

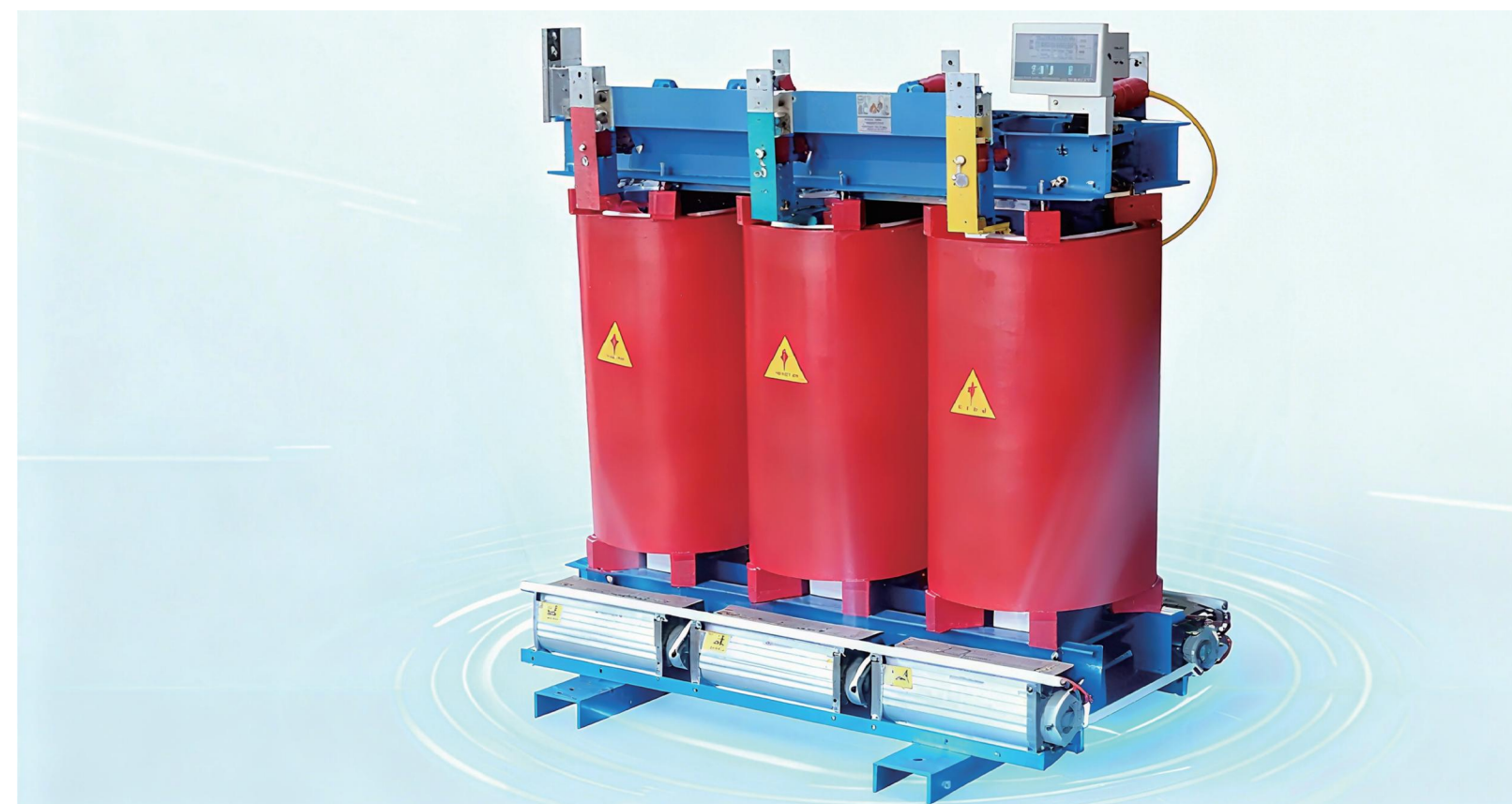
NATUS

INDUSTRIAL SOLUTION SYSTEMS

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TRANSFORMER PRODUCT MANUAL



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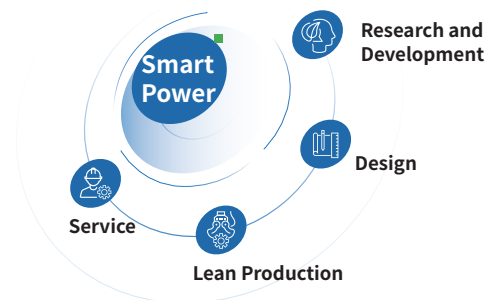
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NATUS ELECTRIC GROUP CO.,LTD.

Group Business



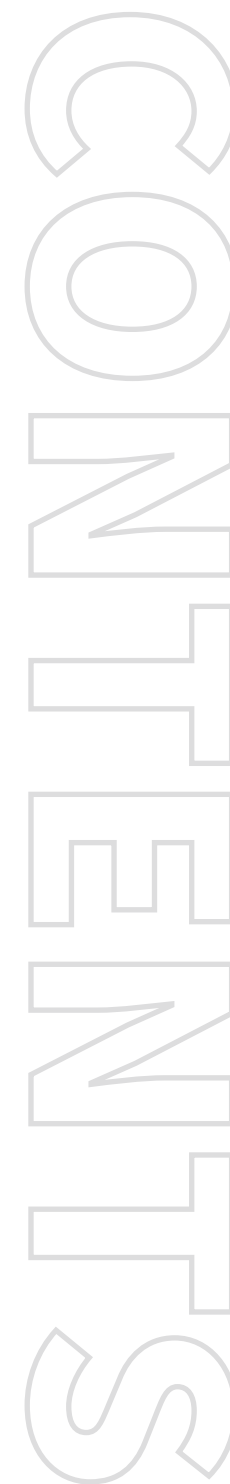
The Group specializes in system integration, EPC turnkey services, and the R&D, production, and sales of core products within the medium and low-voltage power industry. In the field of power equipment, we have deep expertise in intelligent electrical switchgear system, high-end power components, advanced power quality management products, intelligent control instruments, and control systems. Leveraging accumulated expertise in artificial intelligence and big data analytics, we provide comprehensive solutions for meteorological disaster prevention equipment and the safe operation of substations and transmission lines. In the domain of new technologies, we focus on small-area, low-altitude meteorological high-precision prediction technology, offering integrated products and services to support the development of the low-altitude economy.

Group Vision



Natus Electric Group originates from Germany, is firmly rooted in China, and serves the global market. Since its establishment in 1956, the group has built upon German technology deeply integrating Chinese expertise and a global perspective. Supported by a robust Chinese R&D and manufacturing team, we precisely respond to global market demands, delivering professional intelligent power solutions for clients across various industries. Adhering to a customer-centric approach, the group is committed to innovative products, reliable technology, and lean manufacturing.

Working hand-in-hand with global users to build a smarter, more efficient, and sustainable future for the power and energy sector.

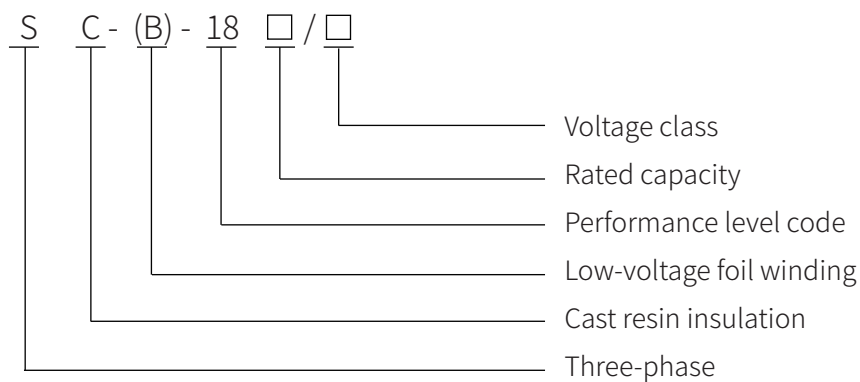


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Epoxy Resin Cast Dry-Type Transformer

Cast Resin Dry-Type Transformer Resin-Insulated Dry-Type Transformer

MODEL DEFINITION



Product Features

- Energy-saving and low-loss, maintenance-free;
- Flame-retardant and well adaptable to the environment;
- Compact design, small footprint, and easy installation;
- Low noise, strong overload capacity, and high short-circuit withstand capability;
- Excellent insulation performance against overvoltage;
- Suitable for installation in harsh environments;
- The rated capacity can be significantly increased when forced air cooling is applied.

Product Structure

- **Winding**
High-voltage windings are made of copper wire, reinforced with glass fiber, and cast with imported high-quality epoxy resin under vacuum to ensure bubble-free pouring. Low-voltage windings are made of copper wire or copper foil according to the transformer capacity, with their ends sealed by epoxy resin.
- **Core**
The core is made of high-quality high-permeability, low-loss cold-rolled grain-oriented silicon steel, which reduces no-load loss and exciting current. The core column is tightly bound with high-strength insulating tape, and the noise level is about 10-15dB lower than that of similar domestic products.
- **Tank Body**
Elastic rubber supports are installed between the high/low-voltage windings and the core during assembly. The whole unit has vibration-damping function and excellent short-circuit impact resistance.



SCB18 Type Level 1 Energy Efficiency Dry-Type Transformer (10kV)

Performance Features

- High insulation strength;
- Excellent resistance to cracking and temperature variations, high mechanical strength, and strong ability to withstand sudden short circuits;
- Ultra-low loss and high efficiency;
- Low partial discharge (usually below 5 pC), high reliability, ensuring long-term safe operation with a service life of up to 30 years;
- No need for a separate transformer room, core lifting inspection, or heavy-duty beams, saving civil engineering space and headroom. Being oil-free, it does not produce toxic gases or cause environmental pollution, eliminating the need for auxiliary structures like oil sumps and reducing civil engineering costs;
- Easy installation, commissioning-free, and nearly maintenance-free. No need for oil replacement or inspection, resulting in low operation and maintenance costs;
- Equipped with a comprehensive temperature protection control system, providing reliable guarantee for the safe operation of the transformer.



Technical Data Sheet for 6kV & 10kV Class 18 Dry-Type Off-Circuit Tap-Changing Distribution Transformers

10KV Dry-Type Three-Phase Double-Winding Off-Circuit Tap-Changing Distribution Transformer, Level 1 Energy Efficiency								
Type	connection group symbol	voltage combination (kv)	Non-load current%	Non-load loss w	Load loss w			Short-circuit impedance%
					B(100°C)	F(120°C)	H(145°C)	
30	Dyn11, Yyn0	6-11±2× 2.5%/0.4	2.0	105	605	640	685	4.0
50			2.0	155	845	900	965	
80			1.5	210	1160	1240	1330	
100			1.5	230	1330	1415	1520	
125			1.3	270	1565	1665	1780	
160			1.3	310	1800	1915	2050	
200			1.1	360	2135	2275	2440	
250			1.1	415	2330	2485	2665	
315			1.0	510	2945	3125	3355	6.0
400			1.0	570	3375	3590	3850	
500			1.0	670	4130	4390	4705	
630			0.85	750	5050	5365	5760	
800			0.85	875	5895	6265	6715	
1000			0.85	1020	6885	7315	7885	
1250			0.85	1205	8190	8720	9335	
1600			0.85	1415	9945	10555	11320	
2000			0.7	1760	12240	13005	14005	
2500			0.7	2080	14535	15445	16605	

SCB14 Type Class 2 Energy Efficiency
Dry-type Transformer (10kV)

Performance Characteristics

- Adopts advanced domestic technologies, featuring high mechanical strength, strong short-circuit resistance, low partial discharge, excellent thermal stability, high reliability and long service life.
- Safe, fireproof and pollution-free, allowing direct operation at the load center.
- Low loss, low noise, remarkable energy-saving effect and maintenance-free.
- Good heat dissipation and strong overload capacity; capacity can be increased under forced air cooling.
- Excellent moisture resistance, suitable for operation in high humidity and other harsh environments.
- The dry-type transformer can be equipped with a complete temperature monitoring and protection system, adopting an intelligent signal temperature control system, it can automatically monitor and circularly display the operating temperature of each three-phase winding, automatically start and stop the fans, and is equipped with functions such as alarm and tripping.
- Small size, light weight, small space occupation and low installation cost.



Technical Data Sheet for 14-Type Dry-Type Non-Excitation Regulating Distribution Transformers (6kV & 10kV Class)

10kV Dry-type Three-phase Double-winding Non-excitation Regulating Distribution Transformer, Class 1 Energy Efficiency								
Type	Connection group symbol	Voltage combination(kv)	Non-load current%	Non-load loss w	Load loss w			Short-circuit impedance%
					B(100°C)	F(120°C)	H(145°C)	
30	Dyn11, Yyn0	6-11±2× 2.5%/0.4	2.0	105	605	640	685	4.0
50			2.0	155	845	900	965	
80			1.5	210	1160	1240	1330	
100			1.5	230	1330	1415	1520	
125			1.3	270	1565	1665	1780	
160			1.3	310	1800	1915	2050	
200			1.1	360	2135	2275	2440	
250			1.1	415	2330	2485	2665	
315			1.0	510	2945	3125	3355	
400			1.0	570	3375	3590	3850	
500			1.0	670	4130	4390	4705	6.0
630			0.85	750	5050	5365	5760	
800			0.85	875	5895	6265	6715	
1000			0.85	1020	6885	7315	7885	
1250			0.85	1205	8190	8720	9335	
1600			0.85	1415	9945	10555	11320	
2000			0.7	1760	12240	13005	14005	
2500			0.7	2080	14535	15445	16605	

SCB10, SCB11, SCB13 Type Laminated Core
Dry-Type Transformers (10kV–35kV)

Technical Data Sheet for 10-Type Dry-Type Non-Excitation Regulating Distribution Transformers (6kV & 10kV Class)

Type	Connection group symbol	Voltage combination(kv)	Non-load current%	Non-load loss w	Load loss w			Short-circuit impedance%
					B(100°C)	F(120°C)	H(145°C)	
SC10-30	YynODyn11	6-11±2× 2.5%/0.4	2.0	190	670	710	760	4.0
SC10-50			2.0	270	940	1000	1070	4.0
SC10-80			1.5	370	1290	1380	1480	4.0
SC10-100			1.5	400	1480	1570	1690	4.0
SC10-125			1.3	470	1740	1850	1980	4.0
SC10-160			1.3	540	2000	2130	2280	4.0
SC10-200			1.1	620	2370	2530	2710	4.0
SC10-250			1.1	720	2590	2760	2960	4.0
SC10-315			1.0	880	3270	3470	3730	4.0
SC(B)10-400			1.0	980	3750	3990	4280	4.0
SC(B)10-500			1.0	1160	4590	4880	5230	4.0
SC(B)10-630			0.85	1340	5530	5880	6290	4.0
SC(B)10-630			0.85	1300	5610	5960	6400	6.0
SC(B)10-800			0.85	1520	6550	6960	7460	6.0
SC(B)10-1000			0.85	1170	7650	8130	8760	6.0
SC(B)10-1250			0.85	2090	9100	9690	10370	6.0
SC(B)10-1600			0.85	2450	11050	11730	12580	6.0
SC(B)10-2000			0.7	3050	13600	14450	15560	6.0
SC(B)10-2500			0.7	3600	16150	17170	18450	6.0
SC10-1600			0.85	24500	12280	12960	13900	8.0
SC10-2000			0.7	3050	15020	15960	17110	8.0
SC10-2500			0.7	3600	17760	18890	20290	8.0

Technical Parameters of Type 11 Dry-type Non-excitation
Voltage Regulating Distribution Transformers (6kV & 10kV Class)

Type	Connection group symbol	Voltage combination(kv)	Non-load current%	Non-load loss w	Load loss w			Short-circuit impedance%
					B(100°C)	F(120°C)	H(145°C)	
SC11-30	YynODyn11	6-11±2× 2.5%/0.4	1.9	170	670	710	760	4.0
SC11-50			1.9	240	940	1000	1070	4.0
SC11-80			1.5	330	1290	1380	1480	4.0
SC11-100			1.5	360	1480	1570	1690	4.0
SC11-125			1.3	420	1740	1850	1980	4.0
SC11-160			1.3	480	2000	2130	2280	4.0
SC11-200			1.1	550	2370	2530	2710	4.0
SC11-250			1.1	640	2590	2760	2960	4.0
SC11-315			1.0	790	3270	3470	3730	4.0
SC(B)11-400			1.0	880	3750	3990	4280	4.0
SC(B)11-500			0.9	1040	4590	4880	5230	4.0
SC(B)11-630			0.9	1200	5530	5880	6290	4.0
SC(B)11-630			0.9	1170	5610	5960	6400	6.0
SC(B)11-800			0.8	1360	6550	6960	7460	6.0
SC(B)11-1000			0.8	1590	7650	8130	8760	6.0
SC(B)11-1250			0.8	1880	9100	9690	10370	6.0
SC(B)11-1600			0.7	2200	11050	11730	12580	6.0
SC(B)11-2000			0.6	2740	13600	14450	15560	6.0
SC(B)11-2500			0.6	3240	16150	17170	18450	6.0
SC11-1600			0.7	2200	12280	12960	13900	8.0
SC11-2000			0.6	2740	15020	15960	17110	8.0
SC11-2500			0.6	3240	17760	18890	20290	8.0

Technical Parameters of Type 13 Dry-type Non-excitation
Voltage Regulating Distribution Transformers (6kV & 10kV Class)

10kV Dry-type Three-phase Double-winding Non-excitation Regulating Distribution Transformer, Type 13								
Type	Connection group symbol	Voltage combination(kv)	Non-load current%	Non-load loss w	Load loss w			Short-circuit impedance%
					B(100°C)	F(120°C)	H(145°C)	
30	Dyn11,Yyno	6-11±2× 2.5%/0.4	2.0	135	605	645	685	4.0
50			2.0	195	845	900	965	
80			1.5	265	1160	1240	1330	
100			1.5	290	1330	1410	1520	
125			1.3	340	1560	1660	1780	
160			1.3	385	1800	1910	2050	
200			1.1	445	2130	2270	2440	
250			1.1	515	2330	2480	2660	
315			1.0	635	2940	3120	3350	
400			1.0	705	3370	3590	3850	
500			1.0	835	4130	4390	4700	
630			0.85	935	5050	5360	5760	6.0
800			0.85	1090	5890	6260	6710	
1000			0.85	1270	6880	7310	7880	
1250			0.85	1500	8190	8720	9330	
1600			0.85	1760	9940	10500	11300	
2000			0.70	2190	12200	13000	14000	
2500			0.70	2590	14500	15400	16600	
1600			0.85	1760	11000	11600	12500	8.0
2000			0.70	2190	13500	14300	15400	
2500			0.70	2590	15900	17000	18200	

Dry-Type Transformer

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SGB18 and Type 14 Un-Encapsulated Class H Dry-Type Transformers (10kV)

Performance Characteristics

■

Low-voltage balanced outlet method to ensure low-voltage side balance of open-type triangular three-dimensional wound core transformers;

■

Patented built-in high-voltage wiring technology between three phases, reducing transformer installation area by 60%;

■

Overall transmission efficiency of triangular low-load loss transformers can reach more than 99.8%.

Application Scope

■

High-rise buildings, shopping malls, airports, subways, stations, docks, petroleum, chemical industry, nuclear power plants, marine transformers, densely populated residential areas, light rail, electrical engineering, and other places requiring fire prevention and explosion protection, as well as new energy sources such as wind power and solar energy.

Features

■

The open-type triangular three-dimensional wound core transformer developed by the company integrates traditional laminated core transformers, open-type single-slit and closed-type three-dimensional wound core transformers, solving numerous technological problems in mass production.

■

This product boasts the advantages of simple technology, low loss, low noise, low cost, strong short-circuit resistance, strong over-excitation capability, and convenient maintenance.

■

It conforms to the national strategy of energy conservation, green development and environmental protection, and is also in line with the development trend of core materials.



Dry-Type Transformer

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SCBH15 Amorphous Alloy Dry-type Transformer (10kV)

Technical Parameters

Technical Parameters of SCBH15 and SGBH15 Amorphous Alloy Dry-Type Transformers

Type	Voltage combination(KV)			Connection group symbol	Non-load current%	Non-load loss w	Load loss W			Short-circuit impedance%
	(H.V.)	High pressure tapping range%	(L.V.)				B(100°C)	F(120°C)	H(145°C)	
30	6 6.3 6.6 10 10.5 11	±5 ±2×2.5	0.4	Dyn11	1.6	70	670	710	760	4.0
50					1.4	90	940	1000	1070	4.0
80					1.3	120	1290	1380	1480	4.0
100					1.2	130	1480	1570	1690	4.0
125					1.1	150	1740	1850	1980	4.0
160					1.1	170	2000	2130	2280	4.0
200					1	200	2370	2530	2710	4.0
250					1	230	2590	2760	2960	4.0
315					0.9	280	3270	3470	3730	4.0
400					0.8	310	3750	3990	4280	4.0
500					0.8	360	4590	4880	5230	4.0
630					0.7	420	5530	5880	6290	6.0
630					0.7	410	5610	5960	6400	6.0
800					0.7	480	6550	6960	7460	6.0
1000					0.6	550	7650	8130	8760	6.0
1250					0.6	650	9100	9690	10370	6.0
1600					0.6	760	11050	11730	12580	6.0
2000					0.5	1000	13600	14450	15560	6.0
2500					0.5	1200	16150	17170	18450	6.0
1600					0.6	760	12280	12960	13900	8.0
2000					0.5	1000	15020	15960	17110	8.0
2500					0.5	1200	17760	18890	20290	8.0

07 / Transformer Product Manual

Transformer Product Manual / 08

SGB18 and Type 14 Un-Encapsulated Class H Dry-Type Transformers (10kV)

Product Introduction

Un-encapsulated coil three-phase dry-type transformer features safety, reliability, energy saving, fire prevention, explosion protection and easy maintenance. It is advanced in design, reasonable in structure and attractive in appearance. Its main performance indicators are superior to domestic standards, such as partial discharge level, no-load loss, load loss, noise, and adaptability to high-humidity environments. It can be installed in areas near lakes, seas and with heavy loads.

Product Introduction

- The carefully designed coil structure and vacuum pressure impregnation process ensure that the SG(B)18, 14 series of un-encapsulated coil dry-type transformers produce no partial discharge under operating conditions, and no cracking or insulation level degradation occurs throughout their service life.
- The high-voltage windings adopt continuous winding, and the low-voltage windings adopt foil winding. The whole transformer is treated by vacuum pressure impregnation and curing, supported by high-strength laminated products, providing excellent resistance to sudden short circuits.
- Flame-retardant, non-flammable, non-toxic, self-extinguishing and fireproof.
- Under high-temperature open flame combustion, SG(B)18, 14 series un-encapsulated coil transformers produce almost no smoke.
- The transformer adopts Class H (180°C) insulation, while the NOMEX insulation system is Class C. The insulation layer is extremely thin and uniform, resulting in strong short-time overload capacity without forced cooling. It can operate at 120% rated load continuously and 140% rated load for 3 hours.
- Environmentally friendly. At the end of its service life, the transformer can be easily disassembled, and the conductive materials together with the core can be recycled, realizing real environmental protection.



Application Range

- Power system;
- Transportation: subways, stations, highway systems, airports, ports;
- Public buildings: hotels, hospitals, commercial centers, scientific research institutions, high-rise buildings, stadiums; Industrial and mining enterprises;
- Offshore oil drilling platforms, ships, oil fields.

Product data

Rated High Voltage: 10kV, 6KV

Rated Low Voltage: 0.4KV

Connection Group: Dyn11或Yyn0

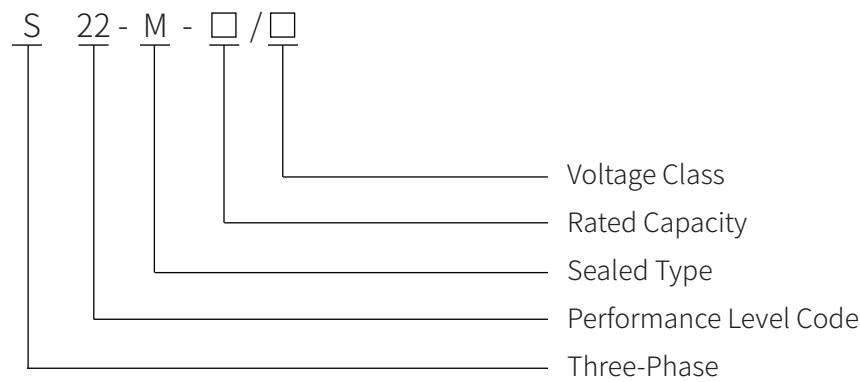
Insulation Level: Tapping Range: $\pm 2 \times 2.5\%$ etc.

Type	Local size (L×B×H)mm	Installation dimensionm ×n(mm)	Body weight(kg)	Shell size L×B×H(mm) +Bottom (mm)	Shell weight(kg)
SG10-100	1215×860×1050	660×660	675	1700×1250×1600+(60)	260
SG10-125	1215×860×1060	、	720	1700×1250×1600+(60)	260
SG10-160	1260×860×1130	660×660	890	1700×1250×1600+(60)	260
SG10-200	1260×860×1105	660×660	920	1700×1250×1600+(60)	260
SG10-250	1260×860×1130	660×660	1050	1700×1250×1600+(60)	260
SG10-315	1390×860×1155	660×660	1410	1700×1250×1600+(60)	260
SG10-400	1390×860×1375	660×660	1565	1700×1250×1600+(60)	260
SG10-500	1390×860×1390	660×660	1680	1700×1250×1600+(60)	260
SG10-630	1475×860×1375	820×820	1800	1900×1350×1800+(65)	320
SG10-800	1480×1020×1410	820×820	1930	1900×1350×1800+(65)	320
SG10-1000	1610×1020×1410	820×820	2355	1900×1350×1800+(65)	320
SG10-1250	1610×1020×1680	820×820	2940	2100×1400×2135+(65)	360
SG10-1600	1790×1150×1730	1070×1070	3540	2300×1500×2130+(70)	400
SG10-2000	1790×1150×1760	1070×1070	4050	2300×1500×2130+(70)	400
SG10-2500	1900*1150*1895	1070×1070	4790	2300×1500×2130+(70)	400
SG10-3150	2100*1150*1960	1070×1070	6215	2400×1600×2330+(70)	400

- This series of products complies with the national standards GB 1094.1-5 Power Transformers and GB/T 6451 Technical Parameters and Requirements for Three-Phase Oil-Immersed Power Transformers. A series of major improvements have been made in materials, technology and structure, enabling the product's electrical performance to reach the advanced level of similar domestic products. Featuring high efficiency and low loss, they can save a great amount of electric energy and operating costs with remarkable social benefits, and are recommended as new products by the state.
- Compared with conventional oil-immersed transformers, hermetically sealed transformers eliminate the oil conservator. The corrugated fins of the corrugated tank replace oil tubes as cooling and heat-dissipating components. The corrugated tank is made of high-quality cold-rolled thin steel plates on a dedicated production line. The corrugated fins can expand and contract with the thermal expansion and contraction of transformer oil, thus isolating the transformer interior from the atmosphere, preventing and slowing down oil degradation and insulation moisture absorption, improving operational reliability, and requiring maintenance-free operation under normal conditions.

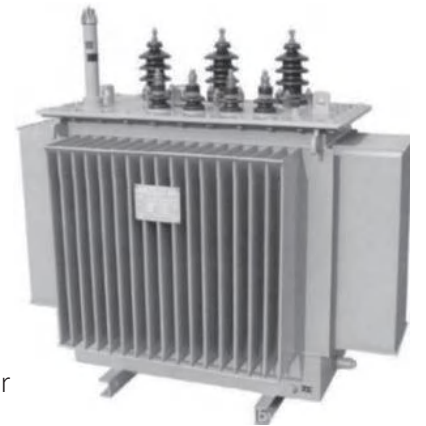


Meaning of Model



S22 Series Energy Efficiency Level 1
Oil-Immersed Transformer (10kV)

- It is currently the most energy-efficient product on the market, adopting the latest energy-saving silicon steel material (B20R065 or equivalent) and T1 copper with excellent electrical conductivity.
- The product is becoming increasingly miniaturized and portable.
- It integrates high reliability, stability and safety, ensuring stable online operation in the power grid.



S22-M-30~2500/6~10 Type Off-Circuit Tap-Changing Distribution Transformer

10kV Oil-immersed Three-phase Double-winding Off-circuit Tap-changing Distribution Transformer, Energy Efficiency Level 2 (GB 20052-2020)							
Type	Connection group symbol	Voltage Combination		Non-load current%	Non-load loss W	load loss (75°C)W	Short circuit impedance %
		H.V.KV	L.V.KV				
30	Dyn11,Yyn0	$\pm 2 \times 2.5\%$ $\pm 5\%$	0.4	1.50	70	505	4.0
50				1.30	90	730	
63				1.20	100	870	
80				1.20	115	1050	
100				1.10	135	1265	
125				1.10	150	1510	
160				1.00	180	1850	
200				1.00	215	2185	
250				0.90	260	2560	4.5
315				0.90	305	3065	
400				0.80	370	3615	
500				0.80	430	4330	
630				0.60	510	4960	
800				0.60	630	6000	
1000				0.60	745	8240	
1250				0.50	870	9600	
1600				0.50	1050	11600	5.0
2000				0.40	1225	14640	
2500				0.40	1440	14840	

S20 Series Energy Efficiency Level 2
Oil-Immersed Transformer (10kV)

- With the application of new materials, products of the same model feature superior performance and stronger overload capacity.
- Adopting optimized design with proprietary software, the layout is more reasonable and the product is more stable and reliable.
- Through the application of new technologies, the product not only saves energy but also better meets the customized requirements of customers.



S20-M-30~2500/6~10 Type Off-Circuit Tap-Changing Distribution Transformer

10kV Oil-immersed Three-phase Double-winding Off-circuit Tap-changing Distribution Transformer, Energy Efficiency Level 1 (GB 20052-2020)						
Type	Connection group symbol	Voltage combination		Non-load current%	Non-load loss W	Load loss (75°C)W
		H.V.KV	L.V.KV			
30	Dyn11,Yyn0	$\pm 2 \times 2.5\%$ $\pm 5\%$	0.4	1.50	65	455
50				1.30	80	655
63				1.20	90	785
80				1.20	105	945
100				1.10	120	1140
125				1.10	135	1360
160				1.00	160	1665
200				1.00	190	1970
250				0.90	230	2300
315				0.90	270	2760
400				0.80	330	3250
500				0.80	385	3900
630				0.60	460	4460
800				0.60	560	5400
1000				0.60	665	7415
1250				0.50	780	8640
1600				0.50	940	10440
2000				0.40	1085	13180
2500				0.40	1280	13360

S11、S13 Series Oil-Immersed Transformers (10kV–35kV)

Technical Parameters

S11-M-30~2500/6~10 Type Off-Circuit Tap-Changing Distribution Transformer

Type	Connection group symbol	Voltage Combination		Non-load current%	Non-load loss W	load loss (75°C)W	Short circuit impedance %
		H.V.KV	L.V.KV				
30	Dyn11 Yyn0 Yzn11	$\pm 2 \times 2.5\%$ ± 5	0.4	1.5	0.1	0.630/0.600	4.0
50				1.3	0.13	0.910/0.870	
63				1.2	0.15	1.09/1.04	
80				1.2	0.18	1.31/1.25	
100				1.1	0.2	1.58/1.50	
125				1.1	0.24	1.89/1.80	
160				1	0.28	2.31/2.20	
200				1	0.34	2.73/2.60	
250				0.9	0.4	3.20/3.05	
315				0.9	0.48	3.83/3.65	
400				0.8	0.57	4.52/4.30	
500				0.8	0.68	5.41/5.15	
630	Dyn11 Yyn0	$\pm 2 \times 2.5\%$ ± 5	0.4	0.6	0.81	6.2	4.5
800				0.6	0.98	7.5	
1000				0.6	1.15	10.3	
1250				0.5	1.36	12	
1600				0.5	1.64	14.6	
2000				0.4	1.94	18.3	5.0
2500				0.4	2.29	21.2	

Note:

- 1、For transformers with rated capacity of 500 kVA and below, the load loss values above the oblique line in the table apply to Dyn11 and Yzn11 connection groups; the values below the oblique line apply to Yyn0 connection group.
- 2、When the annual average load factor of the transformer is between 35% and 40%, using the loss values in the table can achieve the highest operating efficiency.

Technical Parameters

S13-M-30~2500/6~10 Type Off-Circuit Tap-Changing Distribution Transformer

Type	Connection group symbol	Voltage Combination		Non-load current%	Non-load loss W	Load loss (75°C)W	Short circuit impedance %
		H.V.KV	L.V.KV				
30	Dyn11 Yyn0 Yzn11	6±5% or 6.3±5% or 10±5%	0.4	1.40	80	630/600	4
50				1.20	100	910/870	4
63				1.20	110	1090/1040	4
80				1.20	130	1310/1250	4
100				1.00	150	1580/1500	4
125				1.00	170	1890/1800	4
160				1.00	200	2310/2200	4
200				1.00	240	2730/2600	4
250				0.80	290	3200/3050	4
315				0.80	340	3830/3650	4
400				0.80	410	4250/4300	4
500				0.70	480	5410/5150	4
630				0.50	570	6200	4.5
800				0.50	700	7500	4.5
1000				0.50	830	10300	4.5
1250				0.45	970	12000	4.5
1600				0.45	1170	14500	4.5
2000				0.35	1550	18300	5.5
2500				0.35	1830	21200	5.5

Note: The load loss values on the left side of the slash in the table apply to Dyn11 or Yzn11 connection groups, while the values on the right side of the slash apply to Yyn0 connection group.

S13-M·R Type Three-Dimensional Wound Core Oil-Immersed Transformer (10kV)

The core structure of traditional transformers is planar. The triangular wound-core transformer breaks through the traditional structure by adopting three identical rectangular half-section wound cores, which are combined to form a three-dimensional three-phase transformer core. This makes the three-phase core magnetic circuit completely symmetrical, greatly reduces magnetic reluctance, and significantly lowers exciting current and no-load loss. It is a high-efficiency energy-saving transformer made of conventional materials, featuring lower operating noise and a more compact structure. It has been widely promoted and applied in distribution networks, improving the economic operation level of distribution systems.

The three-dimensional wound core has no joints

- The magnetic circuit is evenly distributed without obvious high-resistance regions and no flux density distortion at joints.
- The direction of magnetic flux is fully consistent with the crystal orientation of the silicon steel sheet.
- The three-phase magnetic circuit lengths are completely equal, and their total length is the shortest.
The three-phase magnetic circuit is fully symmetrical, and the three-phase no-load currents are completely balanced.

Low loss and remarkable power saving effect.

- The magnetization direction of the 3D three-dimensional wound core is fully consistent with the rolling direction of the silicon steel sheet. In addition, there are no lap joints between core layers, the magnetic flux is uniformly distributed along the magnetic circuit, and there are no obvious high-resistance regions or flux density distortion at joints. Under the premise of the same material, compared with laminated cores, the core loss process coefficient of the wound core is reduced from 1.2–1.3 to about 1.05. This factor alone can reduce core loss by 10–20%.
- Due to the special three-dimensional structure, the material consumption of the yoke part of the core is reduced by 25% compared with the traditional laminated core, and the reduced corner weight accounts for about 6% of the total core weight.
- Shearing treatment of silicon steel sheets will deteriorate their magnetic properties. The 3D three-dimensional wound core is subjected to high-temperature (800±°C) vacuum nitrogen-filled annealing treatment, which not only eliminates mechanical stress in the core but also refines the magnetic domains of the silicon steel sheet, improves its secondary recrystallization ability, and makes the performance of the silicon steel sheet much better than its factory-delivered state.
- According to testing and certification, the no-load loss of three-dimensional wound-core transformers is 25–35% lower than the national standard, and the no-load current can be reduced by up to 92%.

Low loss and remarkable power saving effect.

- The root causes of noise generated by the vibration of the transformer body are:
 - Magnetostriction of silicon steel sheets causes core vibration and noise;
 - Electromagnetic attraction caused by magnetic flux leakage exists at joints and between laminations, inducing core vibration and noise;
- Excessively high working magnetic flux density close to or reaching the saturation point results in excessive leakage flux and noise.
- The three-dimensional wound core is continuously and tightly wound from silicon steel strips on a special core winding machine without any joints. Therefore, it does not produce noise caused by discontinuous magnetic circuits as in laminated cores.
- The three-phase magnetic circuits and magnetic flux of the wound core are fully symmetrical, and the working magnetic flux density is reasonably designed, so the product noise is greatly reduced.



SH15 Type Amorphous Alloy Oil-Immersed Transformer (10kV)

Amorphous Alloy Core Oil-Immersed Transformer

- The core is made of amorphous alloy material with suspended installation, and the product performance meets the Level 1 energy efficiency standard.
- An axial heat dissipation oil duct is arranged inside the winding to facilitate heat dissipation.
- A corrugated oil tank is adopted to meet the thermal expansion and contraction requirements of transformer oil.
- Compared with S11 type products, the annual operating cost is reduced by about 23% on average, with good economic benefits.



Short-Circuit Withstand Design

A silicon steel frame is added inside the amorphous core. This frame supports the amorphous core and shields most of the leakage flux from entering it. In addition, the silicon steel frame limits the deformation space of the high-voltage and low-voltage windings, providing strong support for them. It can also transmit the clamping force exerted by the side clamps on the high-voltage winding, preventing the high-voltage winding from expanding and deforming outward.

Advantages

- Stable short-circuit withstand capability;
- No varnish impregnation, simple process and reliable insulation;
- Solves the problem of severe vibration and debris generation of the amorphous core caused by magnetic attraction.

Technical Parameters

SBH15-M Sealed Amorphous Alloy Power Transformer Technical Data Sheet

Type	Connection group symbol	Voltage Combination			Non-load current%	Non-load loss W	Load loss (75°C)W	Short circuit impedance %
		H.V.KV	Tapping range %	L.V.KV				
SH-M-30	Dyn11	6 6.3 10 10.5 11	$\pm 2 \times 2.5$ ± 5	0.4	1.5	33	630/600	4
SH-M-50					1.2	43	910/870	4
SH-M-63					1.1	50	1090/1040	4
SH-M-80					1	60	1310/1250	4
SH-M-100					0.9	75	1580/1500	4
SH-M-125					0.8	85	1890/1800	4
SH-M-160	Dyn11	6 6.3 10 10.5 11	$\pm 2 \times 2.5$ ± 5	0.4	0.6	100	2310/2200	4
SH-M-200					0.6	120	2730/2600	4
SH-M-250					0.6	140	3200/3050	4
SH-M-315					0.5	170	3830/3650	4
SH-M-400					0.5	200	4520/4300	4
SH-M-500					0.5	240	5410/5150	4
SH-M-630					0.3	320	6200	4.5
SH-M-800					0.3	380	7500	4.5
SH-M-1000					0.3	450	10300	4.5
SH-M-1250					0.2	530	12000	4.5
SH-M-1600					0.2	630	14500	4.5
SH-M-2000					0.2	750	18300	5
SH-M-2500					0.2	900	21200	5

ZGS Series

Combined Transformer

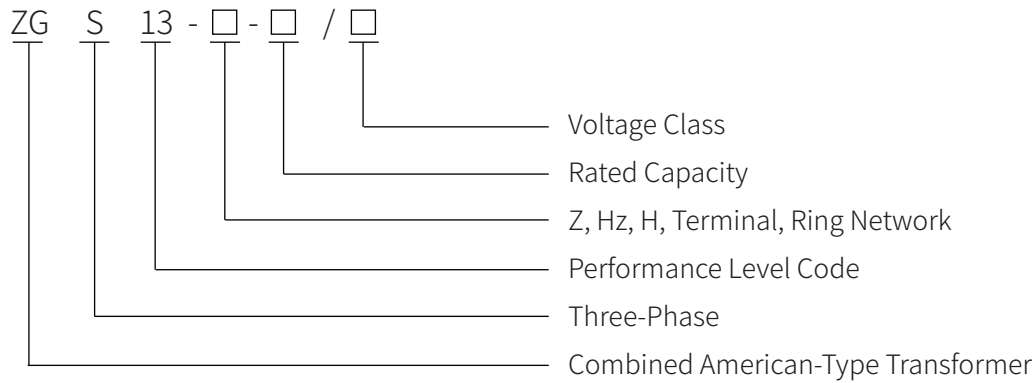
American Type Pad-Mounted Transformer

ZGS Series Combined Transformers are a new type of distribution equipment (commonly known as American-type pad-mounted transformers). High-voltage load switches, plug-in fuses and high-voltage current-limiting fuses are installed in the transformer tank, with mineral oil for insulation and cooling. They feature reasonable and compact structure, small size, flexible installation, convenient operation and small land occupation.



Combined transformers are especially suitable for load centers of urban power grids to reduce losses and improve power supply quality. They have been widely used in urban power grids of developed countries abroad. China is also carrying out urban and rural power grid reconstruction. ZGS13 Series Combined Transformers are designed in accordance with the national standard GB/T 10217 Combined Transformers, and are undoubtedly the optimal distribution equipment in urban power grid reconstruction.

Explanation of Model Designation



Product Features

- Small size, reasonable and compact structure;
- Hermetically sealed oil tank, fully insulated design, safe and reliable operation;
- Strong overload capacity and excellent resistance to sudden short circuits;
- Suitable for both ring network and terminal power supply, convenient operation and reliable power supply;
- Energy-saving and low loss;
- Good impulse performance;
- Cable connectors can carry 200A load current with long mechanical and electrical life.

Rated Capacity KVA	Voltage Combination			Connection group	Non-load loss W	Load loss (75°C)W	No load current %	Short circuit impedance %
	H.V.KV	Tapping range %	L.V.KV					
100	10 10.5 11	±2×2.5 or ±5.0	0.4	Dyn11	200	1500	1.1	4.0
160					290	2200	1.0	
200					330	2600		
250					400	3050	0.9	
315					480	3650		
400					570	4300	0.8	
500					680	5150		
630					810	6200	0.6	4.5
800					980	7500		
1000					1150	10300		

Photovoltaic Series

Photovoltaic American-type pad-mounted transformer

As a clean energy generation method, photovoltaic power generation has developed rapidly both at home and abroad.

The ZGS-Z.T series combined transformers are a series of products independently developed by our company to meet the growing power supply demand of photovoltaic power generation.

They are developed on the basis of our 10kV and 35kV combined transformers, by digesting and absorbing advanced technologies from both domestic and overseas sources and combining them with domestic application requirements.

This product integrates the transformer, load switch and high-voltage fuses into the transformer tank, using the transformer’ s insulating fluid as the insulation and heat dissipation medium for the entire unit.

It adopts a fully sealed structure. The shell is manufactured with a split-type design and processed through shot blasting, pickling, phosphating, and separate coating of primer, intermediate coat and topcoat.

As a result, its surface performance in terms of corrosion resistance, weather resistance and UV resistance exceeds that of conventional coating processes.

The product features small size, light weight and convenient installation.

Product Structure Features

- Fully sealed oil tank without oil conservator, core-pulling free;
 - The tank body is treated with a special process and features excellent anti-corrosion performance;
 - For 10kV class combined transformers, high-voltage backup current-limiting fuses are used in series with plug-in overload protection fuses to provide full-range protection for the transformer;
- The 35kV class combined transformers adopt a brand-new full-range protection high-voltage current-limiting fuse with high breaking capacity.

Primary System Selection of Combined Transformers

Rated Capacity KVA	High voltage load switch	High voltage arrester	Low voltage circuit breaker	Low voltage arrester	Auxiliary transformer
400	35KV: BYFI- 40.5/630-20 10KV: FYB-10/630- 20-F2	35KV: HY5WZ- 51/134 or TBP-B- 42/800 10KV: HY5WZ- 17/45	HNW2- 3200/3P In=2000A KFW2-1600/3P In=1000A 3WL1600N/100 OA 4P	0.69KV: MYG-690/5 or ZYM-FD/690/3P 0.4KV: ZYMS-400/3P or HY1.5W-0.5/2.6	0.69KV: SG-3/0.69/0.4 or SG-80/0.69/0.4 0.315KV: SG-10/0.315/0.4
630					
900					
1600					
2350					
3350					



Wind Power Series

The ZGF□-40.5/0.69 Series Compact Wind Power Box-type Substation (hereinafter referred to as the compact box substation) is a special equipment that boosts the voltage of 0.6~0.69 kV generated by wind turbines to 35 kV for grid-connected output.

Developed by our company in response to user requirements and incorporating the advantages of American-style box substations, this new product reduces the cost of American-style box substations and overcomes their shortcomings of incomplete protection, as well as the poor ventilation and heat dissipation of the main transformer in European-style box substations.

Suitable for various wind power generation sites, this product is an ideal supporting equipment for wind power generation systems.



Buried Landscape Transformer Series

Buried landscape transformers can reduce noise and electromagnetic radiation

The buried installation of the transformer provides excellent shielding effect, which effectively reduces noise and electromagnetic radiation.

Good economic benefits

Replacing underground substations (rooms) in high-rise buildings frees up an area of 100 square meters, which can be sold as parking spaces with a value of more than 2.5 million yuan. In addition, there is uninterrupted commercial advertising income over 20 years. The day-and-night light box advertising design brings in additional advertising revenue.

Beautify the environment

Municipal construction: urban (commercial area) renovation, street lamp (public transport) projects, etc., beautify and brighten the city, enhance the soft power of modern cities, and serve as a rapid way to improve the city image. The complete sets of supporting equipment can be used for public welfare publicity, landscape display, cultural promotion, commercial promotion, etc.

The operation of the buried landscape transformer is safer

The high and low voltage incoming and outgoing lines adopt a waterproof, fully sealed, fully insulated and fully shielded wiring method, making operation safer.



Intelligent Transformer

The intelligent transformer equipment is mainly composed of the transformer main body and an intelligent integrated assembly. The intelligent integrated assembly includes a control unit, a protection unit, a condition monitoring unit, a metering unit, a communication unit, etc.

The intelligent transformer itself features functions such as control, communication, and condition monitoring, for example:

Digitized data acquisition;

Abnormal signal identification and error prevention;

Complete self-diagnosis and self-recovery functions;

Automatic optimal control adopted for the transformer cooling system to achieve energy conservation and consumption reduction;

Automatic switching of the on-load tap-changer;

Simultaneous electrical and non-electrical protection functions for the transformer.

In addition to power functional components, the intelligent transformer also includes the following main functional units:

Control Function Unit

- Intelligent Control of Transformer On-Load Tap-Changer: Including automatic switching of the on-load tap-changer based on voltage and automatic control realized by its stepping motor drive;
- Intelligent Control of Cooling System: Each transformer is equipped with multiple sets of auxiliary heaters. The auxiliary heaters are switched on or off based on transformer oil temperature and optical fiber temperature measurement signals;
- Intelligent Control of On-Line Oil Filtering Device for Transformer On-Load Tap-Changer: On-line filtering of the insulating oil at the tap positions. Users can set the oil filtering time after each tap operation, and can also select timed oil filtering according to the oil quality condition.

Online Monitoring and Fault Diagnosis Function Unit

It conducts online monitoring and fault diagnosis of the oil level, oil temperature, winding temperature rise, oil chromatography analysis, core grounding current, partial discharge, discharge, and pressure relief valve in the transformer oil conservator, and transmits the detected information to the intelligent terminal. According to the ambient temperature, cooling system status, oil temperature, discharge, pressure relief valve and other conditions, it comprehensively analyzes whether the transformer has overload capacity, evaluates the maintenance cycle or provides early warning.

Protection Function Unit

The transformer is equipped with dual electrical protection and single electrical protection to ensure that it can be automatically, quickly and selectively disconnected from the system in case of failure, or handled by signals issued by operators.

Communication Function Unit

Realize real-time communication with the bay layer and the station control layer, and achieve functions such as data sharing and remote monitoring among various functional units.



Box-type Substation Series (European-style Box Substation)

The products comply with standards such as GB 17467 High-voltage and Low-voltage Prefabricated Substations and IEC 1330.

Commonly known as the European-style box substation, the YB series box-type substation, as a new type of power supply equipment, has many advantages over traditional civil-constructed substations.

Due to its small size, small land occupation and compact structure, it is easy to relocate, thus greatly shortening the infrastructure cycle, reducing land occupation and cutting infrastructure costs.

Meanwhile, the box-type substation features simple on-site installation, rapid power supply and convenient equipment maintenance, requiring no special on-duty personnel.

In particular, it can be placed deep into the load center, which is of great significance for improving power supply quality, reducing power loss, enhancing power supply reliability and renovating the distribution network.

The YB series substation consists of four components: high-voltage switchgear, low-voltage distribution panel, distribution transformer and outer enclosure.

The high-voltage part adopts an air-type load switch; the transformer can be either a dry-type transformer or an oil-immersed transformer.

The enclosure adopts an excellent heat-insulating and ventilating structure with an attractive appearance and good thermal insulation performance.

Equipped with upper and lower ventilation ducts, the enclosure minimizes the temperature rise in the transformer room and the high-voltage & low-voltage rooms caused by outdoor solar radiation.

Temperature-controlled forced ventilation devices and automatic temperature control devices can be installed inside the enclosure.

Each independent unit is equipped with a complete control, protection, live display and lighting system.

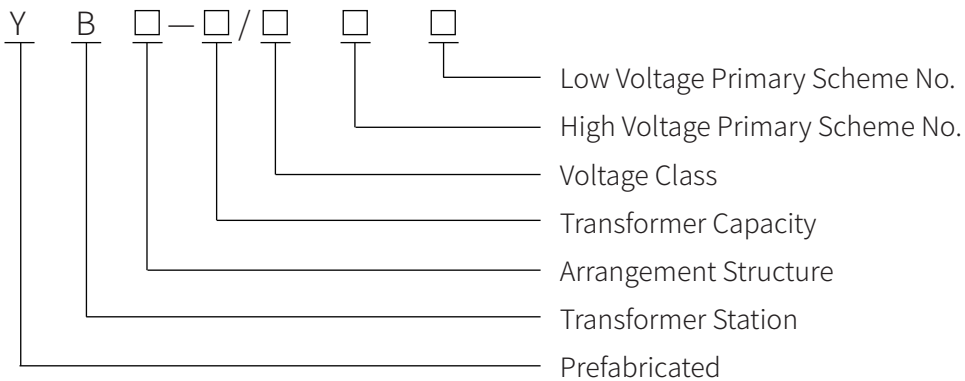


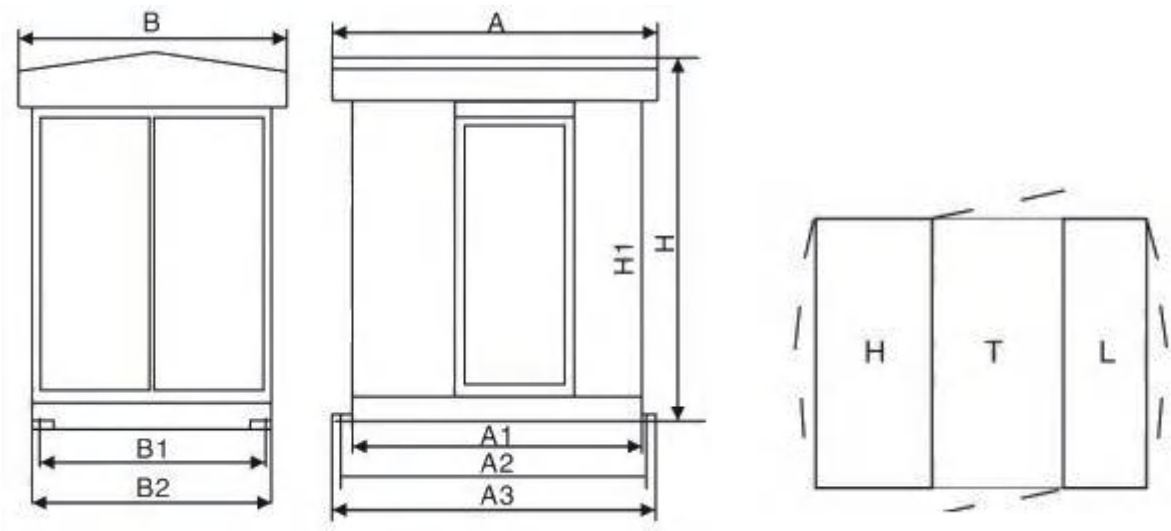
Functions and Features

- It features a three-in-one integration of high-voltage switchgear, transformer and low-voltage switchgear with high completeness.
- Complete high and low voltage protection, safe and reliable operation, and easy maintenance;
- Small footprint, low investment, short production cycle and convenient movement;
- Flexible and diverse wiring schemes;
- Unique structure: the unique honeycomb double-layer (composite panel) enclosure is firm, heat-insulating, ventilated for heat dissipation, aesthetic and with high protection degree. Optional enclosure materials include stainless steel, titanium alloy, aluminum alloy, cold-rolled steel plate and color-coated steel plate;
- Various types: general type, villa type, compact type, etc.;
- The high-voltage ring main unit can be equipped with a distribution automation terminal (FTU) to realize reliable detection of short-circuit and single-phase earth faults. It is equipped with the "four remote" functions, facilitating the upgrading of distribution network automation.

Application

Widely used in indoor and outdoor sites such as urban power grid reconstruction, residential quarters, high-rise buildings, factories, hotels, shopping malls, airports, railways, oil fields, docks, expressways, and temporary power facilities.





Design serial number	Dimensions(mm)	Installation dimensions(mm)	Transformer capacity
101	A=2960 B=2110	A2=2820 B2=1740	30-250KVA
	H=2370 A1=2750		
	A3=2800 B1=1800		
	H1=2120		
102	A=3500 B=2300	A2=3270 B2=1940	315-630KVA
	H=2410 A1=3200		
	A3=3320 B1=2000		
	H=2160		
103	A=3800 B=2700	A2=3570 B2=2340	800-1250KVA
	H=2660 A1=3500		
	A3=3600 B1=2400		
	H1=2360		

Note:Dimensions provided for reference only type design,the final size of the product shape prevail.

Box-type substation senes(European box change)Basic technical data

	Item	Unit	Parameter
High-voltage part	Rated frequency	Hz	50
	Rated voltage	KV	6 10 35
	The Max Working Voltage	KV	6.9 11.5 40.5
	Work frequency and withstand voltage	KV	32/36 42/48 95/118
	Liightning impulse withstand voltage	Transformer Product Manual	60/100 75/85 185/215
	Rated current	A	400 630
	Rated short time withstand current	KA	12.5(2S) 16(2S) 20(2S)
	Rated short time withstand current	KA	32.5 40 50
Low-voltage part	Rated voltage	V	380 220
	Main circuit rated current	A	100-3200
	Rated short time withstand current	KA	15 30 50
	Rated short time withstand current	KA	30 63 110
	Branch current	A	10-800
	The number of branch cirouits	Circuit	1-12
Transformer part	Compensation capacity	KVA	0-360
	Rated Capacity	KVA	50-3000
	Short-circuit impedance	%	46
	Tapping range		±2×2.5%±5%
	Join group		Yyn0 Dyn11



PRECISION IN DETAIL