

GENERAL INFORMATION

1. Name of the economic operator: China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.
2. Fiscal code: 9132118233888785XM (1/1)
3. Head office address: No.188 Zhongdian Road, Yangzhong, Zhenjiang, Jiangsu Province, China
4. Telephone: +86 25 52095922
- Fax: +86 25 52095999
- E-mail: bwc@ceeg.cn;ceeg@cnceeg.com
5. Registration decision RMB 160,000,000 Yuan April 8,2015
(number, date of registration)
Yangzhong City Administration for market supervision
(the issuing institution)
6. The main fields of activity: Transmission and distribution and control equipment R&D manufacturing, design and other related technical services; Sales of metal products; Independent management and agents of all types of goods and technology import and export business (Except for state limited business or prohibited imports and exports of goods and technology)
(to be indicated in accordance with the provisions of the operator's statute)
7. Licenses in the field (certificates, authorizations) 00120Q311194R0M/1100 December 29,2020 CHINA QUALITY CERTIFICATION CENTER The design,manufacturing,sales and after services of 220 kv grade and below voltage oil-immersed transformer and transformer supporting accessories valid from:January 6,2022 until:December 28,2023
(number, date, issuing institution, types of activity, validity period).
8. Enterprises, subsidiaries, which are part of it: CEEG Nanjing Transmission & Distribution Equipment Co.,Ltd. No.22 Chengxin Rd. Yuhua district,Nanjing, Jiangsu, China
(name, address)
9. Affiliated structures, enterprises: CEEG Nanjing Transmission & Distribution Equipment Co.,Ltd. No.22 Chengxin Rd. Yuhua district,Nanjing, Jiangsu, China
(name, address)
10. Owned capital at the date of the last balance sheet 33742,000 USD 2022
(indicate the value and date)
11. The number of personnel on the staff 1082 persons, of which workers 600 persons.
12. The number of personnel who will be involved in the performance of the contract 60 persons, of which workers 40 persons, inclusively:

(indicate the professions and qualification categories)

13. The balance sheet value of fixed assets 239997.10 thousand lei
14. Technical endowment: since 1993 with 30 years manufacturing experience about 300000 sets transformers served across over 100 countries (indicate the main means that will be used for the execution of the contract)
15. Turnover for the last 3 years (thousands of lei):
- | | | | |
|------|-------------|-------------------|--------------|
| Year | <u>2020</u> | <u>1071110.40</u> | thousand lei |
| Year | <u>2021</u> | <u>1165422.60</u> | thousand lei |
| Year | <u>2022</u> | <u>1349739.40</u> | thousand lei |
16. Total debts of the economic operator 426960.30 thousand lei, inclusively: to the budget 11703000.00 thousand lei

Date of completion: 13, June, 2023 WEICHAO
WEICHAO BAI Sales Rep

(The name, surname and position of the person authorized to represent the economic operator)

(signature) and Stamp Place



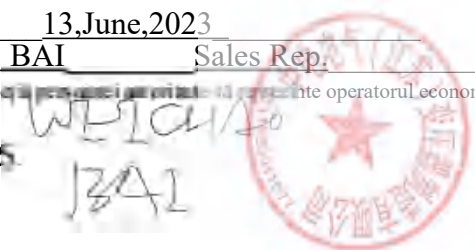
INFORMAȚIE GENERALĂ

1. Denumirea operatorului economic: China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.
2. Codul fiscal: 9132118233888785XM (1/1)
3. Adresa sediului central: No.188 Zhongdian Road, Yangzhong, Zhenjiang, Jiangsu Province, China
4. Telefon: +86 25 52095922
- Fax: +86 25 52095999
- E-mail: bwc@ceeg.cn;ceeg@cnceeg.com
5. Decizia de înregistrare RMB 160,000,000 Yuan April 8,2015
(numărul, data, înregistrării)
Yangzhong City Administration for market supervision
(instituția emitentă)
6. Domeniile principale de activitate: Transmission and distribution and control equipment R&D manufacturing, design and other related technical services; Sales of metal products; Independent management and agents of all types of goods and technology import and export business (Except for state limited business or prohibited imports and exports of goods and technology)
(de indicat în conformitate cu prevederile din statutul operatorului)
7. Licențe în domeniu (certIFICATE, autorizații) 00120Q311194R0M/1100 December 29,2020 CHINA QUALITY CERTIFICATION CENTER The design,manufacturing,sales and after services of 220 kv grade and below voltage oil-immersed transformer and transformer supporting accessories valid from:January 6,2022 until:December 28,2023
(numărul, data, instituția emitentă, genurile de activitate, durata de valabilitate).
8. Întreprinderi, filiale, care intră în componență: CEEG Nanjing Transmission & Distribution Equipment Co.,Ltd. No.22 Chengxin Rd. Yuhua district,Nanjing, Jiangsu, China
(denumirea, adresa)
9. Structuri, întreprinderi afiliate: CEEG Nanjing Transmission & Distribution Equipment Co.,Ltd. No.22 Chengxin Rd. Yuhua district,Nanjing, Jiangsu, China
(denumirea, adresa)
10. Capitalul propriu la data de întocmire a ultimului bilanț 33742,000 USD 2022
(de indicat valoarea și data)
11. Numărul personalului scriptic 1082 persoane, din care muncitori 600 persoane.
12. Numărul personalului care va fi încadrat în realizarea contractului 60 persoane, din care muncitori 40 persoane, inclusiv:
(de indicat profesiile și categoriile de calificare)
13. Valoarea de bilanț a mijloacelor fixe 239997.10 mii lei
14. Dotare tehnică: since 1993 with 30 years manufacturing experience about 30000 sets transformers served across over 100 countries
(de indicat principale mijloace care vor fi utilizate la executarea contractului)
15. Cifra de afaceri pe ultimii 3 ani (mii lei):
Anul 2020 1071110.40 mii lei
Anul 2021 1165422.60 mii lei
Anul 2022 1349739.40 mii lei
16. Datoriile totale ale operatorului economic 426960.30 mii lei,
inclusiv: față de buget 11703000.00 mii lei

Data completării: 13,June,2023WEICHAO BAI Sales Rep.

(Numele, prenumele și funcția persoanei care reprezintă operatorul economic)

(semnătura) și L.5



China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.

(Name of the economic operator)

Full address No.188 Zhongdian Road, Yangzhong, Zhenjiang, Jiangsu Province, China

tel, fax, e-mail +86 25 52095922 +86 25 52095999 ceeg@cnceeg.com bwc@ceeg.cn

THE BID

To SE „Moldelectrica”, mun. Chisinau, 78 V. Alecsandri Street

(beneficiary's name and full address)

Having examined the procurement documentation related to the procurement of:

T-129/05-23: Power transformer 110/35/10 kV (1 pc.) with nominal power of 25000kVA with transportation and installation at SS Ungheni -110kV

(name of the procurement contract announced by the beneficiary)

we present the bid on the execution of the aforementioned procurement contract, namely:

Supply (execution, provision):

No.	Name	The bid price, EUR without VAT	The bid price, EUR with TVA
Lot no.1			
1	Power transformer 110/35/10 kV (1 pc.) with nominal power of 25000kVA (DAP SS Ungheni -110kV according to INCOTERMS 2020 conditions (including unloading at final destination and installation))	335000,00	/
2	Services of transformer transportation to SS Ungheni-110kV Port of Constanța	135000,00	/
3	Transformer installation works at SS Ungheni -110kV	/	/
Total bid		470000,00	/

II. The total value of the bid on the execution of the procurement contract is: FOUR HUNDRED AND SEVENTY THOUSAND ONLY 470000,00 EUR, without VAT

(the sum in letters and numbers)

to which is added the VAT in the amount of / EUR,
(the sum in letters and numbers)

III. Terms of payment: CIF Constanta Port

(must be filled in)

IV. Term of contract: 30% down payment when order is placed, 30% second payment when all drawings are all confirmed, 40% third payment when FAT finished and shall be paid before delivery

(must be filled in)

Date of completion: 14, June, 2023

(The name, surname and function of the person authorized to represent the economic operator)

WEICHAO BAI Sales Manager

(signature) and Stamp Place

BAI



China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.

(Denumirea operatorului economic)

adresa completă No.188 Zhongdian Road, Yangzhong, Zhenjiang, Jiangsu Province, China
tel, fax, e-mail +86 25 52095922 +86 25 52095999 ceeg@cnceeg.com bwc@ceeg.cn

OFERTĂ

Către ÎS „Moldelectrica”, mun. Chișinău, str. V. Alecsandri nr.78

(denumirea beneficiarului și adresa completă)

Examinând documentația de achiziție referitor la achiziția:

T-129/05-23: Transformator de forță 110/35/10 kV (1 buc.) cu puterea nominală de 25000kVA cu transportarea și montarea la SE Ungheni-110kV

(denumirea contractului de achiziție anunțate de beneficiar)

prezentăm oferta privind executarea contractului de achiziție susmenționat, și anume:

Furnizarea (executarea, prestarea):

Nr	Denumirea	Pretul ofertei, EUR fără TVA	Prețul ofertei, EUR cu TVA
Lot nr.1			
1	Transformator de forță 110/35/10 kV (1 buc.) cu puterea nominală de 25000kVA (ĐAP SE Ungheni-110kV conform condițiilor INCOTERMS 2020 (inclusiv descărcarea la destinația finală și instalarea)))	335000,00	/
2	Servicii de transportare a transformatorului până la SE Ungheni-110kV Port Constanta Romania	135000,00	/
3	Lucrări de montare a transformatorului la SE Ungheni-110kV	/	/
Total ofertă		470000,00	/

II. Valoarea totală a ofertei privind executarea contractului de achiziții este: NUMAI PATRU SUTE ȘAPTEZECI DE MII 470000,00 EUR, fără TVA

(suma în litere și în cifre)

la care se adaugă TVA în sumă de _____ EUR,
(suma în litere și în cifre)

III. Condiții de achitare: T/T

(se completează în mod obligatoriu)

IV. Termen de executare a contractului: 30% avans de plată atunci când comanda este plasat, 30% a doua plată atunci când toate desenele sunt confirmate, 40% a treia plată atunci când FAT terminat și se va plăti înainte de delivery

(se completează în mod obligatoriu)

Data completării: 14,iunie,2023

WEICHAO BAI manager de vânzări

(Numele, prenumele și funcția persoanei autorizate să reprezinte operatorul economic)

(semnătura) și L.S.



WEICHAO
BAI

China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd
(denumirea/numele operatorului economic)

DECLARAȚIE **privind situația personală a operatorului economic**

Titlul achiziției: **T-129/05-23: Transformator de forță 110/35/10 kV (1 buc.) cu puterea nominală de 25000kVA cu transportarea și montarea la SE Ungheni-110kV**

Subsemnatul, WEICHAO BAI, reprezentantul legal al China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.,

(numele și prenumele)

(denumirea operatorului economic)

în calitate de ofertant, la achiziția Transformator de forță 110/35/10 kV (1 buc.) cu puterea nominală de 25000kVA cu transportarea și montarea la SE Ungheni-110kV

organizată de Î.S. „MOLDELECTRICA”, declar pe propria răspundere, sub sancțiunea excluderii din procedură și a sancțiunilor aplicate faptei de fals în acte publice, că ofertantul:

- în ultimii 5 ani, nu a fost condamnat, prin hotărârea definitivă a unei instanțe judecătorești, pentru participare la activități ale unei organizații sau grupări criminale, pentru corupție, pentru fraudă și/sau pentru spălare de bani, pentru infracțiuni de terorism sau infracțiuni legate de activități teroriste, finanțarea terorismului, exploatarea prin muncă a copiilor și alte forme de trafic de persoane;

- în ultimii 3 ani, nu a fost condamnat, prin hotărârea definitivă a unei instanțe judecătorești, pentru o faptă care a adus atingere eticii profesionale sau pentru comiterea unei greșeli în materie profesională;

- nu se află în proces de insolabilitate ca urmare a hotărârii judecătorești;

- și-a îndeplinit obligațiile de plată a impozitelor, taxelor și contribuțiilor de asigurări sociale în conformitate cu prevederile legale în vigoare în Republica Moldova sau în țara în care este stabilit;

- nu a încheiat cu alți operatori economici acorduri care vizează denaturarea concurenței;

- prezintă informații și documente veridice și autentice pentru procedura de achiziție sus menționată.

Declar că informațiile furnizate în scopul demonstrării îndeplinirii criteriilor de calificare sunt complete și corecte în fiecare detaliu și înțeleg că întreprinderea are dreptul de a solicita, în scopul verificării și confirmării declarațiilor, orice documente doveditoare de care dispun.

Înțeleg că, în cazul în care această declarație nu este conformă cu realitatea, sunt pasibil de încălcarea prevederilor legislației penale privind falsul în declarații.

Data completării 13 June 2023

WEICHAO,BAI

(Nume, Prenume)

În calitate de: Sales Manager

(funcția deținută)

Ofertantul: China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.
No.188 Zhongdian Road, Yangzhong, Zhenjiang, Jiangsu Province, China

(denumirea, adresa completă)

L.Ş.

China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.

DECLARATION
regarding the personal situation of the economic operator

The title of the procurement: **T-129/05-23: Power transformer 110/35/10 kV (1 pc.) with the nominal power of 25000kVA with transportation and installation at SS Ungheni -110kV**

The undersigned, WEICHAO BAI, legal representative of China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.,

(name and surname)

(name of the economic operator)

as a bidder, at the procurement of Power transformer 110/35/10 kV (1 pc.) with the nominal power of 25000kVA with transportation and installation at SS Ungheni -110kV

organized by SE "MOLDELECTRICA", declare on my own responsibility, under the penalty of exclusion from the procedure and the penalties applied to the act of forgery in public documents, that the bidder:

- in the last 5 years, has not been convicted, by the final decision of a court, for participation in the activities of a criminal organization or group, for corruption, fraud and/or for money laundering, for terrorist offenses or related offenses of terrorist activities, terrorist financing, child labor exploitation and other forms of human trafficking;
- in the last 3 years, has not been convicted, by the final decision of a court, for an act that violated professional ethics or for committing a mistake in professional matters;
- is not in an insolvency process as a result of a court decision;
- has fulfilled its obligations to pay taxes, fees and social security contributions in accordance with the legal provisions in force in the Republic of Moldova or in the country where it is established;
- has not entered into agreements with other economic operators aimed at distorting competition;
- provides truthful and authentic information and documents for the aforementioned procurement procedure.

I declare that the information provided for the purpose of demonstrating the fulfillment of the qualification criteria is complete and correct in every detail and I understand that the enterprise has the right to request, in order to verify and confirm the declarations, any supporting documents that I have at my disposal.

I understand that if this declaration is not according to reality, I am liable to violate the provisions of criminal law on false statements.

Date of completion 13, June, 2023

WEICHAO, BAI

(Name, Surname)

(signature) 

As: Sales Manager
(function held)

Bidder: China Electric Equipment (Jiang Su) Transformer Manufacture Co., Ltd.
No.188 Zhongdian Road, Yangzhong, Zhenjiang, Jiangsu Province, China
(name, full address)



Stamp Place

Transformatorul de forță Ungheni 25 MVA, $115 \pm 9 \times 1.78 \% / 38.5 \pm 2 \times 2.5 \% / 11$ kV				
Nr	Descrierea	U.M.	Valori solicitate	Valori garantate
1	GENERALITĂȚI			
	Producător			CEEG
	- țara de origine			China
	- oraș			Yangzhong
	Tip de instalare		Pentru funcționare în exterior	outdoor
	Standarde		IEC60076	IEC60076
			IEC60137	IEC60137
			IEC61463	IEC61463
			IEEE 693-2005	IEEE 693-2005
	Unitatea mono sau trifazată		trifazat	Three-phase
	Tip miez magnetic		Cu coloane, îmbinările de tip step-lap	3 limb, step-lap stacked core form
	Tip cuva		Cu capac	Upper flange tank
	Cuva și accesoriile rezistente la vid		Da	Da
	Numărul înfășurărilor		3	Three
	Materialul înfășurărilor (ÎT, MT, JT)		Cupru	Coper
	Uleiul electroizolant			
	- producător			PetroChina
	- tip			45#
	- standard		IEC 60296	IEC 60296
	- inhibat cu aditivul antioxidant		Da	Da
	- metode de verificare la prezența sulfurii de cupru		IEC 62535 și ASTM D1275B	IEC 62535 and ASTM D1275B
2	PARAMETRII NOMINALI			
	Puterea nominală la tensiunea nominală (primar/secundar/terțiar)			
	- tip de răcire ONAN	MVA	20/20/20	20/20/20

- tip de răcire ONAF	MVA	25/25/25	25/25/25
Temperatura maximă ambiantă	°C	50	50
Temperatura medie ambiantă anuală	°C	15	15
Temperatura minimă ambiantă	°C	-30	-30
Altitudinea maximă de operare	m	1000	1000
Limitele de supratemperatură pe toate ploturile comutatoarelor de reglaj			
- ulei/straturi superioare	K	50	50
- înfășurările/medie	K	55	55
- înfășurările/hot spot	K	68	68
Tensiunea nominală (regim de mers în gol)			
- ÎT	kV	115	115
- MT	kV	38.5	38.5
- JT	kV	11	11
Frecvența nominală	Hz	50	50
Încărcarea permisă a neutrlui transformatorului	%	100/legată efectiv la pământ/izolată cu descărcător de protecție	100/solidly earthed/surge arrester
Grupa de conexiuni		YNyn0d11	YNyn0d11
Tensiunea de scurtcircuit – ÎT/JT (relată la 25 MVA)			
- pe plotul maximal	%	De specificat	18
- pe plotul nominal	%	17.5	17.5
- pe plotul minimal	%	De specificat	17
Tensiunea de scurtcircuit – ÎT/MT (relată la 25 MVA)			
- pe plotul maximal	%	De specificat	11
- pe plotul nominal	%	10.5	10.5
- pe plotul minimal	%	De specificat	10
Tensiunea de scurtcircuit – JT/MT (relată la 25 MVA)	%	Min. 6.5 (±30%/-0%)	Min. 6.5 (±30%/-

				0%)
	Densitatea fluxului magnetic			
	-la tensiunea și frecvența nominală	Tesla	Max. 1.7	Max. 1.7
	Pierderi în regimul de mers în gol (toleranța +0%)	kW	<15	<15
	Curentul în regimul de mers în gol (I _o /I _n)	%	0.1	0.1
	Pierderi în miez (W _{17/50})	W/kg	Max. 0.9	Max. 0.9
	Tensiunea de scurtcircuit			
	- ÎT-JT	%	17,5	17.5
	- ÎT-MT	%	10.5	10.5
	- MT-JT	%	6.5	6.5
	Pierderi în regimul de mers în sarcină la puterea nominală			
	ÎT/JT (relatate la 25 MVA)			
	- pe plotul maximal	kW	De specificat	115
	- pe plotul nominal	kW	max. 120	Max. 120
	- pe plotul minimal	kW	De specificat	130
	ÎT/MT (relatate la 25 MVA)			
	- pe plotul maximal	kW	De specificat	115
	- pe plotul nominal	kW	max. 120	Max. 120
	- pe plotul minimal	kW	De specificat	130
	MT/JT (relatate la 25 MVA)	kW	max. 110	N.A.
	Înfășurarea ÎT (relatate la 25 MVA)			
	- pe plotul maximal	kW	De specificat	N.A.
	- pe plotul nominal	kW	De specificat	N.A.
	- pe plotul minimal	kW	De specificat	N.A.
	Înfășurarea JT (relatate la 25 MVA)	kW	De specificat	N.A.

	Înfășurarea MT (relatate la 25 MVA)			
	- pe plotul maximal	kW	De specificat	N.A.
	- pe plotul nominal	kW	De specificat	N.A.
	- pe plotul minimal	kW	De specificat	N.A.
	Puterea absorbită de sistemul de răcire	kW	De specificat	5
	Indexul de eficiență (PEI) recalculat la 75 °C pe plotul nominal și la:			
	- 100% din puterea nominală La factorul de putere 1.0	%	99.7	99.46@HV-MV
	- 75% din puterea nominală La factorul de putere 1.0	%	99.7	99.56@HV-MV
	- 50% din puterea nominală La factorul de putere 1.0	%	99.7	99.64@HV-MV
	- 25% din puterea nominală La factorul de putere 1.0	%	99.7	99.64@HV-MV
	- 100% din puterea nominală La factorul de putere 0.8	%	99.7	99.32@HV-MV
	- 75% din puterea nominală La factorul de putere 0.8	%	99.7	99.45@HV-MV
	- 50% din puterea nominală La factorul de putere 0.8	%	99.7	99.55@HV-MV
	- 25% din puterea nominală La factorul de putere 0.8	%	99.7	99.55@HV-MV
	Diapazonul de variație a tensiunii ÎT	kV	+/- 18.423	+/- 18.423
	Domeniul de reglaj ÎT	%	+/- 16	+/- 16
	Numărul de ploturi ÎT	plot	+/- 9	+/- 9
	Puterea constantă nominală pe toate ploturile		Da	Da
	Diapazonul de variație a tensiunii MT	kV	+/- 1.925	+/- 1.925
	Domeniul de reglaj MT	%	+/- 5	+/- 5
	Numărul de ploturi MT	plot	+/- 2	+/- 2
	Plotul nominal ÎT	kV	115	115
	Plotul nominal MT	kV	38.5	38.5

	Izolația înfășurărilor			
	- ÎT		Uniformă	Graded
	- MT		Uniformă	Uniform
	- JT		Uniformă	Uniform
	Nivelul de solicitare la seism după MSK		IX	After order
3	NIVELE DE IZOLAȚIE			
	Nivelul de izolație înfășurare ÎT			
	- Tensiunea aplicată 50 Hz linia/neutru	kV	230/230	230/140
	- Impuls de trăsnet linia/neutru	kV	550/550	550/325
	Nivelul de izolație înfășurarea JT			
	- Tensiunea aplicată 50 Hz	kV	34	34
	- Impuls de trăsnet	kV	110	110
	Nivelul de izolație înfășurarea JT			
	- Tensiunea aplicată 50 Hz linia/neutru	kV	95/95	95/95
	- Impuls de trăsnet linia/neutru	kV	250/250	250/250
4	DETALII DE FUNCȚIONARE			
	Metoda de răcire		ONAN/ONAF	ONAN/ONAF
	Nivelul de zgomot (LpA) măsurat la distanța de 2.0 m (cu sistemul de răcire forțată în funcțiune)	dB(A)	Max. 60	Max. 65
5	TRECERI IZOLATE			
	Înfășurate ÎT			
	- producător			Nanjing Zhida,

				China
	- tip			OIP
	- curentul nominal	A	800	800
	- tensiunea de ținere la frecvența industrială 50 Hz	kV	255	255
	- tensiunea de ținere la impuls de trăsnet		550	550
	- linia de fugă minima în conformitate cu IEC 60815	mm	2835	2835
	- solicitări statice și dinamice la borne în conformitate cu IEC 60137	daN	De specificat	After order
	Neutru ÎT			
	- producător			Nanjing Zhida, China
	- tip			OIP
	- curentul nominal	A		800
	- tensiunea de ținere la frecvența industrială 50 Hz	kV	105	140
	- tensiunea de ținere la impuls de trăsnet		250	325
	- linia de fugă minima în conformitate cu IEC 60815	mm	1050	2250
	- solicitări statice și dinamice la borne în conformitate cu IEC 60137	daN	De specificat	After order
	Înfășurarea JT			
	- producător			Nanjing Zhida, China
	- tip			Pure porcelain bushing
	- curentul nominal	A	2000	2000
	- tensiunea de ținere la frecvența industrială 50 Hz	kV	42	42
	- tensiunea de ținere la impuls de trăsnet		110	110
	- linia de fugă minima în conformitate cu IEC 60815	mm	280	280


	- solicitări statice și dinamice la borne în conformitate cu IEC 60137	daN	De specificat	After order
	Înfășurarea/neutru MT			
	- producător			Nanjing Zhida, China
	- tip			Pure porcelain bushing
	- curentul nominal	A	630	630
	- tensiunea de ținere la frecvența industrială 50 Hz	kV	105	105
	- tensiunea de ținere la impuls de trăsnet		250	250
	- linia de fugă minima în conformitate cu IEC 60815	mm	1050	1050
	- solicitări statice și dinamice la borne în conformitate cu IEC 60137	daN	De specificat	After order
6	TRANSFORMATOARELE DE CURENT			
	Înfășurarea ÎT			
	Pentru protecții			
	Puterea nominală secundară	VA	10	10
	Curent nominal			
	- primar	A	100-150-200-300	100-150-200-300
	- secundar	A	5	5
	Clasa de precizie		0.5sFS5	0.5sFS5
	Pentru protecții			
	Puterea nominală secundară	VA	30	30
	Curent nominal			
	- primar	A	200-300-400-600	200-300-400-600

	- secundar	A	5	5
	Clasa de precizie		5P20	5P20
	Pentru protecții			
	Puterea nominală secundară	VA	30	30
	Curent nominal			
	- primar	A	200-300-400-600	200-300-400-600
	- secundar	A	5	5
	Clasa de precizie		5P20	5P20
	Neutru ÎT			
	Pentru protecții			
	Puterea nominală secundară	VA	10	10
	Curent nominal			
	- primar	A	200-300-400-600	200-300-400-600
	- secundar	A	5	5
	Clasa de precizie		5P20	5P20
	Înfășurarea MT			
	Pentru protecții			
	Puterea nominală secundară	VA	10	10
	Curent nominal			
	- primar	A	100-200-300-400	100-200-300-400
	- secundar	A	5	5
	Clasa de precizie		0.5sFS5	0.5sFS5

	Pentru protecții			
	Puterea nominală secundară	VA	30	30
	Curent nominal			
	- primar	A	200-300-400-600	200-300-400-600
	- secundar	A	5	5
	Clasa de precizie		5P20	5P20
7	COMUTATORUL DE REGLAJ SUB SARCINĂ			
	Producător			MR
	Tip			V type
	Curentul nominal	A	400	400
	Puterea nominală a plotului	kVA	1320	1320
	Tensiunea de ținere la impuls de trăsnet	kV	550	325
	Tensiunea de ținere la frecvența industrială	kV	230	140
	Curentul de scurtă durată			
	- valoarea de 3s	kA	6	6
	- valoare de vârf	kA	15	15
	Tip conectare		Neutru	Neutral
	Tip constructiv		Cu comutarea în vid	Vacuum type diverter switch
	Durata de viață a contactelor	operațiuni	Min. 600 000	Min. 600 000
	Tensiunea de alimentare dispozitiv de acționare (CA)	V	400/230	400/230
8	ECHIPAMENTUL DE PROTECȚIE ȘI MONITORIZARE			
	- Releul Buchholz		EMB BF 80/10 (sau echivalent)	EMB BF 80/10 (or. equ.)
	- Releul de protecție la jet de ulei		EMB URF 25/10 (sau echivalent)	EMB URF 25/10

				(or. equ.)
	- Releul de protecție a membranei de tip sac		EMB CF-38 (sau echivalent)	EMB CF-38 (or/ equ.)
	- Indicator nivel de ulei			
	Tip			After order
	Producător			Messko's product
	- Supapa de suprapresiune		Resetabilă cu acționare în baza de arc	resettable spring loaded
	Tip			After order
	Producător			Messko's product
	- Dezumidificator de aer		Cu autoregenerare fără necesitate de mentenanță	Automatic, maintenance free
	Tip			After order
	Producător			Messko's product
	- Indicator de temperatură a uleiului			
	Tip			After order
	Producător			Messko's product
	- Indicator de temperatură a înfășurărilor			
	Tip			After order
	Producător			Messko's product
9	DIMENSIUNI DE GABARIT ȘI GREUTĂȚILE			
	Greutatea transformatorului:			
	- totală	kg		After order
	- de transport	kg		After order
	- a părții active	kg		After order
	- a uleiului electroizolant	kg		After order
	Dimensiunile de gabarit cu trecerile montate:			
	- înălțimea	mm		After order

	- lățimea	mm		After order
	- lungimea	mm	max. 6250	max. 6250
	Ecartamentul căilor de rulare			
	- longitudinal	mm	1524	1524
	- transversal	mm	2000	2000
10	CERINȚELE DE FIABILITATE			
	Sistemul de presare a înfășurărilor și a miezului magnetic nu va necesita revizii pe toata durata de viața expectată		Da	Da
	Producătorul trebuie să aibă experiența în testele dinamice (de scurt circuit) a transformatoarelor sale cu tensiunea nominală ÎT ≥ 110 kV în conformitate cu prevederile IEC în laboratorul independent acreditat efectuate după anul 2010		De specificat tipul transformatorului, de prezentat raportul de încercări	Da
	Durata expectată de viață	ani	min. 30	Min. 30
11	LIVRARE			
	Incoterms		DAP	INCOTERMS 2020
	Descărcarea în șantier		Da	Port of Constanta
12	PACHETUL DE DOCUMENTE DEPUSE CU OFERTA			
	Eticheta cu parametrii propuse a transformatorului		Da	Da
	Rezultatele testelor tip pentru transformatoarele similare* produse după anul 2010		Da	Da
	Lista de referință cu transformatoarele similare cu indicarea Beneficiarilor finali pentru ultimii 5 ani		Da	Da
	Certificate de acreditare a laboratorului în conformitate cu prevederile IEC/ISO		Da	Da
	Desenul de gabarit a transformatorului		Da	Da
	Certificate pentru ulei electroizolant		Da	After order

 <small>Operatorul sistemului de transport al Republicii Moldova</small>	SPECIFICAȚIA TEHNICĂ TRANSFORMATORUL DE FORȚĂ 25 MVA 110/35/10 kV	Pagina 12 din 12
--	--	-------------------------

	Rezultatele testelor dinamice		Da	Da
	Rezultatele testelor tip pentru comutatorul de reglaj sub sarcină propus, efectuate în conformitate cu prevederile din IEC 60214-1:2014, în laboratorul European acreditat		Da	Da
	Manualul de utilizare și desenele cu privire la montare pentru comutatorul propus de reglaj sub sarcină		Da	N.A.
	Alte documente cerute conform capitolului 5 din specificația tehnică		Da	AFTER ORDER

- Transformatorul similar este un transformator trifazat cu puterea nominală, tensiunile nominale ÎT/MT/JT, pierderile, impedanțele de scurtcircuit și nivelul de zgomot similare/identice cu cele specificate în prezentul document.

Denumirea Ofertantului: China Electric Equipment (Jiangsu) Transformer Manufacture Co., Ltd.

Semnătura și ștampilă/semnătura electronica a Ofertantului: _____



8. TECHNICAL DATA SHEET

Power transformer Ungheni 25 MVA, 115 ± 9x1.78 % /38.5±2x2.5%/11 kV				
No	Description	Unit	Data required	Data offered
1	GENERAL			
	Manufacturer			CEEG
	- country			China
	- city			Yangzhong
	Kind of installation		outdoor	outdoor
	Standards		IEC60076	IEC60076
			IEC60137	IEC60137
			IEC61463	IEC61463
			IEEE 693-2005	IEEE 693-2005
	Single or three-phase unit		Three-phase	Three-phase
	Type of core		3 limb, step-lap stacked core form	3 limb, step-lap stacked core form
	Type of tank		Upper flange tank	Upper flange tank
	Tank fully vacuum proof		Yes	Yes
	Number of windings		Three	Three
	Winding material (HV,MV,LV)		Coper	Coper
	Insulation oil			
	- manufacturer			PetroChina
	- type			45#
	- specification of oil		IEC 60296	IEC 60296
	- insulation oil inhibited		Yes	Yes
	- test method for corrosive sulphur		IEC 62535 and ASTM D1275B	IEC 62535 and ASTM D1275B
2	RATINGS			
	Rated power at nominal voltage (primary/secondary/tertiary)			
	- at ONAN cooling	MVA	20/20/20	20/20/20
	- at ONAF cooling	MVA	25/25/25	25/25/25
	Maximum ambient temperature	oC	50	50
	Annual average ambient temperature	oC	15	15
	Minimum ambient temperature	oC	-30	-30
	Maximum service altitude	m	1000	1000
	Temperature rise limits at all tap changer settings			
	- oil/top	K	50	50
	- windings/average	K	55	55
	- windings/hot spot	K	68	68

	Rated voltages (no load)			
	- HV	kV	115	115
	- MV	kV	38.5	38.5
	- LV	kV	11	11
	Rated frequency	Hz	50	50
	Permissible load at neutral point	%	100/solidly earthed/surge arrester	100/solidly earthed/surge arrester
	Vector group symbol		YNyn0d11	YNyn0d11
	Impedance voltage – HV/LV (25 MVA basis)			
	- maximum tap position	%	Specify	18
	- nominal tap position	%	17.5	17.5
	- minimum tap position	%	Specify	17
	Impedance voltage – HV/MV (25 MVA basis)			
	- maximum tap position	%	Specify	11
	- nominal tap position	%	10.5	10.5
	- minimum tap position	%	Specify	10
	Impedance voltage – secondary/tertiary (25 MVA basis)	%	Min. 6.5 (±30%/-0%)	Min. 6.5 (±30%/-0%)
	Magnetic flux density at			
	-rated voltage and frequency	Tesla	Max. 1.7	Max. 1.7
	No load losses (tolerance +0%)	kW	<15	<15
	No load current (I ₀ /I _n)	%	0.1	0.1
	Core losses (W17/50)	W/kg	Max. 0.9	Max. 0.9
	Short circuit voltage			
	- HV-LV	%	17.5	17.5
	- HV-MV	%	10.5	10.5
	- MV-LV	%	6.5	6.5
	Load losses at rated power			
	HV/LV (25 MVA basis)			
	- maximum tap position	kW	Specify	115
	- nominal tap position	kW	Max. 120	Max. 120
	- minimum tap position	kW	Specify	130
	HV/MV (25 MVA basis)			
	- maximum tap position	kW	Specify	115
	- nominal tap position	kW	Max. 120	Max. 120
	- minimum tap position	kW	Specify	130
	MT/JT (25 MVA basis)	kW	Max. 110	N.A.
	HV winding (25 MVA basis)			
	- maximum tap position	kW	Specify	N.A.

	- nominal tap position	kW	Specify	N.A.
	- minimum tap position	kW	Specify	N.A.
	LV winding (25 MVA basis)	kW	Specify	N.A.
	MT winding (25 MVA basis)			
	- maximum tap position	kW	Specify	N.A.
	- nominal tap position	kW	Specify	N.A.
	- minimum tap position	kW	Specify	N.A.
	Power consumption of cooling plant	kW	Specify	5
	Efficiency referred to 75 °C at rated voltage taping and at:			
	- 100% rated output and 1.0 power factor	%	99.7	99.46@HV-MV
	- 75% rated output and 1.0 power factor	%	99.7	99.56@HV-MV
	- 50% rated output and 1.0 power factor	%	99.7	99.64@HV-MV
	- 25% rated output and 1.0 power factor	%	99.7	99.64@HV-MV
	- 100% rated output and 0.8 power factor	%	99.7	99.32@HV-MV
	- 75% rated output and 0.8 power factor	%	99.7	99.45@HV-MV
	- 50% rated output and 0.8 power factor	%	99.7	99.55@HV-MV
	- 25% rated output and 0.8 power factor	%	99.7	99.55@HV-MV
	Voltage variation range HV	kV	+/- 18.423	+/- 18.423
	Taping range HV	%	+/- 16	+/- 16
	Number of steps HV	steps	+/- 9	+/- 9
	Continuous power on all taps		Yes	Yes
	Voltage variation range MV 38.5 kV	kV	+/- 1.925	+/- 1.925
	Tapping range MV 38.5 kV	%	+/- 5	+/- 5
	Number of steps MV 38.5 kV	steps	+/- 2	+/- 2
	Principal taping HV	kV	115	115
	Principal taping MV	kV	38.5	38.5
	Winding insulation design			
	- HV		Uniform	Graded
	- MV		Uniform	Uniform
	- LV		Uniform	Uniform
	Seismicity on MSK scale		IX	After order
3	INSULATION LEVEL			
	Insulation level HV winding			
	- Power frequency withstand voltage line/neutral	kV	230/230	230/140
	- Lightning impulse level line/neutral	kV	550/550	550/325
	Insulation level LV winding			

	- Power frequency withstand voltage	kV	34	34
	- Lightning impulse level	kV	110	110
	Insulation level MT winding			
	- Power frequency withstand voltage line/neutral	kV	95/95	95/95
	- Lightning impulse level line/neutral	kV	250/250	250/250
4	OPERATION DETAILS			
	Cooling method		ONAN/ONAF	ONAN/ONAF
	Noise level (LpA) at a measuring distance of 2.0 m (all forced cooling in operation)	dB(A)	Max. 60	Max. 65
5	BUSHINGS			
	HV (lines)			
	- manufacturer			Nanjing Zhida, China OIP
	- type			OIP
	- rated current	A	800	800
	- power frequency test voltage	kV	255	255
	- lightning impulse level		550	550
	- minimum creepage distance in accordance with IEC 60815	mm	2835	2835
	- cantilever load level according to IEC 60137	daN	Specify	After order
	HV (neutral)			
	- manufacturer			Nanjing Zhida, China OIP
	- type			OIP
	- rated current	A		800
	- power frequency test voltage	kV	105	140
	- lightning impulse level		250	325
	- minimum creepage distance in accordance with IEC 60815	mm	1050	2250
	- cantilever load level according to IEC 60137	daN	Specify	After order
	LV			
	- manufacturer			Nanjing Zhida, China Pure porcelain bushing
	- type			Pure porcelain bushing
	- rated current	A	2000	2000
	- power frequency test voltage	kV	42	42
	- lightning impulse level		110	110
	- minimum creepage distance in accordance with IEC 60815	mm	280	280

	- cantilever load level according to IEC 60137	daN	Specify	After order
	MT (lines/neutral)			
	- manufacturer			Nanjing Zhida, China
	- type			Pure porcelain bushing
	- rated current	A	630	630
	- power frequency test voltage	kV	105	105
	- lightning impulse level		250	250
	- minimum creepage distance in accordance with IEC 60815	mm	1050	1050
	- cantilever load level according to IEC 60137	dan	Specify	After order
6	CURRENT TRANSFORMERS			
	115 kV line side			
	For protection purposes			
	Rated output	VA	10	10
	Ratio			
	- primary	A	100-150-200-300	100-150-200-300
	- secondary	A	5	5
	Class		0.5sFS5	0.5sFS5
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	200-300-400-600	200-300-400-600
	- secondary	A	5	5
	Class		5P20	5P20
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	200-300-400-600	200-300-400-600
	- secondary	A	5	5
	Class		5P20	5P20
	115 kV neutral side			
	For protection purposes			
	Rated output	VA	10	10
	Ratio			
	- primary	A	200-300-400-600	200-300-400-600

	- secondary	A	5	5
	Class		5P20	5P20
	38.5 kV line side			
	For protection purposes			
	Rated output	VA	10	10
	Ratio			
	- primary	A	100-200-300-400	100-200-300-400
	- secondary	A	5	5
	Class		0.5sFS5	0.5sFS5
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	200-300-400-600	200-300-400-600
	- secondary	A	5	5
	Class		5P20	5P20
7	ON-LOAD TAP CHANGER			
	Manufacturer			MR
	Type			V type
	Rated through current	A	400	400
	Rated step capacity	kVA	1320	1320
	Lightning impulses level	kV	550	325
	Power frequency withstand test voltage	kV	230	140
	Short-time current			
	- 3s value	kA	6	6
	- peak value	kA	15	15
	Type of connection		Neutral	Neutral
	Type of switching		Vacuum type diverter switch	Vacuum type diverter switch
	Contact life operation	Nos	Min. 600 000	Min. 600 000
	Auxiliary supply voltage (AC)	V	400/230	400/230
8	PROTECTION AND MONITORING EQUIPMENT			
	- Buchholz relay		EMB BF 80/10 (or. equ.)	EMB BF 80/10 (or. equ.)
	- Oil flow operated protection relay		EMB URF 25/10 (or. equ.)	EMB URF 25/10 (or. equ.)
	- Conservator gas detection relay		EMB CF-38 (or/ equ.)	EMB CF-38 (or/ equ.)
	- Oil level indicator			
	Type			After order

	Manufacturer			Messko's product
	- Pressure relief device		resettable spring loaded	resettable spring loaded
	Type			After order
	Manufacturer			Messko's product
	- Dehydrating breather		Automatic, maintenance free	Automatic, maintenance free
	Type			After order
	Manufacturer			Messko's product
	- Oil temperature indicator			
	Type			After order
	Manufacturer			Messko's product
	- Winding temperature indicator			
	Type			After order
	Manufacturer			Messko's product
9	MASSES, MEASURES AND DRAWINGS			
	Transformer masses:			
	- total mass	kg		After order
	- transportation mass	kg		After order
	- untanking mass	kg		After order
	- mass of insulating liquid	kg		After order
	Overall dimensions including bushings:			
	- height	mm		After order
	- depth	mm		After order
	- width	mm	max. 6250	max. 6250
	Gauge of the tank			
	- longitudinal	mm	1524	1524
	- transverse	mm	2000	2000
10	RELIABILITY REQUIREMENTS			
	Design of windings and/or magnetic core pressing system should not require any maintenance for the whole expected life term		Yes	Yes
	Manufacture has to have experience in short-circuit tests \geq 110 kV rated voltage transformers (withstand short circuit) according to IEC standard in independent laboratories not earlier than 2010		Specify transformer type, present test report	Yes
	Life time	year	Min. 30	Min. 30
11	DELIVERY			
	Incoterms		DAP	INCOTERMS 2020

	Unloading on site		Yes	Port of Constanta
12	DOCUMENTS TO BE PROVIDED WITH THE OFFER			
	Transformer data plate (photo or drawing)		Provide	yes
	Passport or Test Certificate of the similar* transformer previously manufactured not earlier than 2010		Provide	yes
	Reference list of the similar transformers for the last 5 years with end users contacts		Provide	yes
	Certificate for manufacture's test laboratory (ISO/IEC)		Provide	yes
	Outline transformer drawing		Provide	After order
	Oil test certificate		Provide	yes
	Short-circuit test report		Provide	yes
	OLTC Type Test Report performed in independent and accredited European Laboratory according to IEC 60214-I:2014,		Provide	N.A.
	OLTC instalatuon and operation manual		Provide	AFTER ORDER
	Other documents required according to chapter 5 of the present document		Provide	yes

- Similar transformer is a three – winding transformer with same/similar rated power, HV and MV rated voltage, no-load and load losses, impedance voltage, sound pressure level.

Bidder's name: China Electric Equipment (Jiangsu) Transformer Manufacture Co., Ltd.

Signature and stamp/electronic signature of the bidder: _____



编号 321182000201702210083



营业执照

(副本)

统一社会信用代码 9132118233888785XM (1/1)

名称 中电电气(江苏)变压器制造有限公司
类型 有限责任公司
住所 镇江市扬中市中电大道188号
法定代表人 陆瀚
注册资本 16000万元整
成立日期 2015年04月08日
营业期限 2015年04月08日至*****
经营范围 输配电及控制设备研发、制造、设计及其他相关技术服务；金属制品销售；自营和代理各类商品及技术的进出口业务（国家限定企业经营或禁止进出口的商品和技术除外）。（依法须经批准的项目，经相关部门批准后方可开展经营活动）



登记机关



2017年 02月 21日

BUSINESS LICENSE

(Copy)

NO.321182000201702210083

Unified Social Credit Code NO.9132118233888785XM (1/1)

Name of Enterprise: China Electric Equipment (Jiang Su) Transformer Manufacturing Co., Ltd.

Character of Economy: Limited Liability Company

Address: No.188 Zhongdian Road, Yangzhong, Zhenjiang, Jiangsu Province, China

Legal Representative: Lu Han

Registered Capital: RMB 160,000,000 Yuan

Date of Foundation: April 8,2015

Business Term: From April 8,2015 to present

Business Scope: Transmission and distribution and control equipment R&D manufacturing、 design and other related technical services; Sales of metal products; Independent management and agents of all types of goods and technology import and export business (Except for state limited business or prohibited imports and exports of goods and technology). (The project that shall be subject to approval according to law, they can carry out business activities after approved by the relevant project department)

Registration Authority: (Seal) Yangzhong City Administration for market supervision
February 21,2017

This certificate is translated into English by China Electric Equipment (Jiang Su) Transformer Manufacturing Co., Ltd



PRODUCT FAMILY



WWW.CNCEEG.COM



CONTENTS



P03 COMPANY PROFILE

P07 PRODUCT INTRODUCTION

P23 PHOTO SHOW

01

+
COMPANY PROFILE

KEEPING DELIVERING PREMIUM POWER TO THE WORLD

Guided by the green concept of "Safety, Energy Conservation and Environmental Protection", China Electric Equipment (Jiangsu) Transformer Manufacture Co., Ltd. is committed to the R & D and production of transmission and distribution equipment. With a registered capital of 160 million Yuan and a total area of 600 mu, the company has an annual production capacity of 40000MVA transformer. The company has ISO9001 quality management system certification, ISO14001 environmental management system certification and ISO45001 occupational health and safety management system certification.

CEEG's main products are 220kV and 110KV railway traction transformers, Scott railway traction transformers, 2x27.5kV railway autotransformers, oil-immersed transformers up to 220kV, cast resin dry type transformer up to 35kV, VPI transformer, urban rail traction rectifier transformers, amorphous alloy dry-type transformers, mine explosion-proof transformers and substation, frequency conversion transformers, anti-harmonic transformers, marine transformers, urban rail transit smart container substation, substations, wind and photovoltaic box-type substation, etc., which covering railways, power, electronics, urban rail transit, hydropower, nuclear power, wind power, coal mines, communications, construction, petroleum, chemical, aerospace and other industries.

02

+

PRODUCT INTRODUCTION

220 (110) kV Railway Traction Transformer

Safe Reliable Extraordinary



Product Introduction

1. Adopt the Nomex insulation system of DuPont company and register the trademark: HIGH LOADED
2. Seven-stage temperature control technology
3. High overload capacity: meet the typical overload curve, with long-term overload capacity of 30%;
4. No partial discharge: less than 40pc
5. Short-circuit resistant: meet the operating characteristics of electrified railroads with frequent near-end short-circuits.

Scope of Application

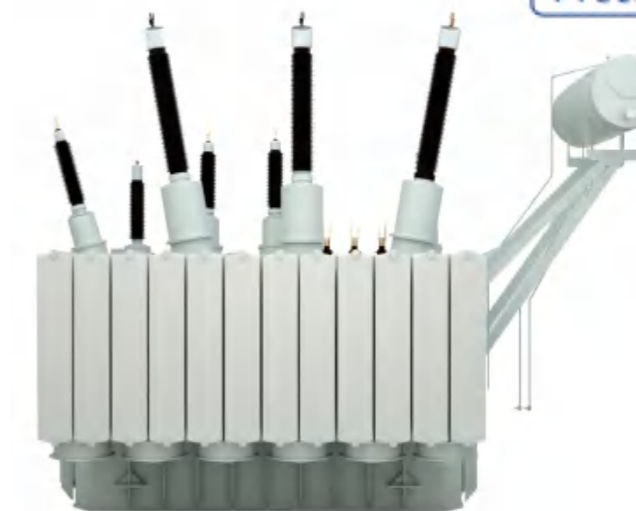
It is applicable to the passenger line of electrified high-speed railroad and heavy-duty freight line.

Reference

Dozens of domestic electrified railroad lines such as Beijing-Shi-Wu high-speed railway, Jin-Qin line, Lan-Xin line, Dunge line, Da-Qin line, Guang-Zhu line, Yu-Fu line, etc.

220kV, 110kV (66kV) Power Transformer

Precision Crafted, Perfect Quality



Product Introduction

1. Adopt constant temperature, humidity, dust-free fully enclosed manufacturing process, lean control of product quality.
2. Adopt the original "seven-stage temperature control technology" system, combined with the temperature field finite element analysis, to give full play to the performance advantages of various insulation materials.
3. For the principle of noise generation, unique noise reduction measures are adopted in different parts to ensure that the noise is better than national standards.
4. The sealing structure parts are all made by one-time molding technology, and through fluorescent, positive pressure and negative pressure leak test methods, to ensure that the product is leak-free
5. The core adopts the integrated automatic shearing and stacking robot production line imported from Switzerland leading to low no-load loss.
6. Pass the sudden short-circuit test of the national transformer testing center at one time, the product is safe and reliable.

Scope of Application

Favorable to meet the power peak demand of summer, suitable for distribution networks with high load rate under high temperature and places with shock load and continuous overload requirements. Such as: steel, metallurgical industry, railroad transportation, power plant, hydropower station, etc.

Reference

Beijing China Coal Electric Co., Ltd., Beijing Lufeng times Technology Development Co., Ltd., Shenhua United Construction Co., Ltd., Chongqing Yuzhan Electric Co., Ltd., WISDRI Engineering & Research Incorporation Limited. (China new iron and Steel Making Co., Ltd.), WISDRI Engineering & Research Incorporation Limited. (ESP power transformer and load switch of Hebei Taihang iron and Steel Co., Ltd.) etc.

SCRBH15 Amorphous Alloy Dry Type Transformer

Three Phase Three Column, Energy Saving Pioneer



Product Introduction

1. Using high-quality amorphous alloy strip, the no-load loss is reduced by about 70%
2. The self-developed three-phase three column structure covers a small area.
3. Vibration model simulation analysis is used to reduce noise effectively;
4. Unique core suspension technology and end seal process to ensure low force on the core and low noise.
5. Adopt unique semi-envelope structure type, strong dustproof ability, high product insulation performance
6. High mechanical strength, waterproof and short circuit resistant.

Scope of Application

It is suitable for places with low power distribution utilization and high requirements for flammable, explosive and fire prevention, such as cloud computing data centers, rural power grids, high-rise buildings, commercial centers, subways, airports, power plants, etc.

Reference

China Telecom, China Mobile, China Unicom, a unit of the Chinese People's Liberation Army, Daqing Zhonglan Petrochemical Company Limited, Beijing General Research Institute of Mining and Metallurgy, etc.

Open Ventilated Dry Type Transformer

Safe, Reliable, Environmentally Friendly and Energy Efficient



Product Introduction

1. The product is class H and the insulation material is class C. It has strong overload capacity, strong short-circuit resistance and high safety performance.
2. High quality high permeability silicon steel with multi-stage stepping process leads to low no-load loss.
3. Copper and silicon steel can be recycled, and the insulation material is completely degraded, which is an environmentally friendly product.
4. Adopting DuPont ReliatraN core technology, the volume is reduced by 10% and the material is saved by 10%.
5. It's intelligent "brain" can use full intelligent data collection and analysis to achieve active operation and maintenance.

Reference

National Olympic Sports Center comprehensive training hall, Beijing Aerospace Times Laser Navigation Technology Co., Ltd., Chinese people's armed police force, China University of petroleum, Beijing Tiantan Hospital, etc.

ZPSG Variable Frequency Transformer

Motor Protection, Energy Saving and Efficiency Increasing

Product Introduction

1. The core adopts the through core positioning structure of multi-stage stepping process, and the core has no transverse and longitudinal displacement under various working conditions.
2. The winding adopts a variety of structural types with strong short-circuit resistance.
3. A special air-cooled guiding system is adopted, leading to high heat dissipation efficiency, safety and reliability.
4. The magnetic flux leakage distribution is reasonable and fully meets the working condition requirements of the frequency converter.



5. Multiple technologies are adopted to effectively suppress the harmonic content, realize perfect harmonic free and prolong the service life of the motor.
6. Various structural types can meet the requirements of various frequency conversion systems.
7. The maximum capacity of the product can reach 9000kVA, which can realize 72 pulse rectification.

Scope of Application

It is suitable for matching with high-voltage frequency converter, mainly in municipal water supply, electric power, metallurgy, petroleum, petrochemical, cement, coal and other industries.

Reference

Siemens (Shanghai) Electric Drive Equipment Co., Ltd., Beijing ABB Electric Drive System Co., Ltd., Beijing Dynamic Power Group, Beijing Hiconics Drive Technology Co., Ltd., Jiangsu LiPu Electronic Technology Co., Ltd., Wuxi Fuji Motor Co., Ltd., etc.

Marine, Offshore Platform Transformer

Super Insulation, Three Proofs, Earthquake Resistance



Product Introduction

1. High quality high permeability silicon steel with multi-stage stepping process leads to low no-load loss.
2. First company in China to use Nomex Paper insulation system to manufacture marine transformer and offshore platform transformer.
3. The active part adopts two process systems: VPI vacuum impregnation process and epoxy vacuum casting process, both of which are acceptable.
4. All fasteners and bare conductors are treated by special process to meet the three prevention requirements.
5. The enclosure is equipped with waterproof groove, and the protection level can reach IP44, which is safe and reliable.
6. The air-water cooling structure of air cooling and water cooling can be adopted, and the product has strong overload capacity.

Scope of Application

Ships (bulk carriers, oil tankers, container ships, chemical ships, LNG ships, Ro Ro ship, Ro Ro passenger ship, etc.), wharf, offshore platform and ship supporting products.

Reference

CSSC 712 Research Institute, Shanghai Zhenhua Heavy Industries Co., Ltd, Nantong COSCO KHI Ship Engineering Co. Ltd, China National Offshore Oil Corporation (Shenzhen) branch, etc.

Cast Resin Transformer

Precision Crafted Perfect Quality

1. High quality high permeability silicon steel with multi-stage stepping process leads to low no-load loss.
2. The surface adopting nano paint self leveling process leads to low noise.
3. It has strong waterproof and short-circuit resistance, strong overload capacity, good electrical performance, safety and reliability.
4. Through the simulation analysis of electric field, temperature field and magnetic field, CEEG is the first company in China to pass KEMA's E2, C2 and F1 tests.
5. The product can adopt dual-mode structure scheme to meet the needs of different customer groups.
6. Special intelligent transformer solution and big data cloud diagnosis technology are adopted to be online from time to time.



Product Category

10kV Series

1. Low loss, low partial discharge and low noise;
2. The product performance parameters of SCB11, SCB12 and SCB13 series are better than GB and IEC standards;
3. It is safe, flame-retardant, fireproof and pollution-free, and can be directly installed in the load center;
4. Maintenance free, convenient installation and low comprehensive operation cost;
5. Low temperature rise and high product reliability;
6. Stable structure and strong seismic capacity;
7. Moisture proof, corrosion-resistant, wide application range;

35kV Series

1. Through the dynamic thermal stability simulation analysis, the winding structure is reasonably arranged and has strong short-circuit resistance;
2. Low loss, low noise and low partial discharge;
3. It can also operate under overload for a long time without air cooling, with strong overload capacity;
4. Winding capacitance distribution is reasonable and impact resistance is strong;
5. The product has the characteristics of flame retardant and self-extinguishing, non-toxic and harmful gas generation, green and environmental protection.

Traction Rectifier Transformer

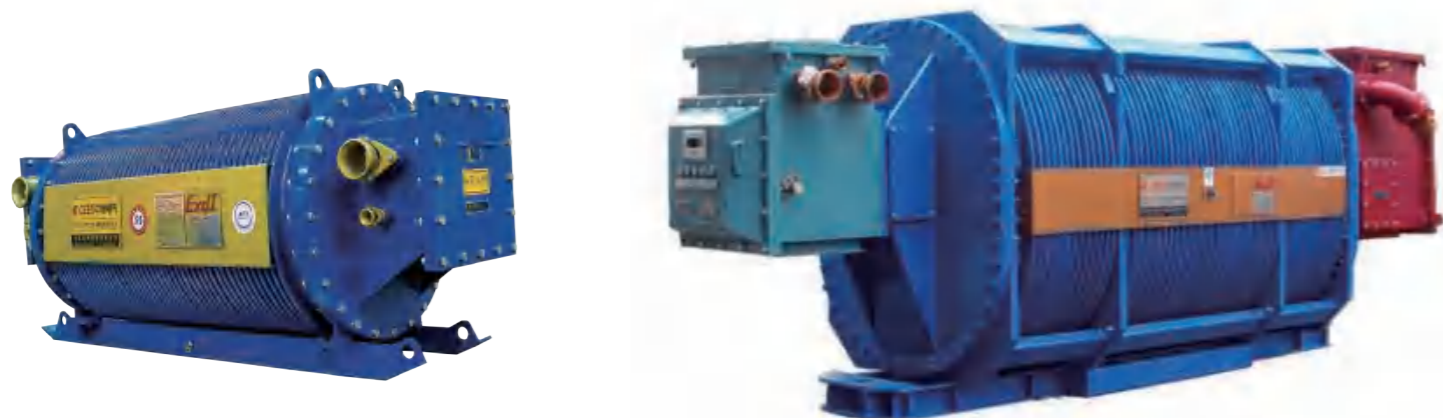
1. Low temperature rise, strong overload capacity and reliable operation under class VI load conditions
2. The key technical parameters are well balanced, the load is evenly distributed, and the amount of non-characteristic harmonics is effectively reduced.
3. The coil adopts axial double split structure, which can eliminate the balance reactor and smooth the output DC waveform.
4. High mechanical strength, good moisture resistance, partial discharge $\leq 10\text{pc}$.
5. Low noise and electromagnetic radiation pollution.

Reference

Olympic Center Gymnasium, Qingdao International Sailing Center, Beijing Urban sub center, Beijing Chang'an Street lighting project, Beijing Winter Olympics, China Iron and Steel Research Institute, Wuxi Metro, Nanjing Metro, Shanghai Disney Land, Shanghai Expo Exhibition Center, etc.

KBSG2-T Mining Explosion-proof Transformer KBSGZY2-T Mining Explosion-proof Mobile Substation

National Patent, Safety, High Compression Strength



Product Introduction

1. The unique full corrugated structure effectively improves the heat dissipation area, and has a national patent;
2. The cylindrical flameproof shell improves the strength of the shell, can withstand 1MPa pressure and has strong explosion-proof performance;
3. DuPont Nomex Paper insulation system is adopted, which is more safe and reliable;
4. Adopting advanced design and processing technology, complete production and testing technology leading to more stable performance;
5. Low loss, low partial discharge, low noise and strong overload capacity;
6. Maintenance free, safe, flame-retardant, explosion-proof and fire-proof, pollution-free, and can be installed directly.

Scope of Application

It is widely used in power supply of underground devices in coal mines.

Reference

China Shenhua Group (including its subsidiaries), Datong Coal Mine Group Tongzhong Electric Co., Ltd., Shanxi Sanyuan Coal Industry group, Xinwen Mining Group, Shanxi China Resources Liansheng Energy Investment Co., Ltd., Inner Mongolia Beilian Power Energy Development Co., Ltd., etc.

KBSGZY2-T Mining Explosion-proof Converter Mobile Substation

Safe, Reliable and Environmentally Friendly

Product Introduction

1. The iron core adopts high-quality high magnetic conductivity silicon steel, full oblique joint and multi-stage stepping process, with low no-load loss;
2. The iron core adopts three-dimensional fastening structure. Under various working conditions, the iron core has no transverse and longitudinal displacement.
3. High and low voltage windings adopt a combined winding process, combined with VPI vacuum pressure impregnation and high-temperature curing, with high mechanical strength.
4. The shell adopts an oval structure, with low product height and short length, which is suitable for the space requirements of various mines.
5. The shell adopts the corrugated cylindrical structure of patented technology, with no ponding and dust on the top, good heat dissipation effect and strong explosion-proof performance.
6. It adopts the eight-point fastening method, which is firm and reliable and can go down the well vertically.
7. Nomex Paper insulation system is adopted, with heat resistance grade up to grade C, recyclable, safe and environmental protection.
8. The integrated design scheme supplies power to the Flameproof Frequency Converter and communicates with the frequency converter to complete the functions of equipment operation status monitoring, fault breaking and centralized control.



Reference

China Coal Science and industry Tiandi (Jiyuan) electrical transmission Co., Ltd. (central enterprise), Qingdao Tianxin frequency conversion Co., Ltd., Liaoning Rongxin Electric Co., Ltd., Shenhua Ningxia Coal Industry Group Co., Ltd., Jincheng Lanyan Coal Industry Co., Ltd., Shenhua Xinjiang Energy Co., Ltd., etc.

Scope of Application

The product supplies power to the Flameproof Frequency Converter and communicates with the frequency converter to complete the functions of equipment operation status monitoring, fault breaking and centralized control. It is widely used in coal mines to supply power to 1140V and 3300v Flameproof Frequency conversion speed regulating devices with three-level technology.

ZGS series Prefabricated Substation

Modular Manufacturing



Product Introduction

1. The product has the advantages of compact structure, small volume, short construction cycle and easy installation and movement.
2. The shell adopts fully sealed design, with good protection effect.
3. The substation adopts unique guiding ventilation technology, with good heat dissipation effect and strong overload capacity.
4. Various power supply schemes of terminal or ring network can be adopted, with long service life and maintenance free.
5. Dry type, oil type, amorphous alloy and other types of transformers can be configured according to user requirements, and the schemes are flexible and diverse.
6. CT, PT, protection and communication devices can be installed at the high-voltage side, and multi-functional intelligent instruments for acquisition and protection can be installed at the low-voltage side, so as to realize the "three remotes" of high-voltage and low-voltage switches and transformers.
7. LED display screen can be installed on the surface of the shell to scroll all kinds of information, which is beautiful, environmentally friendly and economical.
8. It can realize fully intelligent data acquisition and analysis, realize active operation and maintenance, and provide energy management for various scenarios.

Scope of Application

It is widely used in various power transformation and distribution places such as industrial parks, residential quarters, commercial centers and high-rise buildings.

Reference

Beijing Gongke Feida Transportation Engineering Development Co., Ltd., Inner Mongolia Xilin Gol Baiyinhua Coal Power Co., Ltd., Jiangsu Huaxi Group Co., Ltd., Zibo Mining Group material supply Co., Ltd., Anqing Hengjiang industry (Group) Co., Ltd., Gezhouba Group Power Co., Ltd., Qinghai Upper Yellow River Hydro-power Development Co., Ltd., etc.

YB series Prefabricated Substation

Modular Manufacturing



Product Introduction

1. YB series prefabricated substation is a complete set of indoor and outdoor power transformation and distribution equipment composed of high-voltage switchgear, power transformer and low-voltage switchgear.
2. The product is a frame structure, which is welded with section steel or assembled from steel plate. The frame is covered with special paint layer, which has strong mechanical properties, weather resistance and corrosion resistance.
3. The top of the prefabricated substation is provided with a thermal insulation layer to prevent condensation caused by rapid temperature change. A thermal insulation layer can be added around the box.
4. YB series prefabricated substation is to install the secondary system (including telecontrol) of the substation into one or several movable, fully enclosed, moisture-proof and anti-corrosion boxes after installation and commissioning in the factory. After one-time installation in the factory, the box is transported to the site. Only the corresponding foundation and one-time connection are needed to transmit power.
5. It can realize fully intelligent data acquisition and analysis, realize active operation and maintenance, and provide energy management for various scenarios.
6. CT, PT, protection and communication devices can be installed at the high-voltage side, and multi-functional intelligent instruments for acquisition and protection can be installed at the low-voltage side, so as to realize the "three remotes" of high-voltage and low-voltage switches and transformers.

Scope of Application

In places without fire, explosion, chemical corrosion and violent vibration, the ground inclination shall not exceed 5°.

Reference

Beijing Olympic Doping Testing Center, Beijing Lvqi Kechuang Technology Co., Ltd., Qingdao International Sailing Center of the 29th Olympic Games of Qingdao East Olympic Development & Construction Group, 96201 Unit, 4822 plant of the Chinese people's Liberation Army, Wuhan Branch of China Petrochemical Corporation, State Grid Smart Grid Research Institute, Xinjiang Meihua Amino Acid Co., Ltd. and Sinopec (Hong Kong) Hainan Petroleum Co., Ltd., China Railway 14th Bureau Group Co., Ltd., etc.

YBF series Wind Power Substation

Professional Design, Safe and Reliable



Product Introduction

1. Good sealing performance, wind and sand proof, salt fog proof, rain and snow proof.
2. Advanced electric spraying technology, the shell is not easy to rust and fade.
3. The shell has strong adaptability to the environment, which can be selected according to different environments. It has the advantages of beautiful appearance and coordination between the shape and the wind scene.
4. Intelligent control, which can not only be controlled locally, but also be monitored remotely to realize the four remote functions.
5. Natural ventilation. The substation is equipped with sufficient natural ventilation and thermal insulation measures. When the ambient temperature is close to 40 °C, forced ventilation will be started to ensure the normal operation of step-up transformer.

Scope of Application

Wind power plant. YBF series wind power substation is a special equipment for grid connected output after raising the 0.6-0.69kV voltage sent by wind power generator to 10kV or 35kV.

Reference

Inner Mongolia Ximeng zheligentu wind farm phase I, Saihan project of Beijing International Power New Energy Co., Ltd., zheligentu project, Gansu Xinquan Wind Power Co., Ltd., Huaneng Tianzhen Wind Power Co., Ltd., Dafeng Wind Power Co., Ltd., National Electricity Yunnan New Energy Co., Ltd., Jiangxi SPIC New Energy Power Generation Co., Ltd, Datang Zhangzhou Wind Power Generation Co., Ltd., Huaneng Fuxin Wind Power Generation Co., Ltd., etc.

Oil-immersed Distribution Transformer

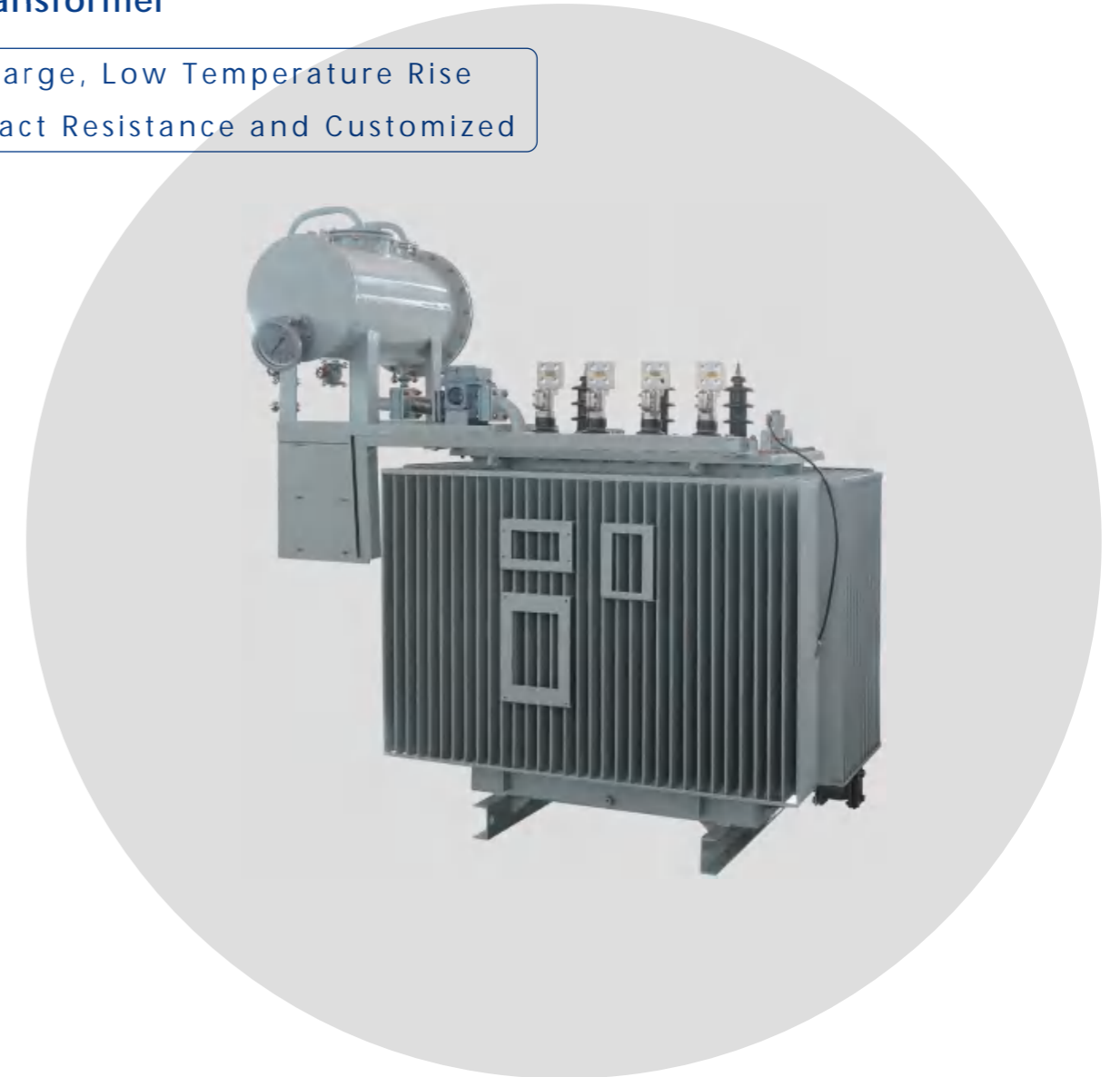
Low Noise, Low Partial Discharge, Low Temperature Rise
Short Circuit Resistance, Impact Resistance and Customized

Product Introduction

Oil-immersed distribution transformer is a new type of transformer with insulation structure based on the combination of traditional oil immersed transformer structure and modern oil immersed transformer structure at home and abroad.

Scope of Application

It is widely used in urban power grid, rural power grid, high-end power supply, steel, coal, chemical industry, cement, papermaking, metallurgy and other industries.



03



PHOTO SHOW





110kV(60kV) Oil-immersed Power Transformer

Energy saving, low consumption



110kV(60kV)
Oil-immersed Power Transformer



中电电气集团

总部地址：南京市江宁经济技术开发区水阁路6号

生产基地：江苏扬州中电大道168号 南京市江宁经济技术开发区水阁路6号

电话：+86 25-83275395 传真：+86 25-52095624

全国统一客户服务专线：800-828-6118 400-828-6118

欢迎访问<http://www.ceeg.cn>

China Electric Equipment Group
CEEG Headquarter: 6 Shuige Road, Jiangning Economy & Technology Development Zone.
Production Base: 168 Zhongshan Road, Yangzhou City, Jiangsu Province
6 Shuige Road, Jiangning Economy & Technology Development Zone.
Tel: 86-25-83275395 Fax: 86-25-52095624
Unified National Customer Service Hotline: 800-828-6118 400-828-6118
Welcome to our website: <http://www.ceeg.cn>

中电电气 | CEEG 中电电气 | 版权所有 CEEG copyright reserved.



本产品由中电电气集团研制，仅用于说明本系列产品的技术参数，中电电气集团保留对任何因技术升级或因更新的生产工艺而造成与本产品不符等，或对本产品的印刷错误及不准确性不承担任何责任。如有任何疑问，请向本公司的销售人员或客服人员咨询，以证实本产品的真实性。

All data on this catalogue printed by CEEG are used for describing the main information of this series products. CEEG have the right to do any improving for it whenever the technology should be upgraded or the production craftwork should be renewed possibly, or do some necessary correction because of the final error and inaccurate information of this manual without any intention. When you make your orders, please keep in touch with related personnel in order to confirm if your information is right.

www.ceeg.cn





China Electric Equipment Group(CEEG) is the world leading supplier of transmission and distribution and new energy, has been involved in Power Transformer, PV Technology, Insulation Materials and Complete Substation. CEEG consists of 15 holding, wholly-owned subsidiary companies, and possess Nanjing, Yangzhong, Shanghai, Jingdezhen four major industrial bases. We employ about 6,000 employees and more than 300 sales & service sites spread all over the major cities of the whole country. CEEG has "China's Resounding Brand", "China Top Brand" and other national honors. There are more than 60 famous domestic and foreign experts in which some of them have participated in drafting out national transformer standard. A group of PV scientists still hold the world record of photovoltaic efficiency so far. CEEG provides world-class products and quality services for electricity, electronics, hydropower, nuclear power, wind power, coal mine, telecommunications, construction, petroleum, chemical engineering, aviation, transportation, railage and other industries.

CEEG transformer, made from US DUPONT NOMEX® Paper as a main insulation material, has changed the traditional concept of transformer industry, filled up our domestic blank with their unique safe function and achieved international advanced level. CEEG has an annual output of 30 million KVA of transformer. CEEG established photovoltaic industry from silicon materials, silicon chip, solar cell, solar modules, solar photovoltaic power system including the complete industrial chain.

We developed application of DUPONT Nomex Paper as the core of new transformer technology and three phase three column energy-saving amorphous alloy transformers. Transducer, rectifier frequency transformer, reactor as the representative of efficient power transmission and distribution solutions which means that fewer resources you can get more power, saving a large expenditure. In these ways, CEEG opened the path to a new energy-saving electric era.

In recent years, CEEG involved in the construction of key projects in many countries, such as Beijing Olympic Project, Shanghai World Expo Project, Manned Space Flight Project, the Guangzhou Baiyun Airport, the Beijing South Railway Station, the Nanjing South Railway Station, so as to secure the maximum power and solar energy solutions meet customer needs. From transmission and distribution, power electronic to solar pv industry, CEEG can provide customers with forward-looking solutions. No matter when and where, the group always carry out the core value of "Foresight, Innovation and Responsibility". With these values, CEEG will make the complex power system more efficient, productive and energy-saving.



Navigator



中国驰名商标 China's Resounding Brand

2008



PCCC产品质量认证 PCCC Product's quality certificate

2005



全国用户满意产品 Users-Satisfaction Product of the whole nation

2006



全国售后服务十佳单位 Industry and circuloton united hand in hand

2007



中国环境标志 China Environment Labeling Products Certificate

2003

AAA

3A资信企业 AAA Grade Credit Company Certificate

2002



ISO9001
质量管理体系认证



ISO14001
环境管理体系认证



OHSAS18001
职业健康安全体系认证



IEC 60076
KEMA认证



IEC 60726
KEMA认证

2000

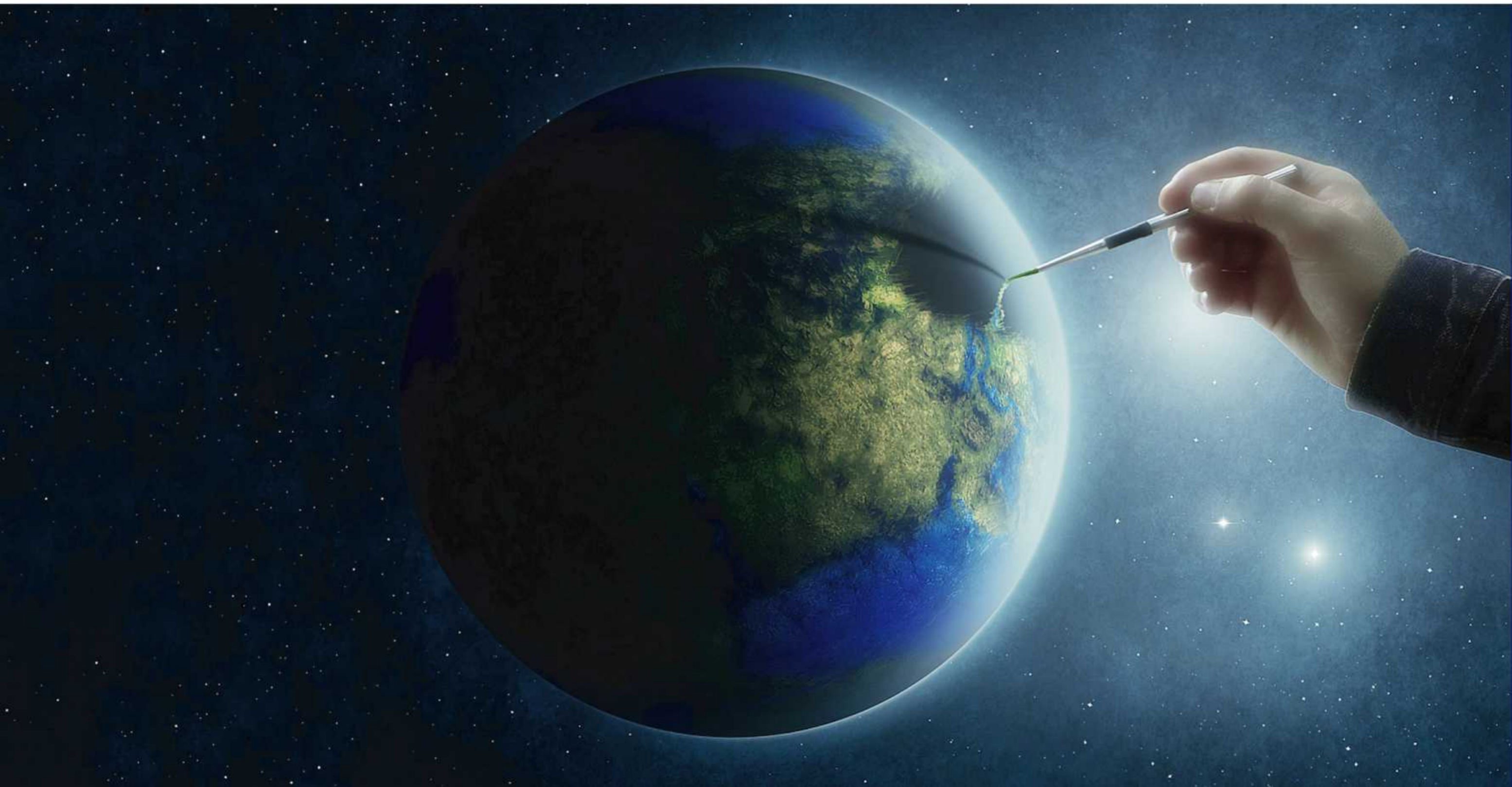


2005年10月，国务院总理温家宝在中央及省市领导的陪同下莅临中电电气视察，充分肯定了中电电气在科技创新、发展自主知识产权方面所做出的不懈努力。
On October 2005, accompanied by central and province leaders, Prime Minister Wen Jiabao arrived CEEG for inspection, and fully affirmed CEEG's continuous effort on technology innovation and self intellectual property at rights development.



2007年中电电气光伏在美国纳斯达克证交所上市，股票代码“CSUN”。
In 2007, CEEG was listed on the Stock Exchange of NASDAQ. The stock code is CSUN.



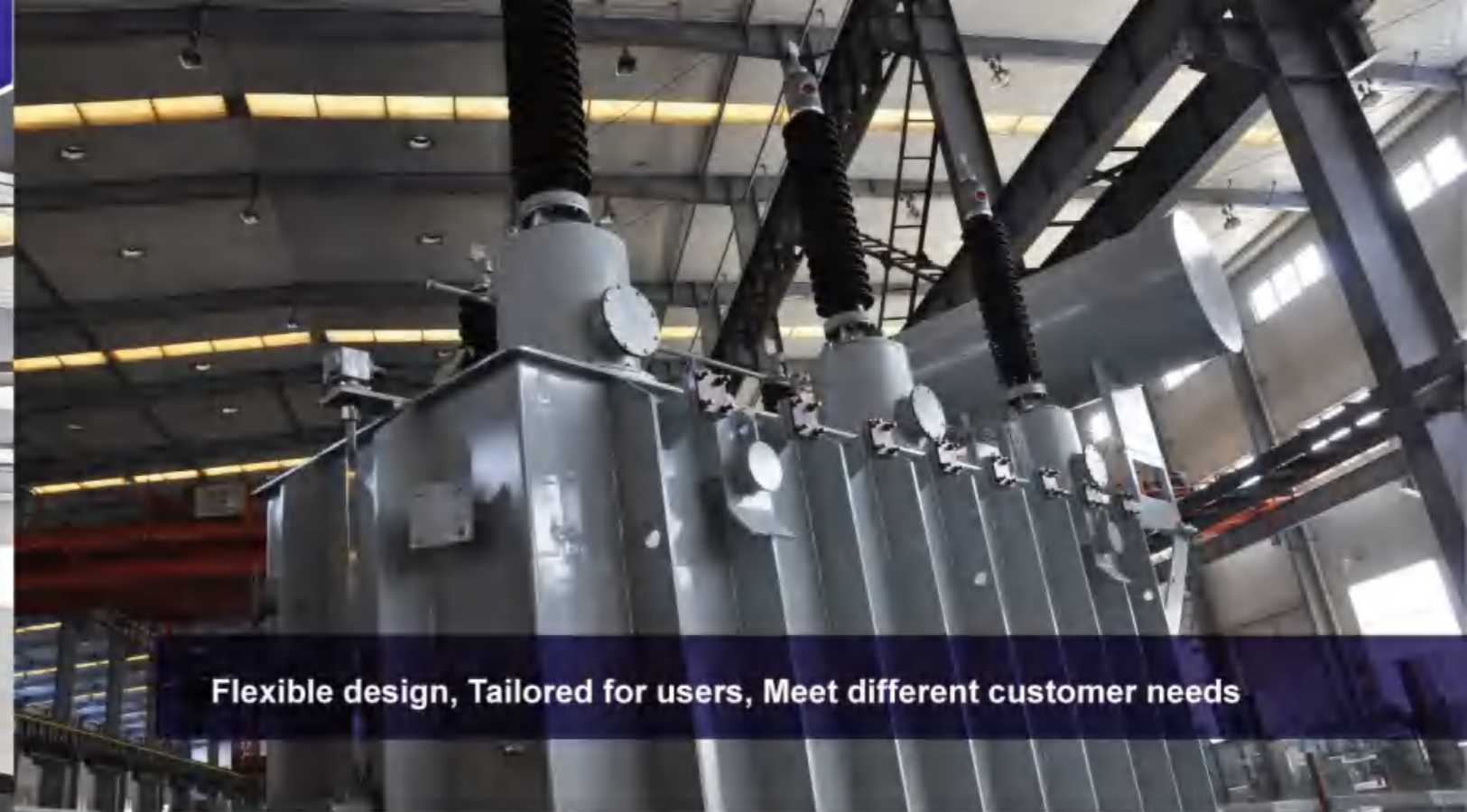




110kV(60kV)



**China Top Brand,
China well-known Trademark**



Flexible design, Tailored for users, Meet different customer needs

First-class product quality

Industry leading research and development team to ensure product performance meets or exceeds national standards, the introduction of scientific management, standardized operation of all aspects of process, to ensure that every product with excellent quality.

Flexible design, Tailored for users, Meet different customer needs

According to actual needs of customers, product structure can be flexible designed and all kinds of accessories are able to select the appropriate model for the purpose of meeting different customers' individual requirements.



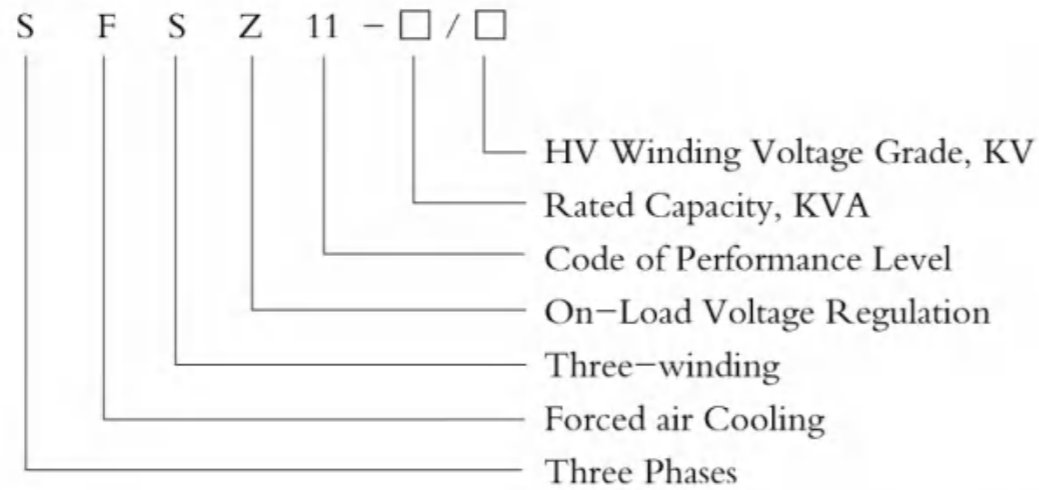
DuPont China strategic partners



110kV(60kV)



110kV(60kV) Oil-immersed Power Transformer



注：“安雷得”，意为“high-loaded”，高过载，即安全可靠。此商标用于混合绝缘结构新型耐高温产品，器身高热点温度部位使用杜邦公司的NomexC级绝缘材料与普通变压器油，达到“高过载、高寿、高可靠”的目的。该产品是有过载需求和想节省固定电费以及更新改造（可在原变压器基础上增容改造）用户的最佳选择。



Energy saving, low consumption

The no-load losses of product decreased 15-20% lower than the current national standard GB6451-2008, the load losses decreased 5% lower than the current national standard GB6451-2008. Self cooling noise level below the national standard. According to user's needs, using the advanced DuPont Nomex C grade insulation and transformer insulating oil, so that product performance to achieve the request of high overload, high life, high reliability, high security, high capacity and density.





Product Introduction

Major structural features

NOMEX® insulated + transformer insulating oil

- 1 High temperature-resistance more secure
Ambient temperature of 40°C, 100% load long-term continuous operation.
At the same temperature, the average rate of continuous load increase 20% compared with oil-immersed transformers.

Ambient temperature(°C)	-10	0	10	20	30	40
SP(K24)	1.25	1.17	1.09	1.00	0.91	0.81
SRN(K24)	1.37	1.3	1.25	1.18	1.10	1.00

- 2 Low loss more energy efficient
Compared with common oil-immersed transformers, saving 20% energy.
- 3 Maintenance-free more environmental protection
Sealing elements have the same service life with transformers.
Compared with common oil-immersed transformers, saving 20% energy.

7 Stage Temperature Control Technology

High temperature liquid immersed transformer adopted mature structure and process of traditional transformer, retained reliability, good manufacturability, economy and other merits of traditional transformer. The biggest difference between this kind of transformer and traditional transformer is that actual situation of temperature field in transformer with reasonable consideration in design, rationally use insulating materials of different temperature levels to form a hybrid insulation system in accordance with the temperature distribution. With the transformer temperature field simulation technology that can more accurately determine the temperature distribution of transformer (mainly in and around winding), according to the different temperature ranges, choose insulation materials of different levels and give full play to high-temperature properties of materials while have a good economy. The actual operation highest oil temperature of this liquid immersed transformer is 95°, to ensure that the transformer has a good safety margin, thermal performance and longer life expectancy. For temperature design of the whole transformer, we propose and implement the "7-stage temperature control technology" concept as a design principle that from winding hot spot with highest temperature gradually to external temperature region extended to five, and considering short circuit and overload situation constitutes seven stage thermal state, the design method of temperature control:

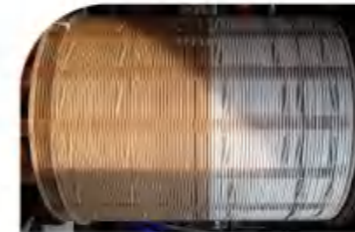
- (1) Insulation Temperature Control Technique: It is such a technique that the hot-spot temperature of winding is controlled by adopting different insulating materials for winding and transformer body in terms of temperature at different positions.
- (2) Liquid Flow Loop Temperature Control Technique: It is a technique that is utilized to determine and control the temperature of liquid flows at various positions through comprehensive consideration of correlativity between liquid velocity field and temperature field. It is designed for controlling the liquid temperature of border stratum nearby control winding hot spots as well as the top-level liquid temperature.
- (3) Overload Temperature Control Technique: It is a technique utilized to control the temperature rise of various positions of transformer at overload condition. The temperature distribution at overload condition differs from that at rated load operation condition, and the temperature rise change at overload condition shall be taken into design consideration.
- (4) Iron Core Temperature Control Technique: It is a technique used in temperature control of insulation piece contacting iron core.
- (5) Sealing Temperature Control Technique: The thermal expansion, deformation and strength of omniseal oil tank vary with temperature change, they shall be controlled so that the transformer can run in a normal manner within the permissible temperature range.
- (6) Subassembly Temperature Control Technique: The subassemblies shall adopt insulating materials, such as sealing gasket, as per different temperatures in their relevant positions.
- (7) Short-circuit Temperature Control Technique: In case of short-circuit problem in transformer, the short-circuit current flowing through winding is very large in magnitude but short in time, usually it is calculated per adiabatic process, the heat accumulation and heat-sink effect shall be taken into consideration under time after time short circuit reclosing condition. As a general rule, since NOMEX® paper features high temperature resistance, it's mechanical strength, dielectric coefficient and dielectric loss hardly vary with temperature change, even in the condition of time after time short circuit reclosing, temperature increment will neither result in mechanic failure and electrical failure nor shorten the service life of insulating material.

Technical Characteristics



Insulation

Hybrid high temperature insulation systems



Coil

Small capacity of HV coil tangled-continuous, large capacity is internal display-continuous, to improve the impact of voltage, capacitance of the coil vertical distribution; Coil structure are oriented oil circulation, lower winding temperature rise, product design life is 30 years.



Full-automatic Iron Core Lamination

Robot full-automatic lamination, the use of all seven steps of 45 degrees oblique joint structure.



Iron Core

The iron core is manufactured with high quality oriented cold rolled silicon-steel of high magnetic conductivity, non-hole binding, and frame structure, D-shaped iron yoke structure is provided on behalf of a large area coil platform, ladder-class joint. Swiss import automatic cutting laminated robot, to ensure that core burr less than 20µm. Core multistage juncture reduced no-load loss, no-load current and noise level.



Oil Tank

Oil tank has two kinds structure: bell type and barrel type. All seals are sealed until the port limit; Metal parts inside and outside the box are rounded and deburr. Weld and seal leakage test by three times (fluorescence, positive pressure, negative pressure leak testing); Paint are made according to antirust requirements of household appliances.



Performance Characteristics



Low Loss

The no-load losses of product decreased 15-20% lower than the current national standard GB6451-2008, the load losses decreased 5% lower than the current national standard GB6451-2008;



Low Noise

Self cooling noise level is lower than 60dB, and it is about 20dB below national standard. Users have special requirements, also can be specially design and manufacture low noise level;



Low Partial Discharge

For 110KV production task, our company introduced modern enterprise management model, all process of 110KV products are dust-free operation, metal parts and insulation parts inside the body are all rounded, partial discharge control at 100pc below.



Capable of short-circuit

110 KV transformers obtain national certification. Ensure none of them is damage for a sudden short circuit, the reliability is very high;



Beautiful sharp

All polishing descaling, powder electric spraying paint can achieve appliance painting effect, wide slice chip radiator, non-fading.



No Leakage

All seals use acrylic materials and using a model technique, no interface, solemnly promise not to leak.

Working Condition

Conducive to summer peaks for high temperature high rate distribution network and the place where have impact load and continuous overload.

Such as: iron & steel industry, metallurgical industry, rail transport, power plants, hydropower station and so on.

Technical Parameters

110kV

S(F)10/11-110kV 630~90000kVA Duplex Winding non-excitation Voltage Regulating Transformer

Rated Power kVA	Voltage Combination and Tapping Range			Vector Group	No-Load Loss kW		Load Loss kW	No-Load Current %	Short Circuit Impedance %
	High kV Voltage	High Voltage % Tapping Range	Low kV Voltage		10type	11type			
6300					8.1	6.9	34.9	0.51	
8000					9.8	8.4	42.5	0.47	
10000			6.3		11.6	9.9	50.2	0.43	
12500	110	±2×2.5	6.6		13.7	11.7	59.5	0.38	
16000	121		10.5		16.5	14.1	73.1	0.35	
20000			11	YNd11	19.3	16.5	88.4	0.32	10.5
25000					22.8	19.5	104.6	0.3	
31500					27	23.1	125.8	0.28	
40000					32.2	27.6	147.9	0.25	
50000					38.5	33	183.6	0.22	
63000					45.5	39	221	0.2	
90000					59.5	51	289	0.2	

Note: The maximum current tapping is -5% tapping position.

SS(F)10/11-110kV 6300~63000kVA Three Winding non-excitation Voltage Regulation Transformer

Rated Power kVA	Voltage Combination and Tapping Range			Vector Group	No-Load Loss kW		Load Loss kW	No-Load Current %	Short Circuit Impedance %	
	High kV Voltage	High Voltage % Tapping Range	Low kV Voltage		10type	11type			Boost Voltage	Reduction Voltage
6300					9.8	8.4	45.0	0.56	High-Medium	High-Medium
8000					11.6	9.9	53.6	0.52	17~18	10.5
10000			6.3		13.9	11.9	62.9	0.48	High-Low	High-Low
12500	110±	35	6.6		16.1	13.8	74.0	0.44	10.5	17~18
16000	2×2.5%	38.5	10.5	YNyn0	19.6	16.8	90.1	0.40	Medium-Low	Medium-Low
20000	121±				23.1	19.8	106.3	0.35	6.5	6.5
25000	2×2.5%		11	d11	27.0	23.1	125.8	0.31		
31500					32.2	27.6	148.8	0.28		
40000					38.2	32.7	178.5	0.26		
50000					45.5	39.0	212.5	0.23		
63000					53.9	46.2	255.0	0.20		

Note:

1. High, medium and low voltage windings capacity allocation is (100/100/100) %;
2. Vector group can be YNd11y10 according to the need;
3. According to customer's needs, medium voltage can choose voltage value different from the table or tap joint;
4. The maximum current tapping is -5% tapping position.



Technical Parameters

S(F)Z10/11type-110kV 6300kVA~63000kVA Duplex Wingding non-excitation Voltage Regulating Transformer

Rated Power kVA	Voltage Combination and Tapping Range			Vector Group	No-Load Loss kW		Load Loss kW	No-Load Current %	Short Circuit Impedance %
	High kV Voltage	High Voltage % Tapping Range	Low Voltage kV		10type	11type			
6300				YNd11	8.8	7.5	34.9	0.58	10.5
8000					10.5	9.0	42.5	0.55	
10000			6.3		12.5	10.7	50.2	0.51	
12500	110	110±	6.6		14.7	12.6	59.5	0.49	
16000	121	8×1.25%	10.5		17.7	15.2	73.1	0.46	
20000			11		21.0	18.0	88.4	0.42	
25000					24.9	21.3	104.6	0.40	
31500					29.5	25.3	125.8	0.36	
40000					35.4	30.3	147.9	0.32	
50000					41.8	35.8	183.6	0.28	
63000					49.7	42.6	221.0	0.22	

Note:

1. On-Load Tap Changer Transformer, temporarily provide reduction voltage structure products;
2. According to user departments in consultation with the manufacturer, can supply other voltage combination of products;
3. The maximum current tapping is -10% tapping position.

S(F)10/11型-110kV 6300~63000kVA Three Winding non-excitation Voltage Regulation Transformer

Rated Power kVA	Voltage Combination and Tapping Range			Vector Group	No-Load Loss kW		Load Loss kW	No-Load Current %	Short Circuit Impedance %
	High kV Voltage	High Voltage % Tapping Range	Low Voltage kV		10type	11type			
6300				YNyn0 d11	10.5	9.0	45.0	0.62	High-Medium
8000					12.6	10.8	53.6	0.60	10.5
10000			6.3		14.9	12.8	62.9	0.57	High-Low
12500	110±	35	6.6		17.6	15.1	74.0	0.55	17~18
16000	8×1.25%	38.5	10.5		21.2	18.2	90.1	0.51	Medium-Low
20000			11		25.1	21.5	106.3	0.51	6.5
25000					29.6	25.4	125.8	0.46	
31500					35.2	30.2	148.8	0.42	
40000					42.1	36.1	178.5	0.36	
50000					49.8	42.7	212.5	0.32	
63000					59.3	50.8	255.0	0.26	

Note:

1. On-Load Tap Changer Transformer, temporarily provide reduction voltage structure products;
2. High, medium and low voltage windings capacity allocation is (100/100/100) %;
3. Vector group can be YNd11y10 according to the need;
4. The maximum current tapping is -10% tapping position;
5. According to customer's needs, medium voltage can choose voltage value different from the table or tap joint.

Technical Parameters

S(F)10/11type-110kV 6300~63000kVA 双绕组低压为35kV级无励磁调压变压器

Rated Power kVA	Voltage Combination and Tapping Range			Vector Group	No-Load Loss kW		Load Loss kW	No-Load Current %	Short Circuit Impedance %
	High kV Voltage	High Voltage % Tapping Range	Low Voltage kV		10type	11type			
6300				YNd11	8.8	7.5	37.4	0.53	10.5
8000					10.5	9.0	45.1	0.50	
10000					12.3	10.5	52.7	0.48	
12500	110	±2×2.5	35		14.4	12.3	62.9	0.45	
16000	121		38.5		17.2	14.7	77.4	0.41	
20000					20.3	17.4	93.5	0.36	
25000					23.9	20.5	109.7	0.33	
31500					28.4	24.3	132.6	0.30	
40000					33.8	29.0	155.6	0.25	
50000					40.5	34.7	193.0	0.23	
63000					47.8	41.0	232.0	0.21	

Note: The maximum current tapping is -5% tapping position.

66kV

S(F)10/11type-66kV 6300~63000kVA Duplex Wingding non-excitation Voltage Regulating Transformer

Rated Power kVA	Voltage Combination and Tapping Range			Vector Group	No-Load Loss kW		Load Loss kW	No-Load Current %	Short Circuit Impedance %
	High kV Voltage	High Voltage % Tapping Range	Low Voltage kV		10type	11type			
6300				YNd11	8.2	7.0	34	0.40	9
8000					9.8	8.4	40.4	0.38	
10000					11.6	9.9	47.6	0.35	
12500	63		6.3		13.7	11.7	56.5	0.33	
16000	66	±2×2.5	6.6		16.5	14.1	69.5	0.31	
20000	69		10.5		19.3	16.5	84.2	0.28	
25000			11		22.8	19.5	99.5	0.26	
31500					27.0	23.1	119.9	0.26	
40000					32.2	27.6	140.7	0.24	
50000					38.5	33	174.3	0.22	
63000					45.5	39	210.0	0.22	



Technical Parameters

66kV

S(F)Z10/11type-66kV 6300~63000kVA Duplex Wingding non-excitation Voltage Regulating Transformer

Rated Power kVA	Voltage Combination and Tapping Range			Vector Group	No-Load Loss kW		Load Loss kW	No-Load Current %	Short Circuit % Impedance
	High Voltage kV	High Voltage % Tapping Range	Low Voltage kV		10type	11type			
6300					8.8	7.5	34.0	0.40	
8000					10.5	9.0	40.4	0.38	
10000					12.5	10.7	47.6	0.37	
12500	63		6.3		14.7	12.6	56.5	0.36	
16000	66	±8×1.25	6.6		17.7	15.2	69.5	0.35	
20000	69		10.5	YNd11	21.0	18.0	84.2	0.32	9
25000			11		24.9	21.3	99.5	0.29	
31500					29.5	25.3	119.9	0.26	
40000					35.4	30.3	140.7	0.24	
50000					41.8	35.8	174.4	0.22	
63000					49.7	42.6	210.0	0.20	

Remarks

Qualification Certificate



鉴定委员会成员名单

序号	姓名	单位名称	职务	职称	专业	备注
1	李俊	国网电力科学研究院	主任	高级工程师	电气	主持人
2	王明	国网电力科学研究院	副主任	高级工程师	电气	
3	张强	国网电力科学研究院	主任	高级工程师	电气	
4	刘伟	国网电力科学研究院	主任	高级工程师	电气	
5	陈亮	国网电力科学研究院	主任	高级工程师	电气	
6	孙磊	国网电力科学研究院	主任	高级工程师	电气	
7	周涛	国网电力科学研究院	主任	高级工程师	电气	
8	吴昊	国网电力科学研究院	主任	高级工程师	电气	
9	郑宇	国网电力科学研究院	主任	高级工程师	电气	
10	赵峰	国网电力科学研究院	主任	高级工程师	电气	





QUALITY MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 00120Q311194R0M/1100

We hereby certify that

China Electric Equipment (Jiangsu) Transformer Manufacture Co., Ltd.
(This main certificate contains 1 attachment and 5 sub-certificates)

Unified Social Credit Code: 9132118233888785XM

No.188 Ganglong Road, Yangzhong Economic Development Zone, Zhenjiang City, Jiangsu Province, China
(Subsidiary's information refers to the attachment and sub-certificate)

by reason of its

Quality Management System

has been awarded this certificate for compliance with the standard

GB/T 19001-2016 / ISO 9001:2015

The Quality Management System Applies in the following area:

- 1.The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Dry Type Transformer, Rectifier Frequency Transformer and Marine Transformer, Rectifier Transformer and Transformer Supporting Accessories
- 2.The Design, Manufacturing, Sales and After Service of 220kV Grade and Below Voltage Oil-immersed Power Transformer, Railway Traction Transformer, Auto-transformer, Amorphous Alloy Oil-immersed Transformer and Transformer Supporting Accessories; The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Wind Power Generation Modular Transformers, PV Power Transformer and Transformer Supporting Accessories; The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Substation, Complete Switch Equipment
- 3.The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Amorphous Alloy Oil-immersed Power Transformer, Amorphous Alloy Core dry Type Power Transformer, Amorphous Alloy Core
(Subsidiary's information refers to the attachment and sub-certificate)

Certified since: December 29, 2020 Valid from: January 6, 2022 Valid until: December 28, 2023

After a surveillance cycle, the certificate is valid only when used together with an Acceptance Notice of Surveillance Audit issued by CQC.
Please access www.cqc.com.cn for checking validity of the certificate.

This certificate and its relevant information can query in the website of Certification and Accreditation Administration of the People's Republic of China (www.cnca.gov.cn).



谢肇煦
Signed by: Xie ZhaoXu



CHINA QUALITY CERTIFICATION CENTRE

Section 9, No.188, Nansihuan(the South Fourth Ring Road) Xilu(West Road), Beijing 100070,China

<http://www.cqc.com.cn>

A 0039175

2021年版



OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 00120S33609R0M/1100

We hereby certify that

China Electric Equipment (Jiangsu) Transformer Manufacture Co., Ltd.
(This main certificate contains 1 attachment and 5 sub-certificates)

No.188 Ganglong Road, Yangzhong Economic Development Zone, Zhenjiang City, Jiangsu Province, China
(Subsidiary's information refers to the attachment and sub-certificate)

has been awarded this certificate for compliance with the standard
GB/T 45001-2020 / ISO45001:2018

The Occupational Health and Safety Management applies in the following area:

- 1, The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Dry Type Transformer, Rectifier Frequency Transformer and Marine Transformer, Rectifier Transformer and Transformer Supporting Accessories and Related Management Activities
- 2, The Design, Manufacturing, Sales and After Service of 220kV Grade and Below Voltage Oil-immersed Power Transformer, Railway Traction Transformer, Auto-transformer, Amorphous Alloy Oil-immersed Transformer and Transformer Supporting Accessories; The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Wind Power Generation Modular Transformers, PV Power Transformer and Transformer Supporting Accessories; The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Substation, Complete Switch Equipment and Related Management Activities
- 3, The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Amorphous Alloy Oil-immersed Power Transformer, Amorphous Alloy Core dry Type Power Transformer, Amorphous Alloy Core and Related Management Activities
(Subsidiary's information refers to the attachment and sub-certificate)

Certified since: December 28, 2020 Valid from: January 6, 2022 Valid until: December 27, 2023

After a surveillance cycle, the certificate is valid only when used together with an Acceptance Notice of Surveillance Audit issued by CQC.

Please access www.cqc.com.cn for checking validity of the certificate.

This certificate and its relevant information can query in the website of Certification and Accreditation Administration of the People's Republic of China (www.cnca.gov.cn).



中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C001-M

谢肇煦

Signed by: Xie ZhaoXu



CHINA QUALITY CERTIFICATION CENTRE

Section 9, No.188, Nansihuan(the South Fourth Ring Road) Xilu(West Road), Beijing 100070,China

<http://www.cqc.com.cn>

A 0039413

2021年版



ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 00120E34741R0M/1100

We hereby certify that

China Electric Equipment (Jiangsu) Transformer Manufacture Co., Ltd.

(This main certificate contains 1 attachment and 5 sub-certificates)

No.188 Ganglong Road, Yangzhong Economic Development Zone, Zhenjiang City, Jiangsu Province, China
(Subsidiary's information refers to the attachment and sub-certificate)

by reason of its

Environmental Management System

has been awarded this certificate for compliance with the standard

GB/T 24001-2016 / ISO 14001:2015

The Environmental Management System Applies in the following area:

- 1,The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Dry Type Transformer, Rectifier Frequency Transformer and Marine Transformer, Rectifier Transformer and Transformer Supporting Accessories and Related Management Activities
- 2,The Design, Manufacturing, Sales and After Service of 220kV Grade and Below Voltage Oil-immersed Power Transformer, Railway Traction Transformer, Auto-transformer, Amorphous Alloy Oil-immersed Transformer and Transformer Supporting Accessories; The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Wind Power Generation Modular Transformers , PV Power Transformer and Transformer Supporting Accessories; The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Substation,Complete Switch Equipment and Related Management Activities
- 3,The Design, Manufacturing, Sales and After Service of 35kV Grade and Below Voltage Amorphous Alloy Oil-immersed Power Transformer, Amorphous Alloy Core dry Type Power Transformer, Amorphous Alloy Core and Related Management Activities
(Subsidiary's information refers to the attachment and sub-certificate)

Certified since: December 28, 2020 Valid from: January 5, 2022 Valid until: December 27, 2023

After a surveillance cycle, the certificate is valid only when used together with an Acceptance Notice of Surveillance Audit issued by CQC.
Please access www.cqc.com.cn for checking validity of the certificate.

This certificate and its relevant information can query in the website of Certification and Accreditation Administration of the People's Republic of China (www.cnca.gov.cn).



中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C001-M

谢肇煦

Signed by: Xie ZhaoXu



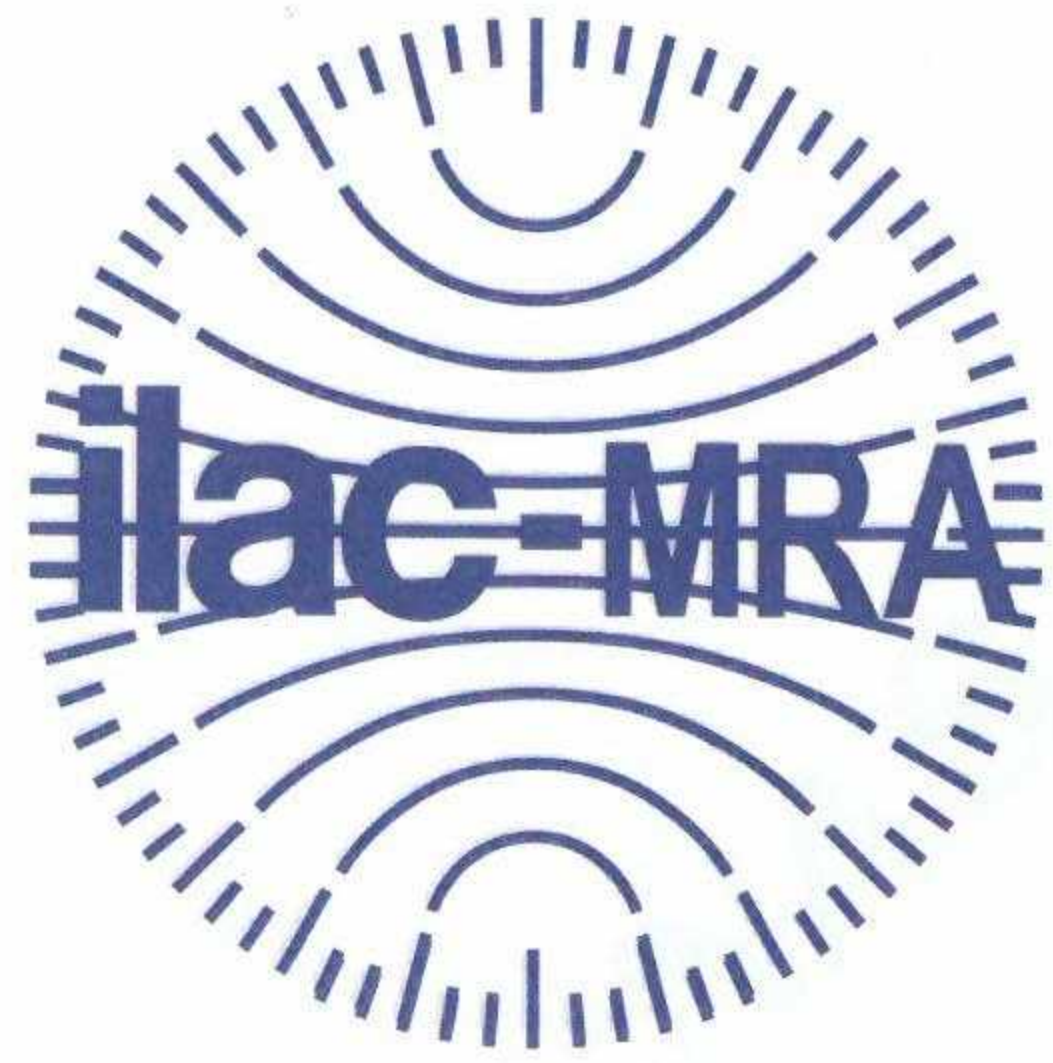
CHINA QUALITY CERTIFICATION CENTRE

Section 9, No.188, Nansihuan(the South Fourth Ring Road) Xilu(West Road), Beijing 100070,China

<http://www.cqc.com.cn>

A 0039070

2021年版



China National Accreditation Service for Conformity Assessment
LABORATORY ACCREDITATION CERTIFICATE
(Registration No. CNAS L18260)

**Testing Center of China Electric Equipment (Jiangsu)
Transformer Manufacture Co., Ltd.**

(Legal Entity: China Electric Equipment (Jiangsu) Transformer Manufacture Co., Ltd.)

Building 8, No.188, Ganglong Road, Economic Development Zone,
Yangzhong, Zhenjiang, Jiangsu, China

is accredited in accordance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule forms an integral part of this certificate.

Effective Date: 2023-05-16

Expiry Date: 2029-05-15

Signed on behalf of China National Accreditation Service for Conformity Assessment

徐朝华

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement (APAC MRA).

The validity of the certificate can be checked on CNAS website at <http://www.cnas.org.cn/english/findanaccreditedbody/index.shtml>.

Export Reference/Supply Reference till 2023

No.	Country/Area of Customer	Type	Products	Qty	Client	Delivery Date
1	Kirghizia	Oil	1600kVA/10kV	33	Electric company of Kirghizia	2003
2	Uganda	Oil	400kVA/11kV	12	Ministry of Foreign Affairs of Uganda	2003
3	Nigeria	Oil	2500kVA/3.5kV	2	GOMBE water factory	2004
		Oil	4000kVA/3.5kV	1		
		Oil	100kVA/3.5kV	20		
		Oil	630kVA/3.5kV	8		
		Oil	3150kVA/33kV	4		
		Oil	6300kVA/33	3		
		Oil	13000kVA/132	2		
4	Russia	Oil	16000kVA/110kV	2	Beijing China Electric Switch Company	2004
		Oil	12500kVA/110kV	1		
		Oil	1250kVA/10kV	5		
		Oil	630kVA/10kV	9		
5	India	Oil	100kVA/11kV	21	India West Mengbon Sargadighi Burned-coal Power factory	2005
		Oil	315kVA/11kV	12		
		Oil	500kVA/33kV	14		
		Oil	800kVA/33kV	2		
		Oil	1250kVA/33kV	6		
		Oil	1600kVA/33kV	12		
		Oil	2000kVA/33kV	9		
		Oil	20000kVA/33kV	2		
6	UAE	Oil	50kVA/11kV	12	United Arab Emirates Cenmetn Corporation Cement Power Grinding station	2006
		Oil	160kVA/11kV	5		
		Oil	200kVA/11kV	5		
		Oil	630kVA/11kV	4		
		Oil	1600kVA/6.6kV	3		
		Oil	1000kVA/6.6kV	4		
		Oil	12500kVA/132kV	2		
7	KSA	Oil	2000kVA/13.8kV	7	Saudi Arabia NAJRAN cement Company Ltd	2006
		Oil	630kVA/13.8kV	11		

		Oil	1600kVA/13.8kV	2		
		Oil	1250kVA/13.8kV	3		
8	Guinea	Oil	630kVA/15kV	2	Guinea Double Tree project	2006
9	Surinam	Oil	200kVA/11kV	4	Surinam Embassy	2006
10	Yemem	Oil	200kVA/11kV	10	Yemen Republic Electric power Bureau	2006
		Oil	3000kVA/33kV	5		
11	UAE	Oil	2000kVA/6.6kV	2	China National Building Material Equipment Co., Ltd	2006
		Oil	2500kVA/6.6kV	3		
		Oil	1600kVA/6.6kV	2		
		Oil	30kVA/11kV	3		
		Oil	250kVA/11kV	1		
		Oil	25000kVA/132	2		
12	Grenada	Oil	630kVA/11kV	4	Hefei Transmission & Distribution Equipment Co.	2006
13	Vietnam	Oil	10000kVA/110kV	2	Vietnam Longan Water and electricity Plant	2006
		Oil	630kVA/10kV	3		
		Oil	100kVA/10kV	1		
		Oil	50kVA/10kV	1		
14	Vietnam	Oil	1000kVA/6kV	2	Vietnam Yuanhe Familiar Material Concrete Co	2006
		Oil	1250kVA/6kV	1		
		Oil	1600kVA/6kV	1		
15	Chile	Oil	3150kVA/23kV	1	Chile Powder Grinding Station	2006
		Oil	31500kVA/110kV	1		
16	Nigeria	Oil	1250kVA/33KV	1	Nigeria Northern Ishan Water Factory	2006
		Oil	1500kVA/33kV	1		
		Oil	2000kVA/33	1		
		Oil	7500kVA/33	1		
		Oil	300kVA/11kV	2		
		Oil	1000kVA/11kV	2		
17	Kenya	Oil	1600kVA/11kV	2	Shenzhen Rongcai Electron and Technology Development Company Ltd.	2006
		Oil	2500kVA/11kV	1		
		Oil	1250kVA/11kV	1		
		Oil	25000kVA/132	2		

18	Dominica	Oil	1250kVA/11kV	4	Former Dominica Palaestra	2006
19	Tanzania	Oil	800kVA/11kV	2	China Trading Company	2006
20	Ethiopia	Oil	1600kVA/6kV	1	Hefei Cement Research Institute	2007
		Oil	630kVA/6kV	1		
21	Nepal	Oil	630kVA/11kV	2	China TIESJIU Civil Engineering Co	2007
22	Costa Rica	Oil	5000kVA/34.5kV	1	SAI MEI S.A	2007
23	Japan	Oil	1630kVA/6kV	5	TOSHIBA Co. Ltd	2007
24	Bangladesh	Oil	1000kVA/11kV	3	China National Heavy Machinery CO.	2007
25	Angola	Oil	630kVA/15kV	5	China National Electronics CO	2007
26	Angola	Dry	630kVA/15kV dry type	5	Beijing Shougang Construction Group CO.	2007
27	Angola	Dry	630kVA/15kV dry type	2	Beijing Fushunxiang Jianzu CO.	2007
28	KSA	Oil	2500kVA/34.5kV	2	Shanghai Pony Technology Co.	2007
		Oil	3150kVA/34.5kV	2		
		Oil	1250kVA/34.5kV	2		
		Oil	800kVA/34.5kV	2		
29	KSA	Oil	2500kVA/13.8kV	4	Hefei Cement Research Institute	2007
		Oil	800kVA/13.8kV	1		
		Oil	1600kVA/13.8kV	2		
		Oil	1250kVA/13.8kV	1		
		Dry	100kVA/13.8kV dry	12		
		Dry	200kVA/13.8kV dry type	12		
30	Bangladesh	Oil	1250kVA/6.3kV	3	China Trading Co.	2007
31	Indonesia	Dry	1250kVA//10.5kV dry	3	Shandong machinery Equipment Group Co.	2007
32	Uruguay	Dry	1000kVA/10kV dry type	2	Tianjin Cement Industry Institute	2007
		Dry	400kVA/10kV dry type	1		
		Dry	1600kVA/10kV dry type	2		
33	Sudan	Oil	20000kVA/33kV	2	Hefei Cement Research Institute	2007

34	Ireland	Oil	1600kVA/11	1	Melton Power Services	2007
35	Russia	Oil	2000kVA/6.6kV	1	China National Building Material Equipment Corporation	2007
		Dry	160kVA/6.6kV dry type	1		
		Dry	30kVA/6.6kV dry type	1		
		Dry	30kVA/6.6kV dry type	1		
36	Russia	Dry	1600kVA/10kV dry	9	WISDRI Engineering Co.	2007
		Dry	1000kVA/10kV dry	1		
		Dry	2000kVA/10kV dry	12		
		Dry	1250kVA/10kV dry	2		
37	South Africa	Dry	1000kVA/11kV dry	1	Beijing General Research Institute	2007
		Dry	2000kVA/11kV dry	5		
		Dry	2500kVA/11kV dry	2		
38	North Korea	Oil	1500kVA/11kV	2	Elcore electrical Contractors	2007
39	Australia	Dry	1250kVA/6.6kV, dry	4	Rutherford Power Pty Ltd	2007
		Oil	12500kVA/33kV	1		
40	Ghana	Oil	500kVA/11kV	2	Western Omega Electric Ltd.	2007
41	South Africa	Dry	1250kVA/6.6kV dry	4	Afrikaans Generator Co	2007
42	Ukraine	Dry	1000kVA/10kV dry	3	Energobud-Komplikt	2008
		Dry	630kVA/6kV dry	2		
		Dry	630kVA/10kV, dry	1		
		Dry	1250kVA/10kV dry	1		
43	UAE	Dry	1500kVA/11kV dry	2	KFB Group	2008
44	North Korea	Oil	1600kVA/3.3kV	1	China trading co.	2008
		Oil	100kVA/3.3kV	1		
45	Australia	Oil	12500kVA/33kV	2	Rutherford Power Pty Ltd	2008
		Oil	3000kVA/25kV	1		
46	Russia	Dry	250kVA/6kV dry type	3	China trading Company	2008
		Dry	400kVA/6kV dry	2		
		Dry	1000kVA/6kV dry	2		
		Dry	1500kVA/6kV dry	1		
		Dry	2000kVA/6kV dry	1		
47	Vietnam	Oil	12500kVA/2kV	2	China Trading Company	2008

48	Algeria	Oil	500kVA/5.5kV	3	Shengli Petro Engineering Com.	2008
		Oil	800kVA/5.5kV,	5		
		Oil	3150kVA/33kV	3		
49	Russia	Oil	3500kVA/10kV	11	Danieli Officine Meccaniche S.P.A	2008
		Oil	2500kVA/11kV	9		
50	Mozambique	Dry	160kVA/11kV dry type	2	Maputo Trading Company (Maputo International Airport)	2008
		Dry	200kVA/11kV dry type	3		
		Dry	400kVA/11kV dry	4		
		Dry	1600kVA/11kV dry	2		
51	India	Dry	630kVA/11.5 dry type	10	SEPCO III Electric Power construction Corporation	2009
		Dry	800kVA/11.5kV dry	4		
		Dry	1600kVA/11.5kV dry	2		
		Dry	2000kVA/11.5kV dry	4		
		Dry	2500kVA/11.5kV, dry	4		
52	Pakistan	Oil	60000kVA/132kV	8	Kunye Co., Ltd	2009
53	Algeria	Oil	10000kVA/33kV	2	Groupment Sonatrach Project	2009
		Oil	13000kVA/66	2		
54	South Africa	Dry	1000kVA/11kV dry type	1	MITTAL Deoxidize Project	2009
		Dry	2000kVA/11kV dry	6		
		Dry	1600kVA/11kV dry	2		
		Oil	2500kVA/11	2		
55	Afghanistan	Dry	630kVA/15kV dry type	2	Kabul Hospital Project	2009
56	Egypt	Oil	800kVA/11kV	4	1250MTPD Vitriol Project	2009
		Oil	630kVA/11kV	6		
57	Angola	Dry	630kVA/15kV, dry	3	Capital Palestra Project	2009
58	Laos	Dry	1000kVA/22kV dry	2	Capital International Cabaret Project	2009
		Dry	800kVA/22kV dry	2		
59	Bangladesh	Oil	10000kVA/15.75kV	1	West Bengal Burn Station	2009
		Oil	75000kVA/132kV	4		
		Oil	2500kVA/6.6kV	2		
60	Burma	Oil	4000kVA/33kV	3	Burma Auto Factory	2009
61	Iraq	Oil	45000kVA/33kV	2	As-Sulaymaniyah Project	2009
62	Cambodia	Oil	25000kVA/115kV	1	Ratanakiri Water Power Plant	2009
63	Bangladesh	Oil	23000kVA/33kV	2	Adex Corporation Ltd	2009

64	Russia	Oil	100 kVA/10kV	1	Tianjin Cement Industry Design & Research Institute	2010
65	Albania	Oil	121kVA/37.5kV/6.3 kV, 12/15MVA	1	NDREKAJ Sh.p.k	2010
		Oil	242kVA/10.5kV, 60MVA	1		
66	Peru	Oil	2.3/66kV,12/15MVA	1	Electrica Yanapampa SAC	2010
67	Hong Kong		800kVA 11/0.4kV Silicone	1	Gason Electrical Contracting Ltd	2010
70	Singapore	Dry	SCR-250/1/0.415	3	Rutherford Power Asia Pte Ltd	2010
		Oil	0.415/6.6kV,750kVA	1		
		Oil	0.415/6.6kV,1000kVA	1		
		Oil	0.415/6.6kV,1500kVA	1		
		Dry	500kVA, 11-10/0.44kV Cast Resin Transformer	1		
		Parts	BWDK-S3207A Dry Type Transformer Temperature Controller	6		
71	Hong kong	Dry	ZSCR10-556kVA 11kV Dry Type Rectifier Transformer	2	First-Tech Engineering Limited	2010
72	Iran	Substation	20/0.4kV,315kVA RMU type pad-mounted transformer	1	ASIA BEHIN BARQ CO.	2010
73	New Zealand	Oil	6.3/33kV, 2700kVA	1	Talla Burn Generation Limited	2010
74	Saudi Arabia	Oil	ZTS-1600kVA/13.5kV/2×720V	1	Nanjing Shengze Technology Co., Ltd	2010
		Oil	ZTS-800kVA/13.5kV/2×720V	1		
		Oil	ZTS-1000kVA/13.5kV/2×720V	1		
		Oil	0V			
		Oil	ZTS-630kVA/13.5kV/2×720V	1		

75	Russia	Dry	SCB10-1000kVA/6kV	2	China National Machinery IMP. & EXP. Co., Ltd	2010
76	Kazakhstan	Parts	Transformer Spare Parts		Tianjin Shiming Machinery & Electrical Spare Parts Co., Ltd	2010
77	Algeria	Oil	13MVA/66kV	1	SINOPEC International Petroleum Service Corporation	2010
		Parts	4TS Monitor	1		
78	Jordan	Dry	SCB	9	SEPCOIII Electrical Power Construction Corporation	2010
79	Indonesia	Switchgear	High Voltage On-load Switcher HXGN-12	1	China National Machinery IMP. & EXP. Co., Ltd	2010
80	North Korea	Oil	SZ9-1000kVA/3.3kV/0.38kV	1	Dandong Ji Li Trading Co., Ltd.	2010
81	Nepal	Dry	SCB10-500KVA/11kV	1	China Jiangxi Corporation for International Economic and Technical Corporation	2010
82	Philippine	Dry	SCB10-800kVA/10kV	2	Dalian East New Energy Development	2010
		Dry	SCB10-1250kVA/10.5kV/0.4KV	3		
		Dry	SCB10-1000kVA/10.5kV/0.4KV	1		
		Dry	SCB10-800kVA/10.5kV/0.4KV	1		
83	Uganda	Dry	SGZ(B)-1250kVA	2	Yan Jian Group	2010
		Switchgear	Low Voltage Switch Box	22		
84	India	Dry	SCB9-1600kVA-6kV/0.4kV	1	Anhui Masteel K.Wah New Building Materials Co., Ltd	2010
85	Uganda	Oil	SRN11-1000kVA	3	Peak International Trading Co., Ltd	2010
		Oil	SRN11-500kVA	5		
86	Peru	Dry	SCB9-500kVA	1	Yan Jian Group	2010
87	Congo	Switchgear	Low Voltage Incoming Cabinet AA1	1	Weihai International Economic & Technical Cooperative CO., Ltd	2010
		Switchgear	Capacitor Box	1		
		Switchgear	Low Voltage Outgoing	2		

		Switchgear	Cabinet AA3/AA4	2		
		Dry	SCB10/20kV/500kVA	1		
		Parts	Seal Bus Duct	1		
88	Bahamas	Dry	SC(B)9-400kVA/11kV/0.20 8kV	2	Shandong Hi-speed Qi Lu Group CO., Ltd	2010
		Dry	SC(B)9-800kVA/11kV/0.20 8kV	2		
89	Peru	Oil	2.3/66KV, 12/15MVA step-up	1		
90	India	Oil	S11-800/6.6	4	Tianjin Cement Industry Design & Research Institute	2011
		Oil	S11-1000/6.6	3		
		Oil	S11-1600/6.6	8		
		Oil	S11-2000/6.6	2		
		Oil	S11-1600/6.9	1		
		Oil	ZTS11-1000/6.6	1		
		Oil	ZTS11-1600/6.6	1		
		Dry	SC10-20/415	7		
		Dry	SC10-30/415	6		
		Dry	SC10-50/415	1		
		Dry	SC10-100/6.6KV	1		
		Dry	SC10-200/415	1		
91	Indonesia	Dry	SCB10-315/6.3	2	Qingdao Jieneng Power Engineering Co., Ltd	2011
		Dry	SCB10-800/6.3	2		
		Dry	SCB10-1000/6.3	6		
		Dry	SCB10-1250/6.3	8		
		Substation	YB-800KVA/20/0.4	1		
92	Congo	Switchgear	LV Incoming Cabinet	1	Weihai International Economic and Technical Cooperative Co., Ltd	2011
		Switchgear	LV Outgoing Cabinet	2		
		Parts	Capacitor	1		
93	Malaysia	Oil	S11-630/6.6	4	Tianjin Cement Industry Design & Research Institute	2011
		Oil	S11-1600/6.6	3		
		Oil	S11-1250/6.6	8		
		Oil	S11-2000/6.6	2		
		Oil	S11-1000/6.6	1		

		Oil	S11-800/6.6	1		
		Switchgear	Load Break Switch	1		
94	Albania	Oil	242/13.8KV, 150MVA	1	China Electric Equipment Group Hong Kong Co., Ltd	2011
95	Korea	Dry	SC10-5000/10 10±2X2.5%/3.3 Dyn11 UK=7%	5	LS Group	2011
		Dry	SCB10-2000/10 10±2X2.5%/0.4 Dyn11 UK=6%	20		
		Dry	SCB10-1600/10 10±2X2.5%/0.4 Dyn11 UK=6%	4		
		Dry	SCB10-1600/10 10±2X2.5%/0.4 Dyn11 UK=4%	4		
		Dry	SCB10-1250/10 10±2X2.5%/0.4 Dyn11 UK=6%	3		
		Dry	SCB10-1000/10 10±2X2.5%/0.4 Dyn11 UK=6%	1		
		Dry	SCB10-630/10 10±2X2.5%/0.4KV Dyn11 UK=6%	2		
		Dry	SCB10-800/10 10±2X2.5%/0.44KV Dyn11 UK=6%	1		
		Dry	SC10-3000/10.5 10.5±2X2.5%/3.3KV Dyn11 UK=6%	1		
		Dry	SCB10-2500/10 10.5±2X2.5%/0.4KV Dyn11 UK=6%	1		
Dry	SCB10-1000/10.5 10.5±2X2.5%/0.4KV Dyn11 UK=6%	1				

		Dry	SCB10-800/10.5 10.5±2X2.5%/0.4KV Dyn11 UK=6%	2		
		Dry	SCB10-2000/10 10±2X2.5%/0.4 Dyn11 UK=6%	2		
96	Russia	Parts	Circuit Breaker	2	Zhejiang CHINT Group	2011
97	Thailand	Oil	0.44/0.11kv, 10kva	2	China Electric Equipment Group Hong Kong Co., Ltd	2011
		Oil	0.44/0.24kv, 15kva	8		
		Oil	0.44/0.24kv, 80kva	2		
		Oil	0.44/0.24kv, 100kva	4		
98	Russia	Dry	SCB10-2000KVA6.3/0.4KV	9	Tianlangxing Power Plant Equipment Co., Ltd	2011
		Dry	SCB10-1600KVA 6.3/0.4KV	8		
		Dry	SCB10-1250KVA 6.3/0.4KV	2		
		Dry	SCB10-1000KVA 6.3/0.4KV	4		
		Dry	SCB10-800KVA 6.3/0.4KV	2		
		Dry	SCB10-630KVA 6.3/0.4KV	2		
		Dry	DKSC-200KVA6.3/0.4	2		
99	Albania	Oil	121/6.3KV, 12/15MVA	1	China Electric Equipment Group Hong Kong Co., Ltd	2011
100	Thailand	Oil	0.44/0.11kv, 10kva	2	China Electric Equipment Group Hong Kong Co., Ltd	2011
		Oil	0.44/0.24kv, 15kva	8		
		Oil	0.44/0.24kv, 80kva	2		
		Oil	0.44/0.24kv, 100kva	4		
101	Malaysia	Oil	S11-630/6.6	1	Tianjin Cement Industry	2011

		Oil	S11-1600/6.6	2	Design & Research Institute	
		Oil	S11-1250/6.6	4		
		Oil	S11-2000/6.6	2		
		Oil	S11-1000/6.6	1		
		Oil	S11-800/6.6	1		
102	Australia	Oil	S11-2000KVA-11/0.42KV	2	China Electric Equipment	2011
		Oil	S11-1500KVA-11/0.42KV	2	Group Hong Kong Co., Ltd	
		Oil	S11-1000KVA-11/0.42KV	1		
		Oil	S11-1000KVA-11/0.725KV	3		
103	Hong Kong	Dry	1500KVA 11/0.38KV	2	China Electric Equipment Group Hong Kong Co., Ltd	2011
104	Peru	Parts	2.3KV bushings	3	China Electric Equipment Group Hong Kong Co., Ltd	2011
105	Taiwan	Parts	Amorphous Alloy Iron Core	44	China Electric Equipment Group Hong Kong Co., Ltd	2011
106	Laos	Oil	S-4000KVA-11/0.69KV	1	China Electric Equipment Group Hong Kong Co., Ltd	2011
107	Australia	Oil	SFZ-25000KVA-66/11KV	1	China Electric Equipment Group Hong Kong Co., Ltd	2011
108	Venezuela	Substation	Substation 30KVA	6	China CAMC Engineering Co., Ltd	2011
		Substation	Substation 50KVA	21		
		Substation	Substation 160KVA	1		
		Substation	Substation 250KVA	1		
		Substation	Substation 315KVA	4		
		Substation	Substation 400KVA	5		
		Substation	Substation 500KVA	7		
		Substation	Substation 630KVA	2		
		Switchgear	Outdoor High Voltage Vacuum Circuit Breaker ZW()-15(D)/630-25	3		
		Parts	Lightning Arrester YH5WS-17/50	3		
		Oil	S11-M-800/13.8	2		
Oil	S11-M-1250/13.8	1				
Parts	Copper Busbar TMY-80×10	90				

		Parts	Copper Busbar TMY-63×10	30		
109	Hong Kong	Oil	S-2000KVA-11/0.38KV	6	China Electric Equipment Group Hong Kong Co., Ltd	2011
110	Hong Kong	Oil	600KVA 11/0.412KV Silicone	1	China Electric Equipment Group Hong Kong Co., Ltd	2011
111	Hong Kong	Oil	550KVA 380/420V	1	China Electric Equipment Group Hong Kong Co., Ltd	2011
112	Hong Kong	Oil	SFZ-25000KVA-66/11KV	1	China Electric Equipment Group Hong Kong Co., Ltd	2011
113	Nigeria	Oil	S11-1250/11	1	Beijing HANSOM Trading Co., Ltd	2011
		Oil	S11-2500/33	1		
114	Italy	Oil	S9-2500/10	9	Danieli&C.Officine Meccaniche S.p.A	2011
		Oil	S9-3500/10	11		
115	Algeria	Oil	S10-800/5.5	1	GROUPEMENT SONATRACH-SINOPEC	2011
		Oil	S10-900/5.5	1		
		Oil	S10-10000/30	2		
		Oil	S10-13000/66	2		
		Oil	S10-400/30	1		
		Oil	S10-50/30	1		
116	Venezuela	Dry	SCB-160KVA	2	China CAMC Engineering Co., Ltd	2012
		Dry	SCB-250KVA	1		
		Dry	SCB-1600KVA	1		
		Dry	SCB-1250KVA	1		
		Dry	SCB-1250KVA	1		
		Substation	Substation 400KVA	1		
		Substation	Substation 800KVA	1		
117	Columbia	Dry	1000KVA 13.8/0.48KV, Dyn5	2	China Electric Equipment Group (HK) Ltd	2012
		Dry	2000KVA 13.8/0.48KV, Dyn5	2		
		Dry	2500KVA 13.8/0.48KV, Dyn5	4		

		Dry	2500KVA13.8/0.69KV, Dyn5	2		
		Oil	100000/12500KVA 34.5/13.8KV, Dyn 5	2		
118	Russia	Substation	Complete transformer substation 35/6 kV	2	China Electric Equipment Group (HK) Ltd	2012
119	Tanzania	Dry	SCB10-3150/10/0.45	1	The ABB Group	2012
120	Australia	Dry	SG10-2000-25 13.2/0.6kv	1	Rio Tinto Group	2012
		Dry	SG10-5000-25/4.16KV	5		
		Dry	SG10-3000-25/4.16KV	13		
		Dry	SG10-3000-25/0.6KV	20		
		Dry	SG10-3000-13.2/0.6KV	4		
		Dry	SG10-5000-25/13.2KV	2		
		Dry	SG10-2000-25/0.6kv	7		
121	Equatorial Guinea	Oil	S11-M-400/20/0.4	1	CCCC First Harbor Engineering Company Ltd	2012
		Oil	S11-M-1250/20/0.4	2		
		Oil	S11-M-800/20/0.4	2		
122	Indonesia	Oil	S11-1600kva/10kv	1	SINOMA International Engineering Co., Ltd	2012
123	Hongkong	Dry	CSD-2000/0.69	2	The ABB Group	2012
		Dry	CSD-225/0.48	2	The ABB Group	
		Dry	CSD-125/0.48	1	The ABB Group	
124	Canada	Dry	SGB10-3000/25	6	The ABB Group	2012
125	Hongkong	Dry	CSD-2000/0.69	2	The ABB Group	2013
		Dry	CSD-1200/0.69	2	The ABB Group	
		Dry	CSD-500/0.69	2	The ABB Group	
		Dry	CSD-450/0.44	2	The ABB Group	
		Dry	CSD-150/0.44	1	The ABB Group	
		Dry	CSD-80/0.69	2	The ABB Group	
		Dry	CSD-30/0.44	4	The ABB Group	
126	Hongkong	Dry	CLSD-100/0.44	16	The ABB Group	2013
		Dry	CLSD-75/0.44	8	The ABB Group	
		Dry	CLSD-270/0.44	8	The ABB Group	
127	Azerbaijan	Oil	S11-M-1250/10	3	China non-ferrous Construction	2013
		Oil	S11-M-1600/10	1		

		Oil	ZS11-900/10	1		
		Oil	ZSS11-M-1800/10	2		
		Oil	ZSS11-M-6200/10	1		
		Dry	SCB11-1250/10	4		
		Dry	SCB11-1600/10	2		
		Dry	ZSCB10-1800/10	1		
128	Yemen	Oil	33/0.4KV,400kVA	5	Yemen Utilities	2013
129	Indonesia	Oil	S11-M-630/10/0.4 Dyn11±2x2.5%4.5%	2	Tianjin Cement Industry Design & Research Institute	2013
		Oil	S11-M-1250/10/0.4 Dyn11±2x2.5%4.5%	2		
		Oil	S11-M-1600/10/0.4 Dyn11±2x2.5%4.5%	2		
		Switchgear	FN3-10/400 On-load Switch	6		
130	Russia	Substation	Complete transformer Substation 4000kva/35/6	2	Russia Petroleum	2013
131	Iran	Oil	S11-1600/6KV	2	Sinoma	2013
132	Congo	Oil	S11-M-1250/10	1	Sinoma-Heidelberg Congo	2013
133	Indonesia	Oil	S11-M-1000/10	2	Sinoma	2013
		Oil	S11-M-1250/10	2		
		Switchgear	On- load switch	2		
134	Indonesia	Substation	YB-2500/6.6/0.4 Substation	1	Heidelberg	2013
135	Malaysia	Dry	SCB10-1250/6.6/0.433	6	Sinoma	2013
136	Hongkong	Dry	CSD-2000/0.69/0.44	4	ABB	2013
		Dry	CSD-1500/0.69/0.44	4		
		Dry	CSD-500/0.69/0.44	4		
		Dry	CSD-450/0.69/0.44	4		
		Dry	CSD-150/0.44/0.23	4		
		Dry	CSD-112.5/0.44/0.23	2		
		Dry	CSD-100/0.44/0.23	4		

		Dry	CSD-30/0.44/0.23	8				
137	Venezuela	Dry	ZSS-6200/13.8/0.75/0.75	1	China Nonferrous Metals Processing Technology	2013		
		Dry	ZSS-1800/13.8/0.66/0.66	1				
		Dry	ZSCB10-1800/13.8/2x0.66	1				
		Dry	ZSCB10-900/13.8/0.66	1				
		Dry	SCB10-1600/13.8/0.48	1				
138	Azerbaijan	Oil	SZ9-16000/110	1	DEL.AL ALUMINIUM LLS	2013		
139	Burkina Faso	Oil	S11-M-1600/10	2	Sinoma-Heidelberg	2013		
		Oil	S11-M-630/10	1				
		Oil	SFZ11-8000/33	1				
140	Ghana	Oil	S11-M-2000/10	1	Tianjin Cement Industry Design & Research Institute-Heidelberg	2013		
141	Russia	Substation	YB-2x6300KVA/35/6	1	Russia Petroleum	2013		
142	Nigeria	Oil	ZTS-700/11	2	Nanjing Shengze Science and Technology	2013		
		Oil	ZTS-1300/11	5				
		Oil	ZTS-2500/11	2				
143	Zambia	Oil	ZTS-700/11	2				
		Oil	ZTS-1300/11	2				
144	Cameroun	Oil	ZTS-2500/11	2				
		Oil	ZTS-700/11	1				
145	Saudi Arabia	Oil	ZTS-1300/11	3			Nanjing Shengze Science and Technology	2013
		Oil	ZTS-2500/11	1				
146	Russia	Dry	SCB-1000,Dyn11,6.0±2x2.5/0.4	2	Tian Lang Xing Power Station Equipment CO,LTD	2014		
		Dry	SCB-200,Dyn11,6.0±2x2.5/0.4	5				
		Dry	SCB-2500,Dyn11,6.0±2x2.5/0.4	2				
		Dry	SCB-800,Dyn11,6.0±2x2.5/0.4	3				
		Dry	SCB-630,Dyn11,6.0±2x2.5/0.4	4				
147	Hong Kong	Oil	11kV/0.38kV,2.5MVA Transformer+6/-2x2.5%	2	CHEVALIER(ENVIROMENT)LIMITED	2014		
		Oil	11kV/0.38kV,2MVA Transformer+6/-2x2.5%	2				

		Oil	11kV/0.38kV, 1.5MVA Transformer+6/-2x2.5%	6		
		Oil	11kV/0.38kV, 1.5MVA Transformer+6/-2x2.5%	2		
148	Burkina Faso	Oil	S11-8000KVA/33/10KVA	1	Heidelberg	2014
149	Canada	Dry	SG10-3000-25/13.2/0.6kV	1	KMP	2014
150	Sweden	Oil	Transformer 500KVA 0.4/0.48KV	1	ABB	2014
		Dry	CSD-1000KVA/0.69/0.44KV	2		
		Dry	CSD-400KVA/0.69/0.44KV	2		
		Dry	CSD-2000KVA/0.69/0.482K V	2		
		Dry	CSD-225KVA/0.69/0.44KV	2		
		Dry	CSD-125KVA/0.69/0.44KV	1		
		Dry	CSD-99KVA/0.69/0.44KV	2		
		Dry	CSD-22.5KVA/0.69/0.44KV	1		
		Dry	CSD-10KVA/0.69/0.44KV	1		
151	Sweden	Dry	CSD=2500KVA/0.44/0.22KV	4	ABB	2014
		Dry	CSD-160KVA/0.44/0.22KV	2		
		Dry	CSD-100KVA/0.44/0.22KV	2		
		Dry	CSD-120KVA/0.44/0.22KV	1		
		Dry	CSD-80KVA/0.44/0.22KV	1		
152	Albania	Oil	220/115/37.6KV, 120MVA Autotransformer	1	EnBi Power Sh.p.k	2014
153	Ghana	Dry	SCB10-11/0.44KV-1000KV A	1	Jiang Xi International CO.,LTD	2014
		Dry	SCB-11/0.44KV-800KVA	1		
154	Peru	Dry	KBSGZY2-T-50KVA/4.16/0 .46KV	1	Genera,LLC.	2014
155	Philippine	Oil	S11-2000KVA/4.16KV	1	Libo International Mechanical & Electrical Engineering Co.,LTD	2014
156	Philippine	Oil	S11-1000KVA/4.16KV	1	Libo International Mechanical & Electrical Engineering Co.,LTD	2014

157	Philippine	Oil	S11-3500KVA/33KV	1	LAFARGE	2014
		Oil	S11-M-400/10	1		
158	Philippine	Oil	ZTS-850KVA/2.3	1	LAFARGE	2014
159	Philippine	Oil	S11-M--750KVA	1	LAFARGE	2014
160	Philippine	Oil	S11-1000/10	1	SINOMA	2014
161	Indonesia	Oil	S11-2000/11KV	1	Heidelberg	2014
		Oil	S11-1600/11KV	1		
		Oil	S11-1250KV/11KV	1		
		Oil	S11-1000KVA/11KV	1		
162	Kazakhstan	Oil	S11-2000/11KV	1	SINOMA	2014
		Oil	S11-1600/11KV	2		
		Oil	S11-1250/11KV	3		
		Oil	S11-1000/11KV	1		
		Oil	S11-800/11KV	2		
163	Malaysia	Oil	S11-1250KVA/6.6KV	1	SINOMA	2014
164	Malaysia	Oil	ZSS-1000KVA/6.6KV	1	SINOMA	2014
165	Kazakhstan	Oil	S11-2500/6	1	Kazakhmys Aktogay LLC-Branch office of Kazakhmys Projects B.V.	2014
166	Congo	Oil	ZTS-1300	2	Nanjing Shengze Science and Technology Co.Ltd,.	2014
		Oil	ZTS-600	2		
167	Mozambique	Oil	ZTS-1500	1	Nanjing Shengze Science and Technology Co.Ltd,.	2014
166	Malaysia	Oil	ZSS-1000/6.6	1	SINOMA	2014
167	Hong Kong	Dry	CSD-50/0.69/0.69	4	ABB (Hong Kong) Limited	2015
169	Saudi Arabia	Oil	S11-1600KVA/13.8KV/0.46 KV	1	Nanjing Shengze Science and Technology Co.Ltd,.	2015
		Oil	ZTS-1300KVA/13.5KV/2*7 20V	1		
170	Saudi Arabia	Oil	ZTS-1600/11/2×2.2Dy11d0 ±3×2.5%6%	1	Nanjing Shengze Science and Technology Co.Ltd,.	2015
		Oil	ZTS-2500/11/2×2.2Dy11d0 ±3×2.5%6%	2		
171	Saudi Arabia	Oil	ZTS-1600KVA/13.8KV/2*7 20V	1	Beijing Datuo technology development Co.Ltd,.	2015
172	Hong Kong	Dry	CSD-1000KVA	2	Shanghai ABB engineering Co.Ltd,.	2015
		Dry	CSD-80KVA	2		

		Dry	CSD-250KVA	2		
		Dry	CSD-100KVA	1		
173	Malaysia	Oil	S11-2000kVA/6.6kV	3	SINOMA	2015
		Oil	S11-1500kVA/6.6kV	9		
		Oil	S11-1000kVA/6.6kV	1		
		Oil	S11-800kVA/6.6kV	1		
		Oil	S11-630kVA/6.6kV	1		
174	UAE	Oil	S11-M-1250/10	1	Sinoma energy conservation Co., LTD	2015
175	Taiwan	Dry	SCH15-30/10 (245kg)	8	MAXWELL Electric Co.,Ltd	2015
		Dry	SCH15-30/10 (215kg)	8		
		Dry	SCH15-30/10 (644kg)	10		
176	Malaysia	Oil	S11-M-1000/10	1	LAFARGE ILIGAN, INC.	2015
177	Taiwan	Dry	SC(R)BH15-2000/10	1	Frank & Associates Plastic Co.,Tld	2015
178	Hong Kong	Dry	CSD-800	2	ABB (Hong Kong) Limited-N697	2015
		Dry	CSD-400	4		
		Dry	CSD-300	1		
179	Norway	Oil	SZ11-10500/70	1	SCANCEM INTERNATIONAL DA	2015
180	Albania	Oil	115/37/10.5KV, 31.5MVA	1	NDREKAJ Sh.p.k	2016
181	Hong Kong	Oil	CS(W/F)D-4000/6.6/0.45	2	ABB (Hong Kong) Limited	2016
182	Nicaragua	Oil	S11-1600	1	Schneider Electric (China) Co.,Ltd.	2016
		Oil	S11-630	1		
183	Indonesia	Oil	S11-M-2000/10	1	/	2016
184	Malaysia	Oil	S11-M-2000/10	1	/	2016
185	Albania	Oil	110/37.5/10.5KV, 15MVA	1	EnBi Power Sh.p.k.	2016
		Oil	110/20.8KV, 40/50MVA	1		
186	Togo	Parts	BWY802	1	SCANCEM	2016
		Parts	BWY804	1		2016
		Parts	AVR	1		2016
187	Philippine	Dry	SCB10-1000/4.16/0.44	1	Holcim Philippines, Inc	2016
		Dry	SCB10-2000/4.16/0.44	1		
188	Irap	Oil	S11-1000/6	1	/	2016
189	Saudi Arabia	Dry	SGBH15-800/13.8/0.4	4	/	2016
190	Malaysia	Dry	SCB10-1000/11/0.433	4	EWT Transformer Sdn Bhd	2016

191	Philippine	Dry	SCB10-1250/11/0.48	2	/	2016
		Dry	SCB10-2500/11/0.48	2	/	
192	Burma	Dry	SCB10-2000/10/0.4	4	/	2016
		Dry	SCB10-1600/10/0.4	1		
		Dry	SCB10-1250/10/0.4	1		
		Dry	ZSCB10-1400/10/0.6	1		
		Dry	SCB10-1000/10/0.4	1		
193	Vietnam	Oil	S11-1250/22	1	/	2016
194	Philippine	Dry	ZSCB10-1800/4.16/0.72*2	1	New Sporot Enterprises (H.K) Company Limited	2016
195	Philippine	Dry	ZSCB10-650/4.16/0.72	2	/	2016
196	Russia	Oil	S11-M-1500/6.3	1	/	2016
		Oil	S11-M-2000/6.3	1	/	2016
197	Philippine	Dry	SCB10-1600/11/0.48	2	/	2017
		Dry	SCB10-2500/11/0.48	2	/	2017
198	America	Dry	SGB10-1000/13.8/0.48	1	Australasian Power Equipment Pty Ltd	2017
199	Burma	Dry	SCB10-630/10/0.4	1	/	2017
		Dry	SCB10-800/10/0.4	1		2017
200	Namibia	Oil	SZ11-8000/66	1	/	2017
		Oil	SZ11-16000/66	1	/	2017
201	Hong kong	Dry	CSD-50/6.6/0.45	2	ABB (Hong Kong) Limited	2017
202	Tanzania	Oil	S11-2500kVA/3.3kV	1	/	2017
203	Namibia	Oil	SZ11-10000/66	1	/	2017
204	Namibia	Oil	S11-M-630/10	1	(WHALE ROCK CEMENT (PROPRIETARY) LTD.	2017
		Oil	S11-M-1250/10	1		2017
205	Albania	Oil	220/115/37.6KV, 120MVA	1	EnBi Power Sh.p.k.	2017
206	Lucky	Oil	S11-800/6	1	PT LUCKY AL-SHUMOOKH HOLDING LIMITED	2017
207	Kyrgyzstan	Substation	YB-1250	1		2017
208	Hong Kong	Dry	SCB10-1500/11/0.38	2	SE Electric (HK) Limited	2017
209	Hong Kong	Dry	CSD-50	1	CSUN-SOLAR INTERNATIONAL	2017
		Dry	CSD-30	1		2017

		Dry	CSD-25	2	LIMITED-N596	2017
		Dry	CSD-10	1		2017
210	UAE	Oil	S11-M-1600/6.3	1	/	2017
211	Brunei	Oil	SZ11-5500/11	1	BUTRA HEIDELBERGCEMENT SDN BHD	2017
212	Hong kong	Dry	CSD-50	1	CSUN-SOLAR INTERNATIONAL LIMITED-N706	2017
		Dry	CSD-30	1		2017
		Dry	CSD-25	2		2017
		Dry	CSD-10	1		2017
213	Lucky	Oil	S11-2000/6.6	1	/	2017
214	Namibia	Oil	S11-2000/33/0.55	3	Swakop Uranium (Pty) Ltd	2017
		Oil	S11-2000/33/6.6	2		2017
		Oil	S11-5000/33/6.6	1		2017
215	Pakistan	Dry	ZGS11-Z.G-11/0.48-1250	10	Adhikot District Khushab Pakistan 12M Grid connected photovoltaic power generation project	2017
216	Pakistan	Switchgear	Low voltage cabinet	1	Adhikot District Khushab Pakistan 13M Grid connected photovoltaic power generation project	2017
217	Philippine	Dry	SCB10-1500/3.3	1	Holcim Philippines, Inc.	2017
218	Cameroon	Dry	DKSC-125/6	1	CIMENCAM Cameroon	2017
219	Uganda	Dry	DKSC-250/11	1	Uganda grinding station project	2017
220	Cote d'Ivoire	Oil	SZ11-5000/33	2	Total drop transformer for Cote d'Ivoire grinding station	2017
221	Cote d'Ivoire	Oil	S11-1000/10	2	Total drop transformer for Cote d'Ivoire grinding station Total drop transformer for Cote d'Ivoire grinding station	2017
		Oil	S11-1600/10	1		2017
222	Philippine	Dry	SC10-250kva/4.16/0.44kv	1	Holcim Philippines, Inc.	2017
		Dry	SC10-50/0.44/0.22	6		2017

		Dry	DC10-50/0.44/0.22	5		2017
223	Namibia	Oil	SZ11-16000/66	1	/	2018
224	Papua New Guinea	Oil	S11-1000/11	1	APEQ	2018
		Oil	S11-500/11	1		
225	Namibia	Oil	S11-1000/10	1	/	2018
		Oil	S11-1250/10	1		
		Oil	S11-1600/10	1		
226	Iraq	Oil	S11-100/33/0.415	10	/	2018
227	Australia	Oil	S11-1500/11	1	APEQ	2018
228	Namibia	Oil	S11-2000/33	2	SWAKOP	2018
229	Vietnam	Oil	S11-M-1000/6.3	1	VCM WHG PROJRECT	2018
230	Vietnam	Oil	S11-M-800/6.3	2	SG WHG PROJRECT	2018
231	Indonesia	Oil	S11-500/6.3	1	Sinoma,Tianjin Cement Industry Design and Research Institute Co.,Ltd.	2018
232	Nigeria	Oil	ZTS-600	3	Nanjing Shengze Science and Technology Co.Ltd.,.	2018
		Oil	ZTS-700	1		
		Oil	ZTS-1300	1		
		Oil	ZTS-2500	1		
233	Papua New Guinea	Switchgear	8DJH -RRLL 12KV	2	OK TEDI MINING (APEQ)	2018
234		Switchgear	8DJH -RRLL 24KV	2		
235		Switchgear	8DJH -RRLL 24KV+DC	2		
236	Bangladesh	Oil	SZ11-9500KVA/33KV	1	CNBM	2018
237	Bangladesh	Oil	S11-M-1000/6.3	1	China Heavy Machinery Co., Ltd	2018
238	Philippines	Substation	YB-1500/13.8	1	/	2018
239	Burkina Faso	Oil	S11-M-1600-10/0.4KV	1	CIMBURKINA S.A	2018
240	Mexico	Dry	SCB10-500-13.2/0.4	2	Ruian New Energy	2018
		Switchgear	GGD	2		
241	Papua New Guinea	Parts	HV isolators	13	OK TEDI MINING (APEQ)	2018
242	Philippines	Dry	SCB10-250/0.44/0.22	1	Holcim Philippines, Inc.	2018
		Dry	SC10-50/0.44/0.22	2		
		Dry	DC10-50/0.44/0.22	1		

243	Zambia	Oil	ZTS-1300/11	1	Nanjing Shengze Science and Technology Co.Ltd,.	2019
244	Pakistan	Oil	S11-630/6	1	Sinoma,Tianjin Cement Industry Design and Research Institute Co.,Ltd.	2019
		Oil	S11-800/6	1		
		Oil	S11-1250/6	1		
		Oil	S11-1600/6	4		
245	Bangladesh	Oil	S11-M-800/11/0.4KV	1	China Heavy Machinery Co., Ltd	2019
		Oil	S11-M-1250/11/0.4KV	1		
		Oil	S11-M-1600/11/0.4KV	1		
		Oil	S11-M-1600/11/0.4KV	2		
		Oil	S11-M-2000/11/0.4KV	1		
246	Albania	Oil	20.8/0.4KV, 250KVA	2	EnBi Power Sh.p.k.	2019
		Oil	110/20.8KV, 40/50MVA	2		
247	Swiss	Dry	SC-80KVA-0.315/0.4	1	MATTDAMON	2019
248	Canada	Dry	SG-24.94/13.2/0.6KV 1MVA	2	Rio Tinto Alcan	2019
249	Chile	Dry	SCB10-500KVA-4.16/0.4 (Outdoor Type)	1	Albemarle Corporation	2019
250	Saudi Arabia	Oil	S11-1250kVA-13.8/0.5kv	1	CNBM KIVAY International Engineering Co., Ltd	2019
251	Hong Kong	Dry	SCB10-1500/11/0.38	2	ATAL	2019
252	Libya	Oil	S11-M-2000/6.6	1	Sinoma,Tianjin Cement Industry Design and Research Institute Co.,Ltd.	2019
253	Tajikistan	Oil	SFZ11-16000/110	2	Yanjan Group Co., Ltd.	2019
		Oil	S13-M-100/10.5	1		
		Oil	S13-M-50/35	1		
		Oil	S13-M-100/6	1		
254	Mozambique	Dry	SGB10-2000/22/0.433 Substation	1	APEQ	2019
255	Indonesia	Oil	ZTS-1200	1	Nanjing Shengze Science and Technology	2019
		Oil	ZTS-600	1		
		Oil	ZTS-800	2		
		Oil	ZTS-900	1		

		Oil	ZTS-2000	1		
256	Philippines	Oil	SFZ-12000/69	1	CRH	2019
257	Philippines	Oil	S11-300/3.3/0.22	1	CRH	2019
258	Trinidad & Tobago	Dry	SCB10-1500/3.3/0.48	2	CEMEX	2019
259	Mexico	Switchgear	Electrical Power Outlets	47	CEMEX	2019
260	Canada	Dry	SGB-3000/25-13.2/0.6	1	Rio Tinto Alcan Inc	2019
261	Dubai	Oil	S11-M-1600/11/0.4KV	2	China Heavy Machinery Co., Ltd	2019
262	Bangladesh	Oil	S11-1250	1	China Heavy Machinery Co., Ltd	2019
263	UAE	Oil	SFZ11-25000/33	1	Sinoma Energy Conservation Limited	2019
		Oil	S11-M-2000/6.6	2		
264	Papua New Guinea	Switchgear	8DJH -DC+RLLL 12KV -013	1	OK TEDI MINING (APEQ)	2019
265	Brunei	Parts	SZ11-5500/11 Transformer Fans	2	BUTRA HEIDELBERGCEMENT SDN BHD	2019
266	Togo	Oil	4MVA 20KV/10.5KV	1	CIMTOGO S.A.	2019
267	Malaysia	Dry	SCB10-3150-33/0.415	2	Intco Malaysia Sdn.Bhd	2019
268	India	Dry	ZPSG-488/6.6	2	ABB India Limited	2019
269	India	Dry	ZPSGL-888/11	2	ABB India Limited	2019
270	India	Dry	ZPSG-563/11	3	ABB India Limited	2019
271	India	Dry	ZPSGL-625/6.6	1	ABB India Limited	2019
272	Papua New Guinea	Switchgear	8DJH -DC+RLLL 12KV -014	1	OK TEDI MINING (APEQ)	2019
273	Philippines	Dry	SCB10-2000/13.8	1	CH Asia World of Electric Inc	2019
274	Brunei	Oil	S11-1000-6/0.4KV	2	BUTRA HEIDELBERGCEMENT SDN BHD	2019
		Oil	S11-500-6/0.4KV	1		
275	Pakistan	Dry	SCB11-2500/11/0.42KV	2	China BOQI	2019
276	Bolivia	Dry	SCB11-2000/6KV	2	CMEC	2019
		Dry	SCB11-10000/24.9/6	1		
		Dry	SCB11-2500/6	3		

277	England Ireland Finland Turkey Columbia Greece	Dry	SGB10-335/6.6/0.4KV (Batch Basis)	16	Rainbow-Cargotec Industries Co.,Ltd	2019
278	Philippines	Oil	S11-1000KVA, 4160/440V	1	REPUBLIC CEMENT MINDANAO, INC	2019
279	Tanzania	Parts	SPARES FOR LV TRANSFORMERS PL4	4	Tanzania Portland Cement Public Limited Company	2019
280	Hong Kong	Dry	SCB10-1500/11/0.38	1	ATAL	2020
281	Uzbekistan	Oil	S11-1250KVA/6±2×2.5%/0. 4kV,DYn11	1	CNBM KIVAY International Engineering Co., Ltd	2020
282	Liberia	Oil	S11-1600/6.3/0.4KV	1	CNBM KIVAY International Engineering Co., Ltd	2020
283	Brunei	Service	6KV 500KVA&1000KVA Transformer Service	1	BUTRA HEIDELBERGCEMENT SDN BHD	2020
284	Philippines	Oil	S11-400KVA/6.6KV	2	CEMEX	2020
		Dry	SC10-150/0.44	1		
		Oil	S11-500KVA/6.3KV	1		
285	Brunei	Service	SZ11-5500/11 Transformer Refurbishment	1	BUTRA HEIDELBERGCEMENT SDN BHD	2020
286	Papua New Guinea	Parts	RMU Remote Control Upgrade Kits	4	OK TEDI MINING (APEQ)	2020
287	Philippines	Dry	SCB10-1500-PH	2	CH Asia World of Electric Inc	2020
288	Singapore	Dry	CSD-100,CSD-200	4	ABB PTE. LTD.	2020
289	Hong Kong	Dry	CS(WF)D-1500/0.69/0.44	4	Sunergy (Hong Kong) Trading Co.,Limited	2020
290	Tajikistan	Oil	KS11-400,10kV/0.4kV,10±5 %,Dyn11	2	Closed Joint Stock Company"TALCO GOLD"	2020
		Oil	KS11-500,10kV/0.4kV,10±5 %,Dyn11	1		

		Oil	KS11-250,10kV/0.4kV,10±5%,Dyn11	1		
		Oil	KS11-160,10kV/1kV,10±5%,Dyn11	2		
		Oil	KS11-315,10kV/0.4kV,10±5%,Dyn11	4		
		Oil	Lighting Transformer 5kVA 380V/220V	4		
		Dry	SG1-5/1.0F 5kVA 380/220V	4		
		Oil	S11-630KVA(10/0.4KV)	7		
		Oil	S11-160KVA(10/0.4KV)	3		
		Dry	SCB11-500,10kV/0.4kV,10±2x2.5%,D.n11	1		
		Dry	SCB11-2000,10kV/0.4kV,10±2x2.5%,Dyn11	2		
		Dry	SCB11-1250,10kV/0.69kV,10±2x2.5%,Dyn11	1		
		Dry	SCB11-1250,10kV/0.4kV,10±2x2.5%,Dyn11	1		
		Oil	S11M-125/10,10/0.4kV,10±2x2.5%,Dyn11	1		
		Oil	S11M-315/10,10/0.4kV,10±2x2.5%,Dyn11	1		
		Dry	SC11-315,10kV/0.4kV,10±2x2.5%,Dyn11	1		
		Dry	SC11-400,10kV/0.4kV,10±2x2.5%,Dyn11	1		
291	Philippines	Oil	S11-630KVA/6.6kV	1	CEMEX	2020
292	Philippines	Dry	SZGB10-550KVA/13.8KV (K=20)	1	CEMEX	2020
293	Indonesia	Oil	SFZ11-40000/22	2	SOMA CFSP 2 x 31MW (RUHN POWER)	2020
		Oil	SF11-9000/10.5	2		
		Dry	SCB13-800/10/0.4	1		
		Dry	SCB10-800/6.3/0.4	1		
		Dry	SCB10-1000/6.3/0.4	5		
294	Philippines	Oil	S11-2000KVA/6.6kV	1	CEMEX	2020

295	New Zealand	Switchgear	8DJH-PT+LL+LLL & LLL+LL+PT (12KV RMUs)	1	OCEANA GOLD	2020
296	Honduras	Oil	SFZ11-31500/138 31.5MVA 138±8X1.25%/6.6kV	1	EMCO 1*25MW (NOVA)	2020
		Dry	SCB11-1250/6.6	3		
297	New Zealand	Switchgear	8DJH-PT+LL+LLL (Grey Street RMU)	1	OCEANA GOLD(APEQ)	2020
298	Philippines	Oil	S11-1000KVA, 4160V	2	REPUBLIC CEMENT MINDANAO, INC	2020
		Oil	S11-2000KVA, 4160V	1		

299	New Zealand	Critical Spares	Zero Sequence Current Transformer 50/1 2.5VA	1	OCEANA GOLD (APEQ)	2020
			Phase Current Transformer 800/1 0.5/5P20 10/10VA	3		
			Phase Current Transformer 200/1 0.5/5P20 10/10VA	3		
			Voltage Transformer 11kV/110V	1		
			Three Position Switch Motor Actuator for Remote Switching	1		
			Shunt Trip Coil	1		
			Undervoltage Release Coil	2		
230	Congo	Oil	S11-7000/10/3.3	1	CNMC International Trading Co.,Ltd	2020
231	Namibia	Oil	SFZ11-16000/33KV	1	SWAKOP Uranium(Pty)Ltd	2020
		Dry	SCB11-2000/6.6KV	1		
232	Middle East	Oil	SFZ11-125000/230	3	JP	2020
233	Laos	Dry	SCZB-1250/11/0.4	3	China Heavy Machinery	2020

			SCZB-1250/22/0.4	1	Co., Ltd	
			SCB-400/22/0.4	1		
			SCZB-400/22/0.4	2		
234	UAE	Spares	Silicone Gel	1	Sinoma Energy Conservation Limited	2020
235	Japan	Dry	SCB10-650/6.6/0.38	1	NEXTES (NR Electric Power Electronics Co.,Ltd)	2020
			SC10-20/0.38/0.2	1		
			DC10-20/0.38/0.2-0.1	1		
236	Philippines	Spares	Transformer Spare Parts	20	Phil Gold Processing & Refining Corp	2020
237	Philippines	Oil	S11-500/0.525	1	REPUBLIC CEMENT MINDANAO, INC	2020
238	Vietnam	Oil	ZTS-1600/6	1	CAPITAL INVESTMENT COMMERCE AND SERVICES JOINT STOCK COMPANY	2021
239	Philippines	Oil	S11-2000	1	REPUBLIC CEMENT ILIGAN, INC	2021
240	UAE	Spares	HV bushing	1	Sinoma Energy Conservation Limited	2021
			LV bushing	1		
			OLTC	1		
			Gaskets for 2000KVA Txf	1		
			Gaskets for 2500KVA Txf	1		
241	Republic of Mali	Oil	S11-50KVA-33KV	1	Selingue (SAC)	2021
		Dry	SCB10-250KVA-33KV	1		
		Switchgear	Outdoor Vacuum Circuit Breaker ZW32-40.5/630A	1		
242	Germany	Dry	SG(L)B-2000/6/0.69	1	CEMEX	2021
		Dry	SG(L)B-1600/6/0.69*2	1		

243	Middle Africa	Dry	SCB11-2500kVA/15kV	2	CEEC (NR Electric Power Electronics Co.,Ltd)	2021
244	Middle East	Oil	SFZ11-20/22MVA-33KV	4	JP	2021
245	Uzbekistan	Dry Mine Type	KBSG ZY2-T-1000/6/1.2/0.693	2	ENERGOMAX LLX	2021
246	Philippines	Dry	SCB10-2000/34.5	2	CH Asia World of Electric Inc	2021
247	Republic of Mali	Dry	SCB11-250/15	1	Markala (SAC)	2021
			SCB11-250/15	1	Bougouni(SAC)	
248	Papua New Guinea	Switchgear	Remote Control Panel	1	OK TEDI MINING (APEQ)	2021
249	Cameroon	Oil	ZTS11-700	1	DANGOTE CEMENT CAMEROON S.A	2021
			S11-2500	1		
250	Federal Republic of Nigeria	Dry	SCB10-1600/11/0.415	4	ZUNGERU Hydro (CNEEC)	2021
			SCB10-800/11/0.415	2		
			SC10-250/11/0.415	2		
			SC10-315/11/0.415	4		
			SCB10-100/11/0.415	2		
251	Thailand	Dry	SCB11-2000/10.5/0.4	4	Bangkok Waste to Energy Project (New Sky)	2021
			SCB11-1250/10.5/0.4	2		
			SCB11-1250/24/0.4	2		
			Reactor	2		
252	Thailand	Dry	SCB11-2000/10.5/0.4	4	Bangkok Andrew Waste to Energy Project (New Sky)	2021
			SCB11-1000/10.5/0.4	2		

			SCB11-1250/24/0.4	1		
253	Canada	Dry	SGB10-1000/24.94-13.2/0.6	2	Anderson Creek Sub X (Rio Tinto Alcan Inc)	2021
254	Singapore	Oil	S11-12000/22	2	ABB PTE. LTD.	2021
		Dry	CSD-700/11/0.4	2		
		Dry	CSD-700/0.435	2		
		Dry	CSD-700/11/0.525	2		
		Dry	SG-200/11/0.4	2		
255	Republic of Guinea	Kiosk	ZGS-1500/0.4/10	5	Kindia Tunnel (China Railway 18th Bureau Group Co.,Ltd)	2021
		Kiosk	ZGS-1250/10/0.4	5		
		Kiosk	ZGS-160/10/0.4	13		
		Switchgear	XGW-12/CCC	13		
256	Tajikistan	Dry	ZSGB10-800/10	1	Parut gold mine (China Nonferrous Metal Mining (Group) Co., Ltd.)	2021
257	Myanmar	Dry	SCB10-1600/10	1	Mount Dagong (China Nonferrous Metal Mining (Group) Co., Ltd.)	2021
258	Vietnam	Oil	S11-1000/10	2	Hefei Rongju Iron (WISDRI-MCC)	2021
		Oil	S11-1600/10	2		
259	Vietnam	Dry	SCB10-800/11	1	VINASPARE COMPANY Limited	2021
260	Uzbekistan	Oil	S11-M-1600/10	1	QCC4 Clinker Line Project (Sino-Cemtech)	2021
		Oil	S11-M-2000/10	1		
		Oil	S11-M-2500/10	2		
261	Saudi Arab	Dry	SGB10-2000/13.8	1	AJCC	2021

					(Jiangsu Pengsheng Photovoltaic Technology Co., Ltd)	
262	Malaysia	Dry	SCB10-100/11	1	Seagate (Nanjing) Power Electronics Technology Co., Ltd	2021
			SCB10-300/33	1		
263	Kenya	Oil	S11-250/11/0.415	1	Berth 1-3, Port Lamu, Kenya COMPLANT (ZCTS Shenzhen Co.,Ltd)	2021
		Oil	SZ11-10000/33/11	1		
264	Zimbabwe	Ehouse	Ehouse	1	SINOMA	2021
265	Barbados	Oil	S11-1000/11	1	CEMEX	2021
266	Ethiopia	Oil	S11-200/15	1	Green River Banks (Jiangsu Nantong Sanjian Construction Group Co., Ltd.)	2021
267	Honduras	Dry	SCB11-1250/13.8	1	Caracol Knits S.A (NOVA)	2021
		Dry	SCB11-2500/13.8	1		
268	Outer Mongolia	Dry	ZSCB10-660	1	NGK (NR Electric Power Electronics Co.,Ltd)	2021
269	Iraq	Spare	Spare Parts	1	Schneider Electric (China) Co.,Ltd.	2021
270	Pakistan	Dry	SCB10-1250	1	F2021E003-WHR PROJECT FOR LUCKY CEMENT LTD. PEZU PLANT LINE (Sinoma Energy Conservation Limited)	2021
271	Iraq	Spare	Spare Parts	1	Nanjing Zhongji Import and export Co. LTD	2021
272	Philippines	Dry	SCB-2500/13.8	1	CH Asia World of Electric Inc	2021
273	Myanmar	Dry	ZSSCB10-630	1	Myanmar International Terminals Thilawa Limited	2021

274	Poland	Dry	ZSCB10-1100	2	Nanjing Shengze Technology Co., LTD	2021
			ZSCB10-2250	1		2021
275	Philippines	Dry	SCB10-1500/34.5	2	CH Asia World of Electric Inc	2021
276	Outer Mongolia	Dry	SCB11-500KVA	1	3MWh Lead carbon Energy Storage (Shuangdeng Group)	2021
277	Saudi Arab	Spare	Current Transformer	5	Sinoma Energy Conservation Limited	2021
278	Dominican Republic	Oil	SF11-40000/138	1	CEMEX	2021
279	Australia	Dry	SGB10-1333KVA/22KV Outdoor Type	1	MT Atlas MMU (APEQ)	2021
280	Bangladesh	Oil	S11-1250/6.3	1	HEIDELBERGCEMENT BANGLADESH LTD	2021
281	Ethiopian	Dry	SGB10-2000/15	2	Ethiopian Bank (Beijing New union International Engineering Technology Co., LTD)	2021
282	Pakistan	Oil	SZ11-25000/132	2	Hefei Cement Research&Design Institute Corporation Ltd	2021
			S13-1000/6.3	3		
			S13-1600/6.3	5		
			S13-2000/6.3	1		
			S13-M-1000/6.3	3		
			S13-M-1000/6.3	1		
			S13-M-1250/6.3	2		
			S13-M-1600/6.3	1		
			S13-M-2000/6.3	2		
			S13-M-2500/6.3	3		

			S13-1000/6.3	1		
			S13-2000/6.3	1		
283	Philippines	Dry	SCB10-2000/34.5	1	CH Asia World of Electric Inc	2021
284	Philippines	Dry	SCB10-2000/13.8	1	CH Asia World of Electric Inc	2021
285	Philippines	Spares	Breather Capsules	5	Phil Gold Processing & Refining Corp	2021
286	Pakistan	Oil	S13-1000	1	Tianjin Cement Industry Research&Design Institute Corporation Ltd	2021
287	Togo	Oil	S11-M-2000	1	SCANTOGO	2021
288	Singapore	Dry	CSD-12	1	NC-256 CDL Cable Laying Vessel(ABB PTE. LTD)	2021
			CSD-250	2		
			CSD-50	1		
			CSD-700	2		
			CSD-1750	1		
			CSD-630	1		
289	Cyprus	Dry	CSCBFD-4500	2	CPP CYPRUS FSRU PROJECT (ABB (Hongkong) Limited)	2021
			CSD-50	2		
			CSCBFD-25/6.6/0.46	2		
290	Philippines	Spares	OTI; Multi-Function Meter; WTI	4	Phil Gold Processing & Refining Corp	2021
291	Australia	Dry	SGB10-1333KVA/11KV Outdoor Type	1	MT Mindarie MMU (APEQ)	2022
292	Namibia	Dry	SCB11-2000/6.6	1	SWAKOP URANIUM (PTY) LTD	2022
293	Japan	Dry	SCB10-300	1	KitaKink 200kW (NR Electric Power	2022

					Electronics Co.,Ltd)	
294	Japan	Dry	SCB10-540	1	Anritsu (NR Electric Power Electronics Co.,Ltd)	2022
			SC-70	1		
295	Gabon	Oil	63/30KV 15MVA	1	COMILOG (Eramet)	2022
		Oil	2MVA 30/5.5KV	1	COMILOG (Hatch)	
		Oil	2MVA 30/0.4KV	9		
		Dry	200KVA 0.4KV	6		
		Dry	50KVA 0.4KV	5		
296	Iraq	Oil	DKS- 2000/33/0.4	1	Mass Iraq Company For Cement Industry	2022
297	Guatemala	Oil	S11-1500 13.8KV	1	CEMEX	2022
		Oil	S11-1500 13.8KV	1		
298	Philippines	Dry	SCB10-1500 13.8/0.4kV	1	CH Asia World of Electric Inc	2022
299	Canada	Dry	CSD-400	2	McRAE Marine Electrical & Electronics LTD.	2022
			CSD-160	2		
			CSD-45	4		
			CSD-45	1		
			CDGD-10	2		
300	Pakistan	Dry	ZSG10-1250/6.3	2	HUBEI AMERSON AUTOMATION SYSEM ENGINEERING CO.,LTD	2022
			ZPSG-700/6	1		
			ZPSG-550/6	1		
301	Ethiopia	Oil	S11-630/15	1	HUAWEI DATA CENTER (Beijing Deere United	2022

					Engineering Technology Co., LTD)	
302	Naura	Dry	SCB13-2750/11	2	Solar Power Development Project (HNAC)	2022
			SCB13-2500/11	1		
			SCB13-2000/11	2		
			SCB13-630/11	2		
303	Nigeria	Oil	ZSS-M-2000/11	1	HEFEI ChunYan	2022
			ZSS-M-2700/11	1		
			S13-M-1000/11	1		
			S13-M-1250/11	1		
			S13-M-1600/11	2		
			S13-M-2000/11	3		
			ZTS-M-550/11	1		
			ZTS-M-700/11	2		
304	India	Oil	SFZ11-25000/132	2	LANJIGARH 130MW (RUHN POWER)	2022
305	Australia	Dry	SGB10-750-11KV	2	Mindarie Mineral Sand Plant (APEQ)	2022
		Dry	SGB10-1500-11KV	3		
		SWG	Siemens 8DJH RMU 12KV+DC+RCP	4		
306	Gabon	Dry	SGB10-1250 5.5KV	1	COMILOG (Hatch)	2022
		Dry	SG10-30	1		
		Dry	DG10-30	1		
		SWG	NGR 300A 10S	1		

307	America	Oil	SSF11-2500 4.16/0.48/0.6kV	1	CEMEX	2022
308	Ethiopia	Dry	SCB13-1250	2	YHF	2022
		Dry	SCB13-1000	2		
309	Trinidad and Tobago	Dry	SCB10-1500 3.3	1	CEMEX	2022
310	Australia	Dry	SGB10-600/22	1	MT Atlas Pump Skid (APEQ)	2022
311	Mexico	Dry	ZSCB-1500 6+/-2*2.5%/0.44kV	1	CEMEX	2022
312	Papua New Guinea	Spares	Buchholz Relay	1	APEQ	2022
			Pressure Relief Valve	1		
313	Japan	Dry	SCB10-750	1	Ando-Hazama 600kW (NR Electric Power Electronics Co.,Ltd)	2022
		Dry	SCB10-110	1		
314	Malaysia	Oil	S13-630 6.6+/-2*2.5%/0.433kV	1	SINOMA Tianjin Control and Engineering Co.,Ltd	2022
315	Dominican Republic	Oil	S11-1000/4.16/0.5	2	HEFEI ChunYan	2022
			S11-1600/4.16/0.5	1		
			S11-2500/4.16/0.5	4		
			ZSS-1000/4.16/2×0.72	1		
			ZSS-1250/4.16/2×0.72	1		
			ZSS-510/4.16/2×0.72	1		
316	Philippines	Dry	SCB10-2000/34.5/0.23	1	ZHZQ ARCHITECT	2022
317	Philippines	Dry	SCB10-3000/34.5/0.38	1	ZHZQ ARCHITECT	2022
318	Philippines	Dry	SCB10-2000/13.8/0.46	1	CH Asia World of Electric Inc	2022

319	Tanzania	Oil	S11-4000/33/0.415	1	(Tanzania Ceramics factory) GUANGZHOU Sunda	2022
320	Senegal	Oil	S11-2500/11/0.4	1	(Senegal Ceramics factory) GUANGZHOU Sunda	2022
321	Philippines	Oil	S11-2000	1	(INFINITYSQUARE) CH Asia World of Electric Inc	2022
322	Gabon	Oil	S11-1250/5.5	2	COMPAGNIE MINIERE DE L'OGOUE (COMILOG)	2022
323	Japan	Dry	ZSC10-70	1	Omron Yachiyo 400KW (NR Electric Power Electronics Co.,Ltd)	2022
		Dry	ZSCB10-540	1		
324	Mexico	Oil	S11-1000/4.16	1	CEMEX	2022
325	Philippines	Oil	ZTS-2500	1	(REPUBLIC CEMENT BUILDING MATERIALS INC.) CRH	2022
326	Thailand	Dry	SCB11-200	2	China Energy Engineering Group Jiangsu Power Design Institute Co.,Ltd	2022
327	Saudi Arab	Oil	S11-2000	1	(SPCC2000kVA) Nanjing Zhongji Import&Export Co.,Ltd	2022
328	Japan	Dry	SCB10-285	1	Fuji 285KW BESS (NR Electric Power Electronics Co.,Ltd)	2022
			SCB10-60	1		
329	Bangladesh	Oil	S11-1600	1	China National Heavy Machinery Corporation	2022
			SZ11-15000/33/11	1		
330	America	Oil	S11-1400/4.16	2	CEMEX	2022
331	Malaysia	Oil	S11-2000	2	Sinoma Energy Conservation Limited	2022

332	Namibia	Dry	SCB11-3150	2	SWAKOP URANIUM(PTY) LTD	2022
333	Philippines	Spare	Spare Parts	1	Phil Gold Processing & Refining Corp	2022
334	Pakistan	Oil	SZ11-35000/132	1	LUCKY CEMENT LIMITED	2022
335	Philippines	Oil	S11-1500	1	REPUBLIC CEMENT BUILDING MATERIALS INC.	2022
336	Dominican Republic	Oil	SF-25000/34000/42000-138	4	Siba Energy Corporation	2022
			SF-39000/52000/65000-138	1		
337	Laos	Oil	S11-M-1000/22/0.4	1	SINO-KCL	2022
		Oil	S11-M-3150/22/10	1		
		Dry	SCB14-3150/10/0.4	1		
		POS	YBW-12/0.4-2000	3		
338	Zambia	Oil	S11-4000/33/0.4	1	GUANGZHOU Sunda	2022
339	America	Oil	S11-1000/4.16	1	CEMEX	2022
340	Philippines	Oil	S11-1500	1	REPUBLIC CEMENT BUILDING MATERIALS INC.	2022
341	Philippines	Oil	S11-8000	1	Phil Gold Processing & Refining Corp	2022
342	Philippines	Spares	Spare Parts	1	Phil Gold Processing & Refining Corp	2022
343	South Africa	Oil	ZTS-1300	1	Sephaku (Shanghai Ehkyu Internatrional Trading Co., Ltd.)	2022
344	Poland	Dry	ZPSGL-500/6/4 × 1.85Yd6-9%/Q/(16418)	4	ABB Sp. z o.o.	2022
345	India	Dry	ZPSG-7296/11/0.73 × 27Yd8-11%/G/(16420)	1	ABB india Limited	2022

346	Germany	Dry	CS(W/F)D-2100/0.69/0.45Dy11±5%6%/Q/(20160)	1	Wärtsilä Deutschland GmbH	2022
			CSCBFD-3200/0.71/0.46Dy11±2.5%6%/T/(20227)	2		
			CSCBFD-3200/0.71/0.46Dy11±2.5%6%/T/(20227)	2		
347	India	Dry	ZPSGT-625/6.6/0.73×18Yd8-10%/T/(16422)	1	ABB india Limited	2022
348	India	Dry	ZPSGL-938/6.6/0.73×18Yd8-10%/Q/(16432)	2	ABB india Limited	2022
349	Thailand	Oil	115/10KV 25/31.5MVA	1	HCE(Pinggao)	2023
		Oil	115/10KV 40/50MVA	2		
350	Republic of Chad	Dry	SC(B)11-3450kVA/15kV	3	CEEC (NR Electric Power Electronics Co.,Ltd)	2023
351	Philippines	Dry	SC10-150KVA	1	CEMEX	2023
352	Philippines	Oil	S11-2000/13.8/0.44KV	1	CEMEX	2023
353	America	Oil	S11-1150KVA/4.16KV	1	CEMEX	2023
354	Honduras	Spares	138KV Bushings	1	IE (NOVA)	2023
355	Myanmar	Dry	SCB10-1600	1	SINOMA	2023
356	Malaysia	Spares	Bushing	1	SINOMA	2023
357	India	Dry	ZPSGL-563/6.6/0.73×18Yd8-10%/Q/(16435)	8	ABB india Limited	2023
			ZPSGT-938/6.6/0.73×18Yd8-10%/T/(16466)	3		
358	Hongkong	Dry	CSD-100/0.415/0.415Dyn11±2×2.5%3.5%/Q/(20144)	2	ABB (Hong Kong) Limited	2023
			CSD-35/0.415/0.415Dyn11±2×2.5%3.5%/Q/(20143)	2		
359	Switzerland	Dry	CS(W/F)D-1650/0.66/0.45Dy11/6%/Q/(20256)	2	Winterthur Gas & Diesel	2023

360	Finland	Dry	CSCBFD-2400/0.71/0.467 Dy11±2.5%6%/Q/(20259)	11	Wärtsilä Deutschland GmbH	2023
361	Saudi Arab	Dry	SCB10-2000/11/0.38	1	Shenglong Electric	2023
362	Venezuela	Dry	SCB11-2000/13.8/0.4	7	Shenzhen Renfuyingrui Import&Export Co., Ltd	2023
363	Nigeria	Oil	S13-M-1600/11/0.4	1	HEFEI ChunYan	2023
			S11-800/10 10±2*2.5%/0.48KV	1		
			S13-M-2000/11/0.4	1		
364	Malaysia	Dry	SCB10-300/11/0.433	1	Xijie(Nanjing) Power electronics technology	2023
365	Pakistan	Dry	SCB10-1250/6.3/0.4		Hefei Cement Research&Design Institute Corporation Ltd	2023



170008222878



(2017)国认监认字(347)号



中国认可
国际互认
检测
TESTING
CNAS L1020



实验室名称: 国家电器产品质量监督检验中心

Lab Name: China National Center for Quality Supervision
and Test of Electrical Apparatus Products

No 20M0561-S

型式试验报告 Type Test Report

委托单位: China Electric Equipment (Jiangsu) Transformer
Manufacturing Co., Ltd

Client:

产品名称: Power transformer

Name of Product:

产品型号: SZ11-63000/110

Product Type:

检验类别: Commission test

Test Category:

本实验室对出具的检验(试验)结果负责, 未经实验室书面同意,
不得部分地复制本报告.

The laboratory is responsible for the inspection (Test) results. The report shall
not be reproduced except in full, written approval of the laboratory.

China National Center for Quality Supervision and Test of Electrical Apparatus Products Test Report

No: 20M0561-S

Total 68 Page 01

Client	China Electric Equipment (Jiangsu) Transformer Manufacturing Co., Ltd	Test category	Commission test
Manufacturer	China Electric Equipment (Jiangsu) Transformer Manufacturing Co., Ltd	Date of sample receiving	Mar. 21, 2020
Name of sample	Power transformer	Type of sample	SZ11-63000/110
Address of manufacturer	No.188 Zhongdian Road, Yangzhong, Zhenjiang City, Jiangsu Province, China	Original number or date of production	ZD202003856
Date of test	From Apr. 09, 2020 to Apr. 22, 2020	Number of sample	1 set
Test items	Routine test Type test (including calculation of the winding hot-spot temperature-rise) Measurement of bushing capacitances and dielectric dissipation factor (tanδ) Measurement of zero-sequence impedances on three-phase transformers Measurement of the harmonics of the no-load current Measurement of frequency response Measurement of no-load excitation characteristics Long-duration no-load test Measurement of short-circuit impedance on LV Short-circuit withstand test	Test standards	GB/T 1094.1—2013 GB/T 1094.2—2013 GB/T 1094.3—2017 GB/T 1094.5—2008 GB/T 1094.10—2003 GB/T 6451—2015 GB/T 7595—2017 JB/T 10088—2016 IEC 60076-1:2011 IEC 60076-2:2011 IEC 60076-3:2013+AMD1:2018 IEC 60076-5:2006 IEC 60076-10:2016 Commission requirements
Test conclusion	The test results of routine test, type test (including calculation of the winding hot-spot temperature-rise), measurement of bushing capacitances and dielectric dissipation factor (tanδ), measurement of zero-sequence impedances on three-phase transformers, measurement of the harmonics of the no-load current, measurement of frequency response, measurement of no-load excitation characteristics, long-duration no-load test, measurement of short-circuit impedance on LV and short-circuit withstand test of power transformer (type: SZ11-63000/110) are in accordance with test standards and commission requirements. The sample has passed the above tests.		
Remarks	Signing and issuing date: 2020-4-29 Note: the conclusion is valid only for the inspected and tested sample. (1)		

Compiled by: 袁小勇 Proofread by: 刘子兴 Checked by: 邹彦珍 Approved by: 李明

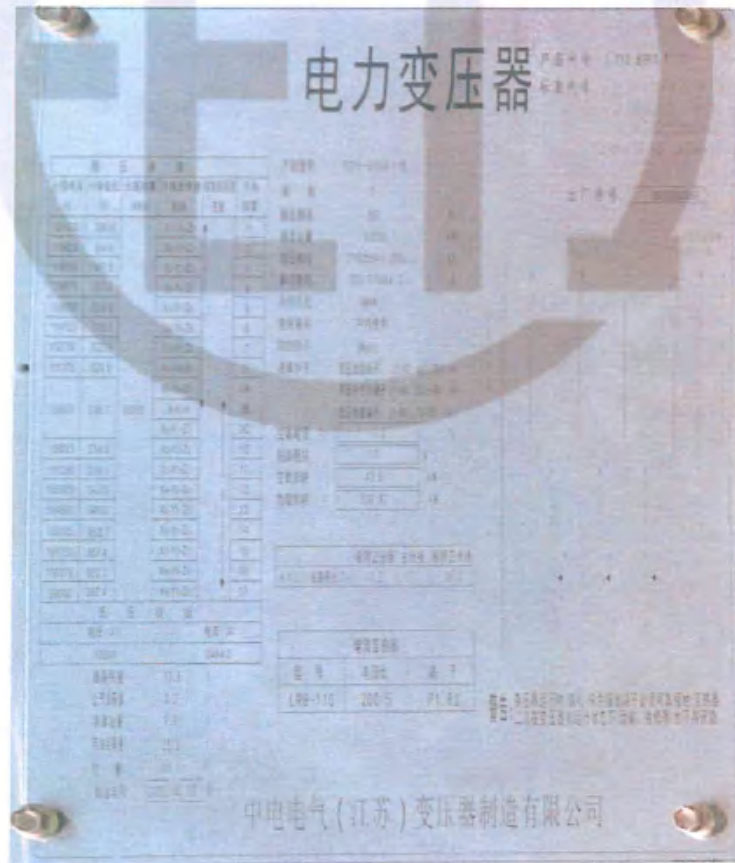
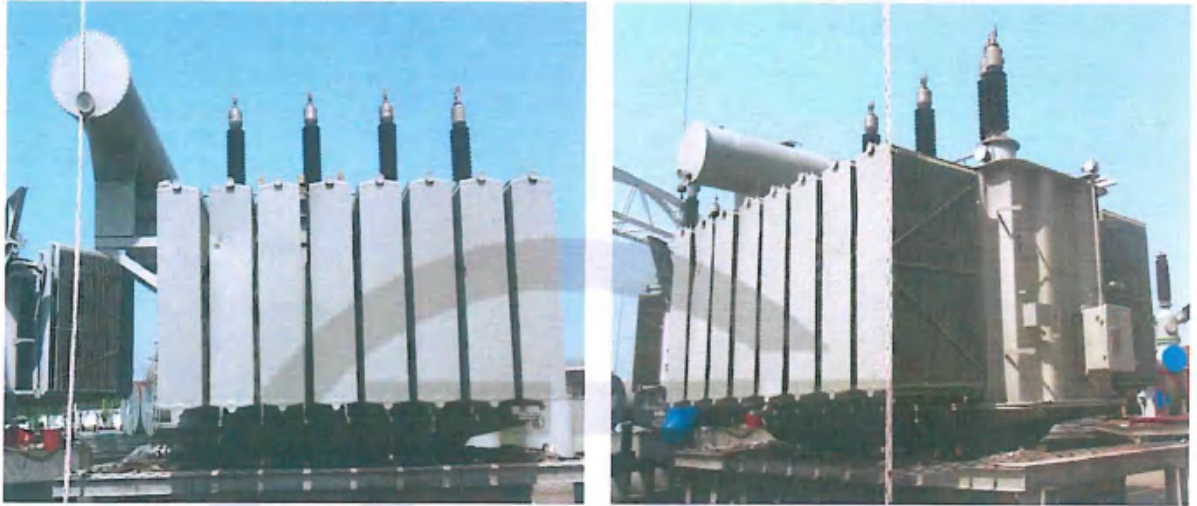
Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 02									
<p>1. Sample parameters</p> <p>Rated power: 63000kVA Rated voltage: 110/10.5kV Rated current: 330.7/3464.2A Rated frequency: 50Hz Number of phases: 3 Tapping ranges: (110±8×1.25%)/10.5kV Connection symbol: YNd11 Cooling method: ONAN Class of insulation and heat-resistant: /</p> <table data-bbox="304 757 1171 869"> <tr> <td>Insulation level: HV</td> <td>Um/LI/LIC/AC</td> <td>126/480/530/200kV</td> </tr> <tr> <td>HVN</td> <td>Um/LI/AC</td> <td>72.5/325/140kV</td> </tr> <tr> <td>LV</td> <td>Um/LI/LIC/AC</td> <td>12/75/85/35kV</td> </tr> </table> <p>2. Test standards</p> <p>GB/T 1094.1—2013 <i>Power transformers—Part 1: General</i> GB/T 1094.2—2013 <i>Power transformers—Part 2: Temperature rise for liquid-immersed transformers</i> GB/T 1094.3—2017 <i>Power transformers—Part 3: Insulation levels, dielectric tests and external clearances in air</i> GB/T 1094.5—2008 <i>Power transformers—Part 5: Ability to withstand short circuit</i> GB/T 1094.10—2003 <i>Power transformers—Part 10: Determination of sound levels</i> GB/T 6451—2015 <i>Technical parameters and requirements of oil-immersed power transformer</i> GB/T 7595—2017 <i>Quality of transformer oils in service</i> JB/T 10088—2016 <i>Sound level for 6kV~1000kV power transformers</i> IEC 60076-1:2011 <i>Power transformers – Part 1: General</i> IEC 60076-2:2011 <i>Power transformers – Part 2: Temperature rise for liquid – immersed transformers</i> IEC 60076-3:2013+AMD1:2018 <i>Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air</i> IEC 60076-5:2006 <i>Power transformers – Part 5: Ability to withstand short circuit</i> IEC 60076-10:2016 <i>Power transformers – Part 10: Determination of sound levels</i> Commission requirements</p> <p>3. Sample description</p> <p>The power transformer is for outdoor use, and the structure of the coil is rotundate concentric type coil. The type used in this report meets the requirements of JB/T 3837—2016 <i>Identification method of transformer's product type</i> and external photos of the sample have been attached.</p>			Insulation level: HV	Um/LI/LIC/AC	126/480/530/200kV	HVN	Um/LI/AC	72.5/325/140kV	LV	Um/LI/LIC/AC	12/75/85/35kV
Insulation level: HV	Um/LI/LIC/AC	126/480/530/200kV									
HVN	Um/LI/AC	72.5/325/140kV									
LV	Um/LI/LIC/AC	12/75/85/35kV									

Test Report

China National Center for Quality Supervision and
Test of Electrical Apparatus Products

No: 20M0561-S
Total 68 Page 03

Photos of the sample



Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 04	
Summary of test results					
No	Test items	Specified value	Measured value		Concl- usion
		Standards (commission requirements)	Before short-circuit test	After short-circuit test	
1	Measurement of d.c. insulation resistance windings-to-earth and between windings (routine test)	Providing value of insulation resistance Providing absorption ratio Providing polarity index	See 4.1	See 4.19.4.1	/
2	Check of core and frame insulation for liquid-immersed transformers with core or frame insulation (routine test)	Providing value of insulation resistance 20°C(MΩ): ≥500	See 4.2	See 4.19.4.2	PASS
3	Measurement of dissipation factor (tanδ) of the insulation system capacitances (routine test)	Providing value of capacitance Providing dielectric dissipation factor tanδ	See 4.3	See 4.19.4.3	/
4	Determination of capacitances windings-to-earth and between windings (routine test)	Providing value of capacitance	See 4.4	See 4.19.4.4	/
5	Measurement of bushing capacitances and dielectric dissipation factor (tanδ) (commission test)	Providing value of capacitance Providing dielectric dissipation factor tanδ	See 4.5	See 4.19.4.5	/
6	Check the ratio and polarity of built-in current transformers (routine test)	Providing the value of ratio and polarity relation	See 4.6	See 4.19.4.6	/
7	Insulation test of auxiliary wiring (routine test)	Wring for auxiliary power and control circuit: 2.0kV 60s Wring for secondary winding of current transformer: 2.5kV 60s	2.0kV 60s 2.5kV 60s	2.0kV 60s 2.5kV 60s	PASS
8	Measurement of voltage ratio and check of phase displacement (routine test)	Voltage ratio tolerance of principal tapping: obtaining the lower of the following values between ±0.5% of declared ratio and ±1/10 of the actual percentage impedance Connection symbol: YNd11	See 4.8	See 4.19.4.8	PASS
9	Measurement of winding resistance (routine test)	Maximum resistance unbalance rate Phase resistance: ≤2% Line resistance: ≤1%	HV (phase):0.33% LV (line):0.36%	HV (phase): 0.31% LV (line):0.39%	PASS

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products				№: 20M0561-S Total 68 Page 05			
No	Test items	Specified value		Measured value				Concl- usion	
		Standards (commission requirements)		Before short-circuit test		After short-circuit test			
10	Measurement of no-load loss and current (routine test)	100% Ur	I ₀ (%): 0.2 +0% P ₀ (kW): 44.800 +0%	0.15 43.691	0.15 43.695			/	
		90% Ur	I ₀ (%): measured P ₀ (kW): measured	0.12 35.394	0.12 35.390				
		110% Ur	I ₀ (%): measured P ₀ (kW): measured	0.50 69.367	0.50 69.343				
11	Measurement of short-circuit impedance and load loss (routine test)	t: 75°C Z(%): 17.0 ±5% P _k (kW): 232.000 +0% P _{total} (kW): 276.800 +0%		16.92 215.380 259.071	16.94 215.330 259.025			PASS	
12	Tests on on-load tap-changers (routine test)	According to clause 11.7 of GB/T1094.1-2013 and IEC60076-1:2011		Meet the requirements		Meet the requirements		PASS	
13	Lightning impulse test (routine test, type test)	HV :		/		478.02~482.82		/	
		Full wave (kV): 480 ±3% Chopped wave (kV):530 ±3% Neutral point (kV):325 ±3%				530.72~533.28 324.47~325.93			
		LV:		/		74.96~76.12		/	
		Full wave (kV): 75 ±3% Chopped wave (kV):85 ±3%				84.36~86.82			
14	Separate-source AC withstand voltage test (routine test)	HV neutral point:140kV 60s LV: 35kV 60s		140.0kV 60s 35.0kV 60s	140.0kV 60s 35.0kV 60s			PASS	
15	Line terminal AC withstand test (routine test)	Phase to earth test							/
		Applied voltage (kV):	ac:	ab:	bc:	ac:	ab:	bc:	
		Induced voltage (kV): 200	A:	B:	C:	A:	B:	C:	
		Duration (s): 120(f _n /f) Frequency (Hz): >50	30 200			30 200			

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 06	
No	Test items	Specified value	Measured value		Concl- usion
		Standards (commission requirements)	Before short-circuit test	After short-circuit test	
16	Induced AC withstand voltage test and induced AC withstand voltage test with partial discharge measurement (routine test)	Three-phase applied voltage			PASS
		0.4U _r /√3 (kV)	25.4	25.4	
		Discharge magnitude≤50pC	A:<14;B:<15;C:<17	A:<16;B:<17;C:<18	
		1.2U _r /√3 (kV)	76.2	76.2	
		Duration (min): 1	1	1	
		Discharge magnitude≤100pC	A:<45;B:<50;C:<50	A:<47;B:<40;C:<45	
		1.58U _r /√3 (kV)	100.3	100.3	
		Duration (min): 5	5	5	
		Discharge magnitude≤250pC	A:<87;B:<92;C:<85	A:<85;B:<87;C:<89	
		2.0U _r /√3 (kV)	127.1	127.1	
		Duration (min): 0.5	0.5	0.5	
		1.58U _r /√3 (kV)	100.3	100.3	
		Duration (min): 60	60	60	
Discharge magnitude≤250pC	A:<90;B:<97;C:<92	A:<85;B:<87;C:<88			
1.2U _r /√3 (kV)	76.2	76.2			
Duration (min): 1	1	1			
Discharge magnitude≤100pC	A:<44;B:<48;C:<50	A:<45;B:<42;C:<42			
0.4U _r /√3 (kV)	25.4	25.4			
Discharge magnitude≤50pC	A:<15;B:<17;C:<16	A:<15;B:<15;C:<17			
Frequency (Hz): >50	200				
17	Insulating liquid test, measurement of dissolved gasses in dielectric liquid from each separate oil compartment except diverter switch compartment (routine test)	Breakdown voltage (kV): ≥45	61.0	58.1	
		tanδ(90°C): ≤1.0%	0.23%	0.36%	
		Water content (mg/L): ≤20	8.9	9.8	
	Providing gas chromatograph analysis: Hydrogen: <30μL /L Acetylene: 0 Total hydrocarbon: <20μL /L	See 4.17	See 4.19.4.17	PASS	
18	Measurement of frequency response (special test)	Providing frequency response characteristics curve	See 4.18	See 4.19.4.18	PASS

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 07	
No	Test items	Specified value		Measured value	Concl- usion
		Standards (commission requirements)			
19	Short-circuit withstand test (special test)	Test times of each phase: 3 times Duration (s): $0.25 \pm 10\%$ The test oscillogram shall be normal. The reactance tolerance of phase before and after the test is not more than 2% The out-of-tank inspection does not reveal any obvious defects. Routine retests shall be passed after short-circuit test.		3 times $0.257 \sim 0.257$ Without abnormality The maximum reactance tolerance of phase is 0.67% Without obvious abnormality Routine retests are passed.	PASS
20	Measurement of no-load excitation characteristics (commission test)	Providing no-load excitation characteristic curve		See 4.20	/
21	Long-duration no-load test (commission test)	Applied voltage (kV): $1.1U_r$ Duration (h): 12 Oil without acetylene		$1.1U_r$ 12 For gas chromatograph analysis, see 4.19.4.17	PASS
22	Measurement of short-circuit impedance on LV (commission test)	Measurement of short-circuit impedance at 380V voltage		See 4.22	/
23	Measurement of zero-sequence impedances on three-phase transformers (special test)	Providing zero-sequence impedances values (Ω)		See 4.23	/
24	Measurement of the harmonics of the no-load current (commission test)	Providing harmonics of the no-load current of each phase		Harmonics of the no-load current of I_1-I_{19}	/
25	Temperature-rise test (including calculation of the winding hot-spot temperature-rise) (type test)	Top oil temperature-rise limits (K): 53 Winding temperature-rise limits (K): 60 Winding hot-spot temperature-rise limits (K): 78 Hot-spot temperature-rise limits of tank and metal structural parts (K): 75		Top oil temperature-rise: 48.8 HV winding temperature-rise: 54.9 LV winding temperature-rise: 55.9 HV winding hot-spot temperature-rise: 69.8 LV winding hot-spot temperature-rise: 71.0 39.3	PASS

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 08	
No	Test items	Specified value		Measured value	Conclusion
		Standards (commission requirements)			
26	Leak testing with pressure for liquid-immersed transformers (routine test)	Body: Applied pressure (kPa): 30 Duration (h): 24 No oil leakage or damage		30.0 24 No oil leakage or damage	PASS
		On-load tap-changer tank: Applied pressure (kPa): 30 Duration (h): 24 No oil leakage or damage		30.0 24 No oil leakage or damage	
27	Determination of sound levels (type test)	Sound pressure level \overline{L}_{pA} dB (A): Sound power level L_{WA} dB(A): ≤ 80		54 74	PASS
28	Mechanical strength test of tank (type test)	Applied degree of vacuum (kPa): 0.133 Applied positive pressure (kPa): 100 Elastic deformation of tank wall (strengthen) (mm): ≤ 32 Elastic deformation of tank wall (mm): ≤ 40 Elastic deformation of tank cover (mm): ≤ 18 Permanent deformation of tank wall (strengthen) (mm): ≤ 16 Permanent deformation of tank wall (mm): ≤ 20 Permanent deformation of tank cover (mm): ≤ 10 No damage		See 4.28	PASS
Blank below					

Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 09	
4. Test items and results					
4.1 Measurement of d.c. insulation resistance windings-to-earth and between windings (routine test) Test date: Apr. 09, 2020 Relative humidity: 46%; Oil temperature: 18.9°C					
Measured parts	R_{15} (GΩ)	R_{60} (GΩ)	R_{600} (GΩ)	Absorption ratio (R_{60}/R_{15})	Polarity index (R_{600}/R_{60})
HV—LV and earth	30.6	40.1	55.9	1.31	1.39
LV—HV and earth	25.3	35.9	53.8	1.42	1.50
HV, LV—earth	15.8	21.6	30.6	1.37	1.42
HV—LV	39.6	51.8	78.8	1.31	1.52
4.2 Check of core and frame insulation for liquid-immersed transformers with core or frame insulation (routine test) Test date: Apr. 09, 2020 Relative humidity: 46%; Oil temperature: 18.9°C					
Measured parts	Measured insulation resistance (GΩ)		Insulation resistance corrected to 20°C(GΩ)		
Core—earth	12.5		12.0		
Frame—earth	14.3		13.7		
Core—frame	11.3		10.8		
4.3 Measurement of dissipation factor ($\tan\delta$) of the insulation system capacitances (routine test) Test date: Apr. 09, 2020 Relative humidity: 46%; Oil temperature: 18.9°C					
Measured parts	Dielectric dissipation factor $\tan\delta$ (%)		Capacitance (pF)		
HV—LV and earth	0.35		11000		
LV—HV and earth	0.33		17750		
HV, LV—earth	0.38		19330		
HV—LV	0.34		14520		
4.4 Determination of capacitances windings-to-earth and between windings (routine test) Test date: Apr. 09, 2020 See 4.3					

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 10	
4.5 Measurement of bushing capacitances and dielectric dissipation factor ($\tan\delta$)(commission test) Test date: Apr. 09, 2020 Relative humidity: 46%; Oil temperature: 18.9°C						
Measured contents	Applied voltage	Measured parts				
		A	B	C	O	
$\tan\delta(\%)$	10kV	0.36	0.35	0.33	0.34	
Measured capacitance (pF)		298.5	298.5	297.6	349.3	
4.6 Check the ratio and polarity of built-in current transformers (routine test) Test date: Apr. 09, 2020 Relative humidity: 46%; Oil temperature: 18.9°C						
Measured winding	A	B	C	O		
	P1-P2	P1-P2	P1-P2	P1-P2		
Ratio	40.12	40.06	39.95	39.98		
polarity	-	-	-	-		
4.7 Insulation test of auxiliary wiring (routine test) Test date: Apr. 09, 2020 Relative humidity: 46%; Ambient temperature: 19.3°C; Oil temperature: 18.9°C; Air pressure: 102kPa						
Parts of applied voltage		Test voltage (kV)	Test duration (s)	Result		
Wring for auxiliary power and control circuit	On-load tapping power	2.0	60	PASS		
	A	2.5	60	PASS		
Wring for secondary winding of current transformer	B	2.5	60			
	C	2.5	60			
	O	2.5	60			

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products				№: 20M0561-S Total 68 Page 11		
4.8 Measurement of voltage ratio and check of phase displacement (routine test)								Test date: Apr. 09, 2020
HV winding		LV winding		Transformer ratio by calculation	Measured voltage ratio tolerance (%)			Connection symbol
Tapping position	Voltage (kV)	Tapping position	Voltage (kV)		AB/ab	BC/bc	CA/ca	
1	121.000	/	10.5	11.524	0.08	0.11	0.12	YNd11
2	119.625			11.393	0.14	0.07	0.03	
3	118.250			11.262	0.10	-0.03	0.16	
4	116.875			11.131	0.01	-0.05	-0.13	
5	115.500			11.000	-0.10	-0.11	-0.10	
6	114.125			10.869	-0.04	-0.06	-0.02	
7	112.750			10.738	0.10	0.05	0.06	
8	111.375			10.607	0.08	0.09	-0.03	
9b	110.000			10.476	0.12	0.10	0.07	
10	108.625			10.345	0.06	0.09	0.08	
11	107.250			10.214	0.03	0.04	0.14	
12	105.875			10.083	-0.10	0.14	0.08	
13	104.500			9.952	-0.08	-0.10	-0.11	
14	103.125			9.821	-0.08	-0.11	-0.08	
15	101.750			9.690	0.07	0.10	0.11	
16	100.375			9.560	0.12	0.12	0.12	
17	99.000			9.429	0.06	-0.11	0.08	

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 12	
4.9 Measurement of winding resistance (routine test)				Test date: Apr. 10, 2020 Oil temperature: 18.8°C		
Winding	Tapping position	Measured values (Ω)			Resistance unbalance rate (%)	
		A~O a~b	B~O b~c	C~O c~a		
HV	1	0.32172	0.32157	0.32201	0.28	
	2	0.31617	0.31672	0.31721	0.33	
	3	0.31178	0.31201	0.31255	0.25	
	4	0.30663	0.30690	0.30721	0.19	
	5	0.30214	0.30256	0.30284	0.23	
	6	0.29841	0.29869	0.29901	0.20	
	7	0.29261	0.29302	0.29317	0.19	
	8	0.28989	0.29007	0.29068	0.27	
	9b	0.28131	0.28163	0.28195	0.23	
	10	0.28793	0.28827	0.28856	0.22	
	11	0.29283	0.29310	0.29337	0.18	
	12	0.29782	0.29805	0.29832	0.17	
	13	0.30276	0.30290	0.30331	0.18	
	14	0.30697	0.30724	0.30757	0.20	
	15	0.31127	0.31152	0.31178	0.16	
	16	0.31558	0.31582	0.31609	0.16	
	17	0.32049	0.32070	0.32112	0.20	
LV	/	3.5195×10^{-3}	3.5227×10^{-3}	3.5324×10^{-3}	0.36	

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products				№: 20M0561-S Total 68 Page 13		
4.10 Measurement of no-load loss and current (routine test)					Test date: Apr. 10, 2020			
Applied voltage	r.m.s. voltage (kV)		No-load current		No-load loss (kW)			
	Average voltmeter reading	r.m.s. voltmeter reading	(A)	(%)	Measured values	Corrected value		
100%Ur	10.506	10.513	5.14	0.15	43.719	43.691		
90%Ur	9.456	9.459	4.03	0.12	35.408	35.394		
110%Ur	11.552	11.564	17.16	0.50	69.440	69.367		
Remarks: the difference between r.m.s voltmeter reading and average voltmeter reading is within 3%.								
4.11 Measurement of short-circuit impedance and load loss (routine test)					Test date: Apr. 10, 2020 Oil temperature: 18.8°C			
Winding	Tapping position	Applied current I		Measured voltage (kV)	Short-circuit impedance (for each phase)		Load loss (kW)	Total loss (kW)
		(A)	I/I _r (%)		HV impedance (Ω)	(%)	Corrected value	Corrected value
					t=75°C I=I _r	t=75°C I=I _r	t=75°C I=I _r	t=75°C I=I _r
HV LV	1	163.60	54.42	11.276	39.80	17.12	208.019	251.710
	9b	191.36	57.87	10.768	32.49	16.92	215.380	259.071
	17	206.41	56.18	9.255	25.89	16.64	248.905	292.596
4.12 Tests on on-load tap-changers (routine test)					Test date: Apr. 10, 2020			
Operation tests:								
a. with the transformer de-energized, eight complete cycles of operation (a cycle of operation goes from one end of the tapping range to the other, and back again);								
b. with the transformer de-energized, and with the auxiliary voltage reduced to 85 % of its rated value, one complete cycle of operation;								
c. with the transformer energized at rated voltage and frequency at no load, one complete cycle of operation;								
d. with one winding short-circuited and, as far as practicable, rated current in the tapped winding, 10 cycles of tap-change operations across the range of two steps on each side from where a coarse or reversing changeover selector operates, or otherwise from the middle tapping (the tapchanger will pass 20 times through the changeover position).								
Test result: PASS								

Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 14						
<p>4.13 Lightning impulse test (routine test) The test is not applied before the short-circuit withstand test.</p>								
<p>4.14 Separate-source AC withstand voltage test (routine test) Test date: Apr. 10, 2020 Relative humidity: 54%; Ambient temperature: 19.1℃; Oil temperature: 18.8℃; Air pressure: 102kPa</p>								
Parts of applied voltage		Test voltage (kV)		Test duration (s)		Result		
HV neutral point—LV and earth		140.0		60		PASS		
LV—HV and earth		35.0		60				
<p>4.15 Line terminal AC withstand test (routine test) Test date: Apr. 10, 2020 Relative humidity: 54%; Ambient temperature: 19.1℃; Oil temperature: 18.8℃; Air pressure: 102kPa Phase to earth test</p>								
Parts of applied voltage	Tapping position	Applied voltage (kV)		Induced voltage (kV)		Frequency (Hz)	Test duration (s)	Result
		LV		HV				
a-c	5	21.0	A	200.0	200	30	PASS	
a-b		21.0	B	200.0				
b-c		21.0	C	200.0				

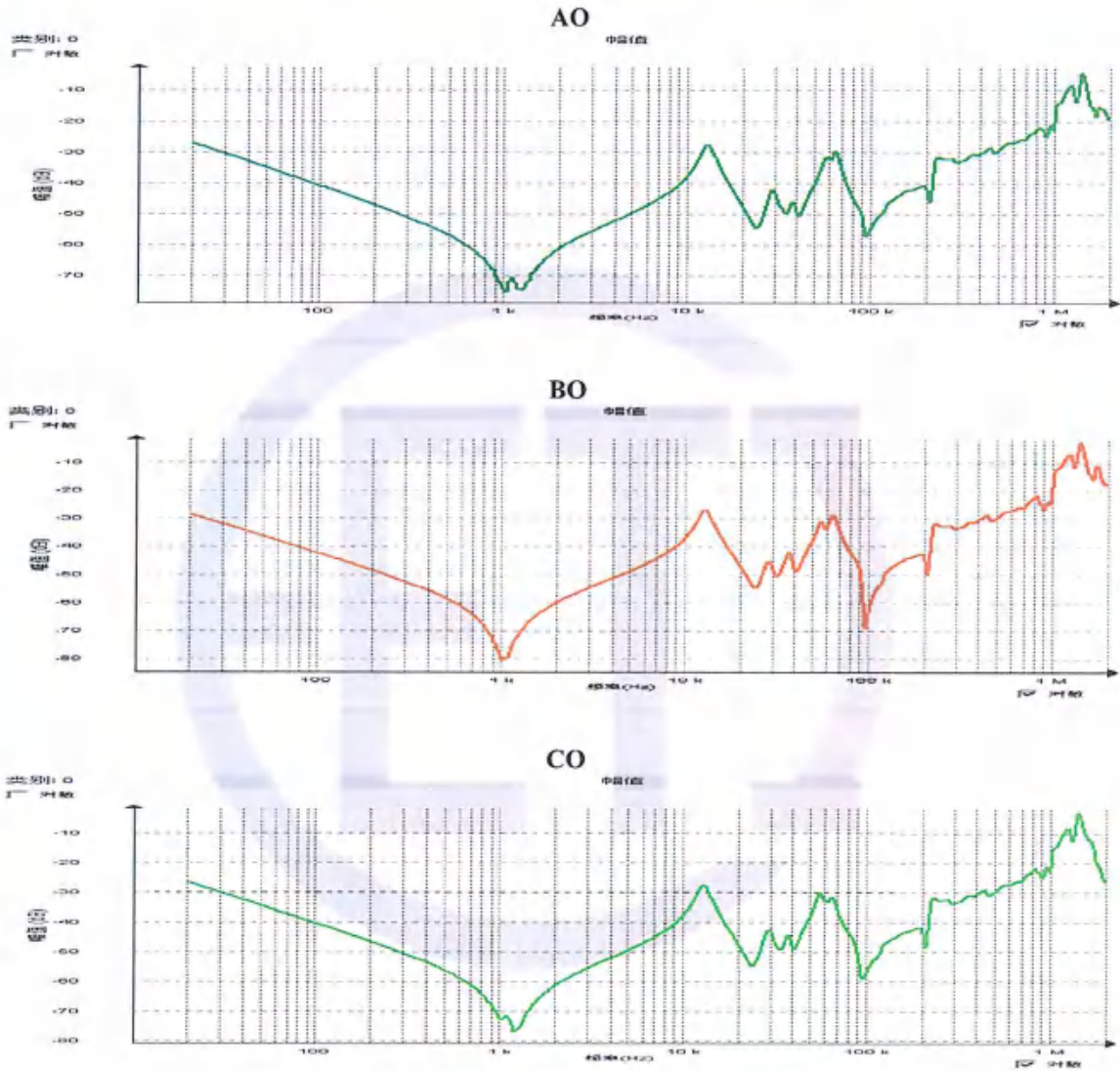
Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 15	
4.16 Induced AC withstand voltage test and induced AC withstand voltage test with partial discharge measurement (routine test) Test date: Apr. 10, 2020					
Relative humidity: 54%; Ambient temperature: 19.1°C; Oil temperature: 18.8°C; Air pressure: 102kPa					
HV tapping position is 9b, frequency is 200Hz.					
Applied voltage		Duration (min)	Partial discharge magnitude (pC)		
Multiple	Phase to earth voltage (kV)		A	B	C
$0.4U_r/\sqrt{3}$	25.4	/	<14	<15	<17
$1.2U_r/\sqrt{3}$	76.2	1	<45	<50	<50
$1.58U_r/\sqrt{3}$	100.3	5	<87	<92	<85
$2.0U_r/\sqrt{3}$	127.1	0.5	/	/	/
$1.58U_r/\sqrt{3}$	100.3	5	<89	<95	<88
		10	<85	<95	<88
		15	<88	<93	<90
		20	<90	<95	<90
		25	<90	<90	<92
		30	<88	<90	<90
		35	<85	<95	<88
		40	<85	<97	<85
		45	<88	<97	<87
		50	<90	<95	<87
		55	<87	<95	<85
60	<90	<90	<85		
$1.2U_r/\sqrt{3}$	76.2	1	<44	<48	<50
$0.4U_r/\sqrt{3}$	25.4	/	<15	<17	<16
Remarks: $U_r=110kV$.					

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products				№: 20M0561-S Total 68 Page 16	
4.17 Insulating liquid test, measurement of dissolved gasses in dielectric liquid from each separate oil compartment except diverter switch compartment (routine test)							
Test date: Apr. 09, 2020 Relative humidity: 50%; Ambient temperature: 18.5°C							
Dielectric dissipation factor(90°C)		Breakdown voltage (kV)			Water content (mg/L)		
0.23%		61.0			8.9		
Gas chromatograph analysis (before all tests)							Test date: Apr. 09, 2020 μL/L
H ₂	CO	CO ₂	CH ₄	C ₂ H ₆	C ₂ H ₄	C ₂ H ₂	Total hydrocarbon
1.65	10.53	46.78	1.14	0.00	0.00	0.00	1.14
Gas chromatograph analysis (after dielectric test, before short-circuit test)							Test date: Apr. 11, 2020 μL/L
H ₂	CO	CO ₂	CH ₄	C ₂ H ₆	C ₂ H ₄	C ₂ H ₂	Total hydrocarbon
1.97	12.75	63.29	1.31	0.00	0.00	0.00	1.31
Gas chromatograph analysis (after short-circuit test, before dielectric retest)							Test date: Apr. 19, 2020 μL/L
H ₂	CO	CO ₂	CH ₄	C ₂ H ₆	C ₂ H ₄	C ₂ H ₂	Total hydrocarbon
3.56	18.54	113.15	2.46	0.00	0.00	0.00	2.46
Gas chromatograph analysis (after dielectric retest, before long-duration no-load test)							Test date: Apr. 20, 2020 μL/L
H ₂	CO	CO ₂	CH ₄	C ₂ H ₆	C ₂ H ₄	C ₂ H ₂	Total hydrocarbon
3.83	20.37	132.65	2.83	0.00	0.00	0.00	2.83
Gas chromatograph analysis (after long-duration no-load test, before temperature-rise test)							Test date: Apr. 21, 2020 μL/L
H ₂	CO	CO ₂	CH ₄	C ₂ H ₆	C ₂ H ₄	C ₂ H ₂	Total hydrocarbon
3.91	21.48	135.77	2.90	0.00	0.00	0.00	2.90
Gas chromatograph analysis (after temperature-rise test)							Test date: Apr. 22, 2020 μL/L
H ₂	CO	CO ₂	CH ₄	C ₂ H ₆	C ₂ H ₄	C ₂ H ₂	Total hydrocarbon
4.26	23.29	139.46	3.12	0.00	0.00	0.00	3.12

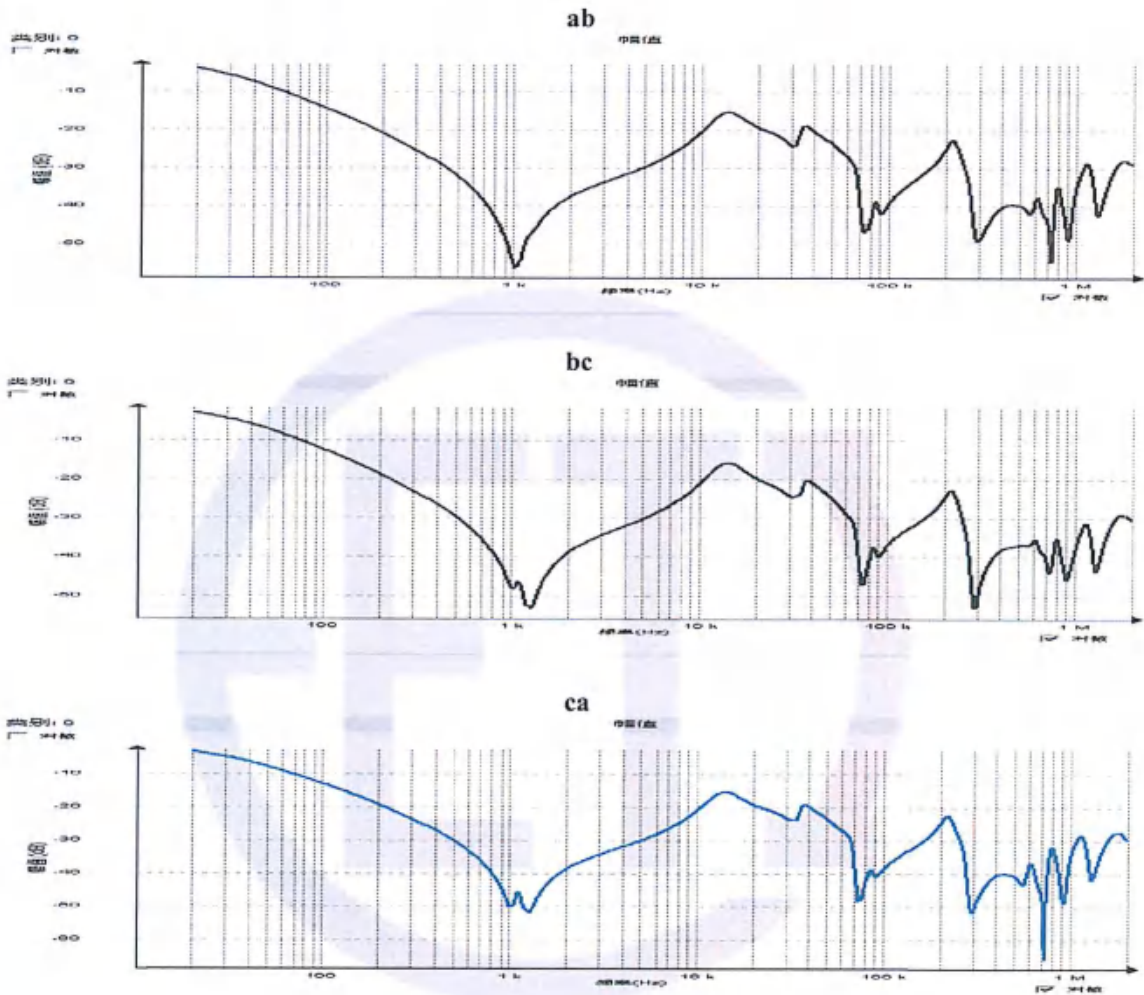
4.18 Measurement of frequency response (special test)

Test date: Apr. 17, 2020

HV winding frequency response curves before short-circuit test



LV winding frequency response curves before short-circuit test



Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 19					
4.19 Short-circuit withstand test (special test)			Test date: Apr. 17, 2020					
<p>Single-phase supply should be used, and test voltage shall be supplied between HV line terminal and the other two line terminals connected together. HV neutral point is earthed, LV is connected by short-circuit and earthed and the test bushing tap is earthed. The test oscillogram shall be normal. For the test oscillogram, see P₂₂₋₃₀. The percentages of peak current and symmetrical current are the ratio of applied current to calculated current</p>								
4.19.1 Current calculation of short-circuit test (reference temperature 75°C)								
Tapping position	Symmetrical current value of phase (A)	Peak current value of phase (A)	Peak coefficient ($K\sqrt{2}$)					
1	1699	4332	2.550					
9b	1877	4786	2.550					
17	2099	5352	2.550					
4.19.2 Current injection of short-circuit test								
Tapping position	Phase of peak current injection	Times	Measurement of current					Oscillogram No
			Symmetrical current value of phase		Peak current value of phase		Duration (s)	
			Measured values (A)	(%)	Measured values (A)	(%)		
1	A-BC	The first test	1622	95.47	4239	97.85	0.257	20M0561-S-T001
		The second test	1668	98.18	4347	100.35	0.257	20M0561-S-T002
		The third test	1650	97.12	4315	99.61	0.257	20M0561-S-T003
		Times	Measurement of reactance					
			Reactance values of phase (Ω)			Reactance variation of phase (%)		
			A	B	C	A	B	C
		Before tests	38.012	38.483	39.271	/	/	/
		The first test	38.051	38.486	39.267	0.10	0.01	-0.01
		The second test	38.107	38.491	39.271	0.25	0.02	0.00
The third test	38.151	38.496	39.276	0.37	0.03	0.01		
The maximum reactance variation of phase is 0.37%.								

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products				№: 20M0561-S Total 68 Page 20			
Tapping position	Phase of peak current injection	Times	Measurement of current					Oscillogram No	
			Symmetrical current value of phase		Peak current value of phase		Duration (s)		
			Measured values (A)	(%)	Measured values (A)	(%)			
9b	B-CA	The first test	1818	96.86	4713	98.47	0.257	20M0561-S-T004	
		The second test	1829	97.44	4752	99.29	0.257	20M0561-S-T005	
		The third test	1844	98.24	4813	100.56	0.257	20M0561-S-T006	
		Times	Measurement of reactance						
			Reactance values of phase (Ω)			Reactance variation of phase (%)			
			A	B	C	A	B	C	
		Before tests	31.212	31.843	31.661	/	/	/	
		The first test	31.332	31.886	31.667	0.38	0.14	0.02	
		The second test	31.335	31.941	31.672	0.39	0.31	0.04	
		The third test	31.340	32.003	31.677	0.41	0.50	0.05	
The maximum reactance variation of phase is 0.50%.									

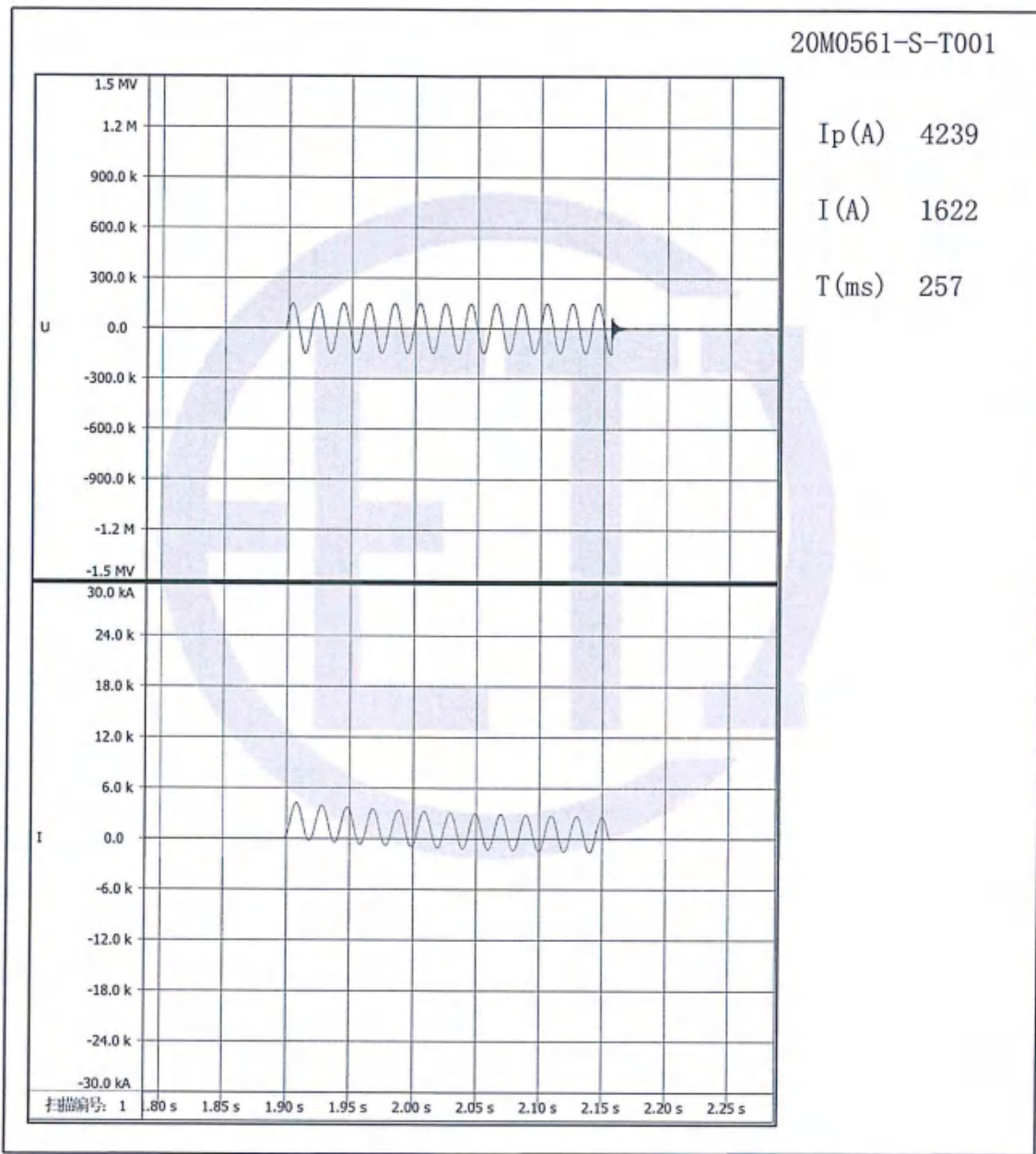
Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products				№: 20M0561-S Total 68 Page 21			
Tapping position	Phase of peak current injection	Times	Measurement of current					Oscillogram No	
			Symmetrical current value of phase		Peak current value of phase		Duration (s)		
			Measured values (A)	(%)	Measured values (A)	(%)			
17	C-AB	The first test	2043	97.33	5328	99.55	0.257	20M0561-S-T007	
		The second test	2019	96.19	5267	98.41	0.257	20M0561-S-T008	
		The third test	2087	99.43	5414	101.16	0.257	20M0561-S-T009	
		Times	Measurement of reactance						
			Reactance values of phase (Ω)			Reactance variation of phase (%)			
			A	B	C	A	B	C	
		Before tests	24.362	25.364	25.270	/	/	/	
		The first test	24.468	25.494	25.349	0.44	0.51	0.31	
		The second test	24.472	25.498	25.399	0.45	0.53	0.51	
		The third test	24.477	25.501	25.440	0.47	0.54	0.67	
The maximum reactance variation of phase is 0.67%.									
4.19.3 The out-of-tank inspection				Test date: Apr. 16, 2020 and Apr. 19, 2020					
The out-of-tank inspection does not reveal any obvious distortion and displacement of coil, lead and supporting structures after the short-circuit test and no traces of discharge are found. For the pictures before and after the short-circuit test, see P ₅₉₋₆₀ .									

Test Report

China National Center for Quality Supervision and
Test of Electrical Apparatus Products

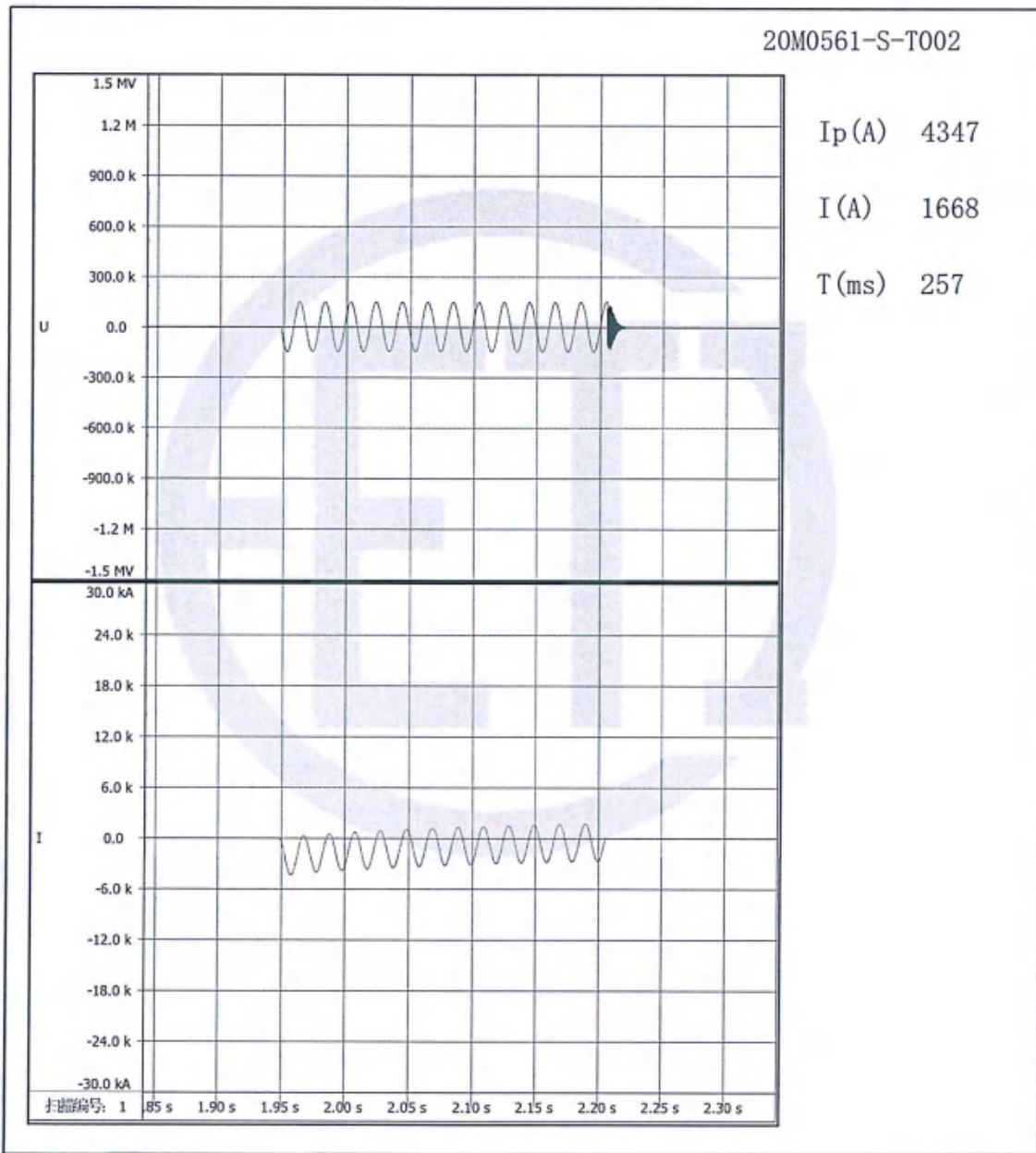
№: 20M0561-S
Total 68 Page 22

Oscillogram



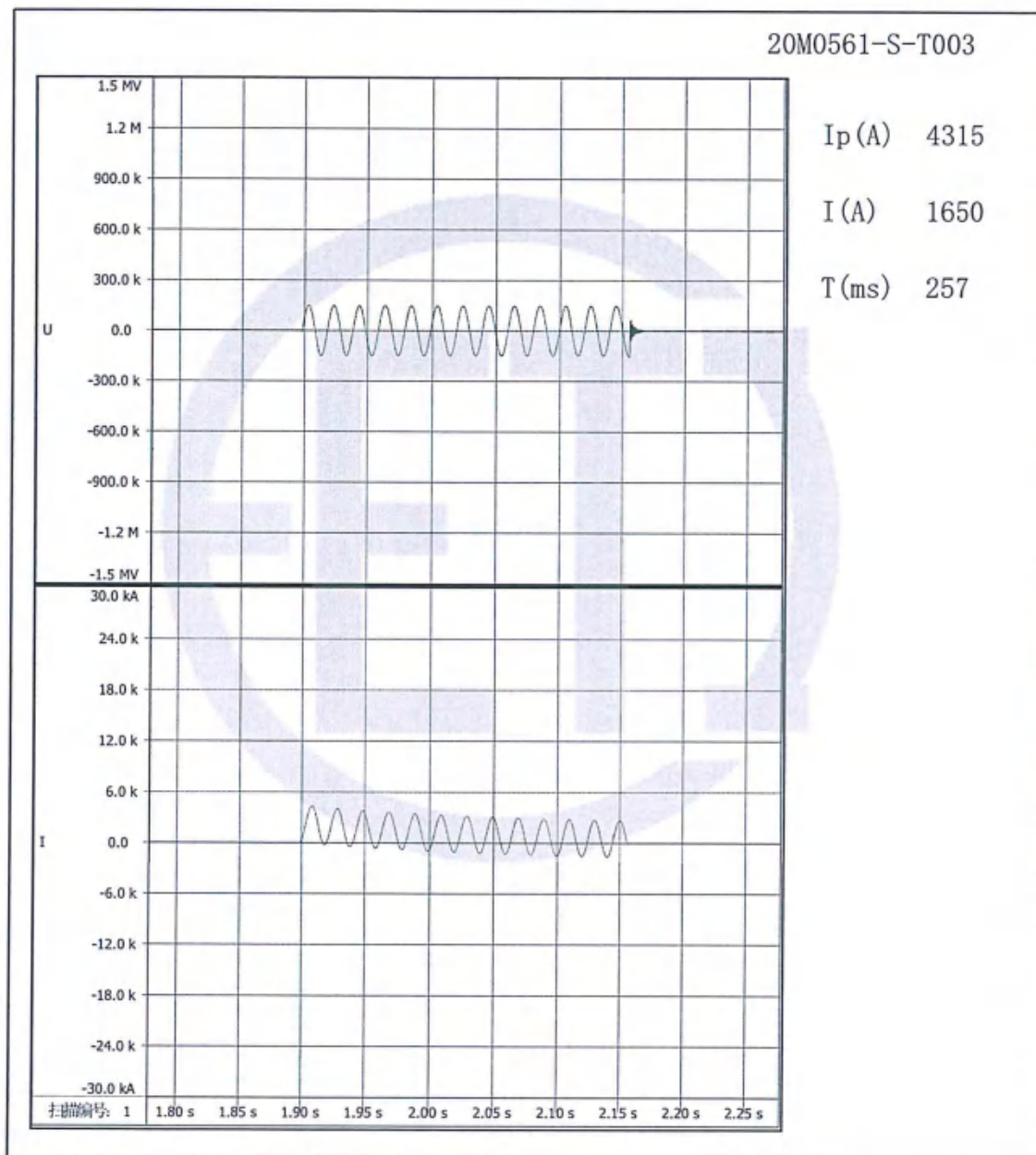
<p>Test Report</p>	<p>China National Center for Quality Supervision and Test of Electrical Apparatus Products</p>	<p>No: 20M0561-S Total 68 Page 23</p>
--------------------	--	---

Oscillogram

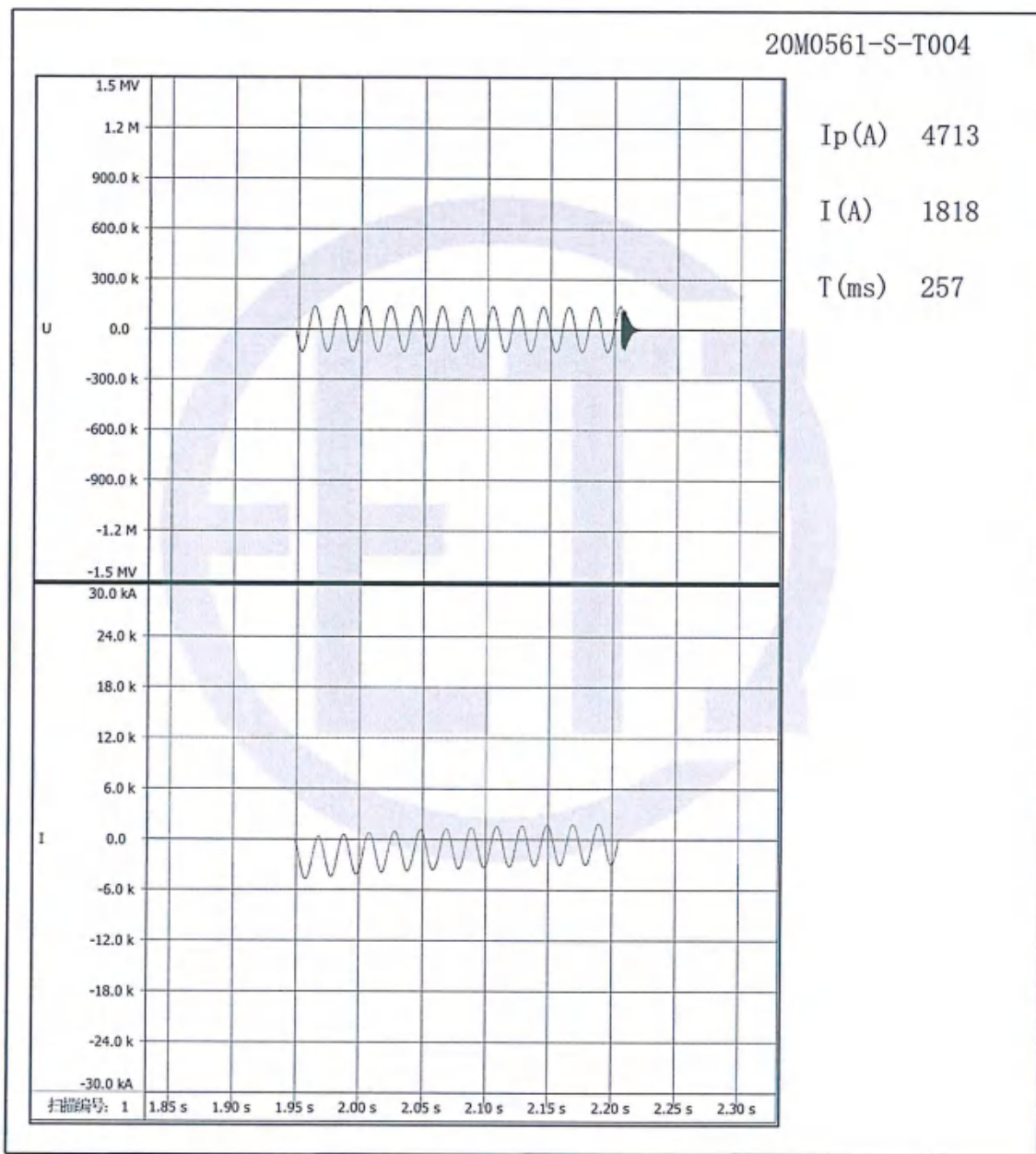


<p>Test Report</p>	<p>China National Center for Quality Supervision and Test of Electrical Apparatus Products</p>	<p>№: 20M0561-S Total 68 Page 24</p>
--------------------	--	--

Oscillogram



Oscillogram

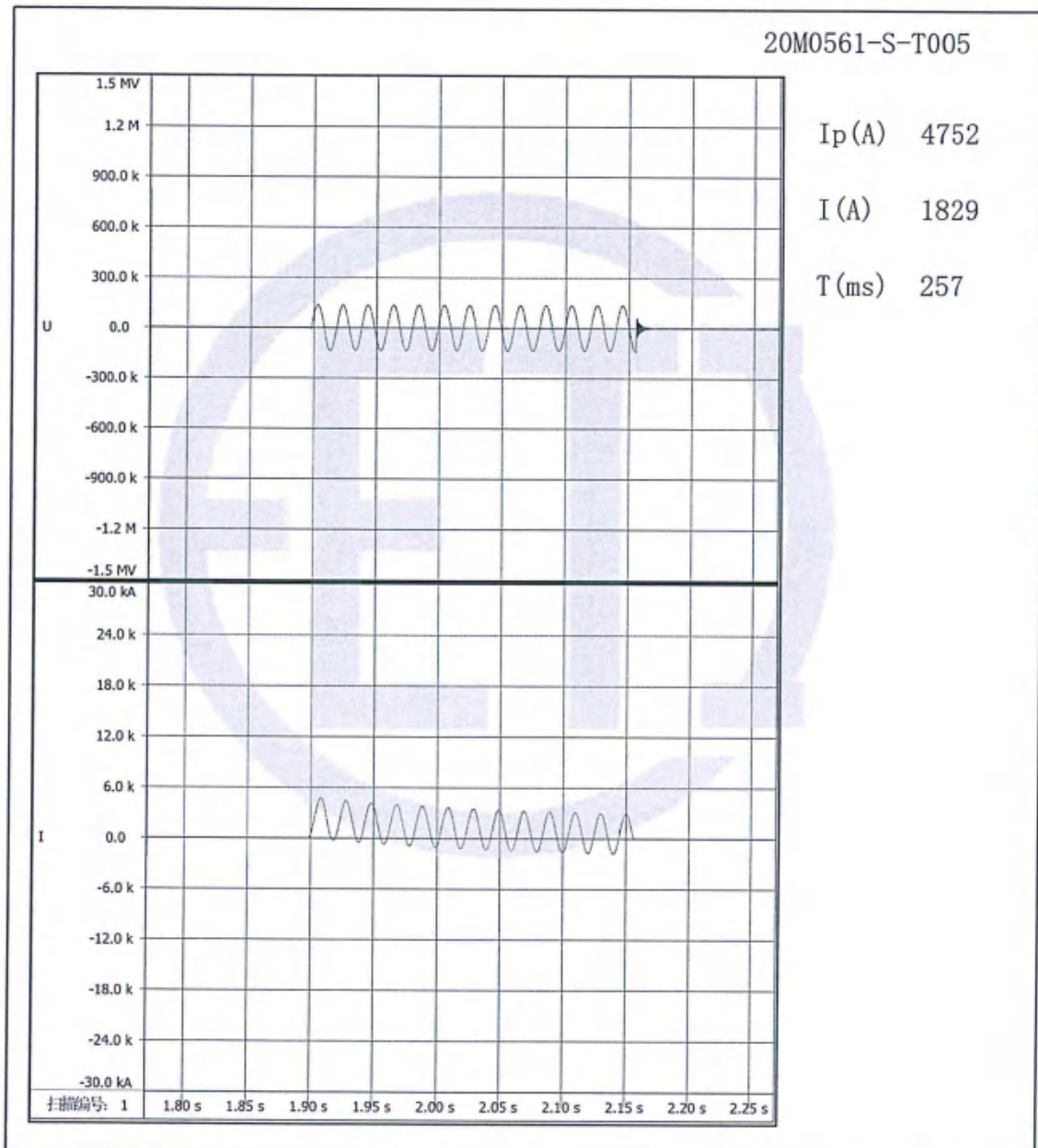


Test Report

China National Center for Quality Supervision and
Test of Electrical Apparatus Products

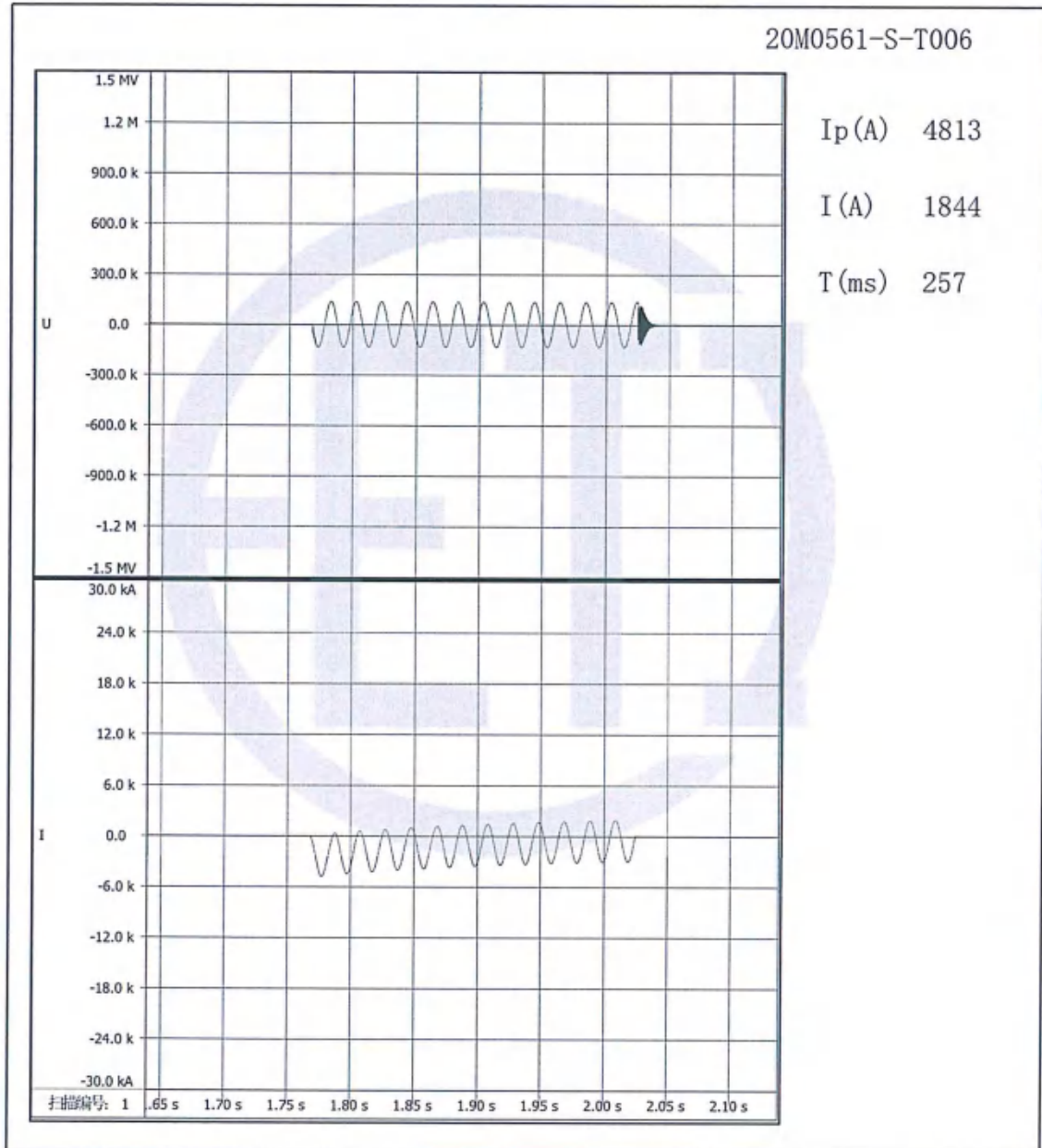
№: 20M0561-S
Total 68 Page 26

Oscillogram



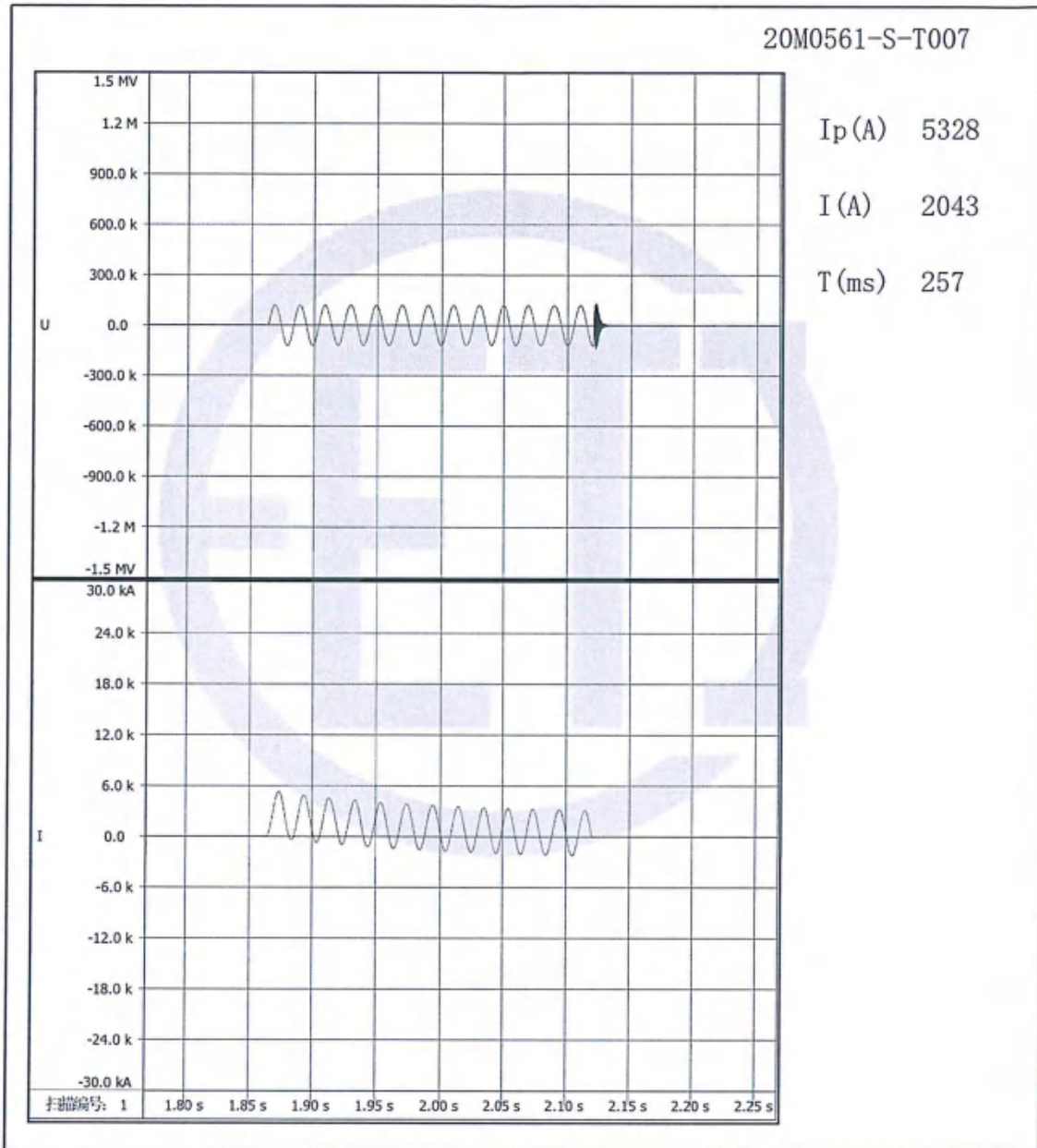
<p>Test Report</p>	<p>China National Center for Quality Supervision and Test of Electrical Apparatus Products</p>	<p>No: 20M0561-S Total 68 Page 27</p>
--------------------	--	---

Oscillogram



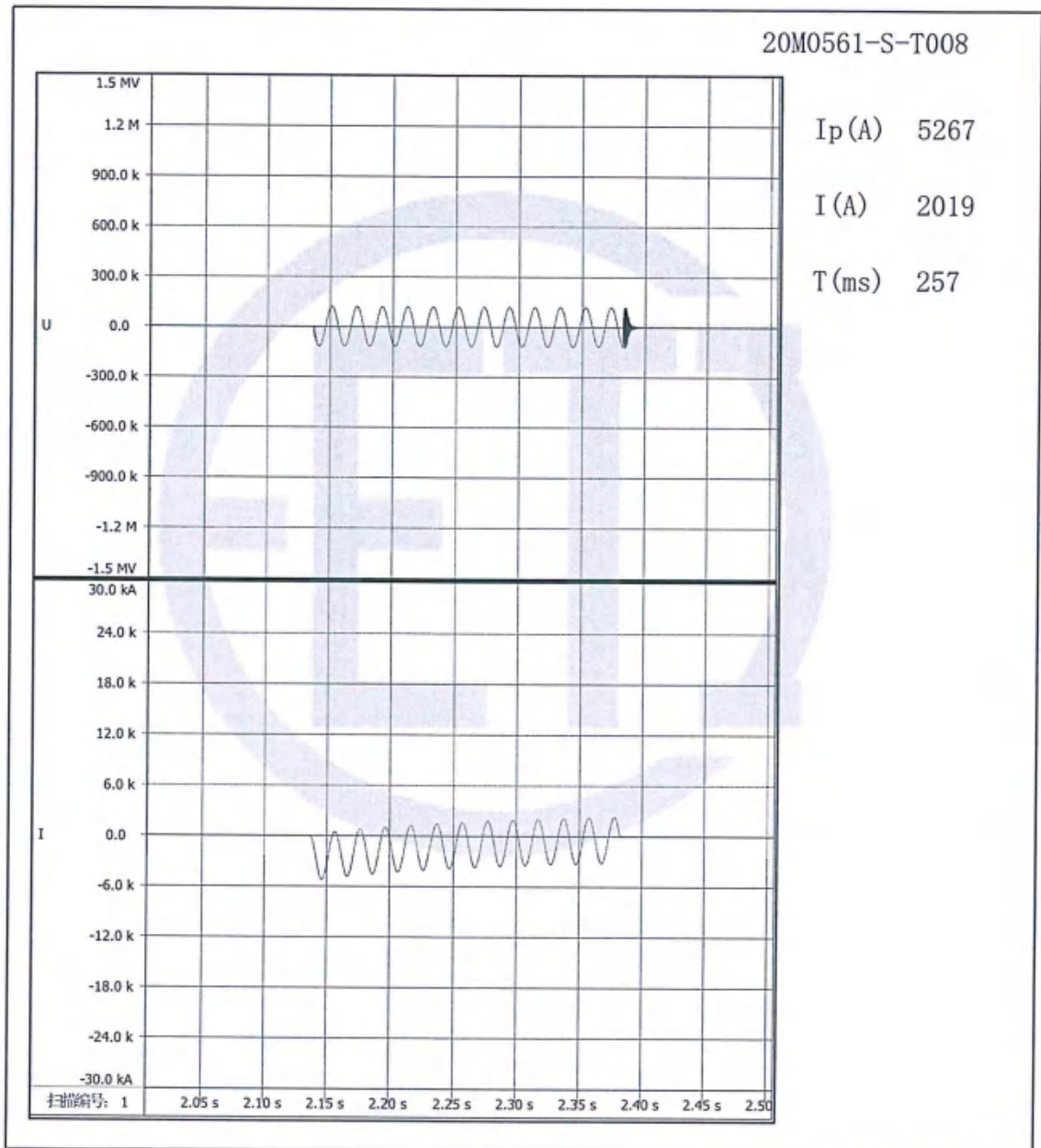
<p>Test Report</p>	<p>China National Center for Quality Supervision and Test of Electrical Apparatus Products</p>	<p>No: 20M0561-S Total 68 Page 28</p>
--------------------	--	---

Oscillogram



<p>Test Report</p>	<p>China National Center for Quality Supervision and Test of Electrical Apparatus Products</p>	<p>No: 20M0561-S Total 68 Page 29</p>
--------------------	--	---

Oscillogram



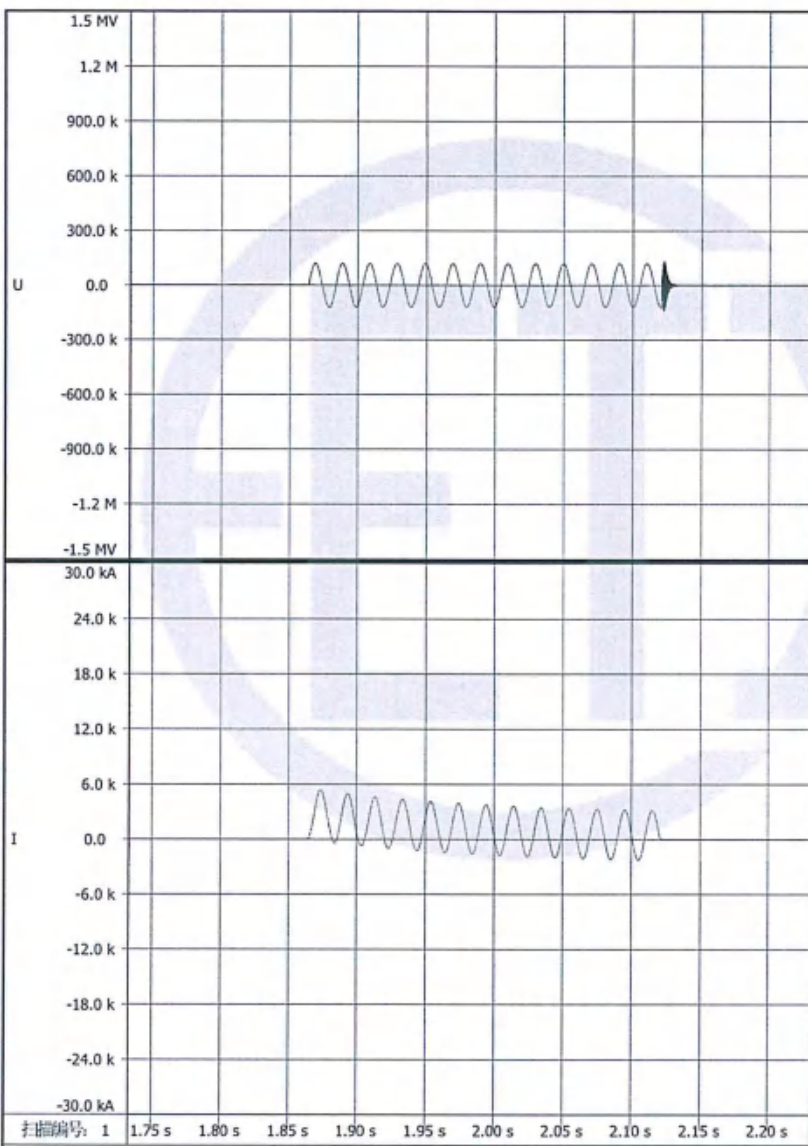
Test Report

China National Center for Quality Supervision and
Test of Electrical Apparatus Products

№: 20M0561-S
Total 68 Page 30

Oscillogram

20M0561-S-T009



I_p (A) 5414

I (A) 2087

T (ms) 257

Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 31	
4.19.4 Routine retests					
4.19.4.1 Measurement of d.c. insulation resistance windings-to-earth and between windings (routine test)					
Test date: Apr. 19, 2020 Relative humidity: 49%; Oil temperature: 21.3°C					
Measured parts	R ₁₅ (GΩ)	R ₆₀ (GΩ)	R ₆₀₀ (GΩ)	Absorption ratio (R ₆₀₀ /R ₁₅)	Polarity index (R ₆₀₀ /R ₆₀)
HV—LV and earth	28.6	38.9	53.2	1.36	1.37
LV—HV and earth	23.4	37.1	55.1	1.58	1.48
HV, LV—earth	13.2	20.5	32.2	1.55	1.57
HV—LV	36.2	48.8	79.5	1.55	1.63
4.19.4.2 Check of core and frame insulation for liquid-immersed transformers with core or frame insulation (routine test)					
Test date: Apr. 19, 2020 Relative humidity: 49%; Oil temperature: 21.3°C					
Measured parts	Measured insulation resistance (GΩ)		Insulation resistance corrected to 20°C (GΩ)		
Core—earth	10.9		11.5		
Frame—earth	13.5		14.2		
Core—frame	10.3		10.9		
4.19.4.3 Measurement of dissipation factor (tanδ) of the insulation system capacitances (routine test)					
Test date: Apr. 19, 2020 Relative humidity: 49%; Oil temperature: 21.3°C					
Measured parts	Dielectric dissipation factor tanδ(%)		Capacitance (pF)		
HV—LV and earth	0.35		11080		
LV—HV and earth	0.33		17730		
HV, LV—earth	0.38		19340		
HV—LV	0.34		14530		
4.19.4.4 Determination of capacitances windings-to-earth and between windings (routine test)					
Test date: Apr. 19, 2020					
See 4.19.4.3					

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 32	
4.19.4.5 Measurement of bushing capacitances and dielectric dissipation factor ($\tan\delta$) (commission test) Test date: Apr. 19, 2020 Relative humidity: 49%; Oil temperature: 21.1 °C						
Measured contents	Applied voltage	Measured parts				
		A	B	C	O	
$\tan\delta(\%)$	10kV	0.34	0.33	0.34	0.34	
Measured capacitance (pF)		298.2	298.4	297.3	350.1	
4.19.4.6 Check the ratio and polarity of built-in current transformers (routine test) Test date: Apr. 19, 2020 Relative humidity: 49%; Oil temperature: 21.1 °C						
Measured winding	A	B	C	O		
	P1-P2	P1-P2	P1-P2	P1-P2		
Ratio	40.17	40.03	39.97	39.96		
polarity	-	-	-	-		
4.19.4.7 Insulation test of auxiliary wiring (routine test) Test date: Apr. 19, 2020 Relative humidity: 48%; Ambient temperature: 20.0 °C; Oil temperature: 20.2 °C; Air pressure: 102kPa						
Parts of applied voltage		Test voltage (kV)	Test duration (s)	Result		
Wring for auxiliary power and control circuit	On-load tapping power	2.0	60	PASS		
	A	2.5	60	PASS		
Wring for secondary winding of current transformer	B	2.5	60	PASS		
	C	2.5	60	PASS		
	O	2.5	60	PASS		

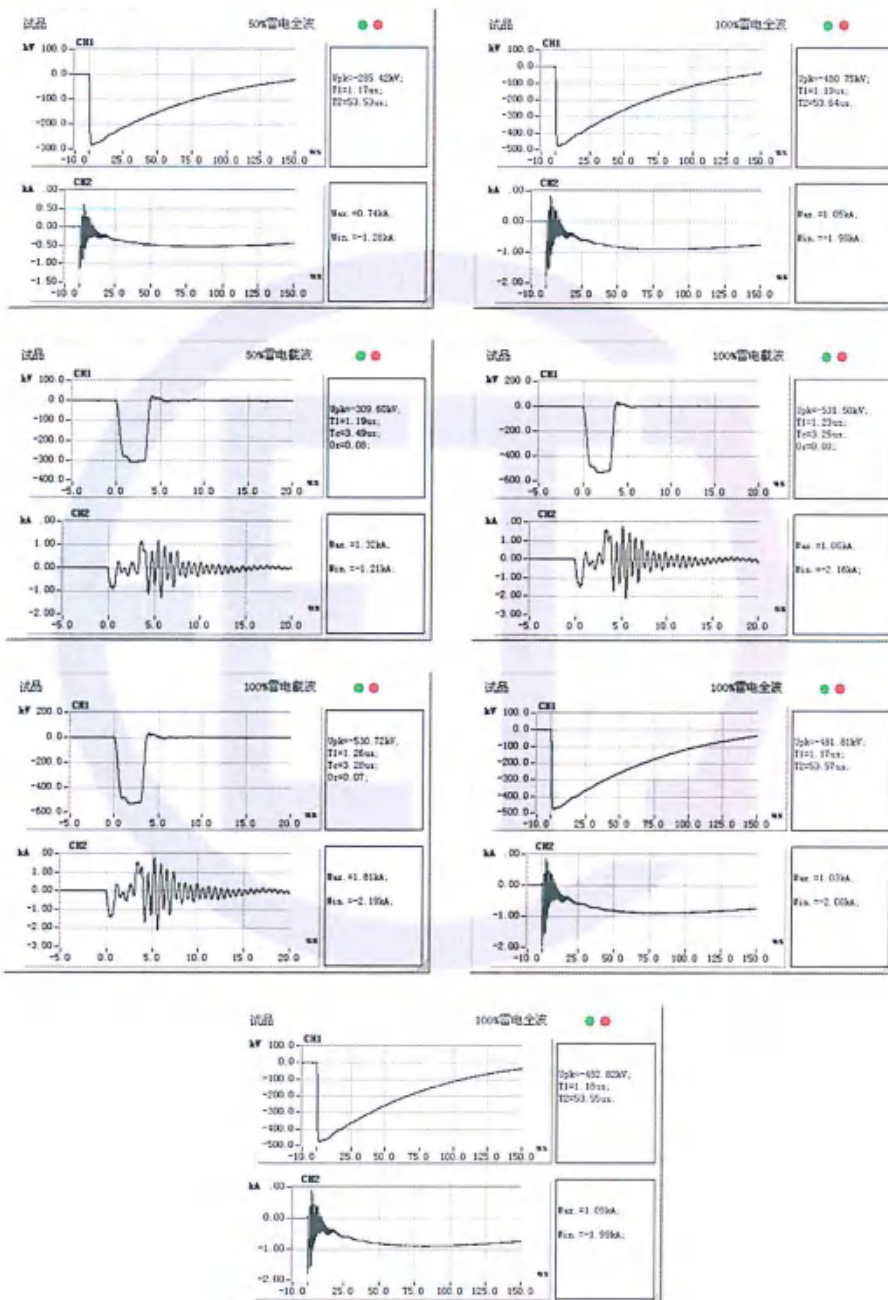
Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 33			
4.19.4.8 Measurement of voltage ratio and check of phase displacement (routine test) Test date: Apr. 19, 2020								
HV winding		LV winding		Transformer ratio by calculation	Measured voltage ratio tolerance (%)			Connection symbol
Tapping position	Voltage (kV)	Tapping position	Voltage (kV)		AB/ab	BC/bc	CA/ca	
1	121.000	/	10.5	11.524	0.18	0.11	0.10	YNd11
2	119.625			11.393	0.07	0.13	0.05	
3	118.250			11.262	0.14	0.06	0.12	
4	116.875			11.131	0.07	0.04	-0.15	
5	115.500			11.000	-0.02	-0.05	-0.10	
6	114.125			10.869	0.05	0.13	-0.02	
7	112.750			10.738	0.06	0.03	0.08	
8	111.375			10.607	0.10	-0.06	-0.03	
9b	110.000			10.476	0.03	0.10	0.07	
10	108.625			10.345	0.06	-0.10	0.08	
11	107.250			10.214	0.01	0.13	0.05	
12	105.875			10.083	-0.10	-0.12	0.12	
13	104.500			9.952	-0.08	-0.10	-0.10	
14	103.125			9.821	-0.06	-0.11	-0.10	
15	101.750			9.690	0.07	0.15	0.11	
16	100.375			9.560	0.17	0.15	0.13	
17	99.000			9.429	0.09	-0.04	0.10	

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 34	
4.19.4.9 Measurement of winding resistance (routine test)				Test date: Apr. 19, 2020 Oil temperature: 19.7°C		
Winding	Tapping position	Measured values (Ω)			Resistance unbalance rate (%)	
		A~O a~b	B~O b~c	C~O c~a		
HV	1	0.32250	0.32284	0.32328	0.24	
	2	0.31752	0.31797	0.31846	0.30	
	3	0.31301	0.31324	0.31378	0.25	
	4	0.30784	0.30811	0.30842	0.19	
	5	0.30344	0.30375	0.30403	0.20	
	6	0.29966	0.29987	0.30019	0.18	
	7	0.29383	0.29417	0.29433	0.17	
	8	0.29093	0.29121	0.29183	0.31	
	9b	0.28247	0.28274	0.28306	0.21	
	10	0.28913	0.28941	0.28970	0.20	
	11	0.29403	0.29425	0.29453	0.17	
	12	0.29907	0.29922	0.29950	0.14	
	13	0.30376	0.30409	0.30451	0.24	
	14	0.30822	0.30845	0.30878	0.18	
	15	0.31249	0.31275	0.31301	0.17	
	16	0.31688	0.31706	0.31734	0.14	
	17	0.32173	0.32196	0.32239	0.20	
LV	/	3.5325×10^{-3}	3.5366×10^{-3}	3.5463×10^{-3}	0.39	

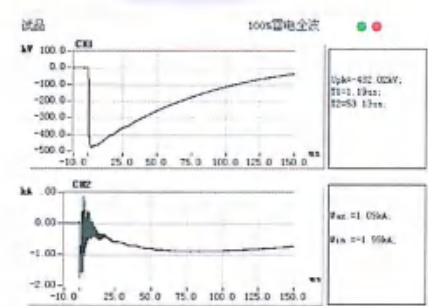
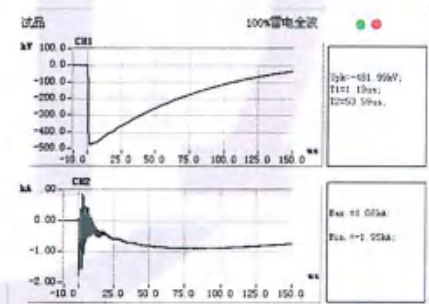
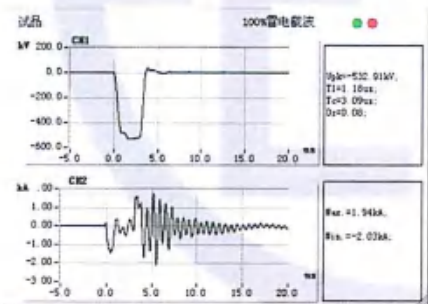
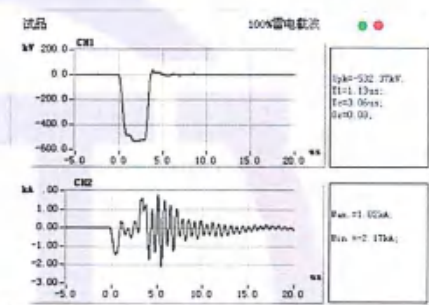
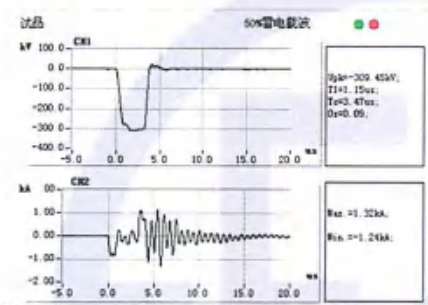
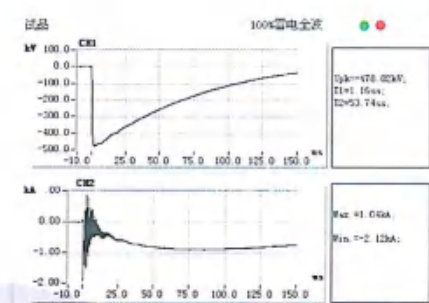
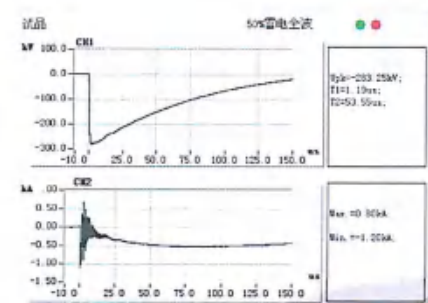
Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 35			
4.19.4.10 Measurement of no-load loss and current (routine test)					Test date: Apr. 19, 2020			
Applied voltage	r.m.s. voltage (kV)		No-load current		No-load loss (kW)			
	Average voltmeter reading	r.m.s. voltmeter reading	(A)	(%)	Measured values	Corrected value		
100%Ur	10.508	10.515	5.11	0.15	43.724	43.695		
90%Ur	9.456	9.461	4.02	0.12	35.409	35.390		
110%Ur	11.552	11.564	17.23	0.50	69.411	69.343		
Remarks: the difference between r.m.s voltmeter reading and average voltmeter reading is within 3%.								
4.19.4.11 Measurement of short-circuit impedance and load loss (routine test)					Test date: Apr. 19, 2020 Oil temperature: 19.7°C			
Winding	Tapping position	Applied current I		Measured voltage (kV)	Short-circuit impedance (for each phase)		Load loss (kW)	Total loss (kW)
		(A)	I/Ir (%)		HV impedance (Ω)	(%)	Corrected value	Corrected value
					t=75°C I=Ir	t=75°C I=Ir	t=75°C I=Ir	t=75°C I=Ir
HV LV	1	165.37	55.01	11.415	39.86	17.15	207.982	251.677
	9b	189.73	57.38	10.693	32.54	16.94	215.330	259.025
	17	202.44	55.10	9.088	25.92	16.66	248.866	292.561
4.19.4.12 Tests on on-load tap-changers (routine test)					Test date: Apr. 19, 2020			
Operation tests:								
a. with the transformer de-energized, eight complete cycles of operation (a cycle of operation goes from one end of the tapping range to the other, and back again);								
b. with the transformer de-energized, and with the auxiliary voltage reduced to 85 % of its rated value, one complete cycle of operation;								
c. with the transformer energized at rated voltage and frequency at no load, one complete cycle of operation;								
d. with one winding short-circuited and, as far as practicable, rated current in the tapped winding, 10 cycles of tap-change operations across the range of two steps on each side from where a coarse or reversing changeover selector operates, or otherwise from the middle tapping (the tapchanger will pass 20 times through the changeover position).								
Test result: PASS								

Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 36																			
4.19.4.13 Lightning impulse test (routine test, type test)		Test date: Apr. 20, 2020																			
<p>Atmospheric conditions of test: Relative humidity: 59%; Ambient temperature: 18.9°C; Oil temperature: 18.8°C; Air pressure: 102kPa.</p> <p style="text-align: center;">Test items and voltage</p> <table border="1" data-bbox="197 607 1493 864"> <thead> <tr> <th rowspan="2">Withstand terminals</th> <th colspan="2">Rated withstand voltage (kV)</th> <th rowspan="2">Tapping position</th> </tr> <tr> <th>Lightning full wave</th> <th>Lightning chopped wave</th> </tr> </thead> <tbody> <tr> <td>A, B, C</td> <td>480</td> <td>530</td> <td>A:1; B:9b; C:17</td> </tr> <tr> <td>O</td> <td>325</td> <td>/</td> <td>1</td> </tr> <tr> <td>a, b, c</td> <td>75</td> <td>85</td> <td>/</td> </tr> </tbody> </table>				Withstand terminals	Rated withstand voltage (kV)		Tapping position	Lightning full wave	Lightning chopped wave	A, B, C	480	530	A:1; B:9b; C:17	O	325	/	1	a, b, c	75	85	/
Withstand terminals	Rated withstand voltage (kV)		Tapping position																		
	Lightning full wave	Lightning chopped wave																			
A, B, C	480	530	A:1; B:9b; C:17																		
O	325	/	1																		
a, b, c	75	85	/																		
<p>Test sequence:</p> <p>Line terminal</p> <p>One negative reduced level full impulse; One negative rated level full impulse; One negative reduced level chopped impulse; Two negative rated level chopped impulse; Two negative rated level full impulse.</p> <p>Neutral point:</p> <p>One negative reduced level full impulse; Three negative rated level full impulse.</p> <p>Test records: T1: wave front time, T2: time to half peak value, Tc: chopped wave time, Up: peak voltage.</p> <p>For waveform diagram, see P₃₇~P₄₃.</p> <p>Voltage ranges of oscillograms are as below:</p>																					
Withstand terminals	Full wave (kV)	Chopped wave (kV)																			
A, B, C	478.02~4882.82	530.72~533.28																			
O	324.47~325.93	/																			
a, b, c	74.96~76.12	84.36~86.82																			

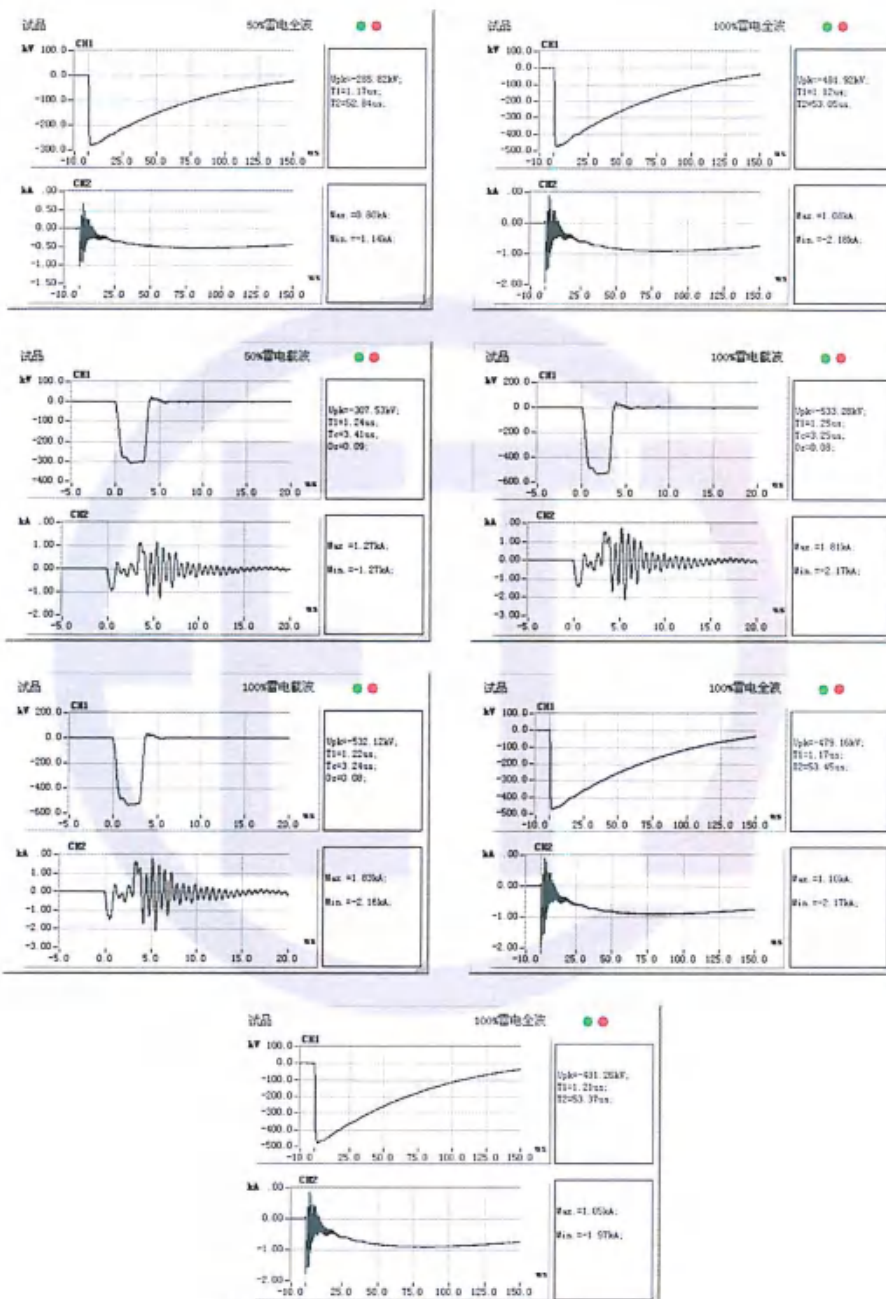
Tested terminal: A Test polarity: negative Channel 1: voltage wave Channel 2: current wave



Tested terminal: B Test polarity: negative Channel 1: voltage wave Channel 2: current wave

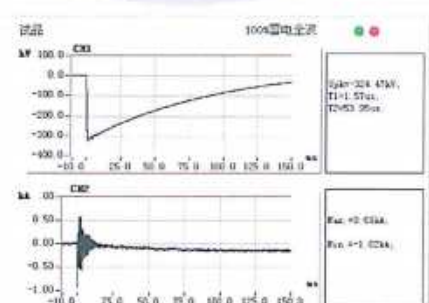
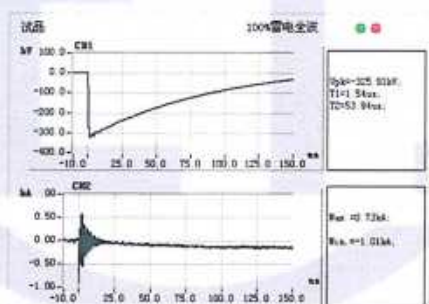
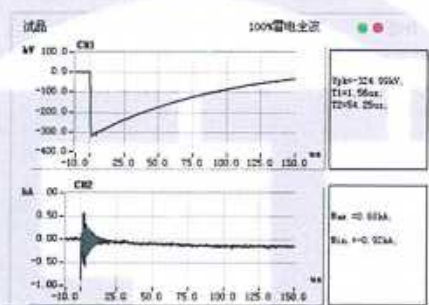
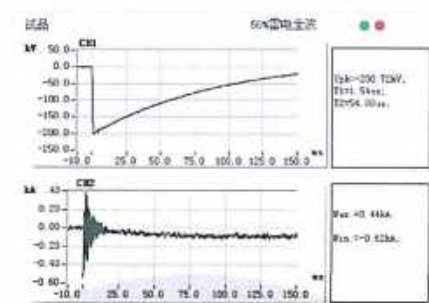


Tested terminal: C Test polarity: negative Channel 1: voltage wave Channel 2: current wave

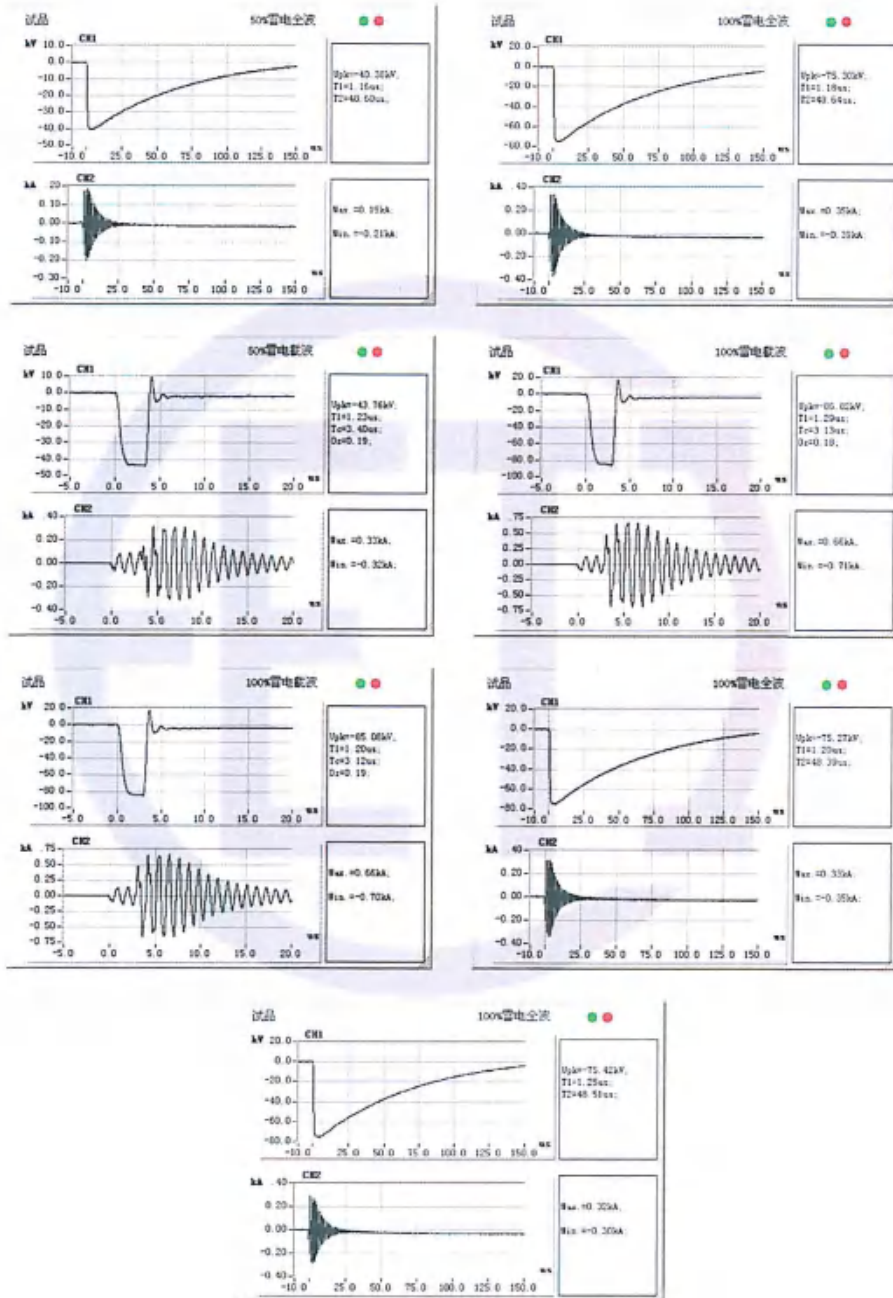


Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 40
-------------	---	----------------------------------

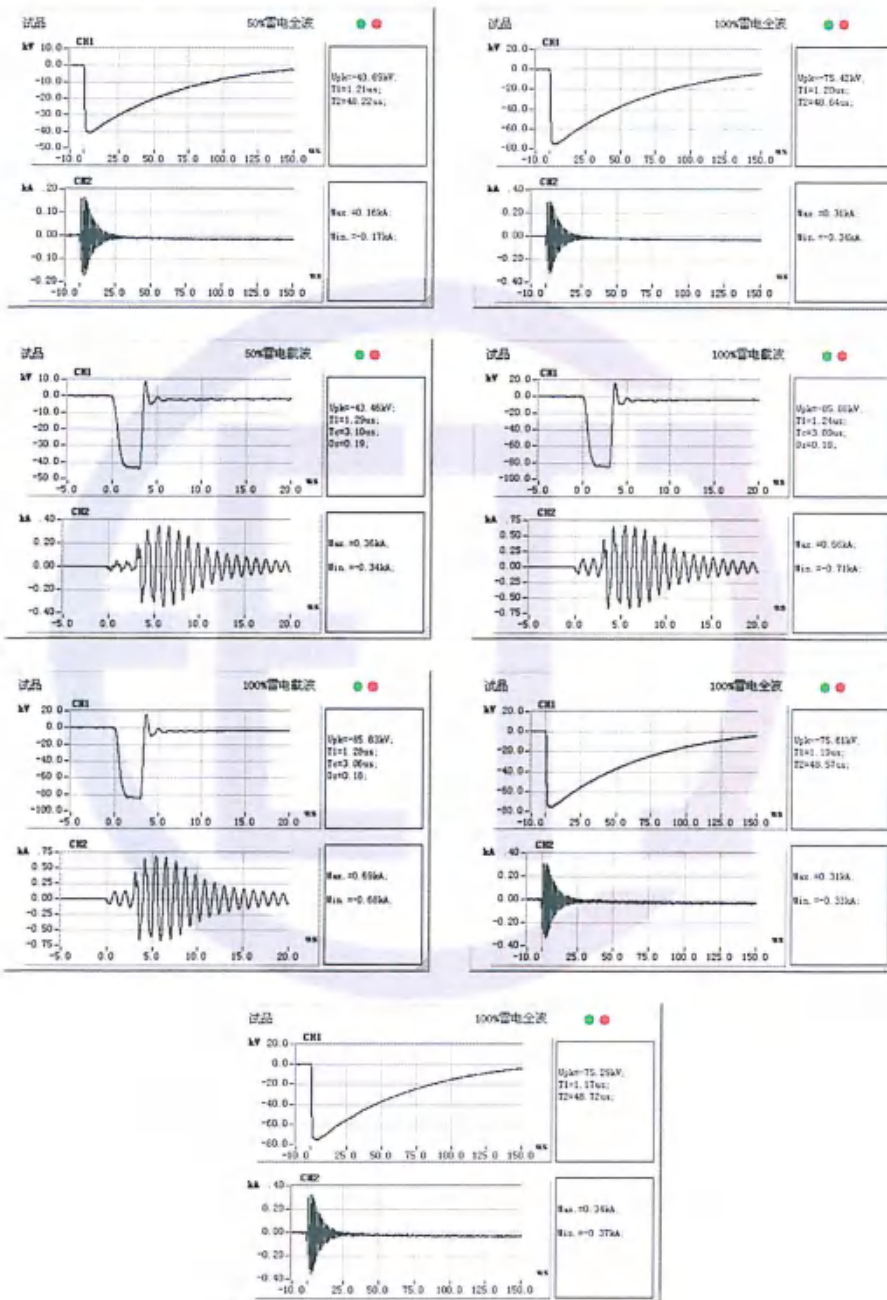
Tested terminal: O Test polarity: negative Channel 1: voltage wave Channel 2: current wave



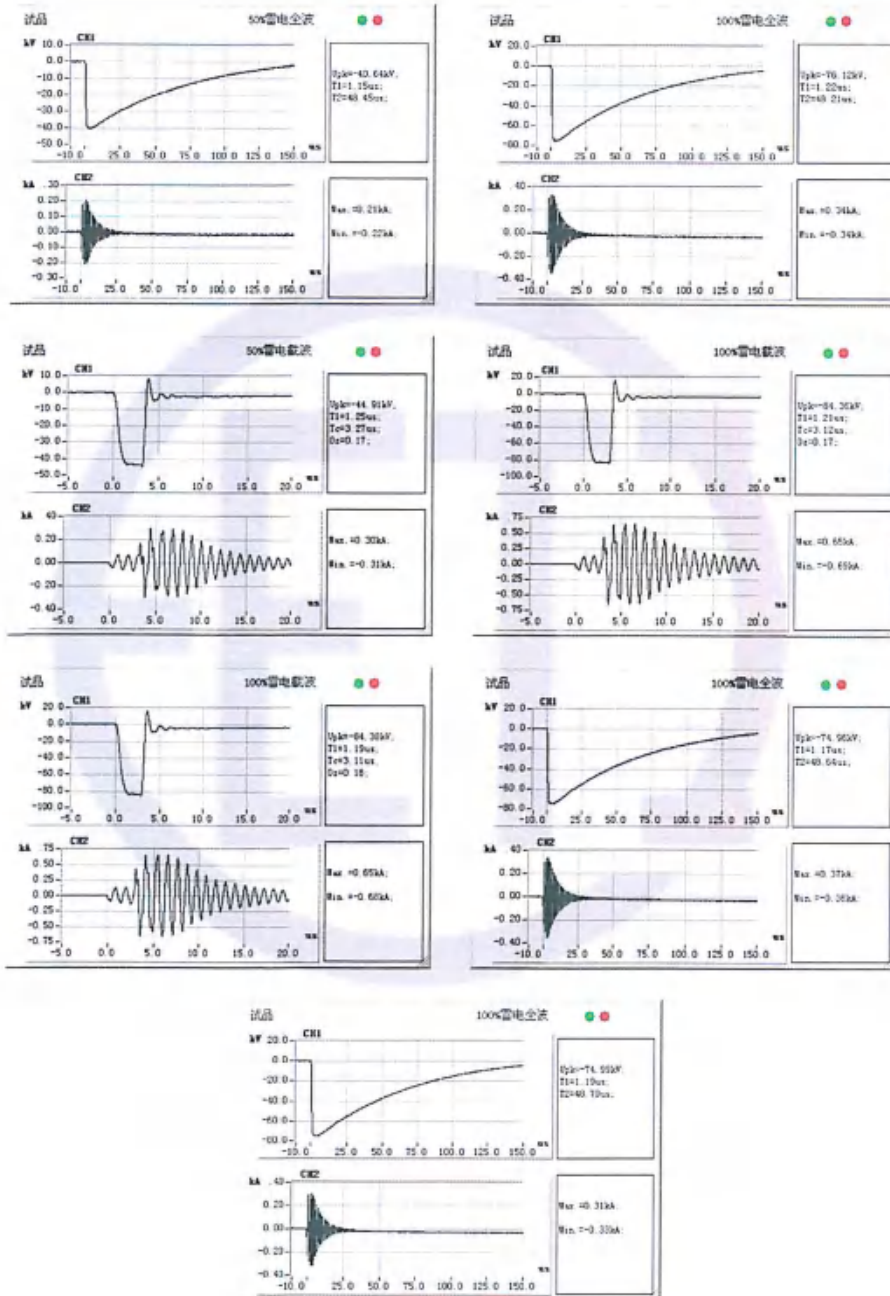
Tested terminal: a Test polarity: negative Channel 1: voltage wave Channel 2: current wave



Tested terminal: b Test polarity: negative Channel 1: voltage wave Channel 2: current wave




Tested terminal: c Test polarity: negative Channel 1: voltage wave Channel 2: current wave



Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 44				
4.19.4.14 Separate-source AC withstand voltage test (routine test)		Test date: Apr. 20, 2020					
Relative humidity: 59%; Ambient temperature: 18.9°C; Oil temperature: 18.8°C; Air pressure: 102kPa							
Parts of applied voltage	Test voltage (kV)	Test duration (s)	Result				
HV neutral point—LV and earth	140.0	60	PASS				
LV—HV and earth	35.0	60					
4.19.4.15 Line terminal AC withstand test (routine test)		Test date: Apr. 20, 2020					
Relative humidity: 59%; Ambient temperature: 18.9°C; Oil temperature: 18.8°C; Air pressure: 102kPa							
Phase to earth test							
Parts of applied voltage	Tapping position	Applied voltage (kV)	Induced voltage (kV)		Frequency (Hz)	Test duration (s)	Result
		LV	HV				
a-c	5	21.0	A	200.0	200	30	PASS
a-b		21.0	B	200.0			
b-c		21.0	C	200.0			

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 45	
4.19.4.16 Induced AC withstand voltage test and induced AC withstand voltage test with partial discharge measurement (routine test)					
Test date: Apr. 20, 2020					
Relative humidity: 59%; Ambient temperature: 18.9°C; Oil temperature: 18.8°C; Air pressure: 102kPa					
HV tapping position is 9b, frequency is 200Hz.					
Applied voltage		Duration (min)	Partial discharge magnitude (pC)		
Multiple	Phase to earth voltage (kV)		A	B	C
$0.4U_r/\sqrt{3}$	25.4	/	<16	<17	<18
$1.2U_r/\sqrt{3}$	76.2	1	<47	<40	<45
$1.58U_r/\sqrt{3}$	100.3	5	<85	<87	<89
$2.0U_r/\sqrt{3}$	127.1	0.5	/	/	/
$1.58U_r/\sqrt{3}$	100.3	5	<84	<87	<87
		10	<84	<87	<87
		15	<84	<87	<87
		20	<84	<87	<87
		25	<85	<86	<87
		30	<85	<86	<87
		35	<85	<86	<88
		40	<85	<86	<88
		45	<85	<86	<88
		50	<84	<86	<88
		55	<84	<86	<88
60	<84	<86	<88		
$1.2U_r/\sqrt{3}$	76.2	1	<45	<42	<42
$0.4U_r/\sqrt{3}$	25.4	/	<15	<15	<17
Remarks: $U_r=110kV$.					

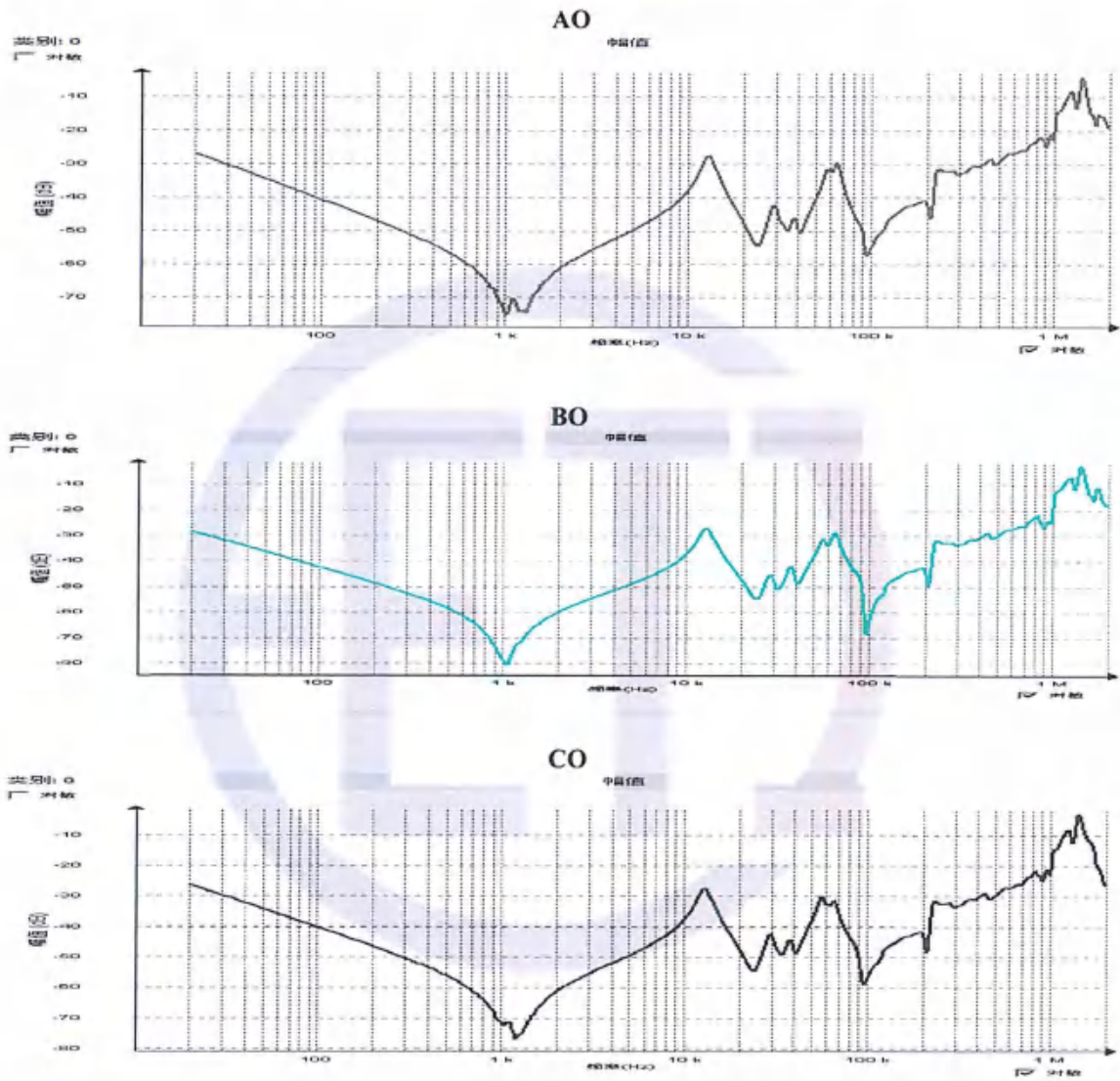
Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 46
<p>4.19.4.17 Insulating liquid test, measurement of dissolved gasses in dielectric liquid from each separate oil compartment except diverter switch compartment (routine test)</p> <p style="text-align: right;">Test date: Apr. 19, 2020 Relative humidity: 61%; Ambient temperature: 20.0°C</p>		
Dielectric dissipation factor(90°C)	Breakdown voltage (kV)	Water content (mg/L)
0.36%	58.1	9.8
<p>Remarks: for measurement of dissolved gasses in dielectric liquid, see 4.17.</p> <div style="text-align: center; opacity: 0.5;">  </div>		

<p>Test Report</p>	<p>China National Center for Quality Supervision and Test of Electrical Apparatus Products</p>	<p>No: 20M0561-S Total 68 Page 47</p>
--------------------	--	---

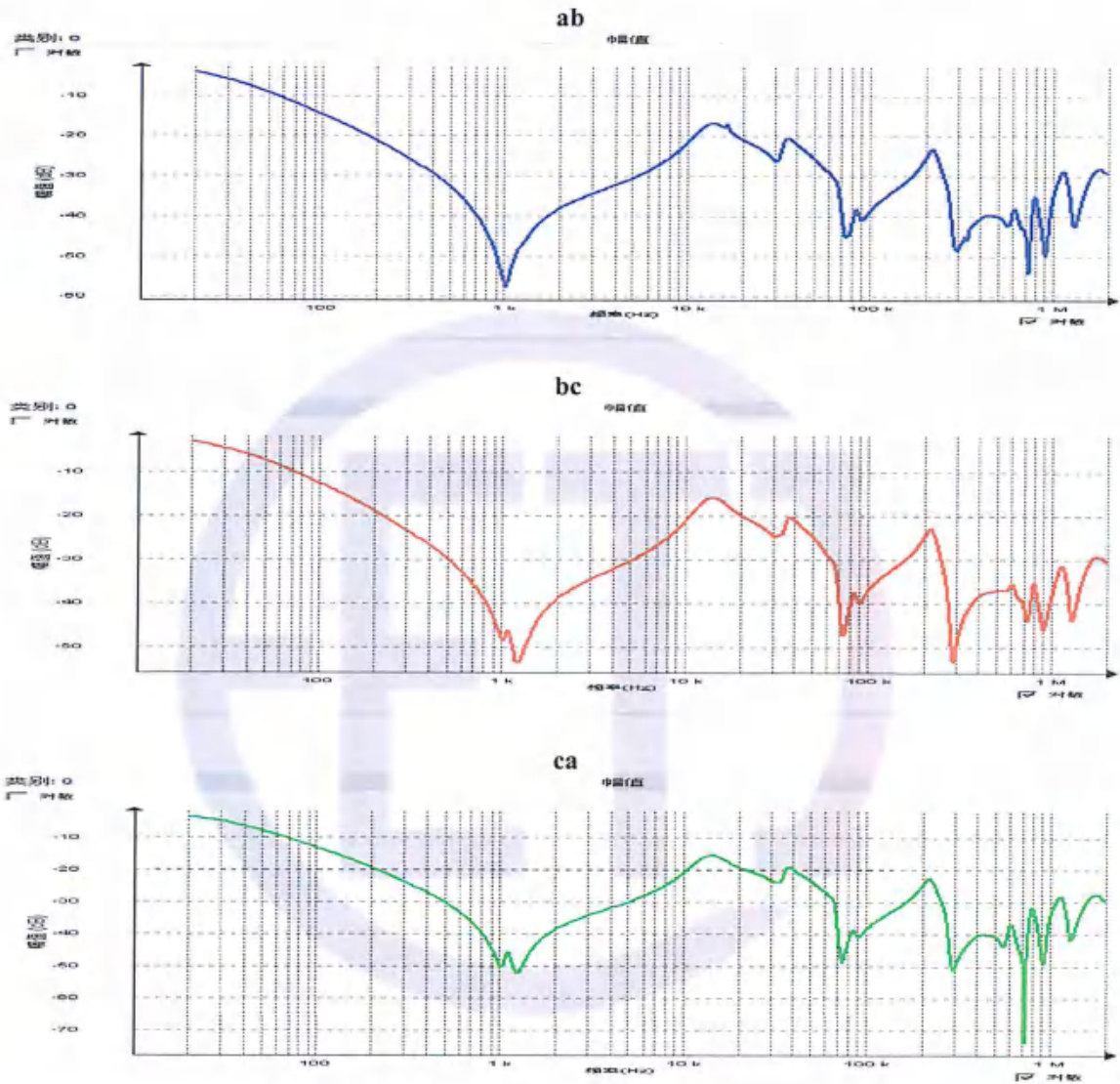
4.19.4.18 Measurement of frequency response (special test)

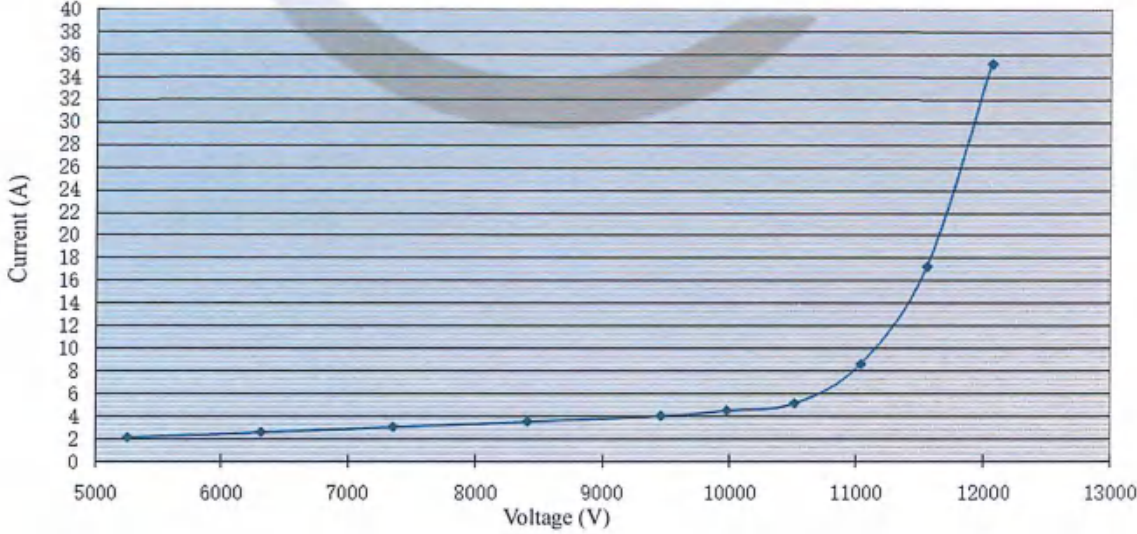
Test date: Apr. 18, 2020

HV winding frequency response curves after short-circuit test



LV winding frequency response curves after short-circuit test



Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 49																						
4.20 Measurement of no-load excitation characteristics (commission test)		Test date: Apr. 21, 2020																						
Voltage	Measured voltage (kV)	Measured current (A)																						
0.50U _r	5.253	2.114																						
0.60U _r	6.304	2.588																						
0.70U _r	7.352	3.045																						
0.80U _r	8.398	3.520																						
0.90U _r	9.452	4.025																						
0.95U _r	9.973	4.515																						
1.00U _r	10.506	5.104																						
1.05U _r	11.029	8.614																						
1.10U _r	11.552	17.231																						
1.15U _r	12.056	35.145																						
Remarks: U _r =10.5kV.																								
<p data-bbox="528 1245 1094 1285" style="text-align: center;">No-load excitation characteristic curve</p>  <table border="1" data-bbox="252 1330 1394 1861"> <caption>Data points for No-load excitation characteristic curve</caption> <thead> <tr> <th>Voltage (V)</th> <th>Measured current (A)</th> </tr> </thead> <tbody> <tr><td>5253</td><td>2.114</td></tr> <tr><td>6304</td><td>2.588</td></tr> <tr><td>7352</td><td>3.045</td></tr> <tr><td>8398</td><td>3.520</td></tr> <tr><td>9452</td><td>4.025</td></tr> <tr><td>9973</td><td>4.515</td></tr> <tr><td>10506</td><td>5.104</td></tr> <tr><td>11029</td><td>8.614</td></tr> <tr><td>11552</td><td>17.231</td></tr> <tr><td>12056</td><td>35.145</td></tr> </tbody> </table>			Voltage (V)	Measured current (A)	5253	2.114	6304	2.588	7352	3.045	8398	3.520	9452	4.025	9973	4.515	10506	5.104	11029	8.614	11552	17.231	12056	35.145
Voltage (V)	Measured current (A)																							
5253	2.114																							
6304	2.588																							
7352	3.045																							
8398	3.520																							
9452	4.025																							
9973	4.515																							
10506	5.104																							
11029	8.614																							
11552	17.231																							
12056	35.145																							

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products				№: 20M0561-S Total 68 Page 50	
4.21 Long-duration no-load test (special test)					Test date: Apr. 21, 2020		
Test with 1.1 times rated voltage applied on LV side for 12h. No C ₂ H ₂ is found in oil and the content of total hydrocarbon has no obvious variation before and after the test. For gas chromatograph analysis data, see 4.17.							
Duration (h)	Voltage (kV)		Current (A)		No-load loss (kW)		
1	11.553		17.228		69.453		
2	11.554		17.230		69.448		
3	11.552		17.232		69.457		
4	11.551		17.234		69.505		
5	11.553		17.231		69.512		
6	11.552		17.228		69.517		
7	11.552		17.228		69.505		
8	11.551		17.229		69.512		
9	11.553		17.228		69.522		
10	11.558		17.230		69.523		
11	11.557		17.234		69.528		
12	11.559		17.232		69.530		
4.22 Measurement of short-circuit impedance on LV (commission test)					Test date: Apr. 19, 2020 Oil temperature: 19.7°C		
Winding	Tapping position	Applied current I		Measured voltage (kV)	Short-circuit impedance (for each phase)		
		(A)	I/I _r (%)		HV impedance (Ω)	(%)	
					t=75°C I=I _r	t=75°C I=I _r	
HV LV	1	5.53	1.84	0.3821	39.88	17.16	
	9b	6.79	2.05	0.3816	32.44	16.89	
	17	8.46	2.30	0.3810	26.01	16.72	
4.23 Measurement of zero-sequence impedances on three-phase transformers (special test)					Test date: Apr. 19, 2020		
Connection symbol	Power supply terminal	Open-circuit terminal	Short-circuit terminal	Tapping position	Applied current (A)	Measured voltage (V)	Impedance (Ω)
YNd11	ABC-O	abc	/	9b	105.7	957.2	27.167

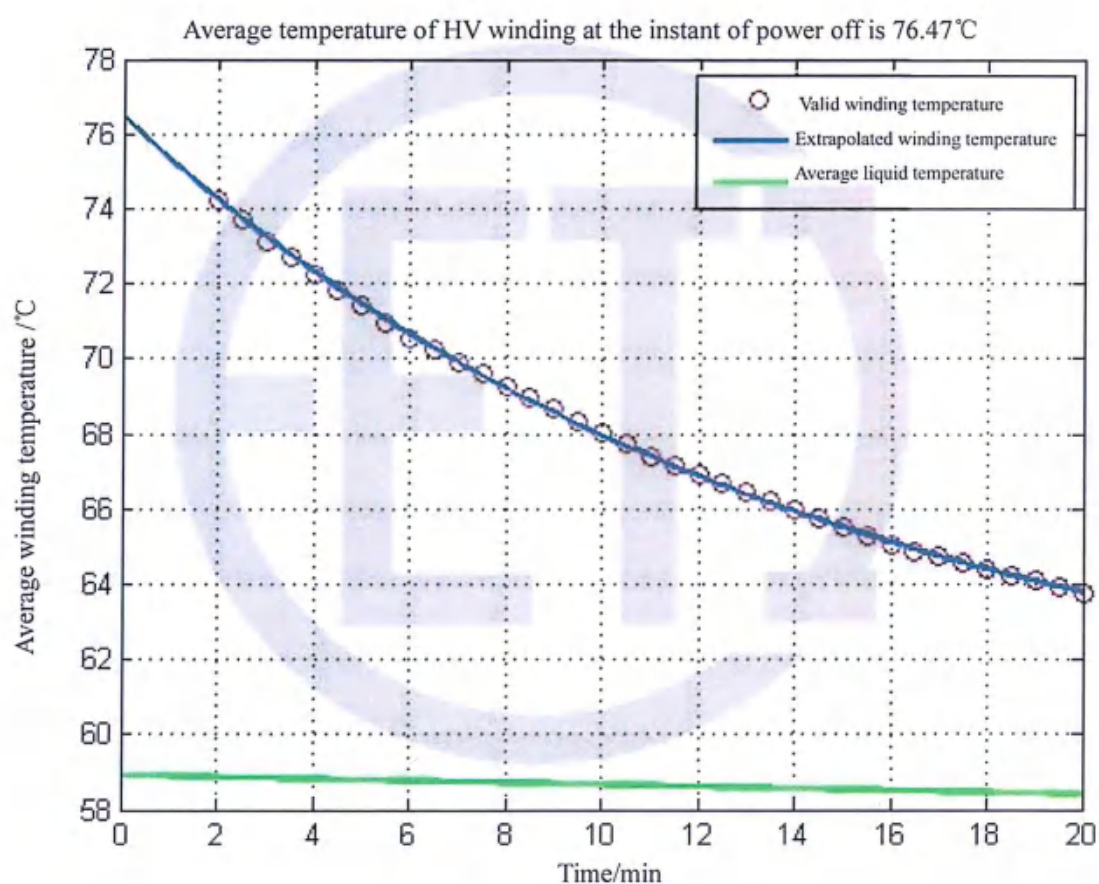
Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products				№: 20M0561-S Total 68 Page 51	
4.24 Measurement of the harmonics of the no-load current (commission test)						Test date: Apr. 19, 2020	
No	CH-A THD =13.53		CH-B THD =14.44		CH-C THD =12.21		
	In(A)	In/I1(%)	In(A)	In/I1(%)	In(A)	In/I1(%)	
01	5.05	100.00	4.69	100.00	5.58	100.00	
02	0.02	0.35	0.03	0.70	0.03	0.60	
03	0.11	2.24	0.10	2.22	0.10	1.85	
04	0.07	1.45	0.07	1.41	0.10	1.86	
05	0.59	11.60	0.57	12.25	0.61	10.95	
06	0.14	2.73	0.14	2.93	0.12	2.16	
07	0.18	3.55	0.20	4.17	0.05	0.87	
08	0.04	0.78	0.04	0.85	0.04	0.70	
09	0.01	0.25	0.03	0.54	0.02	0.36	
10	0.01	0.11	0.01	0.18	0.01	0.22	
11	0.13	2.56	0.11	2.44	0.10	1.84	
12	0.03	0.52	0.04	0.88	0.07	1.25	
13	0.19	3.67	0.19	4.15	0.18	3.27	
14	0.01	0.22	0.02	0.32	0.01	0.17	
15	0.01	0.25	0.01	0.18	0.01	0.20	
16	0.01	0.11	0.00	0.08	0.01	0.14	
17	0.00	0.00	0.00	0.00	0.00	0.00	
18	0.00	0.00	0.00	0.00	0.00	0.00	
19	0.00	0.00	0.00	0.00	0.00	0.00	

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products						№: 20M0561-S Total 68 Page 52			
4.25 Temperature-rise test (including calculation of the winding hot-spot temperature-rise) (type test) Test date: Apr. 22, 2020											
Measurement of top oil temperature rise: The method of temperature rise is the equivalent test in short-circuit connection. The HV (tapping position 17) is supplying power. Test duration is 12h and of which the stabilization time is 3h. it is required to apply 292.561kW of total loss and 292.918kW is actually applied during testing.											
Measurement of winding temperature rise: 367.42A current is required and 367.55A is actually applied during testing.											
Measured data											
Top oil temperature-rise and average oil temperature-rise			Measurement of average temperature-rise windings to oil						Ambient temperature (°C)		
Top oil temperature (°C)	Average oil temperature (°C)	Total loss injection/specified total loss (%)	Current injection/rated current (%)	Cold resistance (Ω)		Average oil temperature (°C)		Average winding temperature (°C)		Total loss	Measurement of cold resistance
70.6	59.2	100.12	100.04	HV	0.6488	At the instant of power off	58.9	HV	76.5	21.8	19.7
				LV	3.5325×10^{-3}	At the end of cooling curve	58.4	LV	77.5		
Calculations of temperature-rise											
Top oil temperature-rise (K)			48.8								
Winding temperature-rise (K)			HV		54.9						
			LV		55.9						
Winding hot-spot temperature-rise (K)			HV		69.8						
			LV		71.0						
Temperature-rise of tank surface and metal structural parts (K)			39.3								
Remarks: the calculated of temperature-rise are the corrected value under specified total loss and rated current. HV winding hot-spot coefficient is 1.2 and LV winding hot-spot coefficient is 1.2.											

Winding temperature curve

Average winding temperature data

Average HV winding temperature	76.5°C
--------------------------------	--------

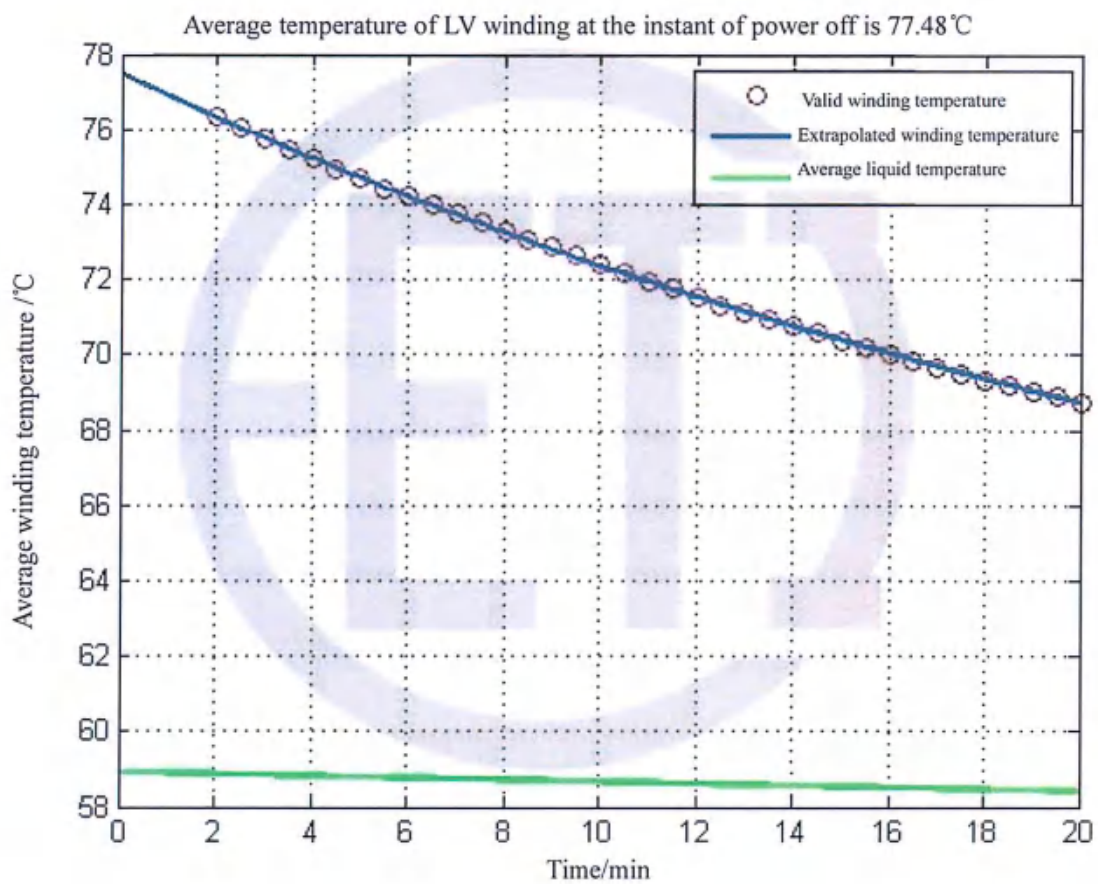


Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 54
-------------	---	----------------------------------

Winding temperature curve

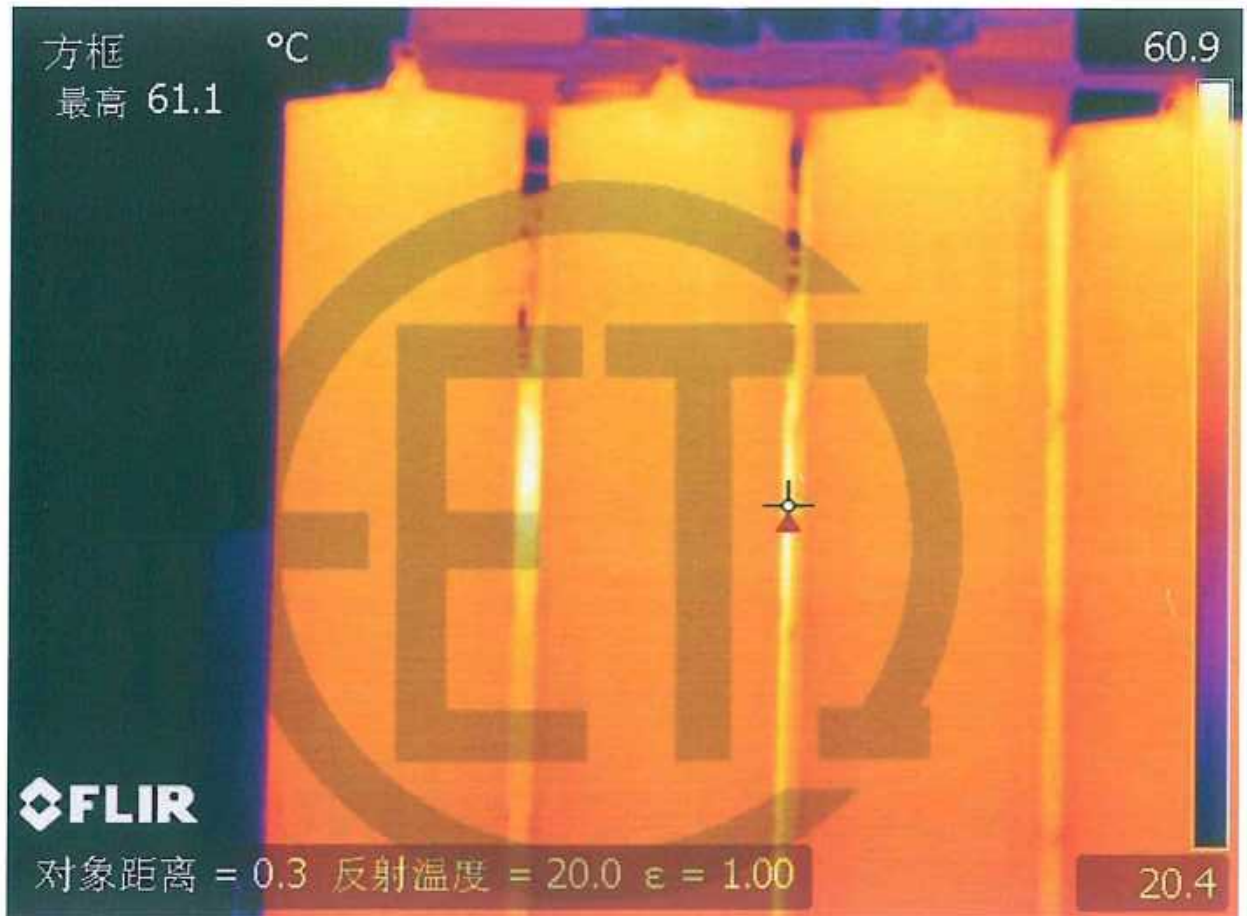
Average winding temperature data

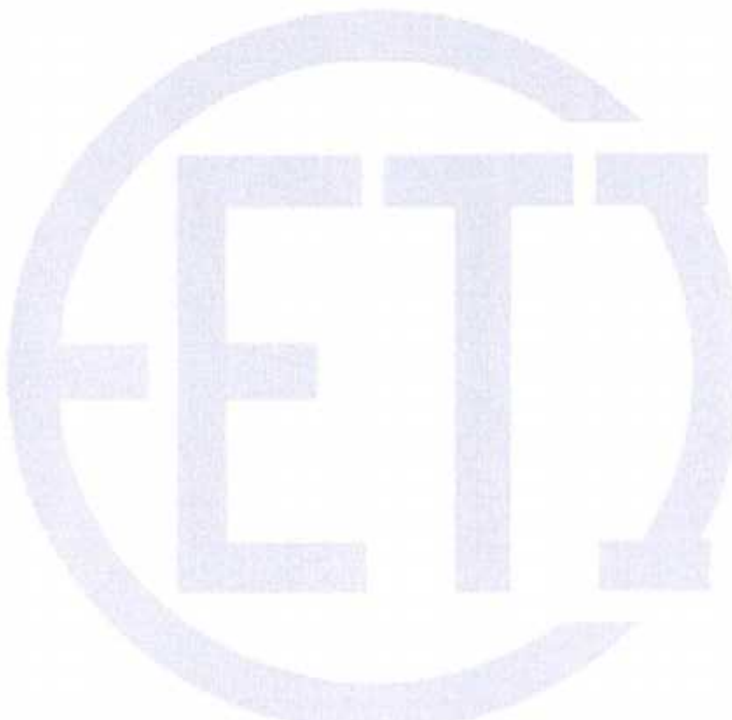
Average LV winding temperature	77.5°C
--------------------------------	--------



Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 55
-------------	---	----------------------------------

Thermograph of tank and metal structural parts



Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products			№: 20M0561-S Total 68 Page 56	
4.26 Leak testing with pressure for liquid-immersed transformers (routine test) Test date: from Apr. 11, 2020 to Apr. 13, 2020					
Test method	Parts of applied voltage	Applied pressure (kPa)	Duration (h)	Residual pressure (kPa)	Result
Static pressure method	Body	30.0	24	29.5	No oil leakage or damage
	On-load tap-changer tank	30.0	24	29.6	No oil leakage or damage
Remarks: the product is a general structure tank. 					

Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 57
-------------	--	----------------------------------

4.27 Determination of sound levels (type test)

Test date: Apr. 19, 2020

4.27.1 Rough estimation of the load current sound power level

Equation:

$$L_{WA,IN} \approx 39 + 18 \lg \frac{S_r}{S_p} = 71.4 \text{ dB(A)}$$

where: S_r —the rated power is 63MVA;

S_p —the reference power is 1MVA.

Because $L_{WA,IN}$ is less 8.6dB (A) than limit value 80dB (A) of assured sound power level, according to standard requirement, it need not to measure load current sound level.

4.27.2 Measurement of sound pressure level and calculation of sound power level

The transformer is rated excitation; the prescribed contour shall be spaced 0.3m away from the principal radiating surface, the distance between measured points is 0.96m, the number of measured points is 24, the height of measured point 1 is 1.07m and point 2 is 2.15m.

Test environment

The total area of the surface of the test room S_v (m ²)	The average acoustic absorption coefficient α	The amount of acoustic absorption A (m ²)	Distance from the principal radiating surface (m)	The area of the measurement surface S (m ²)	Environmental correction K (dB)
3293.2	0.1	329.3	0.3	93.8	3.3

Measured values (dB)

Status of cooling device	Average of background noise		Average noise value of transformer $\overline{L_{pA0}}$	A weighted sound pressure level $\overline{L_{pA}} = 10 \lg(10^{0.1\overline{L_{pA0}}} - 10^{0.1\overline{L_{bgA}}}) - K$	A weighted sound power level $L_{WA} = \overline{L_{pA}} + 10 \lg(S/S_0)$
	Before the test	After the test			
/	31.7	31.8	57.2	54	74

Remarks: $\overline{L_{pA0}}$: the uncorrected average A-weighted sound pressure level; $\overline{L_{pA0}} = 10 \lg(\frac{1}{N} \sum_{i=1}^N 10^{0.1L_{pAi}})$
 $\overline{L_{bgA}}$: the lower of the two calculated average A weighted background noise pressure level.

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products										№: 20M0561-S Total 68 Page 58				
4.28 Mechanical strength test of tank (type test)											Test date: Apr. 13, 2020					
Test method				Applied pressure (kPa)						Duration (min)						
Degree of vacuum				0.133						5						
Positive pressure				100						5						
Measured items		Measured point														
		Tank wall												Tank cover		
		HV side				LV side				Left side		Right side		Middle of length		
		strengthen	Left	Middle	Right	strengthen	Left	Middle	Right	strengthen	Middle	strengthen	Middle	Left	Middle	Right
Degree of vacuum	Initial distance (mm)	400	400	400	400	400	400	400	400	350	350	350	350	300	300	300
	Distance after pressure injection (mm)	412	415	414	413	412	414	415	417	363	367	364	365	311	312	310
	Distance without pressure (mm)	406	408	407	407	405	407	407	408	356	359	357	358	305	306	304
	Elastic deformation (mm)	12	15	14	13	12	14	15	17	13	17	14	15	11	12	10
	Permanent deformation (mm)	6	8	7	7	5	7	7	8	6	9	7	8	5	6	4
Positive pressure	Initial distance (mm)	406	408	407	407	405	407	407	408	356	359	357	358	305	306	304
	Distance after pressure injection (mm)	395	393	393	392	394	396	395	393	346	343	342	345	293	295	295
	Distance without pressure (mm)	401	399	400	401	400	401	399	401	350	351	350	351	299	301	301
	Elastic deformation (mm)	11	15	14	15	11	11	12	15	10	16	15	13	12	11	9
	Permanent deformation (mm)	5	9	7	6	5	6	8	7	6	8	7	7	6	5	3
Remarks		No damage														
Remarks: 1. the product is a general structure tank. 2. the described left and right sides of test point are viewed from HV side. 3. the left, middle and right test points of HV and LV side are obtained from the 1/2 height in vertical direction, 1/4, 1/2 and 3/4 position respectively in horizontal direction.																

Test Report

China National Center for Quality Supervision and
Test of Electrical Apparatus Products№: 20M0561-S
Total 68 Page 59

HV side before short-circuit:



LV side before short-circuit:



Test Report

China National Center for Quality Supervision and
Test of Electrical Apparatus Products№: 20M0561-S
Total 68 Page 60

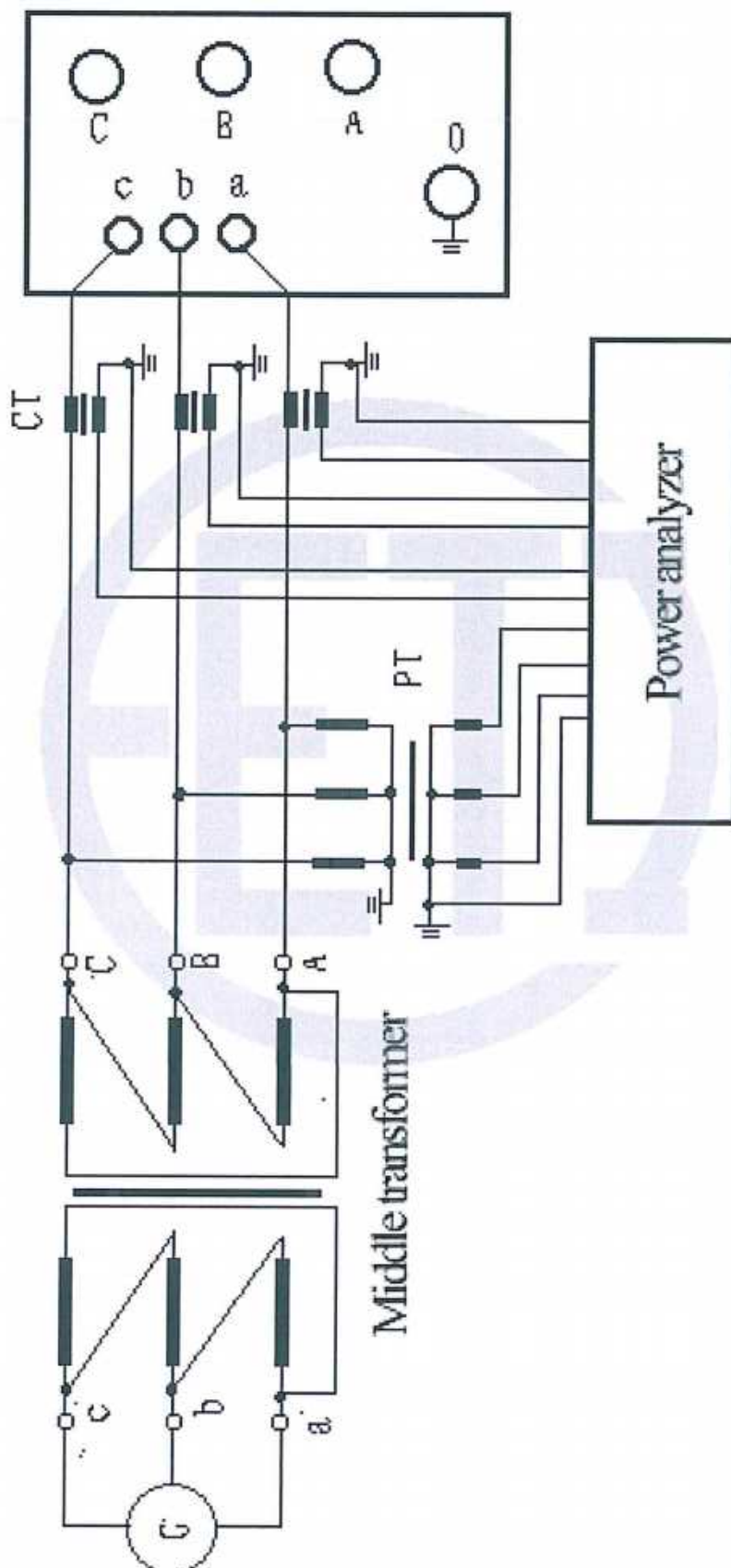
HV side after short-circuit:



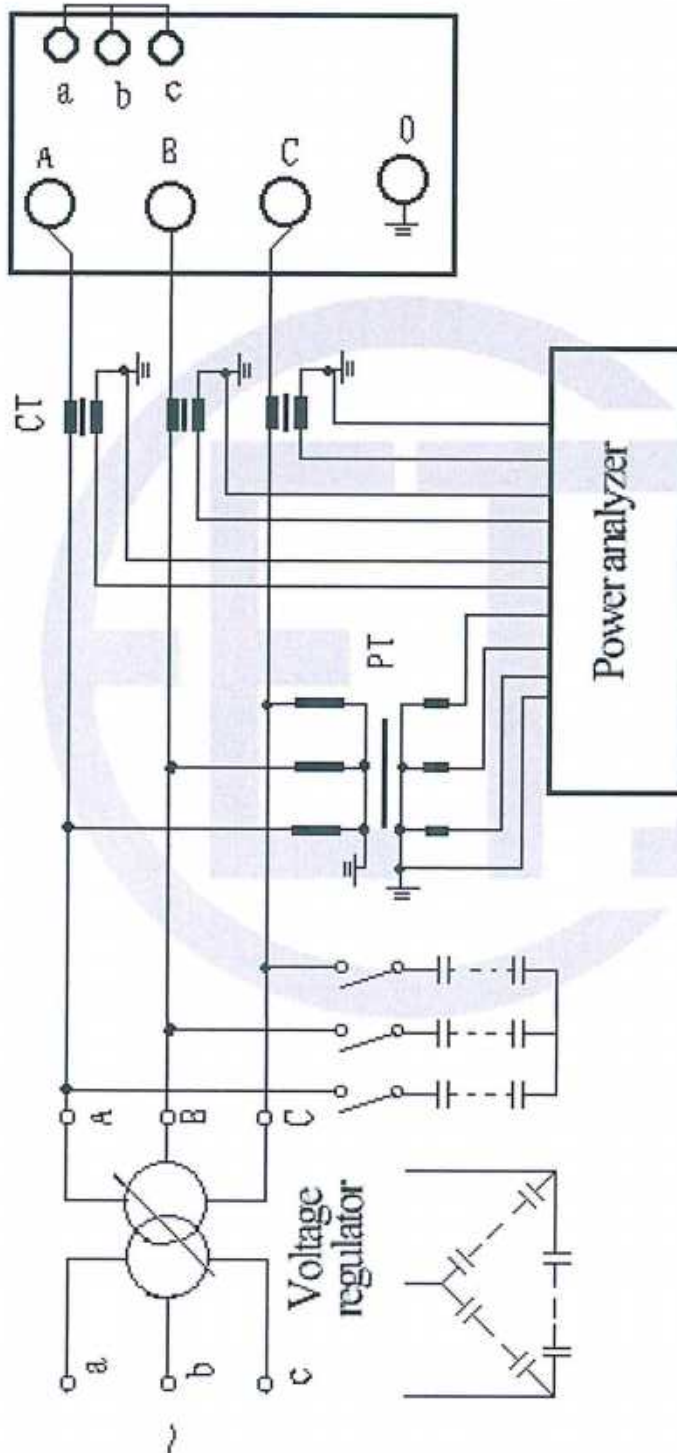
LV side after short-circuit:



Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 61
-------------	---	----------------------------------

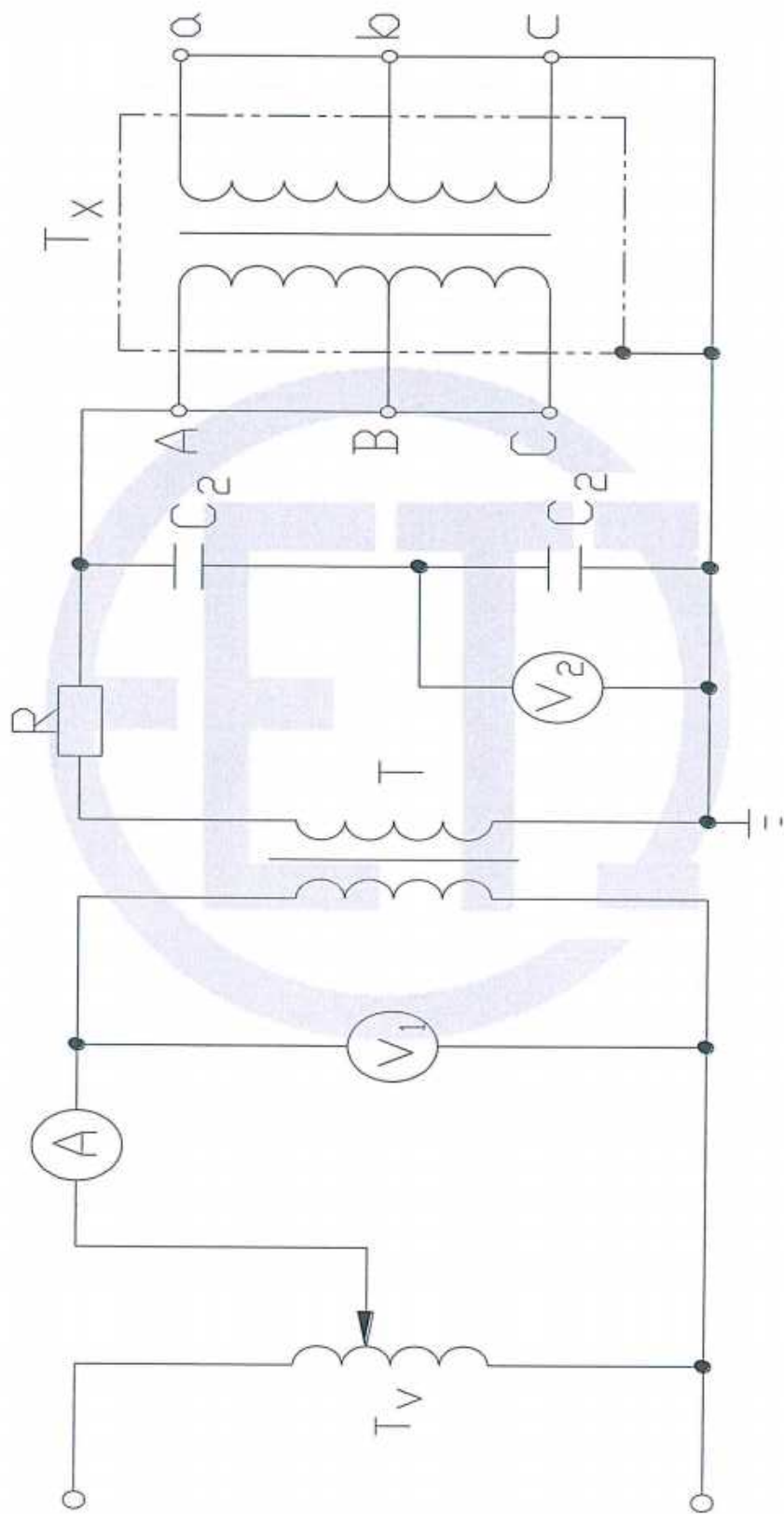


Schematic of no-load test



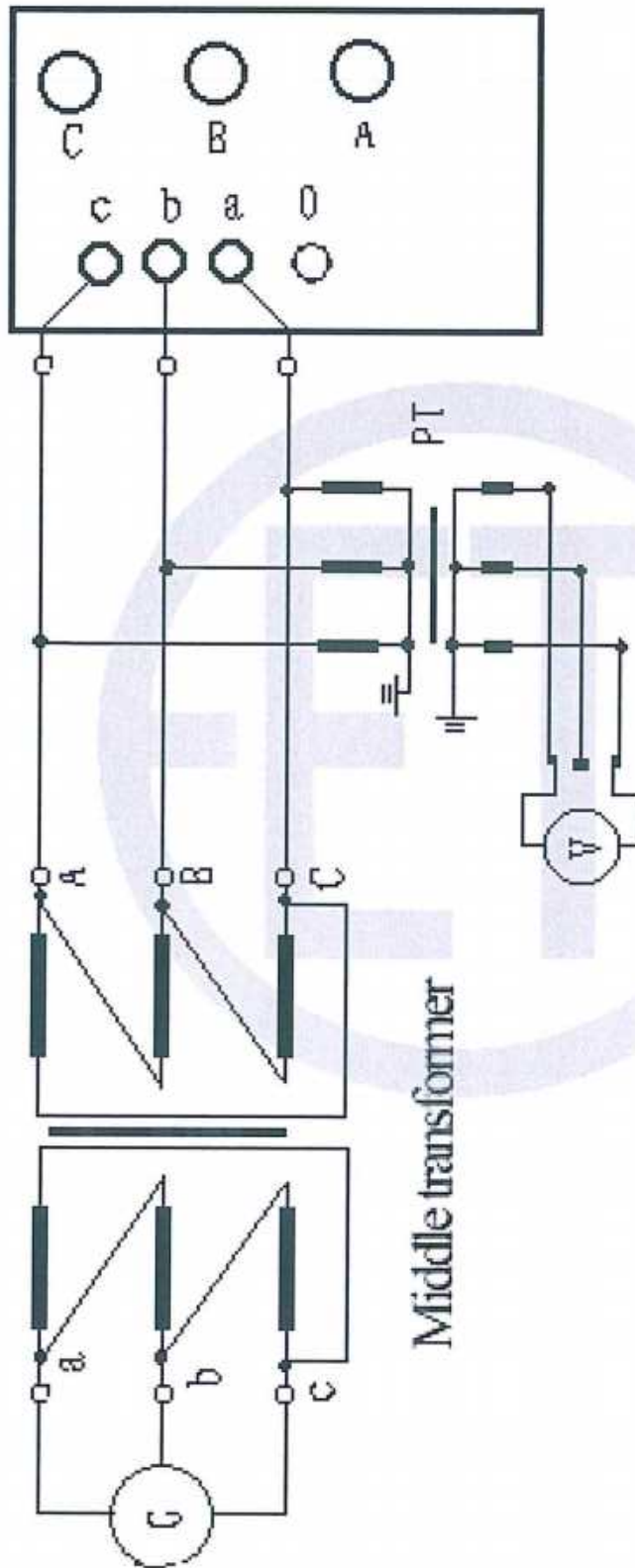
Schematic of load test

<p>Test Report</p>	<p>China National Center for Quality Supervision and Test of Electrical Apparatus Products</p>	<p>No: 20M0561-S Total 68 Page 63</p>
--------------------	--	---



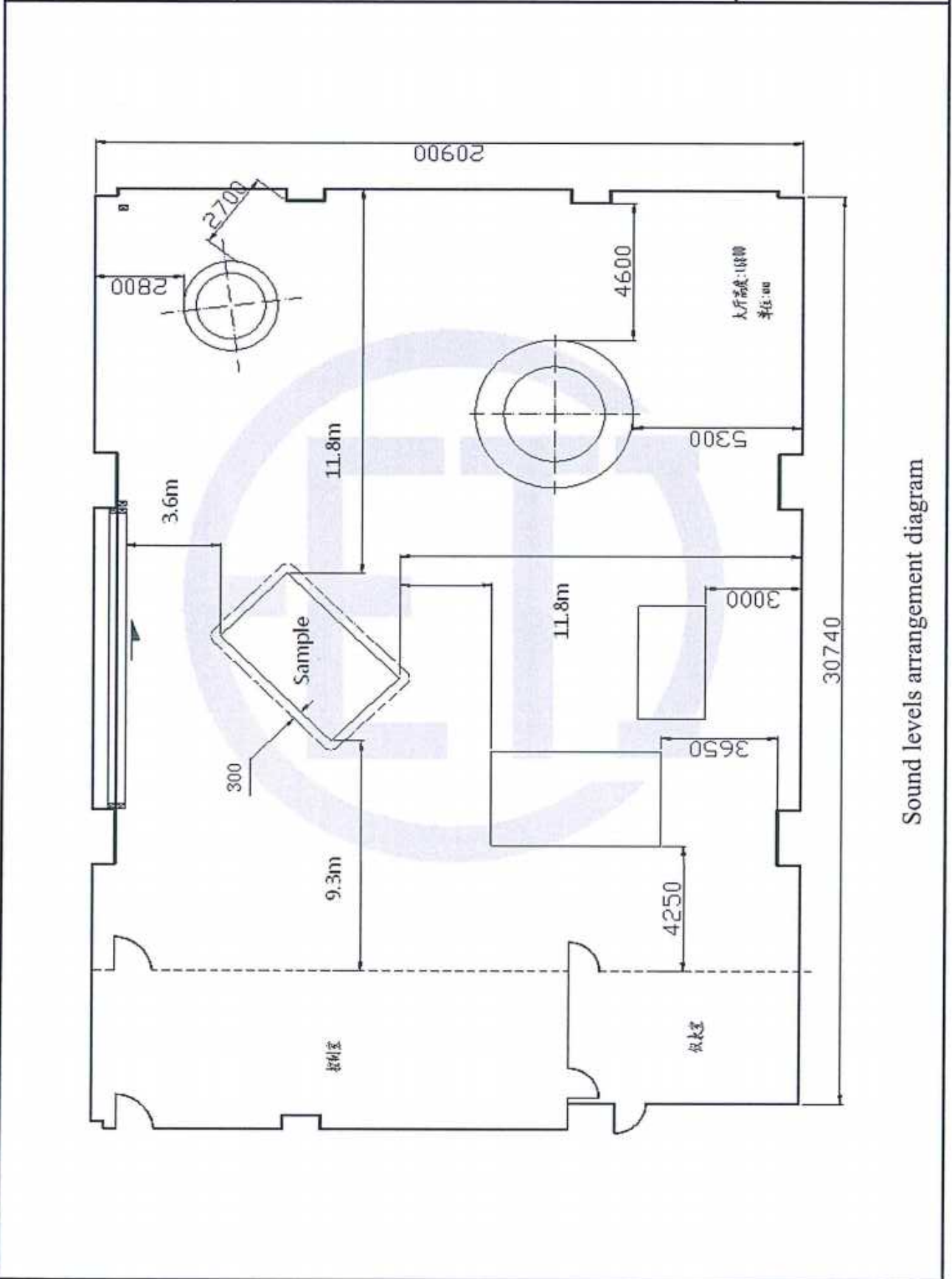
Schematic of separate-source AC withstand voltage test

Test Report	China National Center for Quality Supervision and Test of Electrical Apparatus Products	№: 20M0561-S Total 68 Page 64
-------------	---	----------------------------------



Schematic of induced AC withstand voltage test

<p>Test Report</p>	<p>China National Center for Quality Supervision and Test of Electrical Apparatus Products</p>	<p>No: 20M0561-S Total 68 Page 65</p>
--------------------	--	---



Sound levels arrangement diagram

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 66	
Instruments used in the tests					
No	Test items	Name & type of instrument	Number & validity	Accuracy level	
1	Measurement of d.c. insulation resistance windings-to-earth and between windings	Digital mega-ohm meter F1550C	ER17-017 2020-06-17	200k~5/10/20/50/ 100GΩ class 5, others class 20	
2	Check of core and frame insulation for liquid-immersed transformers with core or frame insulation				
3	Measurement of dissipation factor (tanδ) of the insulation system capacitances	Movable insulation diagnostic and analysis system MIDAS2880	ER19-002 2021-03-19	Capacitance: ±0.3%rdg±0.3pF Inductance: ±0.5%rdg±0.5mH	
4	Determination of capacitances windings-to-earth and between windings				
5	Measurement of bushing capacitances and dielectric dissipation factor (tanδ)				
6	Check the ratio and polarity of built-in current transformers	Multi-function transformer ratio tester YTB	RI15-012 2021-02-28	Ratio±0.2% Phase position 0.2°	
7	Insulation test of auxiliary wiring	Power-frequency withstand voltage tester PFT6-5	745-083 2020-11-24	/	
8	Measurement of voltage ratio and check of phase displacement	Full-automatic three-phase transformer ratio tester 2796	RI15-014 2020-09-03	±0.1mA, ±0.05°	
9	Measurement of winding resistance	DC resistance tester JYR(50C)	ER16-056 2020-10-09	0.2%±0.2μΩ	
10	Measurement of short-circuit impedance and load loss	Transformer power loss test system TMS580-200-4000	749-1237 2020-08-25	Voltage range: 100V~200kV, accuracy; 0.12% current range: 1A~4000A, accuracy; 0.15%	
11	Measurement of no-load loss and current				
12	Tests on on-load tap-changers				
13	Separate-source AC withstand voltage test	Power-frequency partial discharge-free test transformer YDTCW-1000kVA/1000kV	745-034 2021-09-24	/	
		Capacitance voltage divider TRF1000-0.0005	745-034-1 2021-09-24	/	
14	Line terminal AC withstand test	Transformer power loss test system TMS580-200-4000	749-1237 2020-08-25	Voltage range: 100V~200kV, accuracy; 0.12% current range: 1A~4000A, accuracy; 0.15%	
15	Induced AC withstand voltage test and induced AC withstand voltage test with partial discharge measurement	Transformer power loss test system TMS580-200-4000	749-1237 2020-08-25	Voltage range: 100V~200kV, accuracy; 0.12% current range: 1A~4000A, accuracy; 0.15%	
		Multi-channel digital partial discharge comprehensive tester TWPD-2F	RU10-013 2020-12-04	Discharge magnitude: 10,50,100,500pC; 5,10,20,50,100pC Pulse rise time <60ns Frequency range: 50Hz~1000Hz Measuring range of the whole: 0.1pC~10000nC Measuring channel: independent 4 channel Detection sensitivity: 0.1pC Sampling accuracy: 12Bit Sampling rate: 20MHz Non-linear error of the span: 5% Range switching: <1, ×10, ×100, ×1000, ×10000, ×100000 Capacitance range of the testable sample: 6pF~250μF Measuring band: 3dB bandwidth 10kHz~1MHz	

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 67	
Instruments used in the tests					
No	Test items	Name & type of instrument	Number & validity		Accuracy level
16	Insulating liquid test, measurement of dissolved gasses in dielectric liquid from each separate oil compartment except diverter switch compartment	Automatic dielectric strength tester NRYN-1004	ER18-005	2020-12-03	±3%
		High precision full-automatic capacitance, inductance and dielectric loss measuring bridge 2840-Combi	ER18-003	2020-07-22	±0.02%rdg±0.01pF;±0.5%rdg±1×10 ⁻⁵
		Gas chromatogram analyzer 7890B	749-1732	2020-12-17	/
		Moisture analyzer CA-200	CA02-002	2020-05-09	±3μg (water for 10μg to 1mg or above) RSD 0.3% or under (water for 1mg or above)
17	Measurement of frequency response	Transformer winding deformation tester FRAX99	ER16-021	2021-01-15	/
18	Short-circuit withstand test	Voltage transformer TEMP-1000HU	EH112-001	2020-11-08	/
		Voltage transformer VEOS525	EH111-001	2020-10-09	/
		Voltage transformer VEOS525	EH111-002	2020-10-09	/
		Voltage transformer VEOS525	EH111-003	2020-10-09	/
		LCR automatic tester UC2860XD	ER16-063	2020-08-06	/
		Data collection 1-GEN16T-2	EI56-019	2021-01-02	/
		Current divider FLT1-30/2.5	EI30-016	2021-10-28	/
		Current divider FLT1-30/2.5	EI30-017	2021-10-28	/
		Current divider FLT1-30/2.5	EI30-018	2021-10-28	/
		Low sensitivity current divider FLP1	EI31-081	2021-02-26	/
		Low sensitivity current divider FLP1	EI31-082	2021-02-26	/
19	Lightning impulse test	Impulse voltage generator CJDY-1050kV/59kJ	750-009	2020-08-02	/
20	Measurement of no-load excitation characteristics	Transformer power loss test system TMS580-200-4000	749-1237	2020-08-25	Voltage range: 100V~200kV, accuracy; 0.12% current range: 1A~4000A, accuracy; 0.15%
21	Long-duration no-load test				
22	Measurement of short-circuit impedance on LV				
23	Measurement of zero-sequence impedances on three-phase transformers				
24	Measurement of the harmonics of the no-load current				

Test Report		China National Center for Quality Supervision and Test of Electrical Apparatus Products		№: 20M0561-S Total 68 Page 68	
Instruments used in the tests					
No	Test items	Name & type of instrument	Number & validity		Accuracy level
25	Temperature-rise test	Transformer power loss test system TMS580-200-4000	749-1237	2020-08-25	Voltage range: 100V~200kV, accuracy; 0.12% current range: 1A~4000A, accuracy; 0.15%
		Thermocouple Type T	TT33-129/130/131/132/1 33/134	2021-02-16	/
		Data acquisition/switch unit 34970A	TT11-065	2021-02-16	V±5.25%, A±1.5%, T±1°C, Ω±0.81%
		DC resistance tester JYR(50C)	ER16-055	2020-10-09	0.2%±0.2μΩ
		DC resistance tester JYR(50C)	ER16-056	2020-10-09	0.2%±0.2μΩ
		Electronic stopwatch PC396	HT15-010	2021-03-23	/
		Infrared gas leak detector and temperature imager GF306	TT14-017	2020-11-13	±2%(reading range) or ±2°C
26	Leak testing with pressure for liquid-immersed transformers	Pressure gauge Y-100	FP81-428	2020-10-07	Class 1.6
27	Determination of sound levels	Transformer power loss test system TMS580-200-4000	749-1237	2020-08-25	Voltage range: 100V~200kV, accuracy; 0.12% current range: 1A~4000A, accuracy; 0.15%
		Sound level meter 2270	SP01-013	2020-08-12	Class 1
		Sound level calibrator 4231	SP01-020	2020-07-22	Class 1
		Steel tapeline	LS05-032	2021-04-15	/
28	Mechanical strength test of tank	Pressure gauge Y-100	FP81-428	2020-10-07	Class 1.6
		Steel tapeline	LS05-032	2021-04-15	/
		Vacuum gauge	FP81-514	2020-07-07	Class 2.5
The remainder of this page is intentionally left blank.					

DECLARATION

- 1.The report is invalid without special seal for testing and page combining seal on the report;
2. The report is invalid if altered;
3. The report is invalid without signatures of persons for drawing up,
proof-reading, reviewing and approval;
4. The report is valid only for the inspected and tested samples.

NOTICE

1. In case there is any objection to this report, please raise it to the laboratory within fifteen days starting from the date of receiving the report, Thank you for your cooperation.
2. In case there is no objection, please take back the samples within one month starting from the date of receiving the report, when the manufacturer is going to take back the samples, certificate for sample taking and along with the written approval for the report should be brought in presence, only then the samples could be taken back. On time due, the samples will be in the laboratory's own disposal.

The test report is in total 68 pages including 28 figures and 3 photos

Typewriter Yuan Xiaoyong Proofreader Liu Yongning Binder Yuan Xiaoyong

Address: No.5 Qianzhu Rd., Yuexi, Wuzhong District, Suzhou

Tel: (0512)66556600(switchboards) 68252753 68081201

Fax: (0512)68081686

Post code: 215104

<http://www.eeti.cn>

E-mail: [eservice @eeti.c](mailto:eservice@eeti.c)

