CHINT

MV/LV Prefabricated Substation

Prefabricated Substation

Wood-paneled prefabricated substation

Landscape type prefabricated substation

Pseudo-classic style prefabricated substation

Colored composite steel plate prefabricated substation

Non-metal prefabricated substation

Normal type MV/LV prefabricated substation

YBM(P)29-12/0.4 MV/LV Prefabricated Substation

1 General

YB29-12/0.4 series of medium voltage/low voltage pre-fabricated substation is a product designed by our company to meet the needs of urban network construction, with the advantages of compact structure, strong complete set, safe and reliable operation, easy maintenance and beautiful appearance.

In comparison with conventional civil substation, the prefabricated substation with the same capacity only covers an area of 1/10-1/5 of conventional substation, significantly reducing design workload and construction workload, and reducing construction costs. The product can be used in distribution system, which may be looped network distribution system, or dual power or radiation terminal power distribution system. Therefore, it is a kind of new type complete set equipment which could achieve energy saving and cost reducing in urban and rural substation construction and transformation, and could practice "boost, capacity increase, updating and optimizing channel" development thought.

2 Type Designation

Y B □ □ – 12 / 0.4

- 12 / 0.4 — Rated voltage
- □ — Design number
- □ — Structure characteristics: P-type; M-type
- B — Substation
- Y — Prefabricated

3 Working Condition

3.1 Altitude: ≤1000m
3.2 Ambient temperature: no higher than +40℃ and the average value in 24h is no more than 35℃; no lower than -25℃
3.3 Outdoor wind speed: no more than 35m/s
3.4 Relative humidity : Daily average value is no more than 95% (+25℃)
3.5 Seismic restraint capacity
Horizontal earthquake acceleration: below 0.4 m/s2
Vertical earthquake acceleration: below 0.2 m/s2
3.6 There should be no conductive dust, corrosive, flammable and explosive hazardous articles which are harmful to metal and insulator
3.7 Mounting points without severe movements, and not more than 3 degree inclination

***Notes**: If above conditions could not meet use requirements, the users should negotiate with the manufacturer.*

4 Main Technical Parameters

No.	Item	Unit	MV Apparatus	Transformer	LV Apparatus
1	Rated voltage Ue	kV	7.2/12	6/0.4, 10/0.4	0.4
2	Rated capacity Se	kVA		Type(P3 Figure2-1,Figure2-2): 200~1250 Type(P3 Figure2-3,Figure2-4): 50~80	Max 2×1600
3	Rated current Ie	A	200~630		100~3000
4	Rated breaking current	A	Load switch:400~630A		15~63
		kA	composite apparatus depend on fuse		
5	Rated short time withstand current(S)	kA	20×(2)	200~400kVA	15×1
			12.5×(4)	400kVA	30×1
6	Rated peaking withstand current	kA	31.5, 50	200~400kVA	30
				400kVA	63
7	Rated making current	kA	31.5, 50		
8	1min power frequency withstand current voltage	kV	Phase to phase and earth 30/42	Oil immersed: 35/5min	≤300V: 2kV
			Isolating distance 34/48	Dry: 28/5min	300, 660V: 2.5kV
9	Lightning impulse withstand voltage	kV	Phase to phase and earth 60/75	75	
			Isolating distance 75/85	75	
10	Noise level	dB		Oil :<55	
				immersed:<55	
11	Protection degree			IP23D	
12	overall dimensions	Different dimensions for different schemes			

Prefabricated Substation

High voltage room

Low voltage room

Low voltage room

5 Product Structure Characteristics

5.1 The product is composed of medium voltage power distribution equipment, transformer and low voltage power distribution equipment, divided into three functional compartments, which are medium voltage room, transformer room and low voltage room. The medium and low voltage rooms are fully functioned. Preliminary power distribution system at medium voltage side can be arranged in looped network power supply, terminal power supply, dual power supply and other power supply methods. Medium voltage metering components can be installed to meet medium voltage metering requirements. The transformer room could be S9, S9-M R and other low loss oil immersed transformer and dry transformer. The transformer room is equipped with automatic start forced air cooling system and lighting system. The low voltage room could use panel or cabinet structure according to the user's requirements to constitute the required power supply program, with power distribution, lighting power distribution, reactive power compensation, power metering and power measurement functions, to meet the user's different requirements, to facilitate user's power supply management and improve power supply quality.

5.2 Medium and low voltage rooms are arranged compact and reasonable, convenient to operate and overhaul. Medium voltage circuit breaker has anti-misoperation interlock function. According to the user's requirements, the transformer could access transformer main door from the track. In addition, the transformer door is equipped with labyrinth ventilation. Every room is equipped with automatic lighting device. In addition, the performance of selected elements for medium and low voltage switchgears has features of reliable performance, simple operation and convenient overhaul. The top cover of substation is dual-layer insulation structure, which could reduce solar radiation. The surrounding eaves have ventilation holes, forming convection function with every functional room, to facilitate ventilation and heat dissipation. The bottom base is steel structure, with sufficient strength and rigidity.

5.3 Natural and forced ventilation two cooling methods are adopted to keep good ventilation and cooling performance. Transformer room has temperature controller which could automatically control the transformer temperature, ensuring full capacity operation of the transformer.

5.4 Depending on application conditions, different structural forms and materials could be used to meet different use requirements and ensure normal operation of the substation. The enclosure of substation could be made of ordinary steel, stainless steel, aluminum alloy plate, colored composite plate, partially or completely going through surface treatment, so that the shell could have long-term outdoor use conditions, ensuring waterproof, dustproof performance, with long service life and beautiful appearance. The basic structure can be roughly divided into:

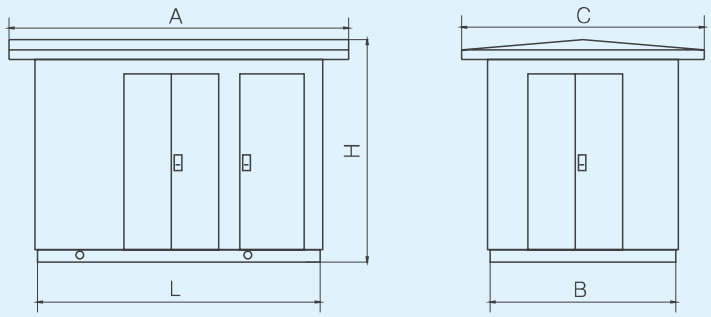
- General substation which is made of ordinary steel plate
- High anti-corrosion type substation which is made of stainless steel or aluminum alloy plate
- Heat preservation and insulation type substation which is made of colored composite plate
- Other kinds of substations

5.5 Incoming and outgoing line are cables, and we also can use other types according to customer's special requirements.

6 Overall dimension and layout forms

6.1 Overall dimension (Figure 1, Figure 2)

Figure1 layout forms drawings of YBM, YBP series pre-fabricated substations ("目"type arrangement)



(mm)Table 2

Type	Transformer capacity(kVA)	L	B	H	A	C
YBM29	100~250	3000	2000	2520	3320	2320
	315-630	4000	2600	2560	4320	2920
	800~1000	4600	2600	2560	4920	2920
	1250	5000	3000	2980	5320	3320
YBP29	100~250	Confirmed by LV outgoing wire	2000	2520	Confirmed by LV outgoing wire	2320
	315~630		2600	2560		2920
	800~1000		2600	2560		2920
	1250		3000	2980		3320

Bending Steel Plate
Prefabricated Substation

Glass Tile
Prefabricated Substation

Colored composite plate
Prefabricated Substation

Steel Plate
Prefabricated Substation

YBM(P)29-24/0.4 24kV MV/LV Prefabricated Substation

1 General

YB29-24/0.4 series of medium/low voltage pre-fabricated substation features compact structure, strong complete set, safe and reliable operation, easy maintenance and beautiful appearance.

In comparison with conventional civil substation, the pre-fabricated substation with the same capacity only covers an area of 1/10-1/5 of conventional substation, significant space-saving has been realized.

The product can be used in distribution system, which may be looped network distribution system, or dual power or radiation terminal power distribution system. Therefore, it is a kind of new type complete set equipment which could achieve energy saving and cost reducing in urban and rural substation construction and transformation, and could practice "boost, capacity increase, updating and optimizing channel" development thought.

The product conforms to GB/T17467 IEC1330-1995 <High Voltage/Low Voltage Pre-fabricated Substation> Standard and SD320 <Box-type Substation Technical Conditions>.

2 Type Designation

Y B □ □—24 / 0.4 — □

- Transformer rated capacity (kVA)
- Rated Voltage
- Design number
- Structure characteristics: P-type; M-type
- Substation
- Prefabricate

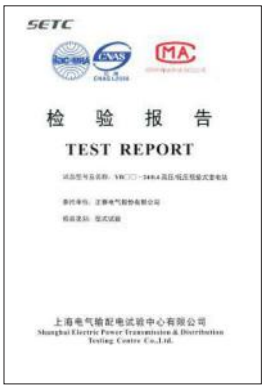
3 Working Condition

3.1 Normal service conditions

- Ambient temperature: no higher than +40℃ and the average value in 24h is no more than 35℃; no lower than -30℃
- Relative humidity: Daily average value is no more than 95%; monthly average value is no more than 90%
- Altitude: ≤Q1000m
- Seismic restraint capacity:
  Horizontal earthquake acceleration: below 0.4 m/s2
  Vertical earthquake acceleration: below 0.2 m/s2
  Safety factor: 1.67
- Mounting points without severe movements, and not more than 30℃
- Outdoor wind speed: no more than 35m/s
- There should be no conductive dust, corrosive, flammable and explosive hazardous articles which are harmful to metal and insulator

3.2 Special service conditions

Customized design is available.



Type Test Report

ZL 2008 2 0155883.3
Inner plate in Double layer of the steel plate of pre-fabricated substation

ZL 2008 2 0155882.9
waterproof cover of pre-fabricated substation

4 Main Technical Parameters

4.1 Main technical parameters of pre-fabricated substation

No.	Item		Unit	HV Side	LV Side
1	Rated voltage Ue		kV	24	0.4
2	Rated frequency		Hz	50	50
3	Rated current Ie		A	630	2000
4	Rated short circuit breaking current		kA	25	50
5	Rated insulation	1min Power frequency withstand voltage	kV	65/79	
		Lightning impulse withstand voltage short-circuit		125/145	
6	Rated short-time withstand current/rated		kA/s	25/4	
7	Rated peak withstand current		kA	63	
8	Transformer rated capacity		kVA	1000	
9	Protection degree of Enclosure			IP33D	
10	Noise level		dB	Oil ≤55, dry ≤65	
11	Type of transformer			Oil or dry	
12	Enclosure class		K	20	

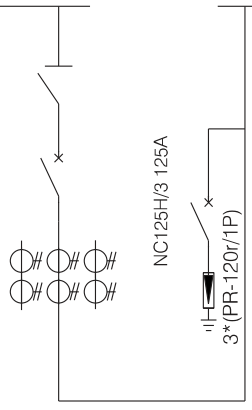
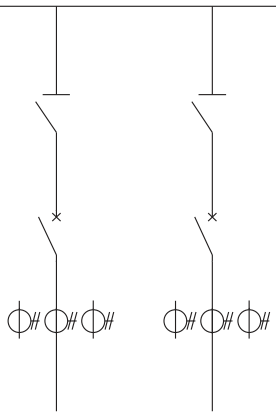
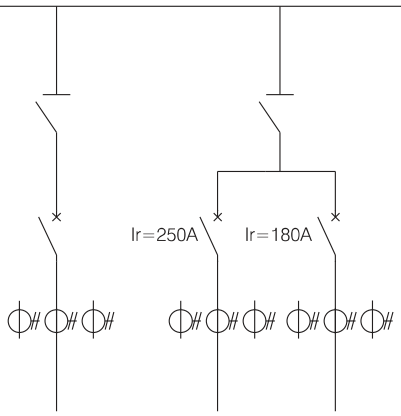
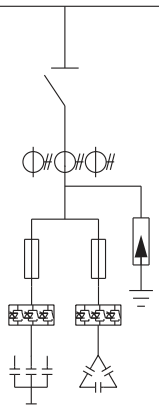
4.2 Main Technical Parameters of switchgear

No.	Item	Unit	Parameters
			With circuit breaker
			NV1-24
1	Rated voltage Ue	kV	24
2	1min power frequency withstand voltage	kV	(50)65
3	Rated lightning impulse withstand voltage(Peak)	kV	125
4	Rated frequency	Hz	50(60)
5	Rated current	A	630 1250 1600 2000 2500 3150
6	Rated current of branch busbar	A	630 1250 1600 2000 2500
7	Rated short-time withstand current	kA	16 20 25 31.5
8	Rated peak withstand current	kA	40 50 63 80
9	Rated short-circuit duration	s	4
10	Protection degree		Enclosure: IP4X; Indoor: IP2X
11	Weight	kg	800, 1000(Rated current above 1600A)

4.3 Main Technical Parameters of circuit breaker

No.	Item		Unit	Parameters
1	Rated voltage Ue		kV	24
2	Rated insulation	1min Power frequency withstand voltage	kV	65(79)
		Lightning impulse withstand voltage	kV	125(145)
3	Rated frequency		Hz	50
4	Rated current Ie		A	630、1250、1600 2000、2500、3150
5	Rated short-time withstand current		kA	20、25、31.5
6	Rated peak withstand current		kA	50、63、80
7	Rated short circuit breaking current		kA	20、25、31.5
8	Rated short circuit making current		kA	50、63、80
9	Rated short-circuit duration		s	4
10	Rated operation sequence			O-0.3s-CO-180s-CO
11	Mechanical life			M2 class (20000 times
12	Rated operation voltage		V	AC 220/DC 220
13	Total breaking time		ms	≤70
14	Electrical life			E2 Class

Prefabricated Substation

	D1	D2		D3		D4
				TMY-3X(80X8)+1X（80X8）+1X(40X4)		
						
	NGG1(GGD)	NGG1(GGD)		NGG1(GGD)		NGG1(GGD)
	800X600X2000	800X600X2000		800X600X2000		800X600X2000
	QP-1000/31	QP-400/31	QP-400/31	QP-400/31	QP-400/31	
	E2S1000 R1000 PR122/PD-LSI 3P	T5H400 PR221DS/P-LI	T5H400 PR221DS/P-LI	T5H400 PR221DS/P-LI	T4H250 PR221DS/P-LI	QP+BH-0.66+PDM803A+FYS+RPCF3-16D+NT00+HXFK-Y-220V-45A(2Pieces)+BSMJ0.25-10x3-1Y(2Pieces)+HXFK-△-380V-45A(6Pieces)+BSMJ0.4-30-3(5Pieces)+BSMJ0.4-15-3(1Piece)
	Ir=800A motor-driven, Shunt trip, no-voltage delay3S	R400/3P Ir=400A	R400/3P Ir=300A	R400/3P Ir=400A	R250/3P *2Pieces	
	1000/5*3 800/5*3	400/5A	400/5A	400/5A	250/5A 200/5	
	DTSD22-SS1					
ter	YTZJ-1A	PDM803A	PDM803A	PDM803A	PDM803A*2 Pieces	
		3WP1:Building No.5 288KW	3WP2:Building No.7 192KW	3WP3:Building No.8 288KW	3WP4:Building 08	3WP5:Building 08
					Dual Power 132KW	Dual Power 88KW

YB29-40.5/12 MV/LV pre-fabricated substation

1 General

YB29-40.5/12 series of medium voltage/low voltage pre-fabricated substation is a three-phase AC 50Hz outdoor equipment with medium voltage of 40.5kV and low voltage of 12kV (7.2), which is widely used in cities, towns, factories, oil fields and other places. It is also applicable for some large-scale construction sites, to accept, transform and distribute electrical energy. It has the features of strong complete set, small coverage area, convenient installation and use, low cost, high comprehensive automation degree, safe and reliable operation.

2 Type Designation

Y B □ – 40.5/12(7.2)

- 40.5/12(7.2) — Rated voltage
- □ — Design number
- B — Substation
- Y — Prefabricated

3 Working Condition

3.1 Normal service Ambient Conditions

- Altitude: no more than 1000m
- Ambient temperature: no higher than +40℃ and no lower than -25℃
- Outdoor wind speed: no more than 34m/s
- Relative humidity: daily average value is no more than 95%; monthly average value is no more than 90%
- There should be no regular violent vibration and impact
- There should be no conductive dust, corrosive, flammable and explosive hazardous articles which are harmful to metal and insulator

3.2 Special service Ambient Conditions

If above conditions could not meet use requirements, the users should negotiate with the manufacturer

4 Main Technical Parameters

4.1 Main technical parameters of transformer

Type	Rated voltage(kV)	Rated capacity (kVA)	Ratio(kV/kV)
SZ7	40.5	1000～20000	35/10、35/6.3
SZ9	40.5	1000～20000	35/10、35/6.3

4.2 Technical parameters of current transformer

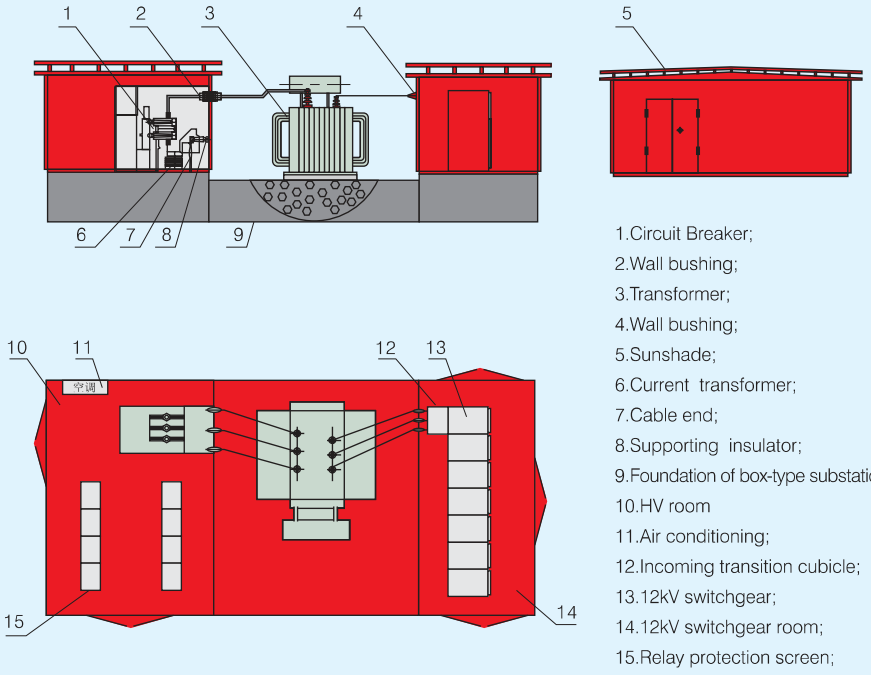
Type	Rated primary current(A)	Rated secondary curren(A)	Accurate class	10%times no more than	secondary load
LCZ-35Q	40～500	5	0.5/10P10	10	50
LZJC-10	100～1000	5	0.5/10P10		

4.3 Main technical parameters of KYN61-40.5 or XGN-40.5 switchgear with ZN85-40.5 type vacuum circuit breaker

No.	Item		Unit	Parameters	
1	Rated voltage Ue		kV	40.5	
2	Rated insulation	1min Power frequency withstand voltage	kV	95	
		Lightning impulse withstand voltage	kV	185	
3	Rated current Ie		A	1250	1600
4	Reted Frequency		Hz	50	
5	Rated short-time withstand current		kA	25	31.5
6	Rated peak withstand current		kA	63	80
7	Rated short circuit breaking current		kA	25	31.5
8	Rated short circuit making current(peak)		kA	63	80
9	Rated short-circuit duration		s	4	
10	Rated operation sequence			O-0.3s CO-180s- CO	
11	Breaking time		ms	<80	
12	Rated short-circuit breaking current breaking times		times	20	
13	Rated Capacitor Banks breaking current		A	630	
14	Mechanical life		times	10000	
15	Rated operation voltage		V	-110/～110，-220/～220	

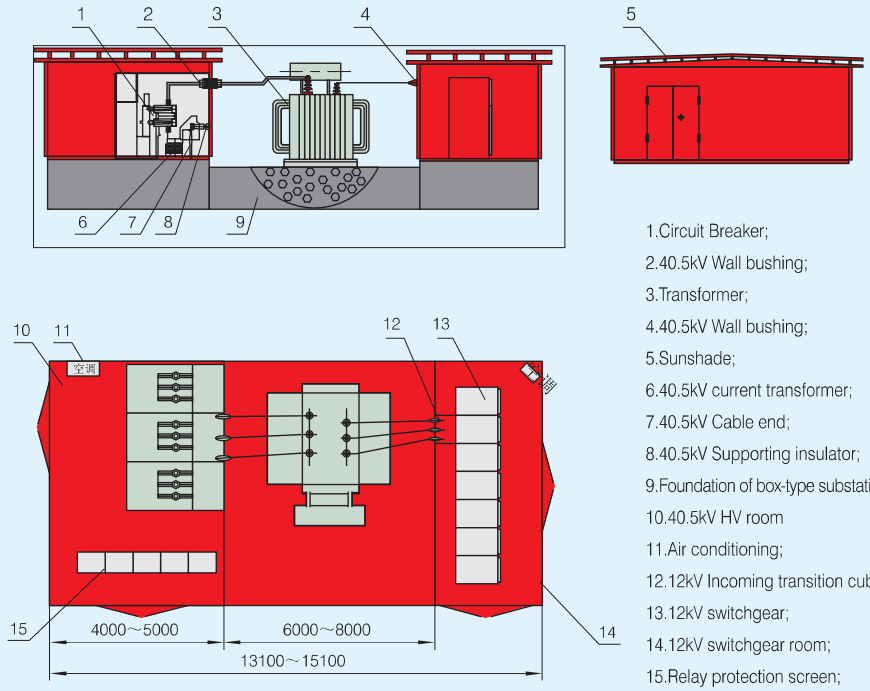
Prefabricated Substation

Figure 2



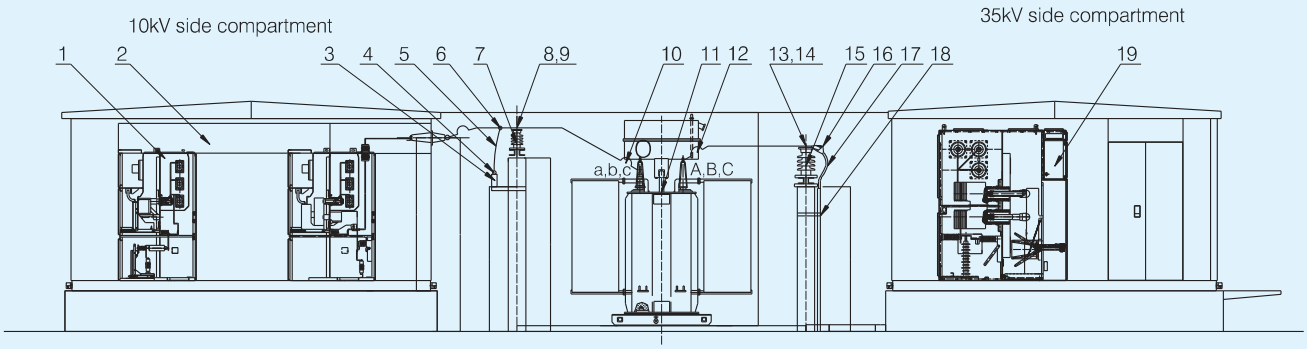
1.Circuit Breaker;
2.Wall bushing;
3.Transformer;
4.Wall bushing;
5.Sunshade;
6.Current transformer;
7.Cable end;
8.Supporting insulator;
9.Foundation of box-type substation;
10.HV room
11.Air conditioning;
12.Incoming transition cubicle;
13.12kV switchgear;
14.12kV switchgear room;
15.Relay protection screen;

Figure 3

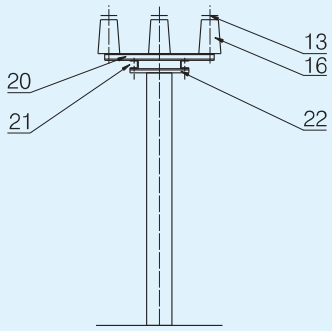


1.Circuit Breaker;
2.40.5kV Wall bushing;
3.Transformer;
4.40.5kV Wall bushing;
5.Sunshade;
6.40.5kV current transformer;
7.40.5kV Cable end;
8.40.5kV Supporting insulator;
9.Foundation of box-type substation;
10.40.5kV HV room
11.Air conditioning;
12.12kV Incoming transition cubicle;
13.12kV switchgear;
14.12kV switchgear room;
15.Relay protection screen;

Figure 4



On-site installation drawings

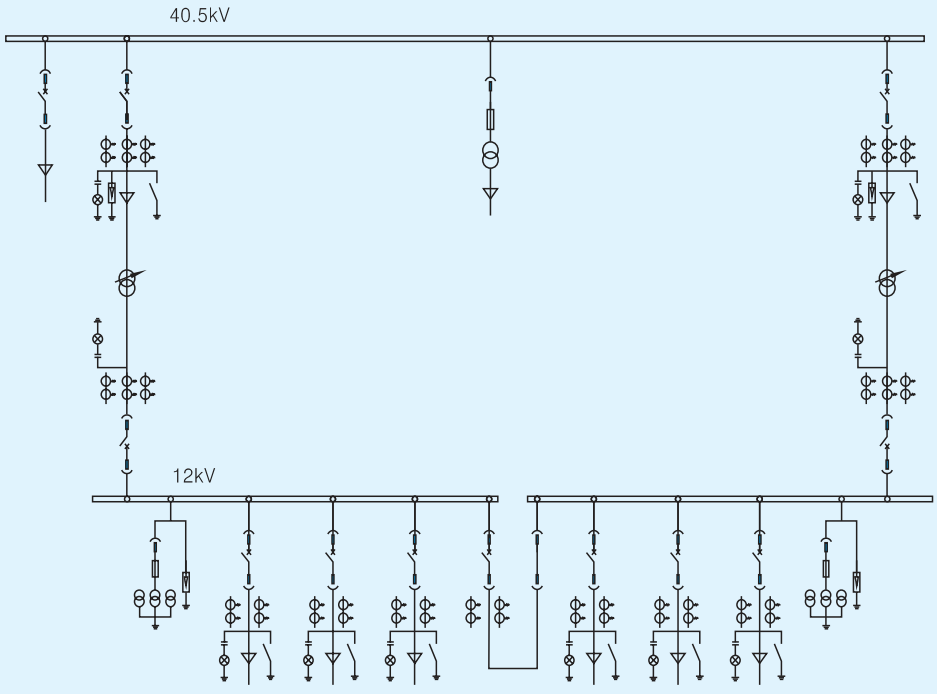


Fixed installation drawings of conductor

1. 10kV switchgear
2. 10kV bus-bar bridge
3. Zinc oxide arrester
4. Copper and aluminum transition equipment clip
5. wire
6. Alive dismounting clip
7. Supporting insulator
8. Rectangular aluminum conductor
9. Rectangular bus-bar fixed fittings
10. Copper and aluminum expansion joint
11. Main transformer
12. Copper and aluminum expansion joint
13. Rectangular aluminum conductor
14. bus-bar fixed fittings
15. Supporting insulator
16. cable end
17. power cable
18. cable protection pipe
19. 35kV switchgear
20. U-steel
21. U-steel
22. U-steel

9 Typical primary system diagram(Figure 5~Figure 7)

Figure 5



YBM(P)29-40.5/0.69kV(Ordinary)

NYBM(P)77-40.5/0.69kV(Compact)

YBM(P)29-40.5/0.69kV (Ordinary Type)
NYBM(P)77-40.5/0.69kV (Compact Type)
40.5kVMV/LV Prefabricated Substation for Wind Power Generation

1 General

YBM(P) 29-40.5/0.69kV and NYBM(P)77-40.5/0.69 kV MV/LV prefabricated substation series products are designed for wind power generation, wind generator output voltage is 0.69 kV, via 0.69/35 kV transformer step-up to 35kV, after 35 kV line side via multiple circuits to form a combined unit, by 35 kV cable line to 35/110kV booster stations.

The prefabricated substation is composed of step-up transformer, medium voltage switchgear Panel, LV switchgear Panel and auxiliary equipment such as power transformer, and combined with reasonable case for a complete set of substation.

The performance is fully met GB/T17467-1998 " MV/LV Prefabricated Substation", it is in view of the special requirements of the wind power generation and developed a new type of prefabricated substation, with the advantages of strong completion, easy installation, short construction period, low cost operation, high structural strength, strong anticorrosion performance etc, fully applicable to the poor natural condition for running, such as the beach, grassland, desert etc. The type testing is inspected by Shanghai power transmission & distribution testing center, the performance is fully met the requirements of wind farms use.

The main difference between YBM(P) 29 - 40.5/0.69kV and NYBM(P)77-40.5/0.69 kV are as following, the main transformer are installed outside of the enclosure for YBM(P) 29 -40.5/0.69 kV, it is more advantageous to the heat dissipation and transformer maintenance, and for NYBM(P)77-40.5/0.69kV, the main transformer is installed within the case, it is better for protective effect.

2 Working Condition

2.1 Normal service conditions

- Running environment temperature: ambient air temperature is less than 45 ℃, and the average value shall not more than 35 ℃within 24 hours. The Minimum ambient air temperature is- 30 ℃
- Relative humidity: Relative humidity of daily mean shall no more than 95%. Water vapor pressure of daily mean shall no more than 2.2 kPa. Relative humidity of monthly mean shall no more than 90%. Water vapor pressure of monthly mean shall no more than 1.8kPa
- Altitude:≤1000m
- Seismic restraint capacity:
  Horizontal earthquake acceleration: below 0.4m/s2
  Vertical earthquake acceleration: below 0. 2m/s2
  Safety factor: 1.67
- Mounting points without severe movements, and no more than 3° inclination
- Outdoor wind speed: not more than 35m/s
- There should be no conductive dust, corrosive, flammable and explosive hazardous articles which are harmful to metal and insulator

2.2 Special service conditions

Customized design is available.

3 Main Technical Parameters

3. 1 Rated Parameter for Prefabricated Substation

- Voltage
  High voltage side: 40.5kV
  Low voltage side: 0.69kV
- Rated frequency: 50Hz
- Rated insulation level
  The rated insulation level of switch gear panel can meet requirements of DL404-91" indoor AC high voltage switchgear panel".

HV Side	To Earth and between poles	Between open contacts
Power frequency withstand voltage	95kV	110kV
Impulse peak Withstand voltage	185kV	215kV
LV Side:		
Power frequency withstand voltage	2500V	

- Phase Number: Three Phase
- Protection Level: IP44D

NFZ77-40.5D/T1250-20

NFZR77-40.5D/T63-31.5

3.2 Main Technical Parameter for Transformer

- Technical Standard

  Transformer can meet the standard of GB1094.1～1094.5 "Power Transformer" and GB6451.1" Three Phase Oil immersed Power transformer technical Parameter and requirement".

- Technical Parameter

  1) Type：S11-M、S9-M
  2) Rated Capacity: 500～2500kVA
  3) Rated Voltage：HV 40.5kV　　LV 0.69kV
  4) Ratio：0.69/40.5（kV）
  5) No-load Loss：≤1.7 kW
  6) Load Loss：≤15 kW

3. 3 Technical Parameter for HV Switchgear

- Vacuum load switch and Fuse-combination Unit

  Type: NFZ77-40.5D/T1250-20 Indoor HV AC Vacuum load switch for wind power use.
  NFZR77-40.5D/T63-31.5Indoor HV AC Vacuum load switch & combination Unit for wind power use.

Use the vacuum load switch and Fuse-combination unit, the element choice are according to the requirements of GB16926"HV AC load switch-fuse combination unit"

Main Technical Parameter for Vacuum load switch and Fuse-combination Unit

SN	Item		Unit	Parameters	
					NFZR77-40.5D/T63-31.5
1	Rated Voltage			NFZ77-40.5D/T1250-20	40.5
2	Rated Frequency		kV	40.5	50
3	Rated Current		Hz	50	63
4	Rated Insulation	1min Power Frequency withstand Voltage	A kV	1250	Vacuum contacts, between poles, and to earth 95; Open contacts 110
		Lightning impulse withstand voltage(peak)	kV		Vacuum contacts, between poles, and to earth 185; Open contacts 215
5	Rated peak withstand current		kA	50	/
6	4s rated short time withstand current		kA	20	/
7	Rated active load breaking current		A	1250	/
8	Rated closed circuit breaking current		A	1250	/
9	rated cable-charging breaking current		A	21	/
10	Rated short-circuit breaking current		kA	/	31.5
11	Rated handover current		A	/	1200
12	Fuse Type			/	XRNT3A-40.5/□ -31.5
13	Impactor energy output		J	/	2～5
14	Rated short-circuit making current		kA	50	80(peak)
15	Rated peak withstand current for earthing switch		kA	50	50
16	4s rated short time withstand current for earthing switch		kA	20	20
17	Rated voltage for auxiliary circuit(DC&AC)		V	220；110	220；110
18	Mechanical Life		times	10000	10000

- Fuse

  1) Type：XRNT-40.5
  2) Rated Voltage：40.5kV

- Surge Arrestor

  1) Style：Silicone rubber coat non-clearance metal zinc oxide surge arrestor
  Type：YH5WZ-51/134
  2) Rated voltage：51kV
  3) Continuous-running voltage：40.8kV

***Notes**: 40.5kV side, according to the requirement of the user, the C - GIS gas insulated switchgear or other types of switchgear could be used.*

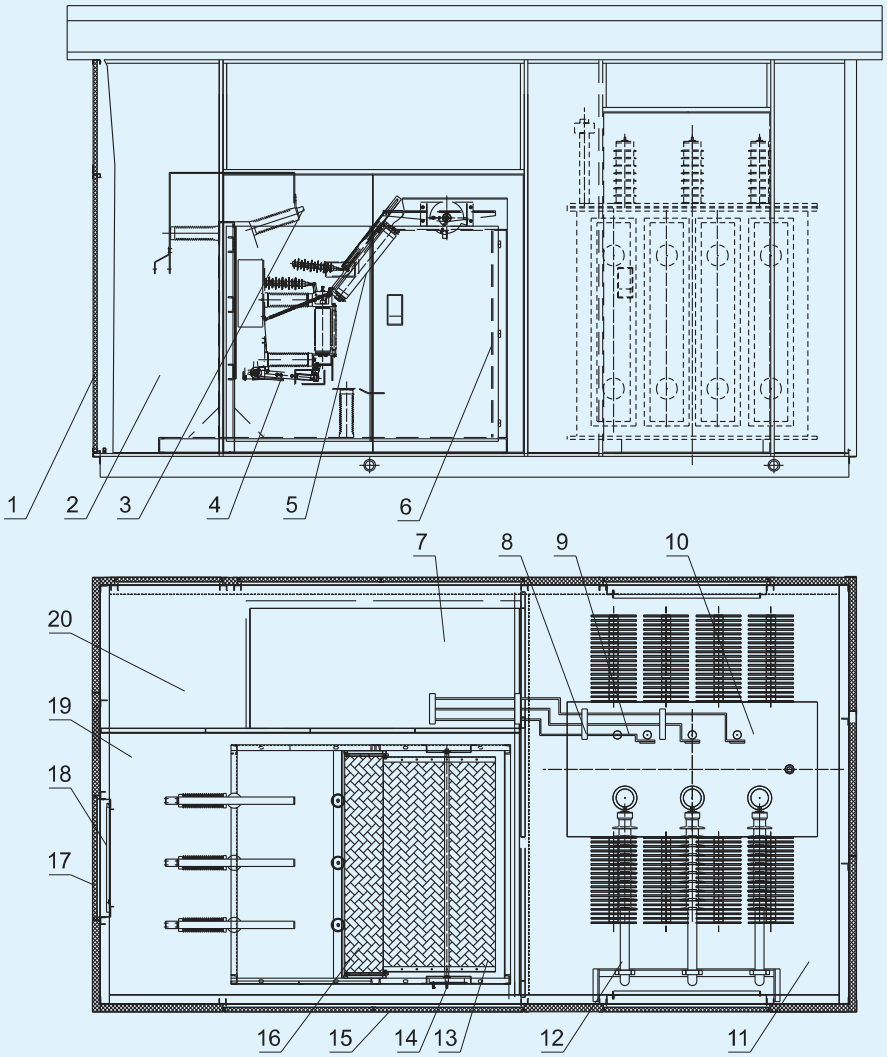
3.4 LV switchgear is produced strictly according to GB725.1、IEC60439 and wind farm conditions.

- LV main circuit breaker

  1) Type
  2) Rated voltage

Prefabricated Substation

Figure 1: YBM(P)77-40.5/0.69kV Common type MV/LV Prefabricated Substation Structure Illustration



1. Enclosure case of Prefabricate substation
2. 40.5kV Outgoing cable bay
3. Stationary contact of vacuum composite apparatus
4. Complete equipment with 40.5kV vacuum composite apparatus
5. Fuse
6. Maintenance door for 40.5kV side
7. LV switchgear
8. LV busbar fix racket
9. Busbar connect from LV main incoming switchgear to transformer room
10. Transformer
11. Transformer room
12. Connect cable for 40.5kV side
13. Insulation board for isolating equipment (upper)
14. Insulation board mechanism for isolating equipment
15. HV room door
16. Insulation board for isolating equipment (lower)
17. HV cable room door
18. Protection door for 40.5kV maintenance room
19. HV room
20. LV room

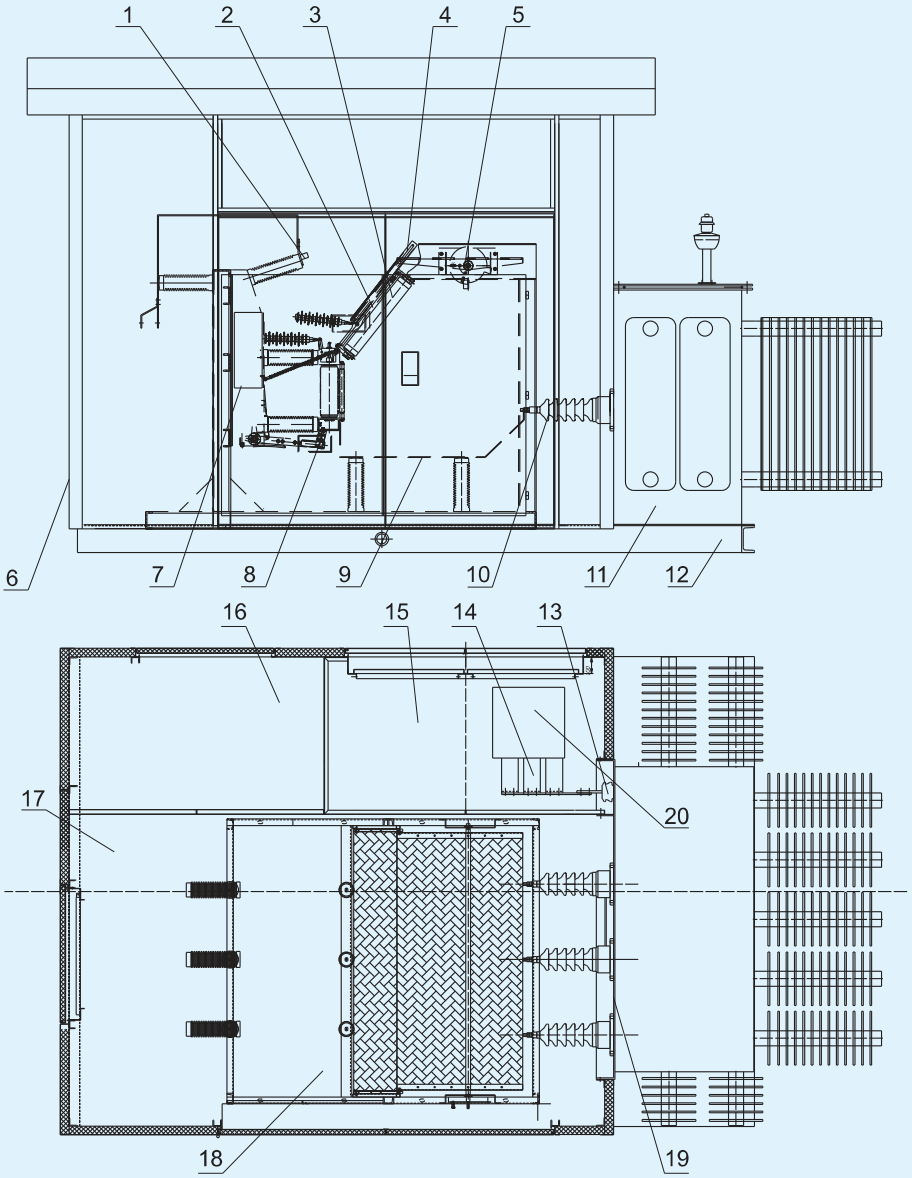
4.2 NYBM(P)77-40.5/0.69kV compact type MV/LV Prefabricated Substation

NYBM(P)77-40.5/0.69kV compact type MV/LV Prefabricated Substation is a model designed based on common type prefabricated substation model: YBM(P)77-40.5/0.69kV. It mainly arranges the radiator of transformer into the enclosure case of substation. And extend MV/LV incoming and outgoing bushing into related functional room through one side face. This design not only better solved heat radiating but also compact the whole structure.
We have applied for a patent from National Patent Bureau.
Patented invention: Isolation interlock equipment for 40.5kV vacuum composite apparatus equipment set (Patent application No: 200810203333.9, Publication No: CN101409174A)

Utility Design Patent: 40.5kV Compact type wind power generation prefabricated substation (Patent application No: 200920072002.6), Design patent: compact composed prefabricated substation (Patent application No: 200930098120.X).

Prefabricated Substation

Figure 2 MV/LV prefabricated substation structure drawing



1. Static contact of vacuum composite apparatus
2. Insulation plate
3. Moving contact of vacuum composite apparatus
4. Fuse
5. Insulated interlocking device
6. Enclosure
7. 40.5kV Vacuum composite apparatus complete equipments
8. 40.5kV Vacuum composite apparatus
9. HV connecting busbar
10. Transformer HV outgoing terminal
11. Transformer
12. Base
13. Transformer LV outgoing terminal
14. LV connecting busbar
15. LV room
16. Mantainance room
17. HV cable outgoing room
18. HV room
19. Transformer outgoing terminal mounting panel
20. LV circuit breaker

HV/LV Busbar Trunking System

www.chint.com en.chintelectric.com

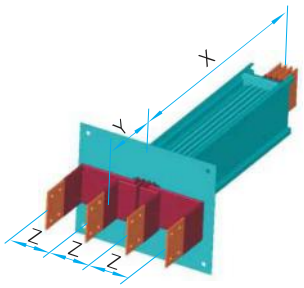
6. Function Unit

Every busbar system are constituted with many independent functional units. The following are the specifications of various kinds of functional units, type choosing and the means to order non-standard products of N series of bus way. (Normal specifications are with *)

6.1 Start terminal (or Incoming feeder section)

The start terminal and origin box comprise the power incoming unit of the bus way, which can also be applied to the connection between the transformer and the switchgear panel.

Sheet 5

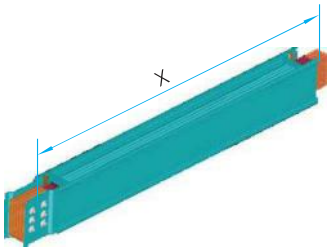
X	Y	Z	Functional code	Diagram
500	250	100	(B-1) *	
500	250	150	(B-2)	
500	250	200	(B-3)	
Non-standard size	Non-standard size	Non-standard size	(B-X+Y+Z)	

6.2 Straight sector

The straight sector is defined as feed type and plug-in type. The feed type has no jack, used as power transmission. The plug-in type has jacks on both sides of the straight sector, and can distribute the power through installing the plug-in box.

The gap between the plugs should be larger than 600mm, less than 6m.

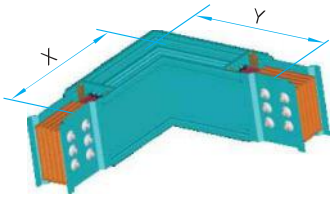
Sheet 6

X	Quantity of jacks (n)	Function code	Diagram
1000	4	(A-1)	
2000	8	(A-2)	
3000	12	(A-3) *	
Non-standard size	Non-standard No.	(A-X+n)	

6.3 L shaped horizontal elbow

L shaped horizontal elbow works as the connection unit when bus way bends in horizontal direction.

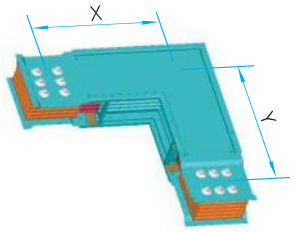
Sheet 7

X	Y	Function code	Diagram
400	400	(LS-1)	
500	500	(LS-2) *	
600	600	(LS-3)	
Non-standard size	Non-standard size	(LS-X+Y)	

6.4 L shaped vertical elbow

L shaped vertical elbow works as the connection unit when bus way bends in vertical direction. And the bending angle is 90° .

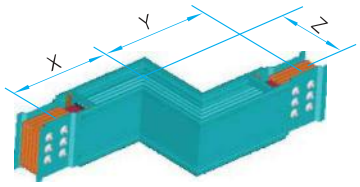
Sheet 8

Rated current (A)	X	Y	Function code	Diagram
250~2000	500	500	(LC-1) *	
2500~3150	600	600	(LC-2) *	
4000~5000	700	700	(LC-3) *	
	Non-standard size	Non-standard size	(LC-X+Y)	

6.5 Z shaped vertical elbow

Z shaped vertical elbow works as the connection unit when bus way bends in horizontal direction. Z is the departure dimension.

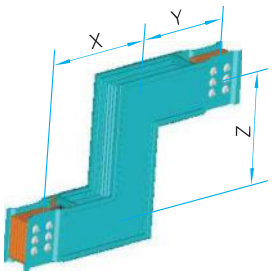
Sheet 9

X	Y	Z	Function code	Diagram
500	500	200	(ZS-1)	
500	500	300	(ZS-2) *	
500	500	500	(ZS-3)	
Non-standard size	Non-standard size	Non-standard size	(ZS-X+Y+Z)	

6.6 Z shaped vertical elbow

Z shaped vertical elbow works as the connection unit when bus way bends in vertical direction, Z is the departure dimension.

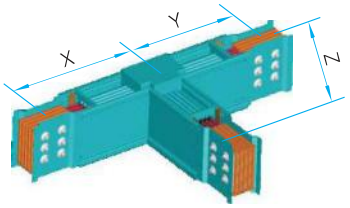
Sheet 10

Rated current (A)	X	Y	Z	Function code	Diagram
250~2000	500	500	200	(ZS-1)	
2500~3150	500	500	300	(ZS-2) *	
4000~5000	500	500	500	(ZS-3)	
	Non-standard size	Non-standard size	Non-standard size	(ZS-X+Y+Z)	

6.7 T shaped horizon elbow

T shaped horizontal elbow works as the connection unit when bus way bends in horizontal direction.

Sheet 11

X	Y	Z	Function code	Diagram
400	400	400	(TS-1)	
500	500	500	(TS-2) *	
600	600	600	(TS-3)	
Non-standard size	Non-standard size	Non-standard size	(TS-X+Y+Z)	

5. Accompanying Document

5.1 Product certificate

5.2 Operation instruction manual

5.3 Packing list, shipping list

5.4 List of accessories , easily damaged parts , spare parts , special parts.

a) Accessories includes : installation material , bolts , earthing wire

b) Easily damaged parts include: Insulator, heat shrinkable tubings, bus clamps, etc.

5.5 Delivery inspection report

5.6 Other technical document required by the contract.

6. Ordering Information

Please specify the following information when ordering:

6.1 Environment condition. Two sides could solve it by consulting for special environment condition.

6.2 Ratings

6.3 Installation requirements or drawings on site.

6.4 We could send engineers to measure on site if needed.

CHINT

Dry-type Transformer

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Sales References

Dry-type Transformer

CHINT Electric dry-type transformers are widely adopted by Industrial End Users from Australia, Japan, Italy, France, South Africa, Bangladesh, Saudi Arabia, etc. like Saint Gobain, VISY Paper, SACOL, etc.; Utility Users from Laos, etc. and Engineering Companies from Australia, Lebanon and so on.

- Visy Paper Pty Ltd - Australia
- ICAN Company Ltd - Japan
- National Electricity Company - Laos
- CODELCO - Chile
- Saint Gobain - China Heilongjiang Ceramic Material Factory - France
- Malabo International Convention Center Project - Equatorial Guinea
- Ampcontrol Africa (Pty) Ltd - South Africa
- South African Coal and Oil (SASOL) - South Africa
- Barrick Gold - South Africa
- China National Heavy Machinery Corporation (CHMC) - Turkey
- Kingdom Iron & Steel Holding Company - Saudi Arabia
- NGS Cement Plant - Bangladesh

……

※ Note: Contact us for more detailed sales references.

Dry-type Transformer

1. General

1.1 Main Feature

- Dry-type transformer mainly consists of core and windings, it doesn't immerse in insulating liquide. Our dry-type transformer designs according to IEC standards and China national standards.
- With no leakage of oil and gas , security, environmental protection, and low-noise performances.

1.2 Application

- Mainly used for locations having special fire safety requirements such as commercial buildings,high-rise buildings,airports, industrial and mining enterprises, power plants, oil platforms, subways and tunnel.
- Applicable for 50/60Hz system.

1.3 Working Condition

- Max.ambient temperature: +40℃
- Max.daily average ambient temperature : +30℃
- Max.annual average ambient temperature: +20℃
  Min. temperature: -5℃ (indoor installation)
- Min. temperature: -30℃ (outdoor installation)
  Altitude: ≤1000m
- Relative humidity: ≤93%, no dews on the winding surface.
- Customized products are available.

1.4 Standard

- IEC 60076-11:2004; ANSI, etc.

SC(B) Epoxy Resin Cast Dry-type Transformer

Type Designation

S C (B) □ - □/□

- Rated voltage (kV)
- Rated power (kVA)
- Design code
- Foil winding
- Resin cast
- Three-phase

SG(B) H-class Impregnated Insulated Dry-type Transformer

Type Designation

S G (B) □ - □/□

- Rated voltage (kV)
- Rated power (kVA)
- Design code
- Foil winding
- Dry-type, natural air cooling
- Three-phase

SCBH15 Amorphous Alloy Core Dry-type Transformer

Type Designation

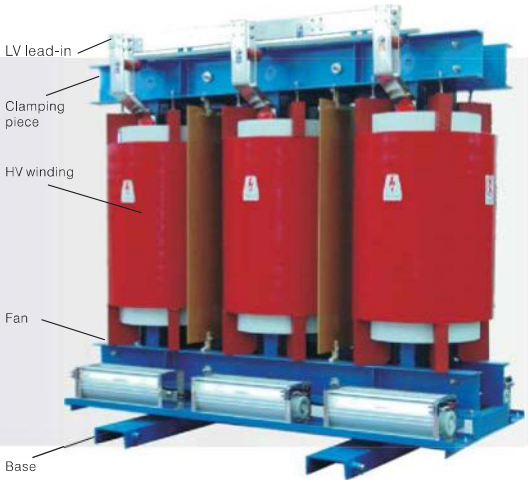
S C B H 15 — □ / □

- Rated voltage (kV)
- Rated power (kVA)
- Loss level code
- Amorphous alloy core
- Foil winding
- Forming solid (Casting)
- Three-phase

2. Technical Feature

2.1 Transformer technology of CHINT Power T&D is based on model experiments, self-developed calculation software of leakage flux, short circuit mechanical strength, on load losses etc, to realize overall optimization of electrical performance of transformer, therefore low-cost and high-performed solutions could be provided to the customers.

2.2 The structure design is based on three-dimension finite element analysis software ,to do analysis on transformer iron core and clamping pieces,which provides a guarantee to enhance mechanical strength,anti-short-circuit capacity and reduce noise.

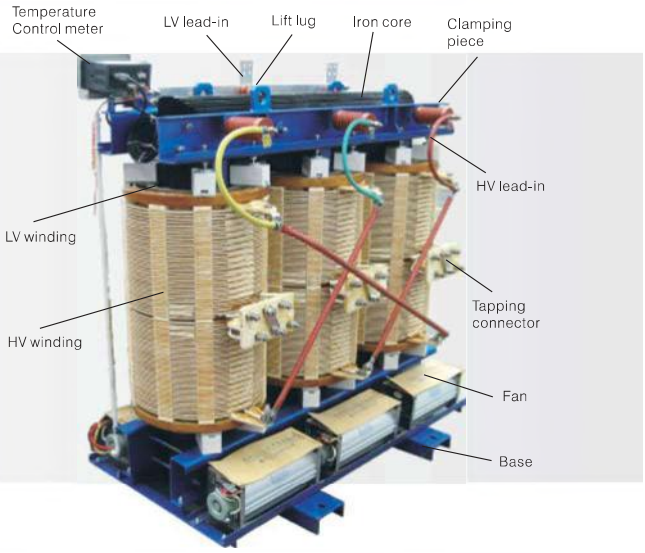


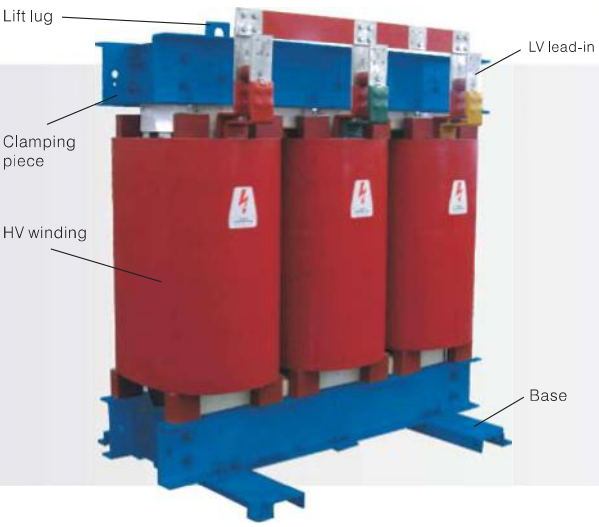
Performance Feature

- Safety, fireproofing, non-polluting, direct operation on the load center.
- Strong mechanical strength, excellent insulation capacity, low partial discharge ,strong radiation capability, high reliability and long life.
- Low loss, low noise, energy-saving.
- High heat dispersion and strong serviceability , forced air cooling can improve the operation of capacity.
- High humidity-resistant, environmental protection, fire-retardant, explosion-proof, less maintenance compact design and light weight.

Performance Feature

- Lower temperature rise, long thermal life.
- Fire-retardant, long time burning under 800˚C high temperature without smoke generation.
- Strong thermal shock resistance ,at -50˚C can immediately increase full load.
- High humidity-resistant performance.
- Low loss, a significant energy saving effect.
- Easy recycling on insulating material and copper at life end for envirnmental protection.
- Temperature control meter.





Performance Feature

- Safe, reliable, no pollution, can operate directly in the load center;
- High mechanical strength, strong ability to withstand short circuit, low partial discharge, good thermal stability, high reliability, long use life;
- Low no-load loss, high performance, low noise, efficient energy conservation;
- High thermal performance, high operation capacity, when forced air cooling the capacity can be improved to run;
- Good moisture resistant ability, can operate in high humidity and other harsh environments;
- With features of environmental protection, flame retardant, explosion-proof and free of maintenance;
- Small size, light weight;

3. Structure Feature

3.1 Iron Core

The iron core is made of high quality, cold-rolled, granule-oriented silicon-steel sheets and machined with completely automatic cutting line，superposed with 45 ° six-level bias seams.Core column adopts special banding technique，the surface of iron core is painted with the special rustproof coating to resist humidity and rust,which can effectively reduce the no-load losses, no-load current and iron-core noise.Facilitated with six sets of cutting lines for iron core such as, Soenen from Belgium.

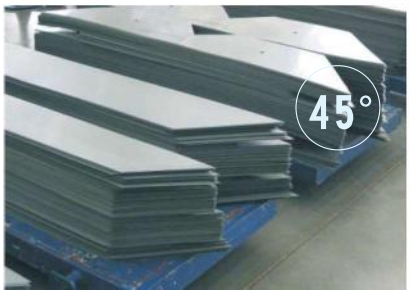
◀ Silicon steel sheet

▼ Core cutting line (transverse)

▲ Cutting line (Slitting)

▲ ③ Automatically stacked silicon steel sheets ▲ ② Silicon steel sheet cutting

▲ ① Sending materials



▲ The silicon steel sheet folded

▲ Iron core overlapping

▲ Core joints

▲ Core molding

Dry-type Transformer

▲ Amarphous alloy core shearing line

◀ Conveyor feed

Automatic cutting & stack ▶

Iron core rolling machine

▲ Pack up iron core

▲ Rall up iron core

▲ Amorphous alloy core corss sectiong

▲ Fixation

3.2 Winding

F-class insulation HV winding: it is made of lacquered wire. With hardness ranges from 120 to 210 Mpa. The insulation material is a composite of silicon micro-powder and epoxy resin, featuring high performances of good thermal shock resistance,fire resistance, no emission of hazardous gases, good heat dispersion and low winding temperature rise.

▲ F-class insulation HV winding

▲ Vacuum casting, drying workshop

▲ Vacuum casting equipment from Germany HÜBERS adopts patented technology such as film defoaming and static mixer,ensure the transformer low partial discharge .

▶ Epoxy resin composite material

▲ HV F-class insulation windings before casting

▲ Vacuum dry oven

Dry-type Transformer

- H-class insulation HV winding: it adopts NOMEX paper wrapped flat copper wire and continuous winding process. The winding made after dry treatment by VPI vacuum pressure device, several times impregnated in special H class insulating paint,and baking features high mechanical strength, good heat dispersion.

▲ Vacuum impregnation device

▲ HV H-class insulation winding

- LV winding: LV winding is mainly made of foils. It adopts interior argon gas protection welding,with high precision and reliability as no external welding joint. It solves the winding turns imbalance , effectively improves thermal performance and enhance short circuit withstanding capability.

▲ LV foil winding

▲ TUBOLY LV foil winding machine from Switzerland which with constant tension, deburring, automatic bypass system and the corrective function

4. Component

4.1 Protection Enclosure

Protection enclosure can be made of general steel plate,stainless steel plate or aluminum alloy materials. For example, protection enclosure of IP20 can prevent solid object which is 12mm from entering, and this type is suitable for indoor installation. Protection enclosure of IP23 inherits the characters of IP20 enclosure and can prevent water dropping at an angle within 60° to the vertical line from inflooding, as well which is adapted to outdoor installation.

Enclosure of steel plate

Enclosure of stainless steel plate

Enclosure of aluminum alloy plate

4.2 Temperature Control Device

Transformer temperature control protection device adopts double-sensor principle of PTC nonlinearity resistance and PT100 linearity resistance. It has functions of LED temperature display,temperature setting. It can keep highest temperature data, automatically alarm and trip signal and start / stop the fan either automatically or manually. Various special temperature devices can be equipped according to the demand of the customer.

4.3 Air Cooling System

Usually, the cooling system of transformer is natural air cooling(AN),then the transformer can continuously operate at rated power. Cooling system can be provided according to customers' requirements. The fan is controlled automatically by the temperature controller to ensure the normal temperature rise when the load exceeds the rated load.

Temperature control device

Cross-flow cooling fan

5. Quality Management, Product Certificate, After-sales Service

5.1 Quality Management

▲ Testing control room ▲ Lightning impulse generator ▲ Partial discharge test ▲ Power frequency voltage test

Quality Control Management

- **QC System**
  - *Quality Management System: ISO9001*
  - *Environmental Management System: ISO14001*
  - *Occupational Health & Safety Management: OHSAS18001*
  - *Survey Management System: ISO10012*
- **QC Policy**
  - *To create a world famous brand and to provide satisfied products and solutions for customers.*
- **QC Activities**
  - *An independent and systematic QC system, 30 quality control points for each key procedures.*
  - *Training of total quality control philosophy for new employees each year..*
  - *"Quality Month" in May each year to improve quality awareness.*
  - *Internal audit in April every year.*
- **QC Review**
  - *Scheme the quality improvement each year.*
  - *Record and analyze quality loss each month to correct and prevent significant defects.*
- **QC Honors**
  - *National Quality Management Award.*
  - *China Top Quality Management Award.*

Quality Control Application

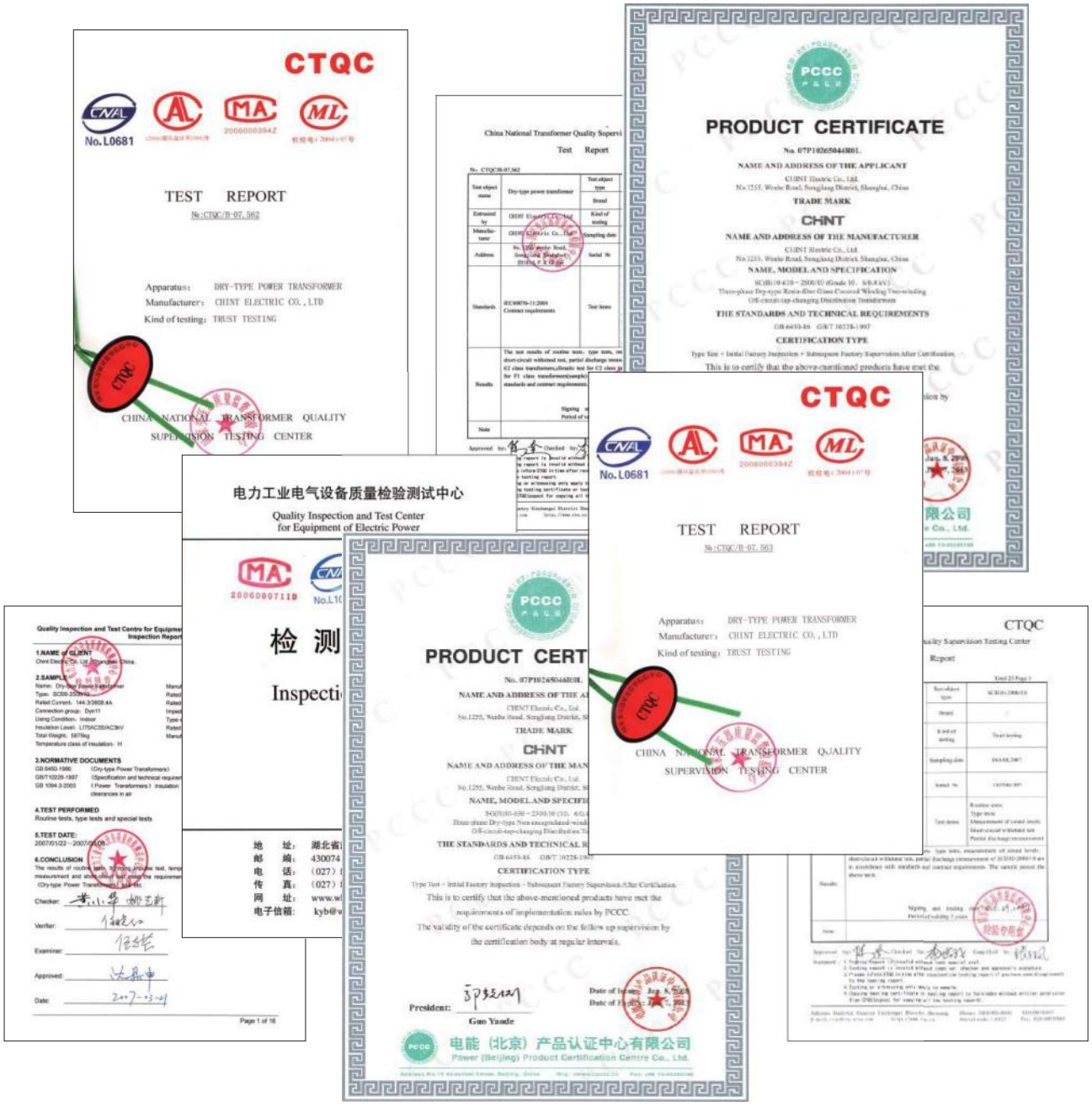
- **Raw Material**
  - *All the suppliers for raw materials are strictly selected.*
  - *Materials outsourced are strictly tested.*
- **Process Control**
  - *Quality inspectors are responsible for process inspection and final quality inspection.*
  - *Quality engineers are responsible for random inspections and quality auditing.*
- **Delivery & Test**
  - *Finished products are strictly tested before delivery.*
  - *Third party inspection and end user inspection are scheduled before delivery.*
- **Zero Defect**
  - *We adopt the Zero Defect Theory from Philip B. Crosby to make things right from the beginning.*





5.2 Product Certificate

35kV and below dry-type transformer has obtained type test reports from China National Transformer Quality Supervision Testing Center and Electric Power Industry Equipment and Instrument Quality Inspection Testing Center.



5.3 After-sales Service

After-sales Service

- **After-sales Service Team**
  - Standard procedures with feedback collection, problem tracking and problem shooting.
  - In-time and efficient solutions to solve problems.
  - Systematical service improvement through problem feedback and tracking.
- **After-sales Service Network**
  - Professional engineers are sent abroad for on-site service, installation guidance, maintenance and handing emergencies.
  - Local service partners are selected for installation and maintenance supports.
  - Global service network being built in order to provide convenient local after-sales service to different customers.

6. Customer-oriented Support System

Professional & Fast customer support system was set up to ensure customer satisfaction.

Customer-oriented Support System

- **Sales Service Team**
  - Multi-language service team.
  - Experienced engineers and sales representatives are chosen to provide professional service and support.
  - Customer-oriented solutions are provided.
- **Customer Oriented**
  - Customized products and solutions are available according to clients' requirements.
  - Customized products meet local standards like AS standard in Australia, etc.
  - Regular internal inspection and supervision on contract execution.
- **Functional Service**
  - Quick-response logistics and finance system to support contract.
  - Strategic collaboration with global renowned logistics service provider to improve global transportation solutions even in tough conditions.
  - Service tracking system and termly customer feedback evaluation system.
- **Punctual Delivery**
  - Large scale production capacity ensures short manufacturing period.
  - Shortest delivery time on special requirements.

10kV Dry-type Transfomer

20kV Dry-type Transfomer

35kV Dry-type Transfomer

7. Main Technical Parameter

7.1 Epoxy Resin Cast Dry-type Transformer

※Note:Customized and more-efficient dry-type transformer is available on your requirements.

7.1.1 9 Series 10kV Free Excitation Voltage Regulation Distribution Transformer Sheet 1

Model	Voltage combination			Connection symbol	No-load loss (W)	Load loss under F class (W) (120˚C)	No-load current (%)	Short circuit impedance (%)
	HV (kV)	HV tap range	LV (kV)					
SC9-30	6; 6.3; 6.6; 10; 10.5; 11	±5 or ±2×2.5	0.4	Dyn11 or Yyn0	220	750	2.4	4
SC9-50					310	1060	2.4	
SC9-80					420	1460	1.8	
SC9-100					450	1670	1.8	
SC9-125					530	1960	1.6	
SC9-160					610	2250	1.6	
SC(B)9-200					700	2680	1.4	
SC(B)9-250					810	2920	1.4	
SC(B)9-315					990	3670	1.2	
SC(B)9-400					1100	4220	1.2	
SC(B)9-500					1310	5170	1.2	
SC(B)9-630					1510	6220	1.0	
SC(B)9-630					1460	6310	1.0	6
SC(B)9-800					1710	7360	1.0	
SC(B)9-1000					1990	8610	1.0	
SC(B)9-1250					2350	10260	1.0	
SC(B)9-1600					2760	12400	1.0	
SC(B)9-2000					3400	15300	0.8	
SC(B)9-2500					4000	18180	0.8	
SC(B)9-1600					2760	13700	1.0	8
SC(B)9-2000					3400	16900	0.8	
SC(B)9-2500					4000	20000	0.8	

7.1.2 10 Series 10kV Free Excitation Voltage Regulation Distribution Transformer Sheet 2

Model	Voltage combination			Connection symbol	No-load loss (W)	Load loss under F class (W) (120˚C)	No-load current (%)	Short circuit impedance (%)
	HV (kV)	HV tap range	LV (kV)					
SC10-30	6; 6.3; 6.6; 10; 10.5; 11	±5 or ±2×2.5	0.4	Dyn11 or Yyn0	190	710	2.4	4
SC10-50					270	1000	2.4	
SC10-80					370	1380	1.8	
SC10-100					400	1570	1.8	
SC10-125					470	1850	1.6	
SC10-160					540	2130	1.6	
SC(B)10-200					620	2530	1.4	
SC(B)10-250					720	2760	1.4	
SC(B)10-315					880	3470	1.2	
SC(B)10-400					980	3990	1.2	
SC(B)10-500					1160	4880	1.2	
SC(B)10-630					1340	5880	1.0	
SC(B)10-630					1300	5960	1.0	6
SC(B)10-800					1520	6960	1.0	
SC(B)10-1000					1770	8130	1.0	
SC(B)10-1250					2090	9690	1.0	
SC(B)10-1600					2450	11730	1.0	
SC(B)10-2000					3050	14450	0.8	
SC(B)10-2500					3600	17170	0.8	
SC(B)10-1600					2450	12960	1.0	8
SC(B)10-2000					3050	15960	0.8	
SC(B)10-2500					3600	18890	0.8	

CHINT

Switchgear Panel

MV Switchgear Panel

MV Air-insulated Ring Main Unit (RMU)

LV Switchgear Panel

LV Control Signal Panel

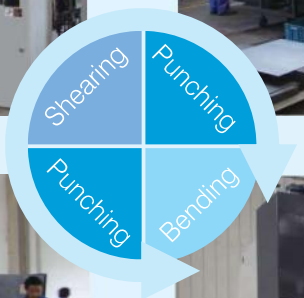
1. Metal Sheet Process

CHINT T&D has world level facilities for manufacturing of switchgears: flexible sheet metal processing production line, laser cutting production line, CNC bending machines, and industrial wastewater treatment recycling facilities and so on. The equipment level ranks at the forefront in the industry.

Metal Sheet Processing

▼ FMS-C3000-type metal sheet processing line

▼ SKYY31530C-type CNC turret pressure machine



▲ M-2048LT CNC multi-station pressure

▲ PPEB220-30-5 CNC bending machine

2. Production Process

Assembly

Wiring

Storage

Inspection

Finished products

3. Quality Management, Certification and Sales Service

3.1 Quality Management

Quality Control Management

- **QC System**
  - *Quality Management System: ISO9001*
  - *Environmental Management System: ISO14001*
  - *Occupational Health & Safety Management: OHSAS18001*
  - *Survey Management System: ISO10012*
- **QC Policy**
  - *To create a world famous brand and to provide satisfied products and solutions for customers.*
- **QC Activities**
  - *An independent and systematic QC system, 30 quality control points for each key procedures.*
  - *Training of total quality control philosophy for new employees each year..*
  - *"Quality Month" in May each year to improve quality awareness.*
  - *Internal audit in April every year.*
- **QC Review**
  - *Scheme the quality improvement each year.*
  - *Record and analyze quality loss each month to correct and prevent significant defects.*
- **QC Honors**
  - *National Quality Management Award.*
  - *China Top Quality Management Award.*

Quality Control Application

- **Raw Material**
  - *All the suppliers for raw materials are strictly selected.*
  - *Materials outsourced are strictly tested.*
- **Process Control**
  - *Quality inspectors are responsible for process inspection and final quality inspection.*
  - *Quality engineers are responsible for random inspections and quality auditing.*
- **Delivery & Test**
  - *Finished products are strictly tested before delivery.*
  - *Third party inspection and end user inspection are scheduled before delivery.*
- **Zero Defect**
  - *We adopt the Zero Defect Theory from Philip B. Crosby to make things right from the beginning.*

QC System Certification





Test Report and Certification

Quality Management Procudure

Lightning impulse ▲ testing platform

▲ On-site test

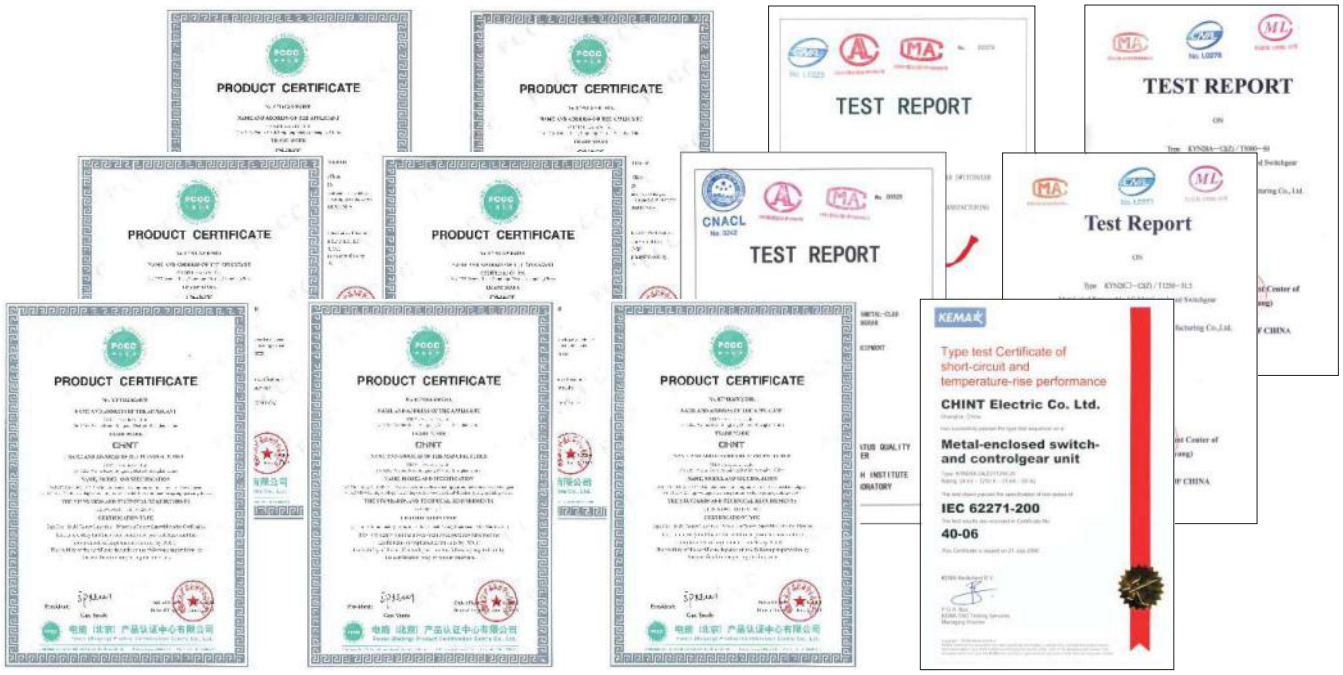
Power frequency withstand ▲ voltage testing platform

▲ Remote monitoring

▲ Temperature rise test

3.2 Certification

CHINT T&D's products are evaluated by STL (Short-Circuit Testing Liaison) laboratories such as KEMA, CESI and other international certification like PCT (GOST),TUV; and tested by CNAS (ilac member in China) laboratories such as CTQC, SEPTDTD, etc.



4. Typical Product

MV (12kV~40.5kV) Metalclad Switchgear Panel, Withdrawable Type

KYN28A–24 (Z) Metalclad Switchgear Panel, Withdrawable Type

1. General

1.1 Ratings: system voltage 24kV, rated current up to 1250A, AC 50/60Hz.
1.2 Application: applicable for power receiving and distribution of power plant and substations for control, protection and measurement.
1.3 Standards: IEC 62271-200

2. Type Designation

K Y N 28A-24 (Z)

- (Z) Vacuum circuit breaker
- 24 Rated voltage (kV)
- 28A Design No.
- N Indoor
- Y Withdrawal type
- K Metalclad type

3. Working Condition

3.1 Ambient air temperature: -15℃～+40℃ (-25℃～+45℃ available as customized products)
3.2 Altitude: ≤1000m
3.3 Relative Humidity: Daily average ≤95%
Monthly average ≤90%
3.4 Earthquake intensity: ≤magnitude 8
3.5 Applicable in the places without corrosive or flammable gas and steam pollution.
※ Note: Customized products are available.

4. Main Technical Parameter

Item	Unit	Data
		CB fitted
		NV1-24
Rated voltage	kV	24
1 min power frequency withstand voltage	kV	(50)65
Rated impulse withstand voltage (peak)	kV	125
Rated frequency	Hz	50(60)
Rated current	A	630 1250 1600 2000 2500 3150
Rated current of branch bus	A	630 1250 1600 2000 2500
Rated short time withstand current	kA	16 20 25 31.5
Rated peak withstand current	kA	40 50 63 80
Rated short circuit continuous time	s	4
Protection level		Shell: IP4X, IP2X when CPT and CB door are open
Weight	kg	800,1000(rated current ≥1600A)

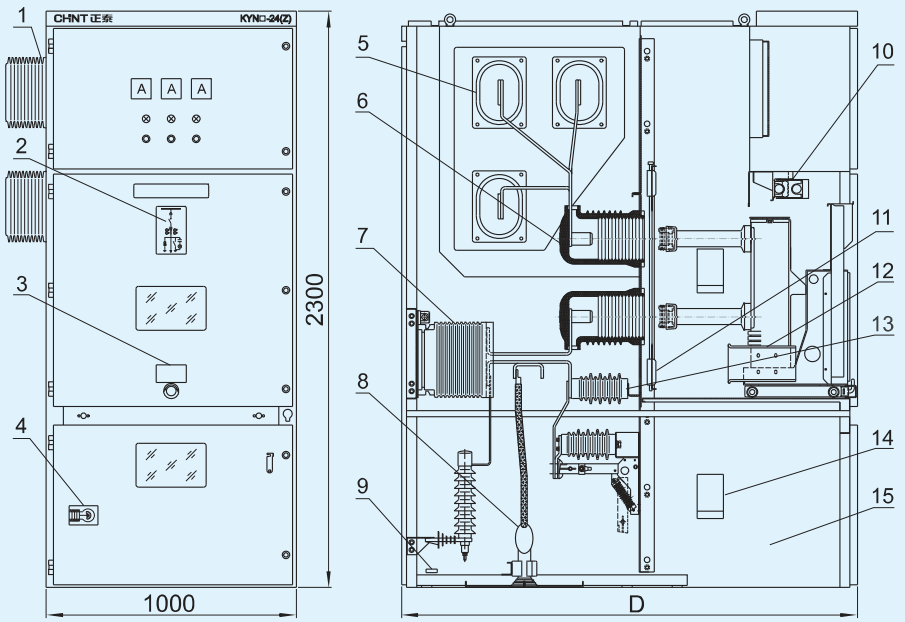
5. Construction

5.1 Compact Design

The switchgear is featured for its outstanding insulation level in its compact design with no necessity of the compund insulation and inter-phase clapboard.

5.2 Reliable structure and easy installation

Switchgear panel construction (unit:mm)

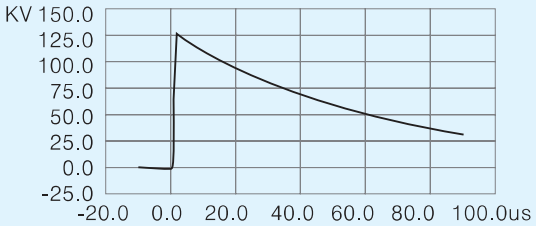


1.Passing bushing 2. Primary diagram 3. Nameplate 4. Lighting lamp 5. Main bus 6. Contact box 7. CT 8. Incoming cable 9. Earthing bus bar 10. Secondary interlocking device 11. Valve mechanism 12. CB trolley 13. Insulator 14. Heater 15. Frame

Depth D (mm)	Cable outgoing feeder	1820
	Overhead incoming and out going feeder	2150

5.3 Anti-lightning impulse capability

Oscillogram-lightning impulse voltage test



Upk=125.33kV

T1=1.11us

T2=45.45us

5.4 Trolley

The frame of trolley adoptes thin steel plate processed by CNC machine tool. The trolley co-ordinates insulatively with the switchgear so as to make the mechanical irrterlock safe and reliable. There are CB trolley, PT trolley and seperating trolley as per the application. Trolleys with the same specifications are inter-changeable.

In the switchgear, the trolley could be locked at three positions of breaking, testing and operating to ensure a reliable interlock.

The trolley is featured by compactness, which is convenient for check and maintenance.

Variety of trolleies

NV1-24 Circuit breaker with trolley

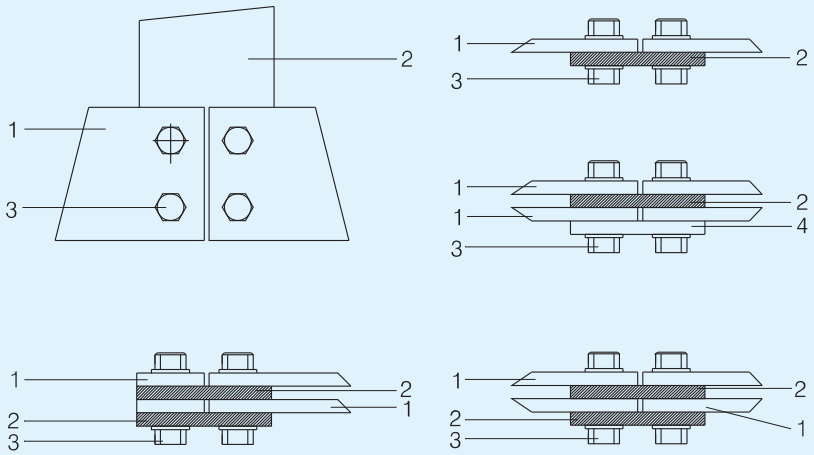
Isolation trolley

Voltage transformer with trolley

5.5 Bus Seperating

Two bus bars' connection could be applied under with trolley big current. The branch bus is connected to the static contact box and main bus without other supporters. Bus of the neighboring switchgear is fixed by the bush which could separate the failure arc from spreading.

Connection mode of the main bus bar and brach bus bar



1. Main bus 2. Branch bus 3. Screw 4. Spacer

KYN28A-12(Z)(GZS1)

KYN28A-12(Z)(NB)

KYN28A–12 (Z) Metalclad AC Enclosed Switchgear Panel, Withdrawable Type

1. General

1.1 Ratings: system voltage 3.6~12kV, rated current up to 3150A, AC 50/60Hz.

1.2 Application: applicable for power receiving and distribution and for control, protection and measurement of circuit.

1.3 Standards: IEC 62271-200

2. Type Designation

K Y N 28A-12 (Z) (□)

- Original GZS1 / Compact NB
- VCB
- Rated voltage(kV)
- Design No.
- Indoor
- Withdrawable type
- Metal-clad type

3. Working Condition

3.1 Ambient air temperature: -15℃~+40℃ (-25℃~+45℃ available as customized products)

3.2 Altitude:≤4000m

3.3 Relative humidity:

Daily average ≤95%, daily average water vapor pressure ≤2.2kPa

Monthly average ≤90%, monthly average water vapor pressure ≤1.8kPa

3.4 Earthquake intensity: ≤ magnitude 8

3.5 Applicable in places without corrosive, flammable gas and steam and places no regular severe shock.

※ Note: Customized products available.

4. Feature

4.1 KYN28A-12(Z)(GZS1) and KYN28A-12(Z)(NB) available.

4.2 Reliable "anti-5" mechanical latch, convenient and safe maintenance,

4.3 Both VCB of ZN63□ -12 developed by our company and VD4, VB2 AND 3AH manufactured by other companies around the world can be matched with the switchgear.

5. Main Technical Parameter

Item			Unit	Data
Rated voltage			kV	3.6, 7.2, 12
Rated frequency			Hz	50
Rated current of circuit breaker			A	630, 1250, 1600, 2000, 2500, 3150, 4000, 5000
Rated current of switchgear			A	630, 1250, 1600, 2000, 2500, 3150, 4000, 5000
Rated short time withstand current (4s)			kA	16, 20, 25, 31.5, 40, 50
Rated withstand current (peak)			kA	40, 50, 63, 80, 100, 125
Rated short circuit breaking current			kA	16, 20, 25, 31.5, 40, 50
Rated short circuit closing current (peak)			kA	40, 50, 63, 80, 100, 125
Rated insulation level	1min power frequency withstand voltage	Between poles, pole to earth	kV	24, 32, 42
		Between open contacts	kV	24, 32, 48
	Lightning impulse withstand voltage(peak)	Between poles, pole to earth	kV	40, 60, 75
		Between open contacts	kV	46, 70, 85
Protection level			Shell: IP4X; IP2X when the CPT and CB doors are open.	

※ Note: 1. The short circuit capacity of the current transformer should be separately considered.

2. See technical parameters of ZN63A-12 in related catalogues of our company.

KYN61–40.5(Z) Metalclad AC Enclosed Switchgear, Withdrawable Type

1. General

1.1 Ratings: system voltage 40.5kV, rated current up to 2000A, AC 50/60Hz.
1.2 Application: applicable for power receiving and distribution of power plant and substations for control, protection and measurement.
1.3 Standard: IEC 62271-200

2. Type Designation

K Y N 61 40.5 □/□-□ □ □ □

- Environmental features
- Operating mode
- Plan code
- Rated short-circuit breaking current (kA)
- Rated current (A)
- Type of CB
- Rated voltage(kV)
- Design No.
- Indoor
- Withdrawable type
- Metalclad enclosed switchgear

3. Working Condition

3.1 Ambient air temperature: -15℃～+40℃ (-25℃～+45℃ available as customized products)
3.2 Altitude: ≤1000m
3.3 Relative humidity: Daily average ≤95%
Monthly average ≤90%
3.4 Earthquake intensity: ≤magnitude 8
3.5 Applicable in the places without corrosive and flammable gas.
※ Note: Customized products are available.

MV (7.2 kV～17.5kV) Metal Enclosed Switchgear Panel, Fixed Type

XGN36–12 (DXG–12) Cubicle AC Metal Enclosed Switchgear Panel, Fixed Type

1. General

1.1 Ratings: rated voltage 3.6～12kV, with VCB 50/60 Hz, rated current up to 3150A, AC 50/60Hz.
1.2 Application: applicable in the system of three-phase single busbarfor power receive and distribution.
1.3 Standards: IEC 62271-200

2. Type and Designation

X G N 36-12/□–□

- Rated short-circuit making& breaking current
- Rated current
- Rated voltage
- Design No.
- Indoor
- Fixed type
- Cubicle type

3. Working Condition

3.1 Ambient air temperature: -25℃～+40℃ (-25℃～+45℃ available as customized products)
3.2 Altitude:≤1000m
3.3 Relative humidity: Daily average ≤95%
Monthly average ≤90%
3.4 Earthquake intensity: ≤magnitude 8
3.5 Applicable in the places without corrosive or flammable gas and steam pollution.
※ Note: Customized products are available.

4. Main Technical Parameter

Item		Unit	Data
Rated voltage		kV	3.6, 7.2, 12
Rated current		A	630, 1250
Rated withstand current (peak)		kA	40, 50, 63, 80
rated short-time withstand current		kA	16, 20, 25, 31.5
Making & breaking times at rated short-circuit current		Times	50
Mechanical life		Times	10000
Rated short-circuit continuous time		S	4
Rated breaking current		kA	16, 20, 25, 31.5
Rated insulation level	1min power frequency withstand voltage	kV	(Inter-phase, phase to earth) 42 (Open contact) 48
	Linghtning withstand voltage	kV	(Inter-phase, phase to earth) 75 (Open contact) 85
Protection level			IP3X
Overall dimension (W×D×H)		mm	800×1000×2270 (ZN63A matched, recommended)
			800×1200×2270 (ZN28A matched)
			800×1300×2270 (Overheaded incoming and outoping feeder, ZN63A matched)
			800×1400×2200 (ZN63/ZN28 matched, not recommended)
			1600A (the dimensions pending for switchgears above 1600A)

XGN□-17.5(Z)/T5000-63
Fixed AC Metal Enclosed Switchgear Panel

1. General

1.1 Ratings: rated voltage 7.2-17.5kV, rated current up to 5000A, AC50/60Hz.

1.2 Application: applicable for connecting the generator into the grid during normal operation and breaking and protecting the generator when short circuit and fault occur in the grid.

1.3 Standards: IEC 62271-200; IEC 60694

2. Type Designation

X G N □ - 17.5 (Z) / T 5000 - 63

- Rated short circuit breaking current (kA)
- Rated current (A)
- Spring operating mechanism
- Vacuum circuit breaker
- Rated voltage (kV)
- Design No.
- Indoor
- Fixed
- Cubicle type

3. Working Condition

3.1 Ambient air temperature : -25℃～+40℃

3.2 Altitude: ≤1000m in 17.5kV system
≤2500m in 12kV system

3.3 Relative humidity: Daily average ≤95%
Monthly average ≤90%

3.4 Saturated vapor pressure: Daily average ≤2.2 kPa
Monthly average ≤1.8 kPa

3.5 Earthquake intensity: ≤magnitude 8; no frequent serious earthquake.

3.6 Applicable in places without dust, smoke, corrosive, flammable gas, vapor and salty smoke pollution.

※ Note: Customized products are available.

MV (12kV) Air-insulated Rain Main Unit (RMU), Fixed Type

XGN15–12(F)
XGN15–12(F·R)
Air–insulated Rain Main Unit (RMU), Fixed Type

1. General

1.1 Ratings: rated voltage 12kV with SF_6 load break swith, rated current up to 630A, AC 50/60Hz.
1.2 Application: applicable in the power distribution systems,especially suitable for application in prefabricated substation to control and protect the electric system.
1.3 Standards: IEC62271-200

2. Type Designation

X G N 15-12(F • R)

- Combination electric equipments of load switch and fuse
- Rated voltage
- Design No.
- Indoor
- Fixed type
- Cubicle type

3. Working Condition

3.1 Ambient air temperature: -15℃～+40℃ (-25℃～+45℃ available as customized products)
3.2 Altitude:≤1000m
3.3 Relative humidity:
Daily average ≤95%, daily average of vapour pressure ≤2.2kPa
Monthly average ≤90%, monthly average of vapour pressure ≤1.8kPa
3.4 Earthquake intensity: ≤magnitude 8
3.5 Applicable in the places without corrosive and flammable gas.
※ Note: Customized products are available.

4. Main Technical Parameter

Item	Unit	Data	
		XGN15-12(F)	XGN15-12(F.R)
Rated voltage	kV	12	
Rated current of main bus	A	630	
Max rated current of circuit breaker	A		125
Rated insulation level			
1min power frequency withstand voltage between phases, to earth/open contacts	kV	42/48	
Lightning impulse withstand voltage between phases, to earth/open contacts	kV	75/85	
Auxiliary and control circuit 1min power frequency withstand voltage	V	2000	
Rated frequency	Hz	50	
Rated short circuit closing current (peak)	kA	50	125
Rated withstand current (peak)	KA	50	
Rated shifting breaking current	kA		1700
Main circuit rated short time withstand current/time	kA/s	20/3	
Earthing circuit rated short time withstand current/time	kA/s	20/2	
Control circuit rated voltage	V	DC：220，AC：220	
Mechanical life	Times	2000	
Protection level		IP2X	

HXGN15A–12(F · R) Air–insulated Rain Main Unit (RMU), Fixed Type

1. General

1.1 Ratings: rated voltage 3～10kV, rated current up to 630A for load break switchgear and 125A for combined switchgear, AC 50/60Hz.

1.2 Application: applicable for power distribution, control, and protection on electric equipments as the loop power supply unit or terminal equipment.

1.3 Standards: IEC60420

2. Type Designation

H X G N 15A- 12 (F • R)

- Combined load break switch and fuse
- Rated voltage
- Design No.
- Indoor
- Fixed type
- Cubicle type
- Loop

3. Working Condition

3.1 Ambient air temperature: -15℃～+40℃ (-25℃～+45℃ available as customized products)

3.2 Altitude:≤1000m

3.3 Relative humidity:

Daily average ≤95%, daily average of vapour pressure≤22kpa

Monthly average ≤90%, monthly average of vapour pressure≤1.8kpa

3.4 Earthquake intensity: ≤magnitude 8

3.5 Applicable in the places without corrosive and flammable gas.

※ Note: Customized products are available.

4. Main Technical Parameter

Item		Unit	Data
Rated voltage		kV	12
Rated current	Load break switchgear	A	630
	Combined switchgear		125
Rated short-circuit breaking current		kA	31.5
Rated active on-load breaking current		A	630
Rated short-time withstands current		kA	20
Rated withstands current (peak)		kA	50
Rated power frequency voltage withstands	Inter-phase, to earth and to the open contact	kV	42/48
Thundering withstands voltage	Inter-phase, to earth and to the open contact	kV	75/85
Mechanical life		Times	10000
Rated take-over current		A	3150
Operating mode			Manual or automatic
Protection level			IP2X

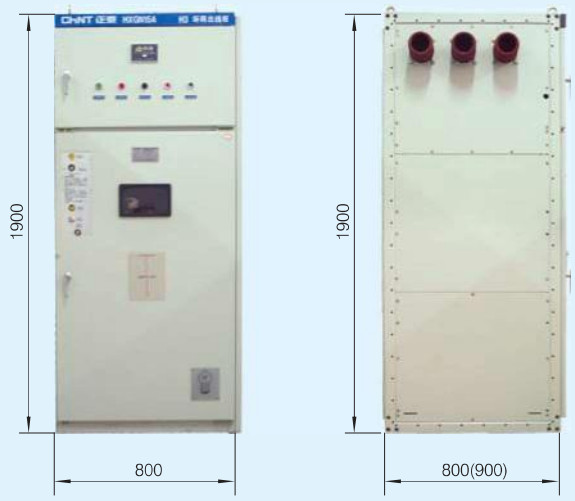
5. Construction

5.1 8MF material adopted for the switchgear, modular holes available with E=20mm.

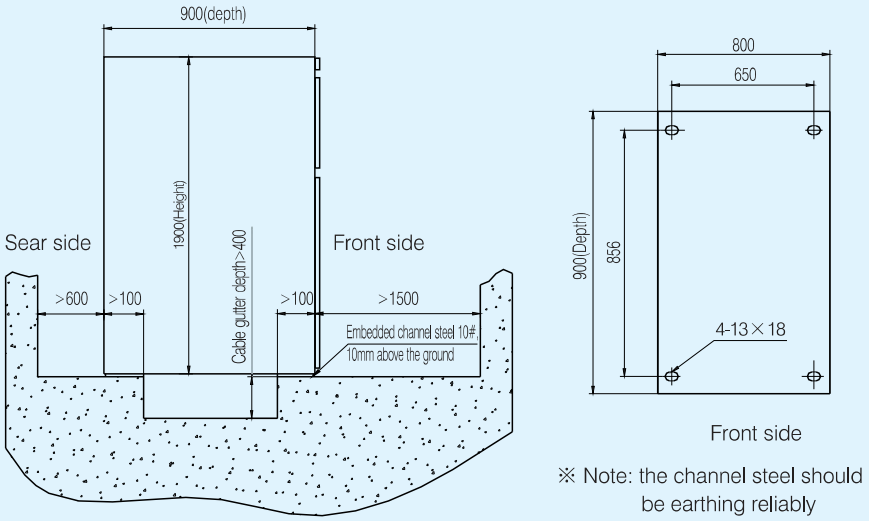
5.2 Switch disconnector, vacuum load break switch, earthing switch and the switchgear door reliably interlocked, which could avoid miss operation.

7. Overall and Installation Dimension (Unit:mm)

Switchgear overall dimension diagram



Installation foundation diagram



※ Note: the channel steel should be earthing reliably

8 Ordering Information

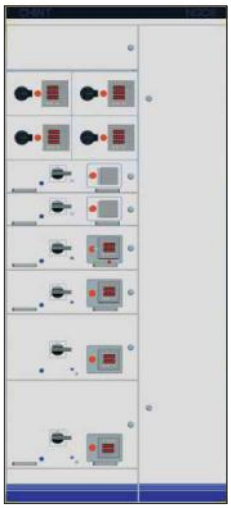
Please specify the following information when ordering:

8.1 Main circuit diagram and plan number or main circuit allocation diagram.

8.2 Auxiliary circuit diagram and control circuit voltage

8.3 Allocation diagram.

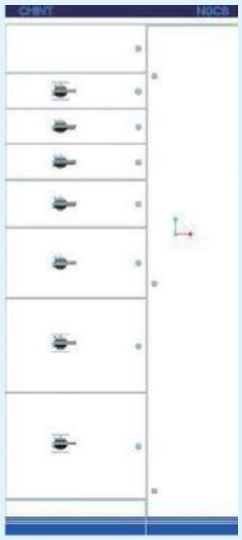
8.4 Customized products are available.



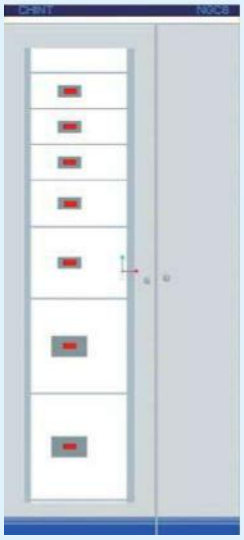
6. NGC8 Cabinet Type

Fig 1

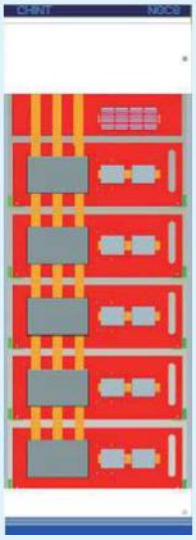
Withdrawable type



Plug-in type



Fixed separated type



Capacitor type

7. Framework

7.1 Main Feature

- Switchgear panel skeleton adopt aluminum connection and tapping screw technology, which is suitable to combine into different type base on relevant module specifications according to actual needs.
- Materials of switchgear panel adopt aluminum and zinc-galvanized steel; Skeleton using flexible processing technology to ensure accuracy and strength; Good grounding continuity.

7.2 Enclosure

- Door plate: the front of switchgear panel uses one or more doors to seal. All the doors can choose to open from left or right. Spring door lock guarantees the safety in lock and can balance the pressure when gas produced.
- Top plate and bottom plate are designed based on the layout of outgoing feeder according to actual protection degree.
- Top plate has explosion-proof function.

7.3 Back and Side Plate

- Seal plate used when the switchgear is installed against the wall; plate that can be opened is adopted when the outgoing feeder is at the back; side plates are made of steel.

7.4 Drawer Unit

- Drawer cabinet consists of drawer unit compartment, outgoing feeder terminal compartment, horizontal cable compartment and horizontal bus compartment, all components are housed in the drawer unit.
- Drawer specifications: 8E / 4, 6 E / 2, 8 E / 2, 4E, 6E, 8E, 12E, 16E, 20E, 24E (E=25). Maximum current is up to 630A.

8E/4 Drawer

8E/2 Drawer

6E Drawer

8E Drawer

16 Drawer

8E Plug-in unit

16E Plug-in unit

NGC3 Low-voltage Switchgear Panel, Withdrawable Type

1. General

1.1 Ratings: rated voltage 690/1000V, rated current up to 5000A, AC 50/60Hz.

1.2 Application: applicable in the low-voltage system of factories, etc. power distribution and motor control systems.

1.3 Protection level: Ip40, Ip43, Ip51, Ip54

1.4 Standards: IEC 60439-1

2. Working Condition

2.1 Ambient air temperature: -5℃～+40℃ (-25℃～+45℃ available as customized products)

2.2 Altitude:≤2000m

2.3 Relative humidity: ≤50% when at +40℃.
≤90% when at +20℃.

2.4 Applicable in the places without danger of fire and explosion, chemical pollution, corrosive and flammable gas.

2.5 Pollution grade: 3

2.6 Indoor installation

※ Note: Customized products are available.

3. Main Technical Parameter

3.1 Electric Data

- Rated insulation voltage: 690/1000V
- Rated operational voltage: 400V / 690V
- Rated frequency: 50/60Hz
- Rated impulse withstands voltage: 8kV
- Rated voltage of auxiliary circuit: AC380/220V, DC110/220V
- Over-voltage grade: III
- Rated current: ≤5000A
- Rated current of horizontal bus bar: ≤5000A
- Rated current of vertical bus bar: 1000A

3.2 Mechanical Item

- Incoming and outgoing item: Cable, Bus duct, Cable bridge.
- Cable incoming and outgoing: From top and bottom of the switchgear panel.
- Connection mode: From front and back side of the switchgear panel.
- The functional units completely separated or partially separated.

3.3 Switchgear Dimension

- Height (mm): 2200
- Width (mm): 600, 800, 1000
- Depth (mm): 600, 800, 1000
- Surface processing:
- Surface color: 5Y8/1

3.4 Horizontal Bus Bar

- Rated short-time withstand current: 50/80/100kA
- Rated peak withstand current: 105/176/220kA

3.5 Vertical Bus Bar

- Rated short-time withstand current : 50kA
- Rated peak withstand current: 105kA

3.6 Earthing System: TT, IT, TN-S, TN-C-S

※ Note: 1. For switchgear of IP54, the min. depth is 728mm.
2. For easier busbar installation, depths of the switchgears should be unified. If the depths are not unified, a busbar exchange switchgear with depth of 400mm should be added.
3. The depth of the switchgear should be ≥ 800mm, if there is incoming and outgoing of busbarbridge and channel.
4. Customized products are available per your requirements.

NGG1(GGD)Low-voltage Switchgear Panel, Fixed Type

1. General

1.1 Ratings: rated voltage 400V, rated current up to 3150A, AC 50/60Hz.

1.2 Application: applicable for the power receive, distribution and control of lighting and distribution equipments, etc.

1.3 Standards: IEC60439-1

2. Type Designation

N G G 1-□-□

- Short-time withstands voltage
- Rated current
- Design No.
- Fixed type
- Enclosed
- Company code

3. Working Condition

3.1 Ambient air temperature: -5℃～+40℃; daily average ≤ +35℃.
(-25℃～+45℃ available as customized products)

3.2 Altitude:≤2000m

3.3 Relative humidity: ≤50% when at +40℃
≤90% when at +20℃

3.4 Applicable in the places without danger of fire and explosion, chemical pollution, corrosive and flammable gas.

3.5 Inclination ≤ 5°

※ Note: Customized products are available.

4. Technical Parameter

4.1 Main Technical Data

Type	Rated voltage(V)	Rated current(A)		Rated short-circuit breaking current(kA)	Rated short-circuit withstand current(1s)(kA)	Rated peak withstand voltage(kA)
NGG1-1000-15	400	A	1000	15	15	30
		B	600(630)			
		C	400			
NGG1-1600-30	400	A	1500(1600)	30	30	63
		B	1000			
		C	600			
NGG1-3150-50	400	A	3150	50	50	105
		B	2500			
		C	2000			

4.2 Main Bus

Single copper busbaradopted when the rated current ≤1600A. Double copper busbaradopted when the rated current >1600A. Brushing & anodizing process adopted which is better than traditional zinc-coated process.

4.2.1 Selection of Horizontal Bus

9. Data Sheet of Typical Products

330~500kV Power Transformer

330kV two-winding power transformer

Model	Rated capacity (kVA)	Rated voltage and tapping range		Vector group	No load current %	No load losses kW	On load losses kW	Impedance voltage (%)
		HV	LV					
SFP11-150000/330	150000	363±2×2.5%	10.5~20	Ynd11	0.3	90	400	14-15
SFP11-400000/330	400000	363±2×2.5%	10.5~20	Ynd11	0.15	185	820	14-15

330kV three-winding power transformer

Model	Rated capacity (kVA)	Rated voltage and tapping range			Vector group	No load current %	No load losses kW	On load losses kW	Impedance voltage (%)		
		HV	MV	LV					HV-MV	HV-LV	MV-LV
SFPSZ11-150000/330	150000	330±8×1.25%	110~121	10.5~35	YNyn0d11	0.3	95	440	14~15	24~26	7~9
SFPSZ11-240000/330	240000	330±8×1.25%	110~121	10.5~35	YNyn0d11	0.25	135	625	14~15	24~26	7~9
SFPSZ11-360000/330	360000	330±8×1.25%	110~121	10.5~35	YNyn0d11	0.15	185	850	14~15	24~26	7~9
OSFPSZ11-150000/330	150000	330±8×1.25%	110~121	10.5~35	YNa0d11	0.3	50	335	11~12	34~36	22~24
OSFPSZ11-240000/330	240000	330±8×1.25%	110~121	10.5~35	YNa0d11	0.25	70	480	11~12	34~36	22~24
OSFPSZ11-360000/330	360000	330±8×1.25%	110~121	10.5~35	Yna0d11	0.15	95	645	11~12	34~36	22~24

400kV power transformer

Model	Rated capacity (kVA)	Rated voltage and tapping range		Vector group	No load current %	No load losses kW	On load losses kW	Impedance voltage (%)
		HV	LV					
SFFZ11-60000/420	60000	420±8×1.25%	6.3~10.5/6.3~10.5	Ynyn0yn0+d11	0.5	45	270	12~14
SFZ11-438000/420	438000	420±8×1.25%	10.5~20	Ynd11	0.15	175	815	12~18

500kV two-winding power transformer

Model	Rated capacity (kVA)	Rated voltage and tapping range		Vector group	No load current %	No load losses kW	On load losses kW	Impedance voltage (%)
		HV	LV					
DFP11-240000/500	240000	500/√3±2×2.5%	10.5~20	Ii0	0.2	110	420	14~16
SFP11-480000/500	480000	550±2×2.5%	10.5~20	Ynd11	0.2	190	950	14~16

500kV three-winding power transformer

Model	Rated capacity (kVA)	Rated voltage and tapping range			Vector group	No load current %	No load losses kW	On load losses kW	Impedance voltage (%)		
		HV	MV	LV					HV-MV	HV-LV	MV-LV
ODFPSZ11-250000/500	250000	500/√3	242/√3±8×1.25%	10.5~66	Ia0i0	0.2	70	370	11~12	34~38	20~24
ODFPSZ11-334000/500	334000	550/√3	242/√3±8×1.25%	10.5~66	Ia0i0	0.15	95	485	11~12	34~38	20~24

※ Note: 1. All the data included are only examples for your reference.
2. Customized and more-efficient transformer is available according to your requirements.

220kV Power Transformer

31500kVA~360000kVA two-winding transformer with NVTC (HV neutral is indirect grounding)

Rated capacity (kVA)	Rated voltage and tapping range HV	LV	Vector group	No load current %	Impedance voltage %	No load losses kW	On load losses kW
31500	220±2×2.5% 242±2×2.5%	6.3,6.6,10.5,11	YNd11	0.70	12~14	35	135
40000				0.70		41	157
50000				0.65		49	189
63000				0.65		58	220
90000		10.5,13.8,11		0.55		77	288
120000				0.55		94	345
150000				0.50		112	405
180000		11,13.8,15.75		0.46		128	459
240000				0.42		160	567
300000		15.75,18		0.38		189	675
360000				0.38		217	774

31500kVA~240000kVA three-winding transformer with NVTC (HV neutral is indirect grounding)

Rated capacity (kVA)	Rated voltage and tapping range HV	MV	LV	Vector group	No load current %	Impedance voltage % Step up	Step down	No load losses kW	On load losses kW
31500	220±2×2.5%,242±2×2.5%	69,121	6.3,6.6, 10.5,11, 35,38.5	YNyn0d11	0.70	HV~MV: 22~24 HV~LV: 12~14 MV~LV: 7~9	HV~MV: 12~14 HV~LV: 22~24 MV~LV: 7~9	40	162
40000					0.63			48	189
50000					0.56			56	225
63000					0.56			66	261
90000			10.5,11,13.8, 35,38.5		0.49			86	351
120000					0.49			106	432
150000			11,13.8,15.75, 35,38.5		0.42			125	513
180000					0.42			142	585
240000					0.35			176	720

31500kVA~240000kVA transformer with NVTC (HV neutral is indirect grounding)

Rated capacity (kVA)	Rated voltage and tapping range HV	LV	Vector group	No load current %	Impedance voltage %	No load losses kW	On load losses kW
31500	220±2×2.5%	63,66,69	YNd11	0.89	12~14	38	151
40000				0.89		45	176
50000				0.82		53	211
63000				0.82		63	247
90000				0.75		83	323
120000				0.75		102	387
150000				0.68		122	453
180000				0.68		138	513
240000				0.61		171	635

110kV Three Phase On-load Power Transformer

6300kVA～120000kVA two-winding transformer with NVTC

Rated capacity (kVA)	Rated voltage and tapping range			Vector group	No load current %	Impedance voltage %	No load losses kW	On load losses kW
	HV	Tapping range %	LV					
6300	110,121	±2×2.5%	6.3,6.6, 10.5,11	YNd11	0.77	10.5	9.3	36
8000					0.77		11.2	45
10000					0.72		13.2	53
12500					0.72		15.6	63
16000					0.67		18.8	77
20000					0.67		22	93
25000					0.62		26	110
31500					0.6		30.8	133
40000					0.56		36.8	156
50000					0.52		44	194
63000					0.48		52	234
75000					0.42	12～14	59	278
90000					0.38		68	320
120000					0.34		84.8	397

6300kVA~100000kVA three-winding transformer with NVTC

Rated capacity (kVA)	Rated voltage and tapping range			Vector group	No load current %	Impedance voltage %		No load losses kW	On load losses kW
	HV	MV	LV			Step up	Step down		
6300	110±2×2.5%,121 ±2×2.5%	35,38.5	6.3,6.6, 10.5,11	YNyn0d11	0.82	HV~MV: 17.5～18.5 HV~LV: 10.5 MV~LV: 6.5	HV~MV: 10.5 HV~LV: 17.5～18.5 MV~LV: 6.5	11.2	47.0
8000					0.78			13.2	56.0
10000					0.74			15.8	66.0
12500					0.70			18.4	78.0
16000					0.66			22.4	95.0
20000					0.65			26.4	112.0
25000					0.6			30.8	133.0
31500					0.6			36.8	157.0
40000					0.55			43.6	189.0
50000					0.55			52.0	225.0
63000					0.50			61.6	270.0
75000					0.50			70.2	307.7
80000					0.50			73.7	323.0
100000					0.50			87.1	381.8

6300kVA~100000kVA two-winding transformer with OLTC

Rated capacity (kVA)	Rated voltage and tapping range			Vector group	No load current %	Impedance voltage %	No load losses kW	On load losses kW
	HV	Tapping range %	LV					
6300	110	±8×1.25%	6.3,6.6, 10.5,11	YNd11	0.8	10.5	10	36
8000					0.8		12	45
10000					0.74		14.2	53
12500					0.74		16.8	63
16000					0.69		20.2	77
20000					0.69		24	93
25000					0.64		28.4	110
31500					0.64		33.8	133
40000					0.58		40.4	156
50000					0.58		47.8	194
63000					0.52		56.8	234
75000					0.63		64.7	266.7
80000					0.63		67.9	297.9
100000					0.63		80.3	330.9

SZ9(M), SZ10(M), SZ11(M)-1000-31500/35
Three-phase Oil-immersed Transformer With OLTC

SZ9(M)-1000~31500/35 Three-phase oil-immersed transformer with OLTC

Rated capacity (kVA)	Rated voltage and tapping range			Vector group	No load losses (kW)	On load losses (kW)	Impedance voltage (%)	No load current (%)	Weight (kg)				Outline dimension (mm)	Trail distance (mm)
	HV	Tapping range	LV						Body	Oil	Gross	Tran-sport	L×W×H	
1000					1.7	13.0		1.1	1930	1240	4600	3650	2850×1930×2430	1070×1070
1250					2.0	15.0		1.1	2200	1320	4950	3800	2900×1950×2450	1070×1070
1600	35				2.4	18.0		1.0	2550	1400	5300	3980	2950×1980×2490	1070×1070
2000					2.9	20.0		1.0	2775	1560	5965	4925	3010×2065×2540	1070×1070
2500				Yd11	3.4	21.8	6.5	1.0	3300	1750	6950	5683	3035×2265×2610	1070×1070
3150					4.1	26.0		0.9	3770	1970	7900	6075	3160×2095×2640	1070×1070
4000			6.3		4.9	30.7	7.0	0.9	4520	2260	9110	7090	3295×2325×2890	1070×1070
5000		±3×2.5	6.6		5.8	36.0		0.68	5620	2980	11825	9500	3900×3000×3050	1070×1475
6300			10.5		7.0	39.0		0.68	6700	3340	13400	10350	3920×3020×3090	1070×1475
8000			11		9.84	44.0	7.5	0.6	8620	3670	16070	12500	4400×3200×3160	1475×1475
10000	35				11.6	51.0		0.6	9900	4000	18500	15400	4450×3520×3500	1475×1475
12500	38.5				13.68	60.5		0.56	11340	4365	21590	17800	4500×3600×3700	1475×1475
16000				YNd11	16.46	74.0		0.54	14300	5400	22800	20100	4950×4100×3750	1475×1475
20000					19.46	87.14	8.0	0.54	15000	6100	30700	22800	5000×3930×3840	1475×1475
25000					23.4	104		0.5	19750	9300	38400	33800	5650×4150×3900	1475×1475
31500					27.5	123.1		0.45	23500	11500	45300	38800	5880×4300×3950	2040×1475

SZ10(M)-1000～31500/35 Three -phase oil-immersed transformer with OLTC

Rated capacity (kVA)	Rated voltage and tapping range			Vector group	No load losses (kW)	On load losses (kW)	Impedance voltage (%)	No load current (%)	Weight (kg)				Outline dimension (mm)	Trail distance (mm)
	HV	Tapping range	LV						Body	Oil	Gross	Tran-sport	L×W×H	
1000					1.5	12.3		1.1	2030	1290	4785	3795	2905 X 1970 X 2480	1070 X 1070
1250					1.8	14.2		1.1	2310	1370	5150	3950	2960 X 1990 X 2500	1070 X 1070
1600	35				2.2	17.0	6.5	1.0	2680	1460	5510	4130	3010 X 2020 X 2540	1070 X 1070
2000					2.6	19.2		1.0	2910	1620	6195	5120	3070 X 2105 X 2590	1070 X 1070
2500				Yd11	3.1	20.6		1.0	3465	1820	7230	5910	3095 X 2310 X 2660	1070 X 1070
3150					3.7	24.6		0.9	3960	2050	8215	6310	3225 X 2140 X 2700	1070 X 1070
4000			6.3		4.4	29.0	7.0	0.9	4750	2350	9475	7375	3355 X 2375 X 2950	1070 X 1070
5000		±3×2.5	6.6		5.2	34.0		0.8	5690	3010	11925	9600	3950×3050×3100	1070 X 1070
6300			10.5		6.3	36.6		0.8	6750	3370	13500	10400	3970×3070×3140	1070 X 1070
8000			11		8.8	40.4	7.5	0.7	8670	3700	16170	12600	4450×3250×3210	1475 X 1475
10000	35				10.4	47.8		0.7	9970	4030	18600	15500	4500×3570×3550	1475 X 1475
12500	38.5				12.3	56.6		0.6	11410	4395	21690	17900	4550×3650×3750	1475 X 1475
16000				YNd11	13.5	70.0		0.6	14370	5430	22900	20200	5000×4150×3800	1475 X 1475
20000					17.8	83.0	8.0	0.5	15090	6130	30800	22900	5050×3980×3890	1475 X 1475
25000					20.8	98.5		0.5	19820	9350	38500	33900	5700×4200×3950	1475 X 1475
31500					24.5	117.0		0.45	23370	11530	45400	38900	5700×4350×4000	2040 X 1475