300 |        | 30~200 | 20~150 | 20~100 |
| HYAT23              | 600~2400                      | 10~1800 | 10~1000 | 10~600 |        | 10~500 | 10~300 | 10~200 |

## Broadband local communication cable

The cable is suitable for integrated building cabling system, intelligent buildings, office buildings, automatic control system of hotel, fire alarm system, And safety alarming system. Meanwhile it is suitable for integrated cabling system of gymnasium, super market, bank, power dispatching buildings, telecommunication operation marketplace, etc, The system composed by this cable can realize the transmission of telephone, fax, computer communication business and the transmission of several sets of TV programs simultaneously. Under certain condition, it can realize video on demand or transmit TV signal of high definition. The highest transmission frequency of this cable is 100MHz. It is the best promotion product of ADSL.

#### Description

| No   | Item                                                                                         | Index                              |
|------|----------------------------------------------------------------------------------------------|------------------------------------|
| HSYA | Copper core polyolefin insulation AL-PE comopsite Sheath broadband local communication cable | 8, 16, 25, 100, 150, 175, 200, 300 |

### Highway Local Communication Cable

This cable is mainly used for aerial communication cable along highway for emergency telephone and business telephone.

#### Description

| Type  | Name                                                                                                                    |
|-------|-------------------------------------------------------------------------------------------------------------------------|
| GHYAT | Highway communication cable with copper core solid polyolefin insulation, filled type, laminated AL-PE composite sheath |

| Type  | Size        | Nominal diameter conductor |
|-------|-------------|----------------------------|
| GHYAT | 3 × 4 × 0.9 | 0.9                        |
| GhYAT | 4 × 4 × 0.9 | 0.9                        |
| GHAYT | 5 × 4 × 0.9 | 0.9                        |
| GHAYT | 5 × 2 × 0.9 | 0.9                        |

### Digital Communication Cable

This cable is suitable for digital communication system, such as ISON, LAN, and data communication system of 100MHz and below.

#### Description

| Name                                       | Type      | Size              | Nominal diameter |
|--------------------------------------------|-----------|-------------------|------------------|
| Indoor super category 5 data cable         | HSYV/Z-5E | 2 ~ 25 × 2 × 0.50 | 0.50             |
| Outdoor super category 5 data cable        | HSYV/Z-5E | 4 × 2 × 0.50      | 0.50             |
| Shielding super category 5 data cable      | HSYV/Z-5  | 4 × 2 × 0.53      | 0.53             |
| Water-blocking super category 5 data cable | HSYV/Z-6  | 4 × 2 × 0.53      | 0.53             |
| Armoring super category 5 data cable       | HSYV/Z-5E | 4 × 2 × 0.50      | 0.50             |

### Power Carrier Coaxial Cable

The cable is used for high-frequency carrier communication of high voltage transmission line.

#### Description

| Name                        | Type     | Size     | Nominal diameter( φ mm) |
|-----------------------------|----------|----------|-------------------------|
| Power Carrier Coaxial Cable | HOY23-75 | 1.23/8.0 | 1.23                    |