CHINT

Empower the World



CHINT Power Quality Product Brochure

ABOUT CHINT



CHINT A leading global provider of smart energy solutions

CHINT was established 38 years ago in 1984 and built from the capital of approximately 8,000 US dollars. With our rapid development these years, CHINT has become the world's leading intelligent energy solutions provider for the whole industrial chain with the most complete product ranges. our annual sales revenue exceeded 16.1 billion dollars and total assets of more than 16.2 billion.

Over two decades of global expansion, our business network covers more than 140 countries and regions worldwide in business industries of low-voltage electric, power transmission and distribution, smart technology, energy instruments and meters, green energy, solar and more. CHINT has more than 40,000 employees worldwide, creating more than 200,000 jobs in the industrial chains.

As the market localization progresses steadily, CHINT Global further establishes its supply chain through business integration and industrial upgrade. Optimizing the service system and project financing, providing innovatively integrated technical services for the global energy market, and a flexible working business model.energy, intelligent manufacturing and digital technology, CHINT has adopted “One Cloud & Two Nets” as the business strategy, takes "CHINT Cloud" as the carrier of intelligent technology and data application, and takes the lead in building the energy Internet of things (EIoT) and industrial Internet of things platforms (IIoT).

Focusing on the energy system of supply, storage, transmission, distribution and consumption, CHINT has core businesses of clean energy, energy distribution, big data and energy value-added services. Furthermore, CHINT’s pillar businesses include photovoltaic equipment, energy storage, power transmission & distribution, low-voltage apparatuses, intelligent terminals, software development and control automation. By developing into a platform-based enterprise, CHINT provides a package of energy solutions for public institutions, industrial & commercial users and end-users, by building a regional smart energy operation ecosphere.

Main Businesses

- Clean Energy
- Low-voltage Apparatus
- Power Transmission and Distribution
- Instrumentation and Apparatus
- Smart Home
- Intelligent Building
- Intelligent Manufacturing
- Industry Automation
- Smart Heating
- Smart Water
- Home Electrical Apparatus
- Energy Efficiency Management

ABOUT CHINT ELECTRIC

CHINT Electric Co., Ltd is a subsidiary of CHINT Group Corporation. With the wide range of transmission and distribution products, as well as the systematic and professional solution, CHINT Electric has supplied products and EPC services to customers over 140 countries across different industrial sectors, including power utility, renewable energy, oil and gas, metallurgy, railway and so on. Now CHINT Electric Co., Ltd has become one of the main players for Power T&D equipment and EPC services in the world.

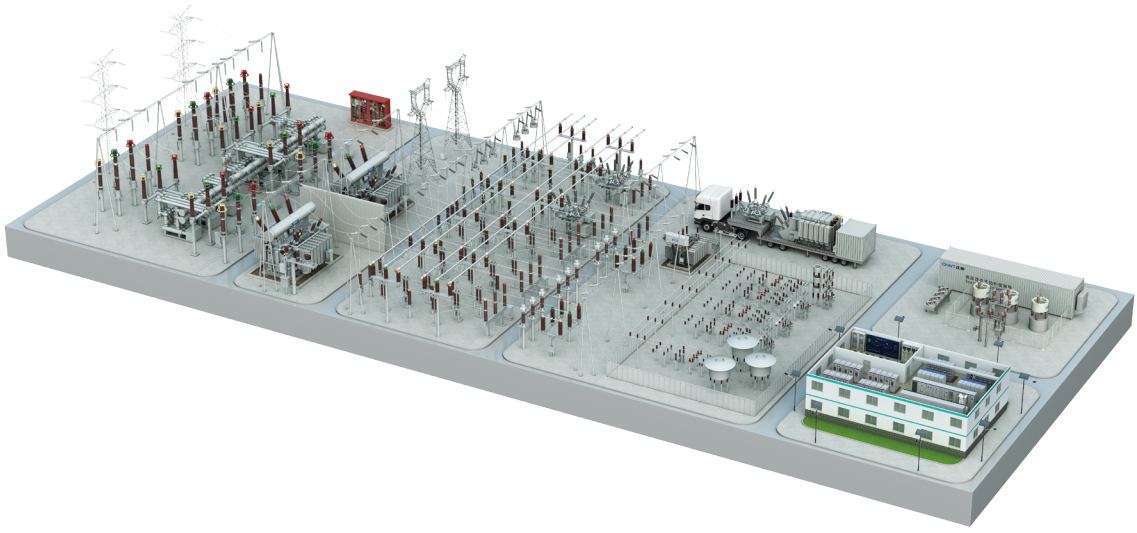
Product Line

The product series is designed solely for the electrical systems with maximum voltage 750kV, covering around 2000 kinds of products within 150 series.

Product Range

- Power Transformer (Up to 750kV)
- SVG Transformer (Up to 35kV)
- Dry-type Transformer (Up to 35kV)
- Reactor (Up to 252kV)
- GIS (Up to 252kV)
- Circuit Breaker and Disconnector (Up to 252kV)
- MV & LV Switchgear Panels
- Surge Arrester and Insulator (Up to 1000kV)
- Current Transformer and Potential Transformer (Up to 500kV)
- Vacuum Circuit Breaker (Up to 12-40.5kV)
- Distribution Automation System
- Cable (Up to 36kV)
- Capacitor (Up to 230kV)





GLOBAL FOOTPRINT



4 National R&D Centers: North America, Europe, Asia Pacific, North Africa

6 International Marketing Territories: Asia Pacific, Western Asia and Africa, Europe, Latin America, North America, China

14 Manufacturing Bases: China (Wenzhou, Hangzhou, Shanghai, Jiaxing, Xianyang, Jinan, Yancheng), Thailand, Singapore, Vietnam, Malaysia, Egypt, Algeria and Cambodia

20+ International Logistics Centers

2300+ Sales Companies

GLOBAL CAPACITY LAYOUT

The industrial manufacturing bases are mainly located in Wenzhou, Hangzhou, Shanghai, Jiaxiang, Xianyang and Yancheng. Additionally, CHINT has set up factories in Thailand, Singapore, Vietnam, Malaysia, Egypt, Cambodia etc.


Wenzhou Manufacturing Base


Hangzhou Manufacturing Base


Shanghai Manufacturing Base


Jiaxing Manufacturing Base



Xianyang Manufacturing Base


Jinan Cable Manufacturing Base


Yancheng New Energy Manufacturing Base


Wuhan Manufacturing Base



Singapore Complete Electric Equipment Manufacturing Base



Vietnam Manufacturing Base



Malaysia Manufacturing Base


Egypt Manufacturing Base



Algerian Manufacturing Base


Cambodia Manufacturing Base



Thailand Solar Power Manufacturing Base

R&D, QUALITY, SALES, LOGISTICS

Main Advantages

Global R&D System

CHINT has established national R&D centers in North America, Europe, Asia Pacific, North Africa and other areas. We have explored the mode of Industry-University Research Institute Collaboration and Integration together with the universities and research institutions worldwide so as to integrate the global innovation resources and promote corporate R&D innovation and talent cultivation.

24 research institutes

The average annual R&D investment accounts for 4-12% of the revenue

Over 6000 patents in total

Global Certification

The products have passed the standards and specifications in various regions around the world and obtained numerous international certifications

Honors

- No. 1 in China's Top 100 Private Enterprises with Social Responsibility in 2021
- No. 92 in 2021 China's Top 500 Private Enterprises
- No. 244 in 2021 Top 500 Chinese Enterprises
- The intelligent manufacturing factory of low-voltage electrical appliances was selected as the national 2021 Intelligent Manufacturing Demonstration Factory



Integrated Vertical R&D

By gathering the global industry elites to Provide safe and stable energy-saving green and advanced electric products.

5%

At least 5% of revenue is invested in research and development



Great Quality System

Ensuring flaw-free and trouble-free products, the multi-dimensional and multilevel control is conducted through procurement, inspection, quality control and certification.



One-stop Services

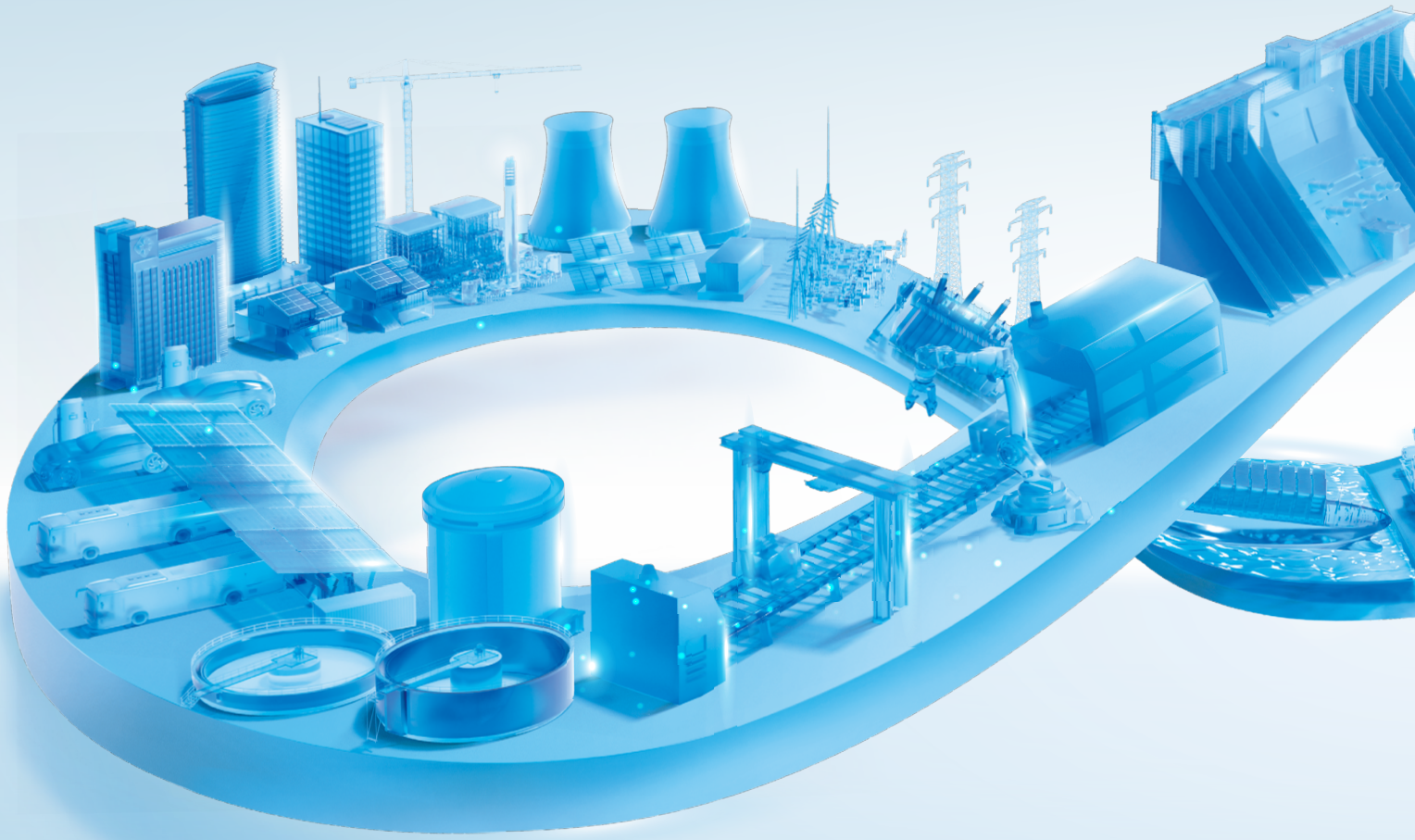
CHINT's concept is that it is not difficult to fulfill a high-quality logistics distribution at one time, while it is difficult to stay as accurat e and prompt as the first-time. High-efficiency and high-precision accuracy are our requirement.



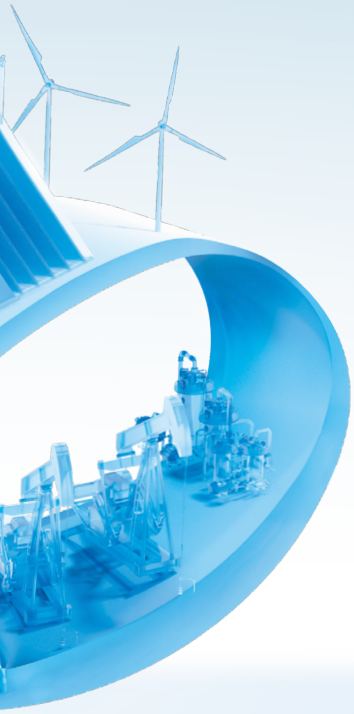
48-Hour Response

Providing end-to-end one-stop services for customers with complains, business consulting and technical support by solving problems immediately and including any possible problems in advance.

48 hour Global Services



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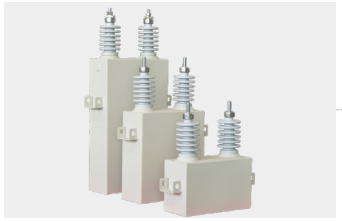
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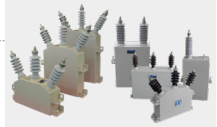
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1.0

Product Family Diagram



Capacitor Unit





Shunt Capacitor Bank





MCR/TCR type Dynamic Reactive Power Compensation Installation





BKGKL type Shunt Reactor



Static Var Generator

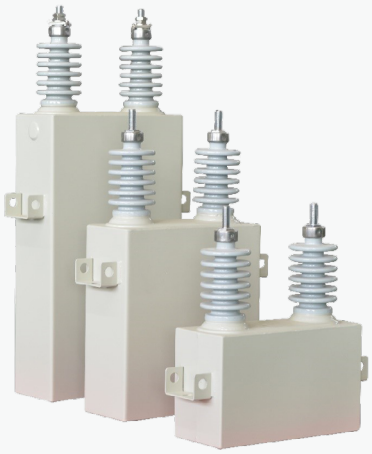
Passive products

Active products

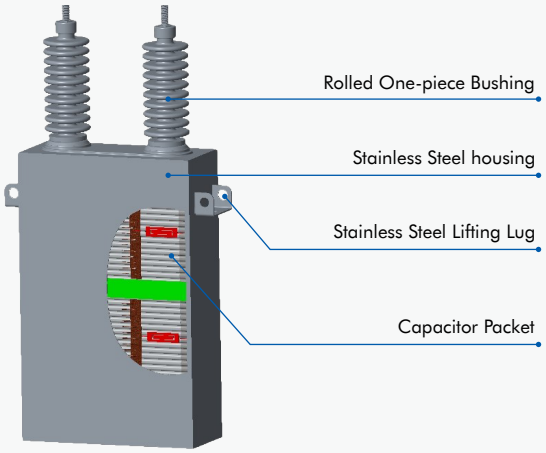
Power Quality Product Family

2.0 Product Introduction

2.1 Shunt Capacitor Unit



Capacitor Real Diagram



Capacitor 3D Structure Diagram

Product Features

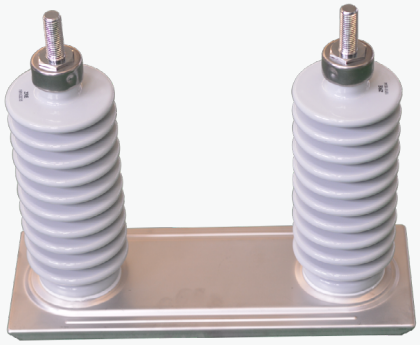
The BAM type high-voltage shunt capacitors produced by CHINT Electric Co., Ltd. are the new generation of all-film high-voltage power capacitors with multiple patents. Their novel and unique **ultrasonic welding technique, internal fuse assembly technique** and other processes enable them to have advanced electrical performance.

Shunt capacitor units are applicable to AC power systems with a power frequency of 50 Hz or 60 Hz and a rated voltage of 1 kV and above. They are mainly used to provide power systems with reactive power, raise the power factor of power grids, lower losses, and improve voltage quality and the efficiency of power supply equipment.

Capacitors are classified into internally fused type and fuseless type based on their different capacity and voltage.

a) Rolled one-piece bushing for solving tightness problem

Casing Torque
≥45N·m
Bending Strength
≥1000N
Tensile Strength
≥1500N



2.0

Product Introduction

b) Stainless steel housing treated with special processes to prevent paint-peeling

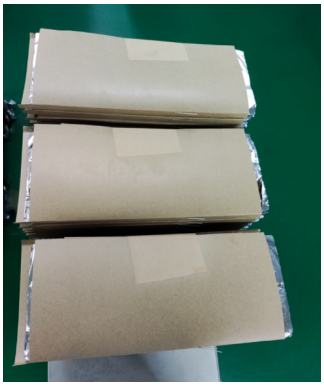
· Formed through bending and seal welding of 1.5 mm thick stainless steel plates, the housing is subject to shot blasting to remove dirt and oxidation layer from the stainless steel surface and roughen the surface, thus allowing the paint to increase its adhesive strength, not fall off easily and be uniform and fine, and making the surface smooth and beautiful.

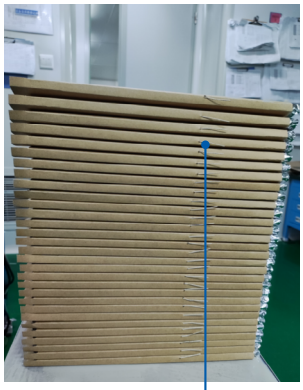
c) Stainless steel lifting lugs with standard mounting dimensions to facilitate the replacement of the product

· Stainless steel lifting lugs have standard mounting dimensions to facilitate the replacement of the product. The bottom of each lifting lug is not painted in order to ensure reliable earthing.

d) Unique internal fuse structure to ensure uniform distribution of electric field inside the capacitor unit

· The capacitor unit is provided with internal fuses, whose unique assembly structure and manufacturing method ensure the uniform distribution of the electric field in the capacitor element and the improvement of electrical performance.





e) Vacuum treatment and low-viscosity insulating oil to improve the electrical performance of the capacitor unit

· Vacuum treatment is conducted by placing the capacitor unit horizontally, and the liquid dielectric is benzyl-toluene with low viscosity and high aromaticity (France C101), which has superior insulation properties to ensure impregnation effect and to improve the product's withstand voltage.



2.0

Product Introduction

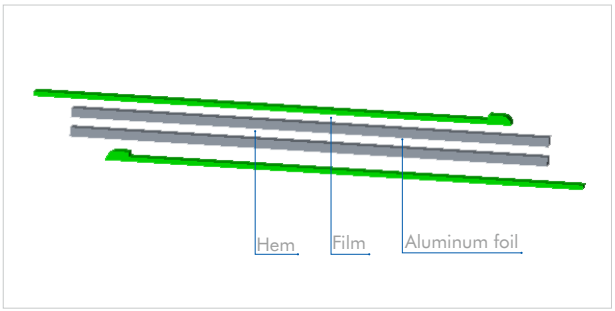
f) Ultrasonic welding to improve heat dissipation and reduce losses of the capacitor unit

· The ultrasonic welding procedure that does not generate heat is used between elements, so as not to damage the insulating dielectric. The resistivity is close to zero.



g) Aluminum foil hemming structure to improve electric field distribution and reduce partial discharge

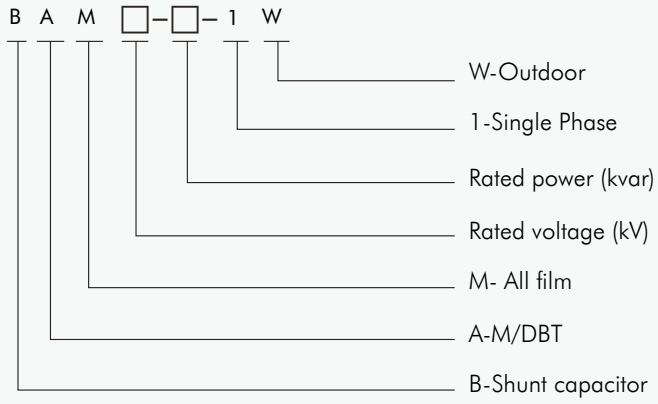
· An element is formed by winding and flattening the aluminum foils (plates) and double-sided roughened polypropylene film (solid dielectric) together. Both ends of the element are hemmed to improve the distribution of the electric field on the plate edges and the partial discharge performance of the product.



2.0 Product Introduction

Product Model and Meaning

- Type Designation



- Standard Adopted

• IEC 60871

- Operating Environmental Conditions

· Place of installation: indoor or outdoor
· Altitude: ≤ 2000 m
· Ambient temperature: -40℃ ~+55℃
· The place of installation and operation shall be free of violent mechanical vibrations, harmful gases and vapors, and electrically conductive or explosive dust
· Relative humidity: monthly average not more than 90% and daily average not more than 95%
· Earthquake intensity: ≤ Intensity VIII

- Electrical Parameters of Capacitor Unit

Rated voltage	Rated frequency	Rated capacity	Capacitance tolerance	Loss tangent tanδ	Lightning impulse voltage
1~24kV	50 Hz / 60 Hz	30 ~ 700 kvar (negotiable for a special model)	-3% ~ +5%	≤ 0.0003	75, 95, 110, 125, 150, 170, 200 kV

Maximum allowable overvoltage	Maximum allowable overcurrent	Self-discharge characteristic of built-in discharge resistor
1.1 Un	1.3 In	dropping from √2Un to below 75V within 10 min of power failure

2.0 Product Introduction

Mechanical Parameters of Capacitor Unit

S/N	Model	Rated Voltage (kV)	Rated Capacitance (μF)	Weight (kg)	Dimensions (mm)			Figure No.
					B	h1	H	
1	BAM3.46-200-1W	3.46	53.2	38	145	120	460	Figure 1
2	BAM3.46-300-1W	3.46	79.81	54	173	220	580	Figure 1
3	BAM3.46-400-1W	3.46	106.41	62	173	220	710	Figure 1
4	BAM3.46-500-1W	3.46	133.01	78	183	220	840	Figure 1
5	BAM3.81-200-1W	3.81	43.86	37	145	120	460	Figure 1
6	BAM3.81-300-1W	3.81	65.82	54	173	220	580	Figure 1
7	BAM3.81-400-1W	3.81	87.76	62	173	220	710	Figure 1
8	BAM3.81-500-1W	3.81	109.7	79	183	220	850	Figure 1
9	BAM4.16-200-1W	4.16	36.81	38	145	120	460	Figure 1
10	BAM4.16-300-1W	4.16	55.21	55	173	220	590	Figure 1
11	BAM4.16-400-1W	4.16	73.61	62	173	220	710	Figure 1
12	BAM4.16-500-1W	4.16	92.01	79	183	220	850	Figure 1
13	BAM4.16-500-1W	4.16	92.14	76	173	220	860	Figure 1
14	BAM3.64-200-1W	3.64	48.07	38	145	120	460	Figure 1
15	BAM3.64-300-1W	3.64	72.11	55	173	220	590	Figure 1
16	BAM6.35-100-1W	6.35	7.90	24	145	120	270	Figure 2
17	BAM6.35-200-1W	6.35	15.79	38	145	120	490	Figure 2
18	BAM6.35-300-1W	6.35	23.7	54	173	220	580	Figure 2
19	BAM6.35-400-1W	6.35	31.59	64	173	220	730	Figure 2
20	BAM6.35-500-1W	6.35	39.48	78	183	220	840	Figure 2
21	BAM6.35-600-1W	6.35	47.39	87	198	220	900	Figure 2
22	BAM6.93-400-1W	6.93	26.54	62	173	220	710	Figure 2
23	BAM6.93-500-1W	6.93	33.17	78	183	220	840	Figure 2
24	BAM6.93-600-1W	6.93	39.79	86	198	220	890	Figure 2
25	BAM8.66-400-1W	8.66	16.99	62	173	220	710	Figure 2
26	BAM8.66-500-1W	8.66	21.23	80	183	220	860	Figure 2
27	BAM8.66-600-1W	8.66	25.48	87	198	220	900	Figure 2
28	BAM7.96-100-1W	7.96	5.03	24	145	120	280	Figure 2
29	BAM7.96-200-1W	7.96	8.38	34	145	120	420	Figure 2
30	BAM7.96-300-1W	7.96	12.57	45	145	220	590	Figure 2
31	BAM7.96-400-1W	7.96	20.11	62	173	220	710	Figure 2
32	BAM7.96-500-1W	7.96	25.13	78	183	220	840	Figure 2
33	BAM13.28-100-1W	13.28	1.81	23	155	120	270	Figure 3
34	BAM13.28-200-1W	13.28	3.01	36	155	120	430	Figure 3
35	BAM13.28-300-1W	13.28	4.51	48	155	220	600	Figure 3
36	BAM13.28-400-1W	13.28	7.22	62	180	220	710	Figure 3
37	BAM13.28-500-1W	13.28	9.03	80	190	220	860	Figure 3
38	BAM13.28-600-1W	13.28	10.83	87	202	220	900	Figure 3
39	BAM13.28-700-1W	13.28	12.64	94	202	220	1000	Figure 3
40	BAM13.86-100-1W	13.86	1.66	23	155	120	270	Figure 3

2.0

Product Introduction

S/N	Model	Rated Voltage (kV)	Rated Capacitance (μF)	Weight (kg)	Dimensions (mm)			Figure No.
					B	h1	H	
41	BAM13.86-200-1W	13.86	3.32	35	155	120	430	Figure 3
42	BAM13.86-300-1W	13.86	4.97	54	180	220	580	Figure 3
43	BAM13.86-400-1W	13.86	6.63	62	180	220	710	Figure 3
44	BAM13.86-500-1W	13.86	8.29	78	190	220	840	Figure 3
45	BAM13.86-600-1W	13.86	9.95	87	202	220	900	Figure 3
46	BAM13.86-700-1W	13.86	11.60	94	202	220	1000	Figure 3
47	BAM24-500-1W	24	2.76	73	180	220	800	Figure 3
48	BAM24-600-1W	24	3.32	94	202	220	1000	Figure 3
49	BAM24-700-1W	24	3.87	101	202	220	1030	Figure 3
50	BAM12-500-1W	12	11.06	80	202	220	850	Figure 3
51	BAM12-700-1W	12	15.48	101	198	220	1030	Figure 3

Note: 1. Dimensions and weights in the table are for reference only, and the actual dimensions and weights shall be subject to the order
2. Due to the limitation of space, only some models are listed in the table, and other models of capacitors can be customized according to the requirements
3. Filter capacitors need to be customized based on engineering parameters
4. The detailed parameter data shall be subject to the parameters confirmed in a specific project
5. Capacitors with a rated voltage of 12 kV and below are available with a single bushing or double bushings
6. Capacitors with a rated voltage of above 12 kV are generally available with a single bushing
7. Each capacitor may be provided with 2, 3 or 4 lifting lugs depending on requirements

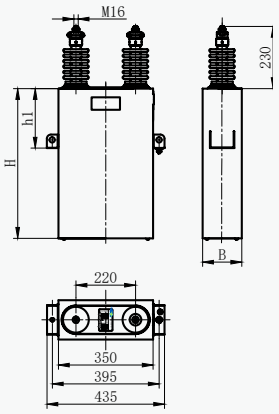


Figure 1

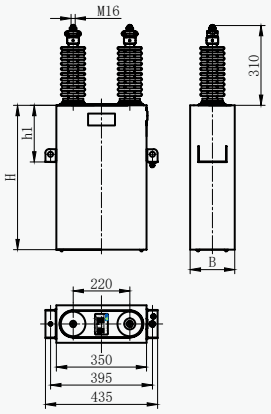


Figure 2

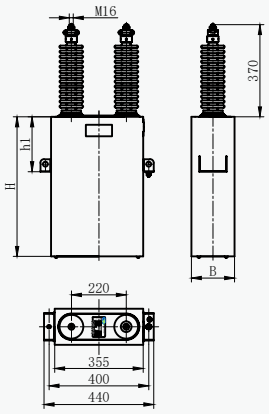


Figure 3

2.0

Product Introduction

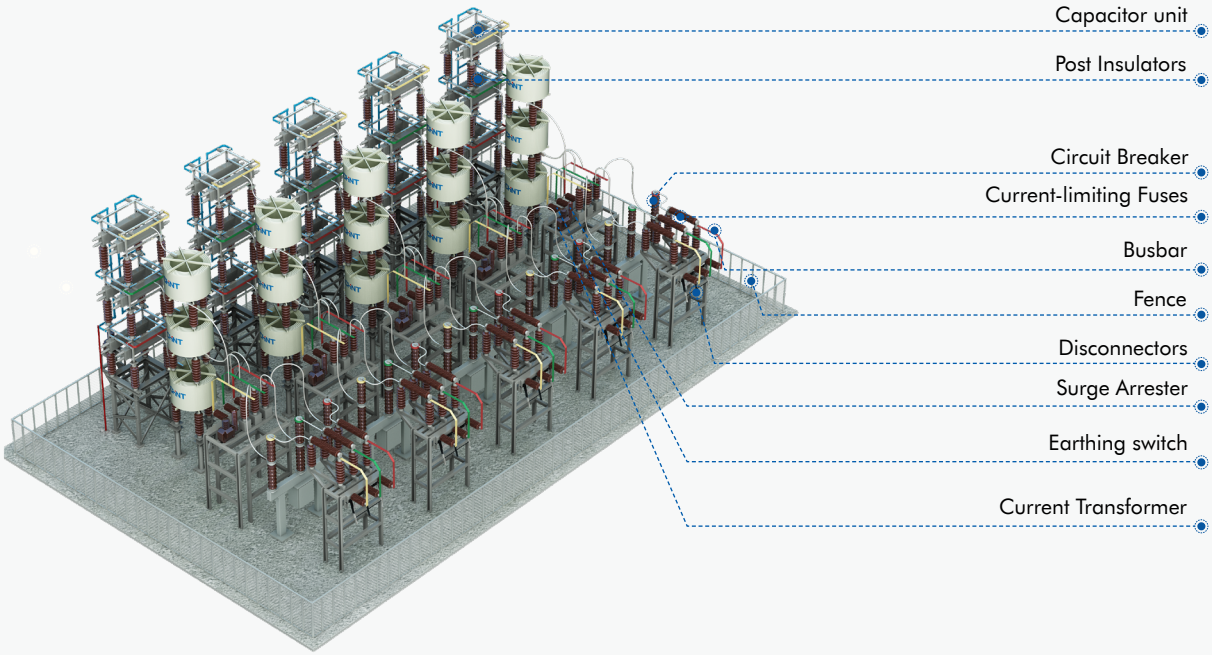
2.2 Capacitor Bank Installation

TA capacitor bank installation (hereinafter referred to as "the installation") is mainly applicable to 1 ~ 230 kV, 50/60 Hz AC power systems to compensate for the capacitive reactive power of the systems, lower losses, improve power quality, raise power factor, increase the active output of the transformers, and improve system stability.

The installations may be classified into frame, indoor cabinet, container and pole-mounted types based on the different places of installation.

Structure Diagram of Capacitor Bank Installation

- A shunt capacitor bank installation mainly consists of capacitor units, series reactors, disconnectors, zinc oxide arresters, current transformers, contactors (circuit breakers), buses, post insulators, fuses, flexible connection wires, cabinets, frames, fences or containers, etc.



TBB type



TBBF type



TBBX type



TBBZ type

2.0

Product Introduction

2.2.1 Product Features of TBB Type Capacitor Bank Installation

- The TBB type capacitor bank installation generally provides fixed compensation, and the capacitor banks are controlled by manually switching on or off them. Frame capacitor banks are generally applied to power grids or industrial and mining enterprise users with fairly stable loads.

a) Series and parallel combination of capacitor units to meet high-voltage and high-capacity requirements

· High-voltage and high-capacity design requirements can be met by series and parallel connection of several capacitor units;
· The installation is of bulk construction to facilitate the replacement of damaged capacitor units.

b) Charged design of the frame to improve the operational reliability of the capacitor bank

· The charged design of the capacitor frame can effectively reduce the voltage between the capacitor plate and the case to ensure the reliable operation of the capacitor bank.



Potential fixing busbar

c) Modular design of capacitor bank to facilitate transportation and installation



Integrated module of capacitor units

d) Outdoor installation, good heat dissipation, and basically maintenance-free

2.0

Product Introduction

2.2.2 Features of TBBF Type Grouped Shunt Capacitor Installation

- The TBBF type grouped shunt capacitor installation is a new type of cabinet installation, which is subdivided into capacitor banks with equal capacity or capacitor banks with unequal capacity. The installation uses vacuum contactors or vacuum circuit-breakers and automatic voltage and reactive power control devices to automatically switch and control capacitor banks for the purpose of automatically regulating the bus voltage, compensating for the reactive power and increasing the voltage qualification rate and power factor. It is safe and reliable.

a) Intelligent power factor controller for automatic control of capacitor banks to ensure the power factor is not below 0.95

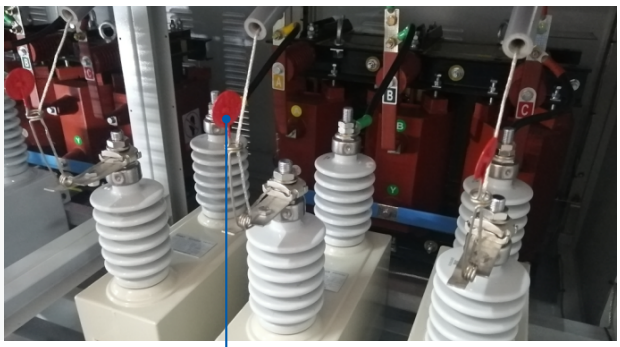
· The current signals of incoming cabinets on the HV/LV side of the main transformer and the three-phase voltage signals of the bus PT cabinet are collected by the intelligent power factor controller, which automatically analyzes and calculates the active power, reactive power and power factor of the system, thus the capacitor banks are switched automatically to maintain the power factor of the system above 0.95.



Intelligent power factor

b) Capacitor units configured with external fuses for rapid prevention of accident expansion

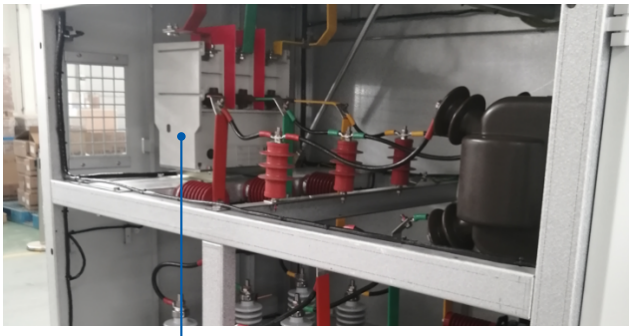
· Expulsion type external fuses provide protection to ensure effective blowout within 75 s when the equipment current is 1.5 times In, thus preventing the expansion of the accident.



Expulsion type external fuse

c) Definite purpose contactors to meet the needs of frequent switching

· Definite purpose contactors are used to meet the Class C2 switching requirements, thus the capacitor installation can be switched on/off frequently.



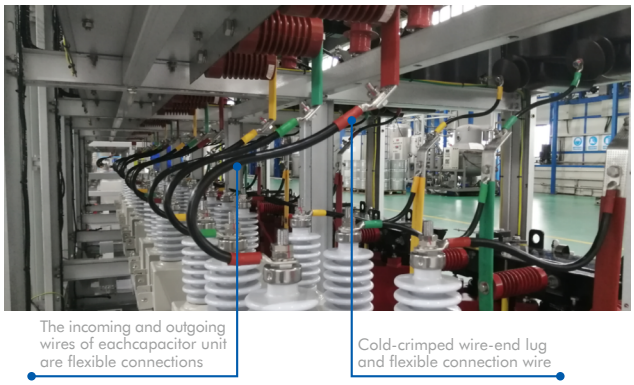
Definite purpose contactor for capacitor switching

2.0

Product Introduction

d) Cold-crimped flexible connections to prevent the bushings of capacitor units from fracturing under stress

· Flexible connections are adopted between each capacitor unit and other equipment to prevent the bushing of the capacitor unit from fracturing under stress due to thermal expansion and contraction or vibration.



e) Multiple switching judgment bases of the controller to support the switching of multiple circuits of capacitor banks

· The controller with better performance provides multiple switching judgment bases including voltage, reactive power, time, and filtering to support the switching of 10 circuits of capacitor banks at most, and can display the 2nd to 63rd system harmonic content and support harmonic over-limit alarm.

f) Testing of multiple indicators for com-prehensive protection of installations

· Comprehensive protection functions: low voltage, overvoltage, delay quick breaking, overcurrent, unbalanced current, harmonic, and other capacitor bank protection functions.

g) Multiple operation management modes to meet the unattended operation requirements of substations

· The installation can be networked with other monitoring equipment in a substation through communication interfaces to form an integrated automation system for the substation, thus meeting the requirements of multiple operation management modes of the substation, including unattended operation and centralized control.

2.2.3 Features of TBBX Type Outdoor Container High-voltage Shunt Capacitor Installation

- The TBBX type outdoor container high-voltage shunt capacitor installation is a new type of capacitor bank installation that integrates high-voltage shunt capacitor bank, switch, controller and protection system, intelligent temperature controller, and heat dissipation and dehumidification system.

a) Standard container housing to fit for use in high-pollution occasions of users

· The housing of this installation is a standard container, whose door panel is made of bent and welded corrugated sheets and which can reach a degree of protection of IP54 and above.



2.0

Product Introduction

b) Container with good thermal insulation property

· Good thermal insulation property enables the capacitor installation to be protected against the impact of external temperature change and allows the capacitor bank to operate more stably.

c) High level of integration to make the equipment ready to use

· Multiple components including the capacitor bank, switchgear and protective equipment are integrated.

d) Meeting the sea and land transportation requirements of export, with classification society certification

2.2.4 Features of TBBZ Type Outdoor Pole-mounted Shunt Capacitor Installation

■ The TBBZ type pole-mounted shunt capacitor installation (hereinafter referred to as "the installation") is applicable to 6 ~ 35 kV high-voltage distribution lines and mainly used to compensate for the inductive reactive power loss of the lines, raise the power factor and improve the system voltage. The Installation mainly has an outdoor container structure, which is composed of shunt capacitor, drop-out fuse, zinc oxide arrester, open-core current transformer, vacuum contactor, straight-through current transformer, voltage transformer, intelligent power factor controller, housing, etc. The straight-through current transformer collects the current information of transmission lines, while the voltage transformer collects the voltage information of transmission lines. The intelligent power factor controller calculates the reactive power gap of transmission lines, thus automatically switching on or off the reactive power compensator.



a) Open-core structure for current sampling, no need to cut the overhead line, and facilitating the installation on site

b) More comprehensive protection functions

· The controller provides overcurrent protection, and drop-out fuses are also configured to provide backup protection for the capacitor bank.

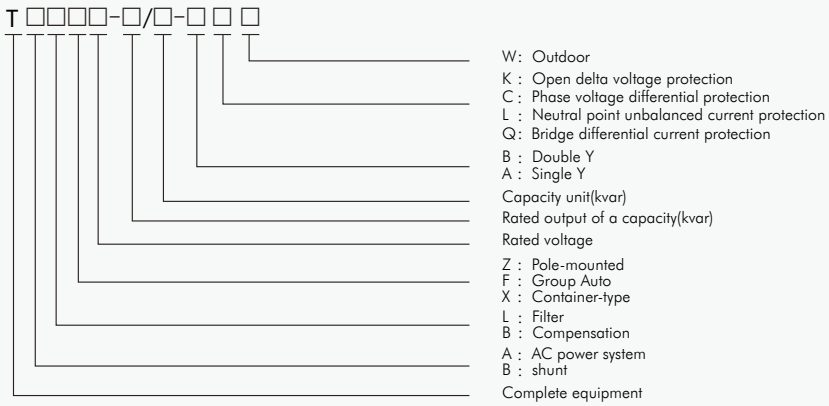
c) Low investment and high economy

· Additional investment in voltage regulators is not required for transmission lines.

2.0 Product Introduction

Product Model and Meaning

- Type Designation



- Standard Adopted

• IEC 60871

- Operating Environmental Conditions

· Place of installation: indoor or outdoor
· Altitude: ≤ 2000 m
· Ambient temperature: -40℃ ~+55℃
· The place of installation and operation shall be free of violent mechanical vibrations, harmful gases and vapors, and electrically conductive or explosive dust
· Relative humidity: monthly average not more than 90% and daily average not more than 95%
· Earthquake intensity: ≤ Intensity VIII

Installation System Voltage	Rated Capacity of Installation
AC 1 ~ 230 kV	50 ~ 120,000 kvar

Capacitance Tolerance

The allowable deviation of the measured capacitance from the rated capacitance of the installation shall be 0 ~ +5%;
The ratio of the maximum phase capacitance to the minimum phase capacitance inside the installation shall be less than or equal to 1.02;

Rated Inductance

The allowable deviation of the measured inductance from the rated inductance shall be 0 ~ +5%;
The phase reactance value shall not be beyond ±2% of the average value of the three phases;

2.0 Product Introduction

Insulation Level

Insulation Level Table

Unit: kV

Nominal voltage of system (RMS)	Maximum voltage of equipment, U_m (RMS)	Rated lightning impulse withstand voltage (peak)	Rated short-duration power-frequency withstand voltage (RMS)	One-minute power-frequency withstand voltage of secondary circuit (RMS)
3	3.6	40	25	3
6	7.2	60	30	
10	12	75	42	
15	18	105	55	
20	24	125	65	
35（33~34.5）	40.5	185	95	
66（66~69）	72.5	325	140	
110（110~115）	123	550	230	
138	145	650	275	
230	245	1050	460	

Overload Capacity

a) Steady-state Overvoltage

Overvoltage Capacity Table

Form	Voltage factor	Maximum duration	Description
power frequency voltage	1.00	Continuous	The maximum duration is the maximum average value within any time period of capacitor energization, and the following provisions shall be followed for any exception that the maximum duration is less than 24 h during energization.
power frequency voltage	1.10	12 h for every 24 h	System voltage regulation and fluctuation
power frequency voltage	1.15	30 min for every 24 h	System voltage regulation and fluctuation
power frequency voltage	1.20	5 min	Voltage rise under light load
power frequency voltage	1.30	1 min	

b) Steady-state Overcurrent

· The installation can operate for a long time when the root mean square (RMS) does not exceed 1.37 In (1.05×1.3).

Discharge Performance

A discharge resistor is installed in a capacitor unit, so the voltage on both ends of the capacitor can be reduced to below 75 V within 5 min after the installation is powered off

Protection Method of Capacitor Bank

Depending on different connection types, the installations are provided with different protection methods, which mainly include:

- Single Y-connection: Open delta voltage protection; Phase voltage differential protection; Bridge differential current protection;
- Double Y-connection: Unbalanced current protection.

2.0

Product Introduction

Table of Mechanical Parameters of TBB Type Capacitor Bank Series Products

Model	Rated capacity (kvar)	Rated voltage (kV)	Rated reactance ratio	Overall dimensions (mm)	Remarks
TBB10(6)-800/267-AKW	800	10(6)	5% (12%)	≤4500×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-800/267-AK	800	10(6)	5% (12%)	≤4000×2000×1800	INDOOR FRAME TYPE
TBB10(6)-1000/334-AKW	1000	10(6)	5% (12%)	≤4500×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-1000/334-AK	1000	10(6)	5% (12%)	≤4500×2000×1800	INDOOR FRAME TYPE
TBB10(6)-2000/334-AKW	2000	10(6)	5% (12%)	≤5000×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-2000/334-AK	2000	10(6)	5% (12%)	≤4500×2000×1800	INDOOR FRAME TYPE
TBB10(6)-3000/334-AKW	3000	10(6)	5% (12%)	≤5000×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-3000/334-AK	3000	10(6)	5% (12%)	≤4500×2000×1800	INDOOR FRAME TYPE
TBB10(6)-4000/334-AKW	4000	10(6)	5% (12%)	≤5000×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-4000/334-AK	4000	10(6)	5% (12%)	≤4500×2000×1800	INDOOR FRAME TYPE
TBB10(6)-5000/334-AKW	5000	10(6)	5% (12%)	≤5500×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-5000/334-AK	5000	10(6)	5% (12%)	≤5000×2000×1800	INDOOR FRAME TYPE
TBB10(6)-6000/334-BLW	6000	10(6)	5% (12%)	≤5500×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-6000/334-BL	6000	10(6)	5% (12%)	≤5000×2200×1800	INDOOR FRAME TYPE
TBB10(6)-8000/334-BLW	8000	10(6)	5% (12%)	≤5500×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-8000/334-BL	8000	10(6)	5% (12%)	≤5500×2200×1800	INDOOR FRAME TYPE
TBB10(6)-10000/334-BLW	10000	10(6)	5% (12%)	≤6000×4000×1800	OUTDOOR FRAME TYPE
TBB10(6)-10000/334-BL	10000	10(6)	5% (12%)	≤6000×2200×1800	INDOOR FRAME TYPE
TBB20-2000/334-AKW	2000	20	5% (12%)	≤5500×4000×1800	OUTDOOR FRAME TYPE
TBB20-2000/334-AK	2000	20	5% (12%)	≤5500×2500×1800	INDOOR FRAME TYPE
TBB20-3000/334-AKW	3000	20	5% (12%)	≤5500×4500×1800	OUTDOOR FRAME TYPE
TBB20-3000/334-AK	3000	20	5% (12%)	≤5500×2800×1800	INDOOR FRAME TYPE
TBB20-4000/334-AKW	4000	20	5% (12%)	≤5500×4500×1800	OUTDOOR FRAME TYPE
TBB20-4000/334-AK	4000	20	5% (12%)	≤5500×2800×1800	INDOOR FRAME TYPE
TBB20-6000/334-BLW	6000	20	5% (12%)	≤6500×4500×1800	OUTDOOR FRAME TYPE
TBB20-6000/334-BL	6000	20	5% (12%)	≤5500×3000×1800	INDOOR FRAME TYPE
TBB20-8000/334-BLW	8000	20	5% (12%)	≤6500×4500×1800	OUTDOOR FRAME TYPE
TBB20-8000/334-BL	8000	20	5% (12%)	≤5500×3000×1800	INDOOR FRAME TYPE
TBB20-10000/334-BLW	10000	20	5% (12%)	≤6500×4500×1800	OUTDOOR FRAME TYPE
TBB20-10000/334-BL	10000	20	5% (12%)	≤5500×3000×1800	INDOOR FRAME TYPE
TBB35-60000/500-AQW	60000	35	5% (12%)	≤8500×9000×1800	OUTDOOR FRAME TYPE
TBB66-20000/417-BLW	20000	66	5% (12%)	≤7500×8500×1800	OUTDOOR FRAME TYPE
TBB66-40000/417-BLW	40000	66	5% (12%)	≤8000×8500×1800	OUTDOOR FRAME TYPE
TBB66-60000/500-AQW	60000	66	5% (12%)	≤8500×9000×1800	OUTDOOR FRAME TYPE
TBB66-120000/500-AQW	12000	66	5% (12%)	≤12500×12000×1800	OUTDOOR FRAME TYPE

Note: The above models are the conventional models of capacitor installations only, and other models can be customized based on the actual demands of users.

Product Introduction

2.3 MSVC Type High-voltage Dynamic Reactive Power Compensator

The MSVC type high-voltage dynamic reactive power compensator (hereinafter referred to as "the installation") is a combination of the magnetically controlled reactor (MCR) and the high-voltage shunt (filter) capacitor (FC). Among them, the MCR mainly produces inductive reactive power in a dynamic manner, and the high-voltage shunt (filter) capacitor produces capacitive reactive power. The capacitive reactive power of the high-voltage shunt (filter) capacitor is neutralized through the adjustment of the inductive reactive power output by the MCR, thus realizing the dynamic adjustment of the installation to raise the power factor of the system, reduce voltage fluctuations, lower the line losses, and improve the system stability.

Structure of MSVC Type High-voltage Dynamic Reactive Power Compensator

- The magnetically controlled reactor (MCR) installation is composed of MCR, thyristor valve block, busbar, post insulator, conductor, fence, etc. The MCR is delta-connected, with the thyristor valve block installed on its body, and often installed outdoors. The control and protection system is installed in the main control room.



10 kV MCR



35 kV MCR body and FC filter branch

Features of MSVC Type High-voltage Dynamic Reactive Power Compensator

a) The MCR branch and the FC branch operate independently, with a perfect control and protection mechanism and high reliability;

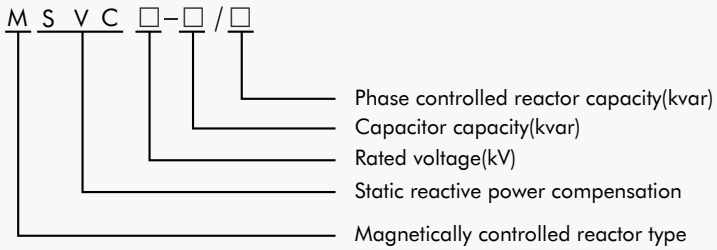
b) Continuously adjustable, quick response and accurate compensation;

c) Reduction of impaction and inrush current brought by frequent switching.

2.0

Product Introduction

Product Model and Meaning



Operating Environment

· Place of installation: indoor or outdoor
· Altitude: ≤ 2000 m
· Ambient temperature: -40℃ ~+55℃
· The place of installation and operation shall be free of violent mechanical vibrations, harmful gases and vapors, and electrically conductive or explosive dust
· Relative humidity: monthly average not more than 90% and daily average not more than 95%
· Earthquake intensity: ≤ Intensity VIII
· Pollution degree: Degree IV

Electrical Parameters of MSVC

Category of magnetically controlled reactor (MCR)	Rated voltage of MCR	Rated capacity of MCR	Capacity adjustment range of MCR	Response time of MCR	Loss of MCR	Place of installation of MCR
oil-immersed type	6 ~ 66 kV	100 ~ 30,000 kvar	1% ~ 100%	25 ~ 300 ms	0.5% ~ 2.5%	indoor or outdoor

Refer to the Table of Mechanical Parameters of TBB Type on Page 23 for the capacitor banks in MSVC.

2.0

Product Introduction

Mechanical Parameters of MCR in MSVC

Model	Rated capacity (kvar)	Rated voltage (kV)	Rated current (A)	Overall dimensions (mm)	Weight (kg)
MCR-600/10.5(6.3)	600	10.5(6.3)	33 (55)	≤1780×1750×1870	3100
MCR -1000/10.5(6.3)	1000	10.5(6.3)	55 (91.6)	≤2000×1875×2250	3100
MCR -1500/10.5(6.3)	1500	10.5(6.3)	82.5 (137.5)	≤2810×2510×2500	5760
MCR -2000/10.5(6.3)	2000	10.5(6.3)	110 (183.2)	≤3270×3100×2600	7400
MCR -2500/10.5(6.3)	2500	10.5(6.3)	137.5 (229.1)	≤3300×3160×2670	9000
MCR -3000/10.5(6.3)	3000	10.5(6.3)	165 (275)	≤3360×3160×2800	9800
MCR -3500/10.5(6.3)	3500	10.5(6.3)	192.5 (320.8)	≤4000×3500×3150	12600
MCR -4000/10.5(6.3)	4000	10.5(6.3)	220 (366.6)	≤4000×3500×3200	14000
MCR -4500/10.5(6.3)	4500	10.5(6.3)	247.4 (412.4)	≤4010×3560×3200	15800
MCR -5000/10.5(6.3)	5000	10.5(6.3)	275 (458.2)	≤4080×3620×3320	17500
MCR -6000/10.5(6.3)	6000	10.5(6.3)	330 (550)	≤4200×3700×3500	19600
MCR -8000/10.5(6.3)	8000	10.5(6.3)	440 (733.1)	≤4320×3750×3500	21600
MCR -10000/10.5(6.3)	10000	10.5(6.3)	550 (916.4)	≤4380×3880×3550	23500
MCR -1500/38.5	1500	38.5	22.5	≤3060×2820×2620	7000
MCR -2000/38.5	2000	38.5	30	≤3330×3320×3100	8500
MCR -3000/38.5	3000	38.5	45	≤3800×3500×3150	11000
MCR -4000/38.5	4000	38.5	60	≤4200×3600×3300	15500
MCR -5000/38.5	5000	38.5	75	≤4380×3820×3520	18400
MCR -6000/38.5	6000	38.5	90	≤4400×3940×3550	21000
MCR -7000/38.5	7000	38.5	105	≤4400×3940×3550	22500
MCR -8000/38.5	8000	38.5	120	≤4520×4050×3580	23500
MCR -10000/38.5	10000	38.5	150	≤4550×4080×3600	25600
MCR -12000/38.5	12000	38.5	180	≤5000×4400×3700	29500
MCR -15000/38.5	15000	38.5	225	≤5400×4500×3750	32500
MCR -18000/38.5	18000	38.5	270	≤5500×4600×3750	33000
MCR -20000/38.5	20000	38.5	300	≤5600×4700×3800	35000
MCR -10000/66	10000	66	87.5	≤4800×4800×3800	45000
MCR -16000/66	16000	66	140	≤4950×5100×3950	58000
MCR -20000/66	20000	66	175	≤5100×5300×4100	65000
MCR -25000/66	25000	66	218.7	≤5150×5400×4200	72000
MCR -30000/66	30000	66	262.4	≤5250×5500×4250	76000

Note: The above models are the conventional models of MSVC installations only, and other models can be customized based on the actual demands of users.

2.0

Product Introduction

2.4 TSVC Type High-voltage Dynamic Reactive Power Compensator

The TSVC type high-voltage dynamic reactive power compensator (hereinafter referred to as "the installation") is a combination of the thyristor controlled reactor (TCR) and the high-voltage shunt (filter) capacitor (FC). Among them, the TCR mainly produces inductive reactive power in a dynamic manner, and the high-voltage shunt (filter) capacitor produces capacitive reactive power. The capacitive reactive power of the high-voltage shunt (filter) capacitor is neutralized through the adjustment of the inductive reactive power output dynamically by the thyristor controlled reactor, thus realizing the dynamic adjustment of the installation to raise the power factor of the system, reduce voltage fluctuations, lower the line losses, and improve the system stability.

Structure of TSVC Type High-voltage Dynamic Reactive Power Compensator

- The thyristor controlled reactor (TCR) installation is composed of dry-type air-core shunt reactor, thyristor valve block, cooling system, current transformer, busbar, post insulator, conductor, fence, etc. The dry-type air-core shunt reactor is delta-connected and often installed outdoors. The thyristor valve block, current transformer, etc. are installed indoors. The control and protection system is installed in the main control room.



Body of thyristor controlled reactor (TCR)



Thyristors for controlling TCR



Filter capacitor bank installation

Features of TCR Type SVC Installation

a) Horizontal thyristor valve block is adopted in the valve body design, which is photoelectrically triggered, water-cooled (auxiliary heat dissipation), provided with BOD protection, and operationally reliable;

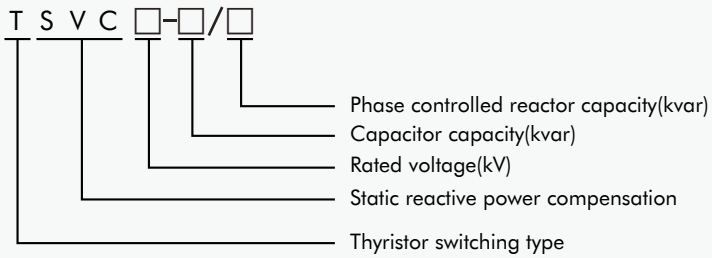


2.0 Product Introduction

b) The voltage covers 6 ~ 35 kV, with a large design capacity, and the maximum design capacity of a single set of TCR can reach 200 Mvar;

c) The unbalanced negative sequence current in the wind farm can be compensated through split-phase, continuous stepless regulation of reactive power.

Product Model and Meaning



Operating Environment

· Place of installation: indoor or outdoor
· Altitude: ≤ 2000 m
· Ambient temperature: -25℃ ~+45℃
· The place of installation and operation shall be free of violent mechanical vibrations, harmful gases and vapors, and electrically conductive or explosive dust
· Relative humidity: monthly average not more than 90% and daily average not more than 95%
· Earthquake intensity: ≤ Intensity VIII
· Pollution degree: Degree IV

Main Technical Performance Indicators

Response time of TCR	Reactive power regulation range	Voltage stability accuracy	Place of installation of TCR
≤ 15 ms	0 ~ 100% (inductive)	≤ 1%	(thyristor) indoor/(TCR) outdoor

Refer to the Table of Mechanical Parameters of TBB Type on Page 23 for the capacitor banks in TSVC.

2.0

Product Introduction

Mechanical Parameters of TCR in TSVC

Model	Rated capacity (kvar)	Rated voltage (kV)	Overall dimensions(mm)
TCR-2000/10.5	2000	10.5	≤6000×4000×1800
TCR-3000/10.5	3000	10.5	≤6500×4500×1800
TCR-4000/10.5	4000	10.5	≤7000×4500×1800
TCR-6000/10.5	6000	10.5	≤8500×4500×1800
TCR-8000/10.5	8000	10.5	≤8500×5000×1800
TCR-10000/10.5	10000	10.5	≤9000×5000×1800
TCR-8000/38.5	8000	35	≤10000×7500×1800
TCR-12000/38.5	12000	35	≤11000×7500×1800
TCR-15000/38.5	15000	35	≤11500×8000×1800
TCR-18000/38.5	18000	35	≤12000×8000×1800
TCR-25000/38.5	25000	35	≤13500×8500×1800
TCR-30000/38.5	30000	35	≤13500×9000×1800
TCR-40000/38.5	40000	35	≤14500×9000×1800
TCR-60000/38.5	60000	35	≤15000×9000×1800

Note: The above models are the conventional models of capacitor installations only, and other models can be customized based on the actual demands of users.

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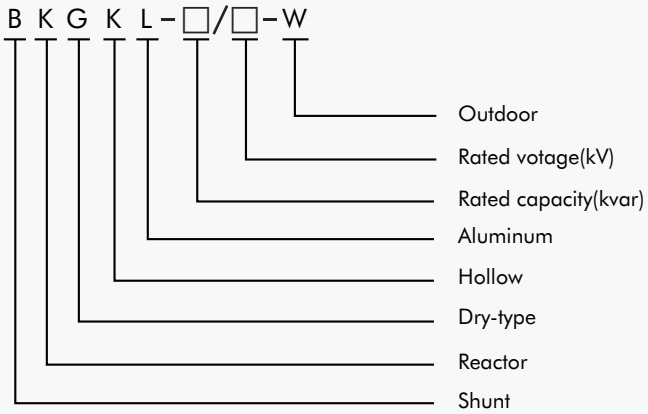
Product Introduction

2.5 Shunt Reactor Installation

The BKGKL dry-type air-core shunt reactor is used in 6 kV ~ 230 kV, 50/60 Hz power systems to compensate for the capacitive current of lines and inhibit the power frequency voltage rise and switching overvoltage at the line ends caused by the capacitive reactive power of lines when the transmission lines are under light load. Besides, the connection of the shunt reactor enables the reduction of the secondary arc current when the system has an earth fault, thus being conducive to the elimination of generator self-excitation, etc.



Product Model and Meaning



Operating Environment

· Installation environment: outdoor or indoor
· Altitude: ≤ 2000 m
· Ambient temperature: -25℃ ~+45℃
· Relative humidity: monthly average not more than 90% and daily average not more than 95%
· The place of installation shall be free of corrosive gases and vapors, and electrically conductive or explosive dust
· The place of installation shall be free of violent mechanical vibration

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Product Introduction

Main Technical Performance Indicators

— Inductance Tolerance

· The allowable deviation of the measured capacitance from the rated capacitance of the reactor shall be 0 ~ +5% of the rated capacitance;
· The single-phase reactance value shall not be beyond ±2% of the average value of the three phases.

Structure and Working Principle

— Structure of Shunt Reactor Installation

· A shunt reactor installation mainly consists of isolating earthing switch, high-voltage shunt reactor, zinc oxide arrester, bus, current transformer and their accessories.

— Structural Features of Shunt Reactor Installation

a) The BKGKL type high-voltage shunt reactor has a dry-type air-core structure, which is designed with small-cross-section electromagnetic wires, with small skin effect and eddy current loss;

b) Good inductor linearity, reasonable distribution of magnetic field, uniform electromagnetic force on the encapsulant, and strong mechanical characteristics and dynamic and thermal stability;

c) Low-noise, maintenance-free, and flexible to install, etc.

— Electrical Parameters of Shunt Reactor

Maximum design voltage	Rated capacity of a single set	Inductance tolerance
1 ~ 230 kV	100 ~ 80,000 kvar	0 ~ +5%

Table of Mechanical Parameters of Shunt Reactor

Model	Rated Capacity (kvar)	Rated voltage (kV)	Overall Dimensions(mm)	Remarks
BKGKL-2000/10.5-W	2000	10.5	≤6500×6000×1800	
BKGKL-4000/10.5-W	4000	10.5	≤6500×6500×1800	
BKGKL-6000/10.5-W	6000	10.5	≤7000×7000×1800	
BKGKL-10000/10.5-W	10000	10.5	≤8000×8000×1800	
BKGKL-30000/38.5-W	30000	10.5	≤10000×10000×1800	
BKGKL-45000/38.5-W	45000	10.5	≤12000×12000×1800	
BKGKL-60000/38.5-W	60000	10.5	≤12000×12000×1800	

Note: The above models are the conventional models of capacitor installations only, and other models can be customized based on the actual demands of users.

2.0

Product Introduction

2.6 Static Var Generator (SVG) Installation

The static var generator (SVG) connects a self-commutated voltage bridge inverter circuit in parallel to a power grid through a reactor. The instantaneous reactive power theory and algorithms such as power decoupling based on synchronous coordinate transformation are adopted, with the reactive power property and size, power factor and power grid voltage as the control targets, to adjust the phase and amplitude of the AC output voltage of the bridge circuit or control its AC current. In this way, this circuit can absorb or produce reactive or harmonic current to achieve the purpose of dynamic reactive power compensation or harmonic control. The SVG dynamically tracks the changes in the grid power quality and adjusts the reactive power output to improve the grid quality.

2.6.1 Product Structure of Static Var Generator (SVG)

- The static var generator (SVG) is composed of a control system, a soft-start circuit, a converter valve block, a connecting reactor, a cooling system and other fittings.

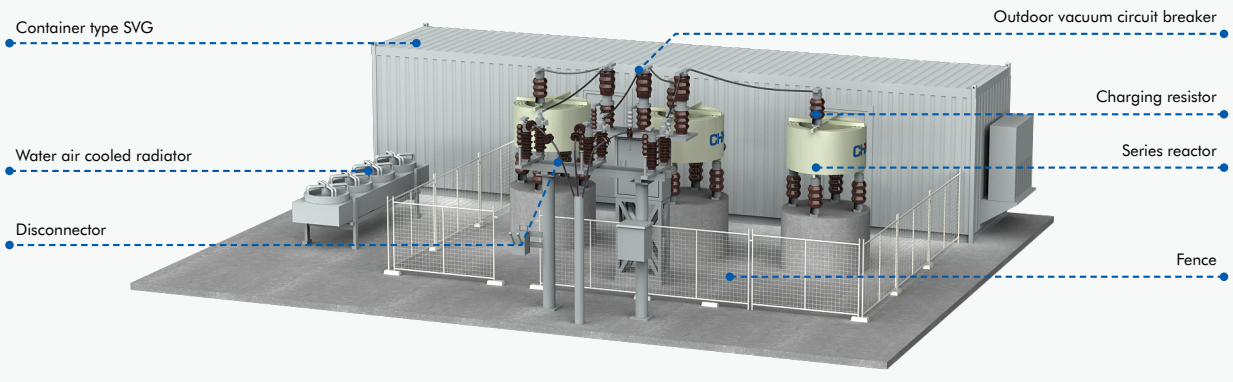
a) Control system: The control system, as the brain of the SVG installation, mainly consists of a core controller, a unit monitoring board, a display screen, etc. It performs such functions as signal sampling and analysis, reactive power and harmonic calculation, equipment status monitoring, and command output uploading.

b) Soft-start circuit: It is composed of a bypass switch and a resistor. When the SVG system is switched on, the DC capacitor in the power unit is charged via the resistor to protect it against inrush current.

c) Converter valve block: The converter valve, also known as power cabinet, is the main body of SVG compensation and consists of power units. Each phase is divided into several chain links based on different input voltages.

d) Connecting reactor: As an essential inductive element for connecting the SVG converter valve block to a power grid, the connecting reactor suppresses the harmonics generated by the SVG itself while providing a reference for the reactive power flow.

e) Cooling system: Liquid cooling or forced air cooling is mostly adopted as the cooling method for SVG and is used to dissipate heat normally during the operation of high-power semiconductor devices, thus ensuring the safe and stable operation of the installation.



Outdoor water-cooled container type

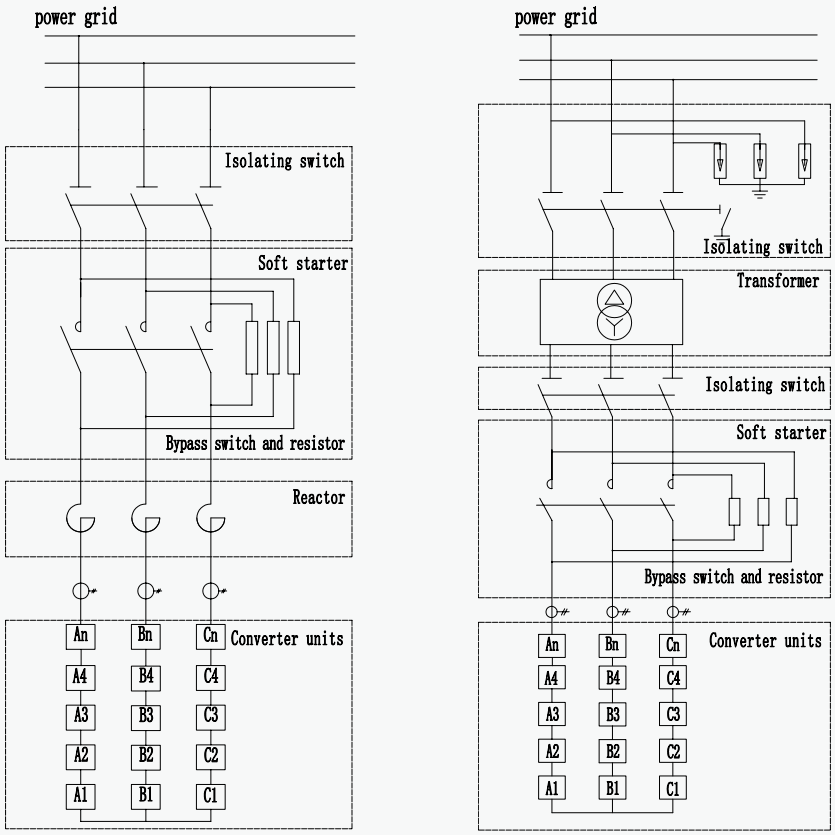
2.0

Product Introduction

2.6.2 Classification of Static Var Generator (SVG)

- Form of connection of SVG to a power grid

· Based on different grid connection forms, SVGs can be classified into directly-mounted type and step-up type.



Circuit topologies of directly-mounted chain type and step-up chain type SVG

· **A directly-mounted SVG** is connected to a power grid through a reactor. This type is **a cost-effective option among large-capacity compensation solutions.**

· **A step-up SVG** is connected by a transformer to a power grid with a higher voltage, and the impedance of the transformer may be used as the inductor for grid connection. This type is **a cost-effective option among small-capacity compensation solutions.**

- Cooling method of SVG

· Based on different cooling methods, SVGs can be classified into air-cooled type and liquid-cooled type.

· **An air-cooled SVG** (including the air-conditioner cooling method) cools the converter valve block through a centrifugal fan. **Characterized by a simple cooling system and low cost, this type is applicable to occasions with good environments.**

2.0

Product Introduction



Outdoor air-cooled container type SVG

· **A liquid-cooled SVG** mostly adopts a water-to-air heat exchange type water cooling system and may also adopt a water cooling system connected to an external water source to cool the converter valve block by circulating water. Because **the converter valve chamber is individually sealed, this type is applicable to occasions with poor environments.**





Indoor water-cooled SVG

■ Arrangement method of SVG

· Based on different installation locations, SVGs can be classified into indoor cabinet type and outdoor cabin type.

· **The indoor cabinet type SVG installation adopts a cabinet design as a whole**, and the cabinet has a degree of protection of IP30. **The product has an elegant appearance and covers a small floor area.**

2.0

Product Introduction



Indoor air-cooled cabinet type SVG

· **The outdoor cabin type SVG** are classified into container type and prefabricated cabin type. The control system, converter valve and other components are designed inside the container or cabin with a degree of protection of IP56. **The complete installation is mounted outdoors, with a compact design and a small floor area, and convenient to construct and mount.**



Outdoor air-cooled container type SVG

2.0

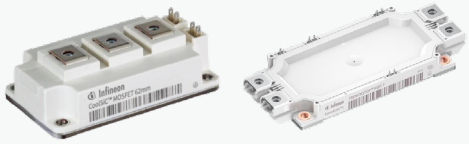
Product Introduction

2.6.3 Composition of Static Var Generator (SVG)

The key parts and components of the static var generator (SVG) include insulated gate bipolar transistor (IGBT), DC capacitor, control circuit, and cooling system.

- IGBT device

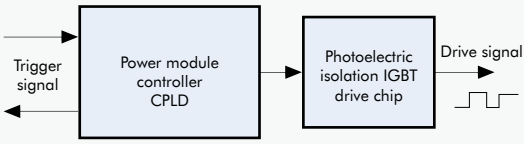
· Based on multiple years of experience in the application of IGBT control, the IGBT timing control and drive parameters are optimized thoroughly, and such technologies as anti-false touch, drive interlock, operating linear region, parallel current sharing and series voltage sharing have been widely verified and applied.



IGBT

- Driver circuit

· The self-developed IGBT driver circuit is based on the optoelectronically isolated driver chip design to realize the opto-electronic isolation between ELV and HV signals, thus eliminating the drive signal crosstalk.



Optocoupler-isolated driver circuit

- Master control system

· The standard machine case design is adopted. Each functional board adopts the plug-in installation method. The system has passed the electromagnetic compatibility certification, and temperature cycle and vibration tests, has good stability, and is convenient for maintenance.

· The human-machine interface is simple, beautiful, and convenient for operating personnel to operate and use.

2.0 Product Introduction



SVG core controller and human-machine interface



Control cabinet faceplate

■ DC capacitor

· A self-healing metalized film capacitor is used as the DC capacitor through overall consideration of the special requirements for capacitance, structural parameters and SVG ripples, with small lead inductance and long service life.



Metalized film DC capacitor

■ Cooling system

a) The air cooling system adopts a centrifugal fan, and the fan state is subject to speed control by frequency variation based on the monitored temperature of the converter valve, thus effectively reducing energy consumption.



Centrifugal fan

2.0

Product Introduction

b) The liquid cooling system adopts an advanced air-water heat exchange system, which is supplemented by cooling air-conditioning. The circulating pump and the heat exchange fan adopt a redundant design, and the coolant with a scientific mix ratio meets the requirements of different environments. Real-time information interaction is realized between the water cooling system and the SVG system, and the system operation is safe and controllable.



Outdoor water-air heat exchanger



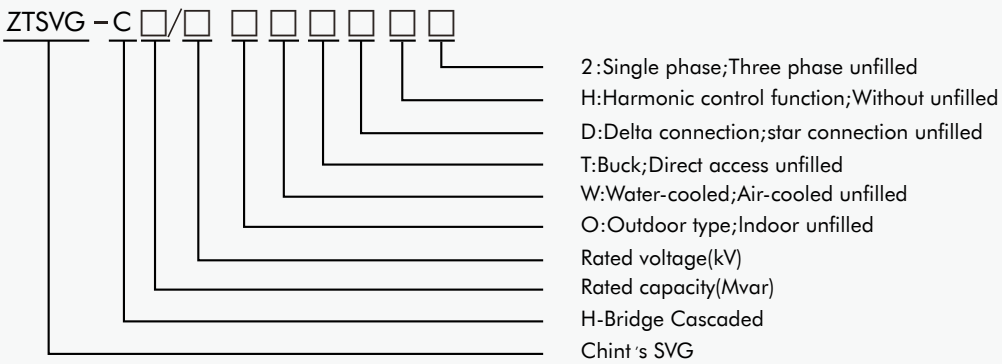


Water-cooled control cabinet (front of the cabinet) and water cooler (inside the cabinet)

2.0 Product Introduction

2.6.4 Product Naming, Meaning and Parameters of Static Var Generator (SVG)

Product Model and Meaning



· For example, the model ZTSVG-C8.0/35T represents an air-cooled static var generator (SVG) with a capacity of ±8 Mvar produced by CHINT, which can be connected to a 35 kV system through a 35 kV transformer and can perform continuous and smooth regulation of the reactive power within a range from an inductive capacity of 8,000 kvar to a capacitive capacity of 8,000 kvar.

Standard Adopted

· ZTSVG Series High-voltage Dynamic Reactive Power Compensation and Harmonic Control Installations (QJ/ZDR 0101-B) (Standard of CHINT Electric Co., Ltd.)

Operating Environment

· Storage temperature: -40°C ～ +70°C
· Operating temperature: -25°C ～ +45°C
· Relative humidity: monthly average not more than 90% (25°C), without condensation
· Altitude: ≤ 2,000 m (Special instructions are required if the altitude is higher than 2,000 m)
· Earthquake intensity: Intensity VIII
· Customization is required in environments with high humidity or severe condensation, or in marine and highly corrosive environments.

Electrical Parameters

Rated capacity	±0.5Mvar～±100Mvar
Rated operating voltage	Direct hanging type:3kV～35kV(The direct mounted step-up type is based on the voltage on the high-voltage side of the transformer)
Rated frequency	50/60Hz
Overload capacity	withstand the load exceeding 1.2 times the rated load for 1 minute
Adjustment method	changing continuously within the range from the rated inductive reactive power to the rated capacitive reactive power
compensation mode	constant reactive power of installation or test point, constant power factor of test point, constant voltage of test point, etc
Response time	≤10ms
Total harmonic distortion (THD) of output current	≤2% In
Average loss	≤1%
Communication Interface	Ethernet、RS485、CAN, etc
Communication protocol	MODBUS、IEC103/104、61850, etc
Protection function	System protection and device protection
Multi machine parallel connection	Support
Switching capacitors	Support

2.0 Product Introduction

Mechanical Parameters

- Indoor installation: cabinet installation, cabinet with a degree of protection of IP3X
- Outdoor installation: container-type prefabricated cabin or special prefabricated cabin for electric power, cabin with a degree of protection of IP56

■ Indoor cabinet type

Voltage (kV)	Capacity (Mvar)	Cooling method	Overall dimensions (mm) Width × depth × height	Mass (t)	Reactor type	Remarks
6	1~2	Air cooling	3300×1400×2400	2.3~2.9	Iron-core	■ The overall dimensions and mass mean the dimensions and weight of the cabinet of an SVG, excluding the dimensions and weight of an air-core reactor; ■ The height excludes the height of cooling fan; ■ For an SVG with an air-core reactor, the place of the reactor needs to be planned; ■ The above dimensions are for reference in model selection, and CHINT reserves the right to upgrade and transform the products.
	3		3400×1400×2400	3.1	Iron-core	
	4~5		4800×1400×2400	3.8~4.3	Iron-core	
	6~7		3600×1400×2400	2.8~3.5	Air-core	
	8~12		5600×1400×2600	4.6~5.0	Air-core	
	1~9	Water cooling	5200×1400×2400	2.6	Air-core	
	10~15		5800×1400×2400	2.8	Air-core	
10~11	1~5	Air cooling	4500×1400×2600	2.0~4.5	Iron-core	
	6		3400×1400×2600	2.5	Air-core	
	7~8		6900×1400×2600	6.4	Iron-core	
	9~10		5600×1400×2600	4.2	Air-core	
	11~12		5700×1400×2600	4.2	Air-core	
	13~21		9500×1400×2600	7.0~9.2	Air-core	
	1~10	Water cooling	5200×1400×2400	2.9	Air-core	
	11~15		5800×1400×2400	3.1	Air-core	
	16~25		8700×1400×2400	3.9~4.5	Air-core	
13.8	1~7	Air cooling	5700×1400×2600	2.7~5.3	Iron-core	
	8		4600×1400×2600	3.3	Air-core	
	9~11		8100×1400×2600	7.2	Iron-core	
	12~16		6800×1400×2600	4.8~5.3	Air-core	
	17~29		10200×1400×2600	7.8~10.0	Air-core	
	1~21	Water cooling	6800×1400×2400	5.6~6.2	Air-core	
	22~34		9700×1400×2400	8.6~10.6	Air-core	
20~22	5~12	Air cooling	11500×1800×2100	8.0~9.0	Air-core	
	13~24		20800×1800×2100	14.6~15.8	Air-core	
	25~40		19600×1800×2100	13.6~15.3	Air-core	
	41~46		35200×1800×2100	24.8~26.9	Air-core	
	3~29	Water cooling	7400×6700×2600	8.0~13.0	Air-core	
	30~50		9700×7900×2600	14.8~23.0	Air-core	
	51~58		14200×7400×2600	17.0~26.0	Air-core	
33~35	8~21	Air cooling	14500×1800×2100	9.6~10.2	Air-core	
	22~42		26200×1800×2100	18.2~19.7	Air-core	
	43~60		19500×1800×2100	16.3~17.4	Air-core	
	61~85		44400×1800×2100	31.0~33.5	Air-core	
	5~50	Water cooling	7400×7900×2600	9.0~14.0	Air-core	
	51~85		11500×7900×2600	15.8~24.0	Air-core	
	86~100		16000×7400×2600	18.0~28.0	Air-core	

2.0 Product Introduction

■ Outdoor container type

Voltage (kV)	Capacity (Mvar)	Cooling method	Overall dimensions (mm) Width × depth × height	Mass (t)	Reactor type	Remarks
6	1~6	Air cooling	5200×2438×2560	6.3~6.5	Iron-core	■ The overall dimensions and mass mean the dimensions and weight of an outdoor container of an SVG (including the internal parts and components), excluding the dimensions and weight of an air-core reactor; ■ For an SVG with an air-core reactor, the place of the reactor needs to be planned; ■ The above dimensions are for reference in model selection, and CHINT reserves the right to upgrade and transform the products.
	7~12		6700×2438×2560	6.5~7.0	Air-core	
	1~15	Water cooling	5800×2438×2591	7.9~8.9	Air-core	
10~11	0.5~0.9	Air cooling	3200×2350×2591	2.8~3.0	Iron-core	
	1~6		5500×2350×2800	6.5~7.0	Iron-core	
	7~12		6700×2438×2560	6.7~7.0	Air-core	
	13~21		9700×2438×2560	9.0~9.7	Air-core	
	1~15	Water cooling	5800×2438×2591	8.2~9.2	Air-core	
	16~25		9300×2438×2591	13.0~15.0	Air-core	
13.8	1~9	Air cooling	6700×2350×2800	7.2~7.8	Iron-core	
	10~17		7900×2438×2560	7.5~7.8	Air-core	
	18~29		10900×2438×2560	9.8~10.5	Air-core	
	1~21	Water cooling	7000×2438×2591	9.0~10.0	Air-core	
	22~34		10500×2438×2591	14.0~16.0	Air-core	
20~22	5~12	Air cooling	11200×2438×2591	11.0~13.3	Air-core	
	13~24		21600×2438×2591	14.6~18.2	Air-core	
	25~48		43190×2438×2591	25.0~30.0	Air-core	
	5~15	Water cooling	12190×2350×2896	18.2~22.0	Air-core	
	16~29		12190×2700×2896	26.0~30.0	Air-core	
	30~58		24380×2700×2896	52.0~60.0	Air-core	
33~35	8~21	Air cooling	12700×2438×2591	12.0~14.3	Air-core	
	22~42		25200×2438×2591	15.6~19.2	Air-core	
	43~84		50390×2438×2591	27.0~32.0	Air-core	
	5~26	Water cooling	14000×2350×2896	19.0~23.0	Air-core	
	27~50		14000×2700×2896	27.0~31.0	Air-core	
	51~100		28000×2700×2896	54.0~62.0	Air-core	

Note:

a) A step-up SVG needs to be provided with a connecting transformer. The voltage at the HV side of the transformer is the nominal voltage of the system, and that at the LV side is subject to the nominal voltage of a directly-mounted SVG.

b) A step-up SVG is not provided with a connecting reactor separately, but the place of the transformer needs to be re-planned.

c) The above models are the conventional models of capacitor installations only, and other models can be customized based on the actual demands of users.

3.0

Quality Assurance

3. 1 Testing Capability

The test station of the reactive power compensation full-load testing center is capable of conducting the factory and type tests of capacitor units, and the voltage class of the test specimen can reach up to 230 kV. In addition, the test station can perform tests on a single capacitor with a maximum capacity of 1,000 kvar, and the annual tested capacity can reach 30,000,000 kvar.

The test station covers a floor area of 300 square meters, owns more than 30 sets of advanced equipment/instruments and regularly calibrates all measuring instruments/equipment (submits them for inspection). The perfectness ratio of instruments/equipment reaches 100%. The test station is divided into a test hall, a test operation room and an oil laboratory.





35 kV ~ 550 kV voltage testing center



SVG factory test



SVG overall test

3.0 Quality Assurance



Test operation room



X-ray detection of SVG circuit board

3.2 Clean workshop and equipment capability



Class 1000 element winding workshop



Fully-automatic element winding machine



Ultrasonic welding procedure with independent patented technology



Class 10000 core assembly workshop

3.0

Quality Assurance



Fully-automatic fuse processing machine



CNC core press



CNC cable paper cutter



Two-stage vacuum oil filter



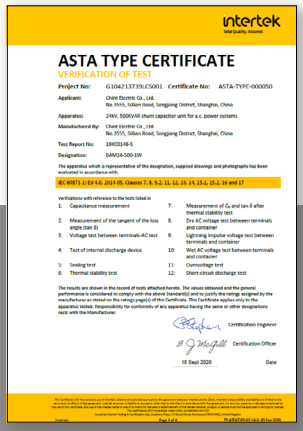
Vacuum impregnation equipment



SMT automatic mounting and welding production line for SVG

3.0 Quality Assurance

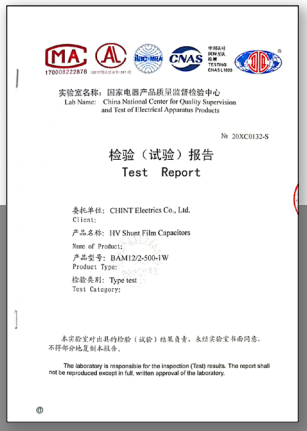
3.3 Type test report and certificate


intertek

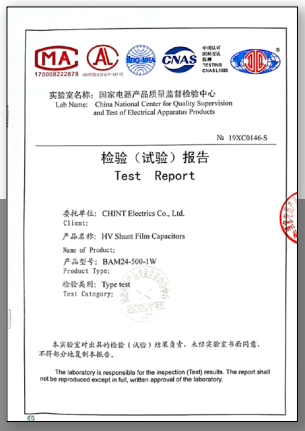
ASTA TYPE CERTIFICATE

VERIFICATION OF TEST

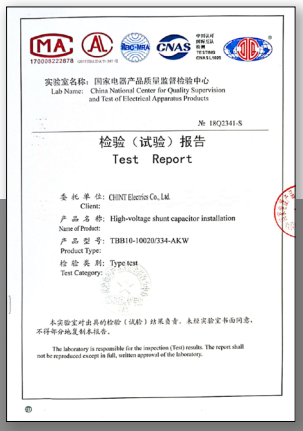

产品认证证书


检验（试验）报告

Test Report


检验（试验）报告

Test Report


检验（试验）报告

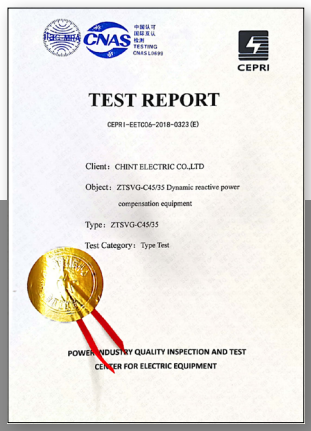
Test Report

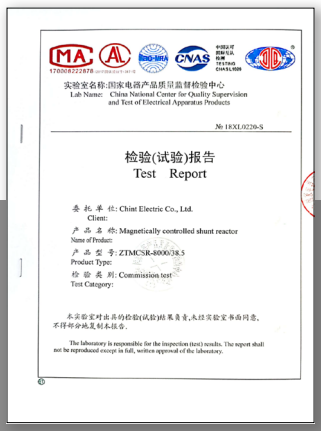

检验（试验）报告

Test Report


检验（试验）报告

Test Report

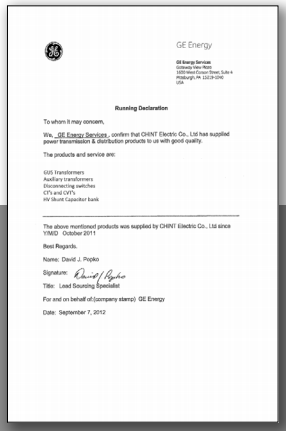

TEST REPORT


检验(试验)报告

Test Report

3.0 Quality Assurance

Operation Report



GE Energy

Running Declaration

To whom it may consern,

We, GE Energy Services , confirm that CHINT Electric Co., Ltd has supplied power transmission & distribution products to us with good quality.

The products and service are:

GIS Transformers
Auxiliary transformers
Disconnecting switches
CT's and CVT's
HV Shunt Capacitor bank

The above mentioned products was supplied by CHINT Electric Co., Ltd since YMD October 2011

Best Regards.

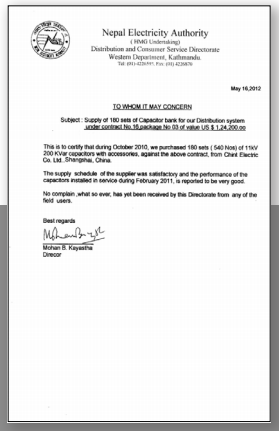
Name: David J. Popko

Signature:

Title: Lead Sourcing Specialist

For and on behalf of:(company stamp) GE Energy

Date: September 7, 2012



Nepal Electricity Authority
(NEA Undertaking)
Distribution and Consumer Service Directorate
Western Department, Kathmandu.

May 16,2012

TO WHOM IT MAY CONCERN

Subject : Supply of 180 sets of Capacitor bank for our Distribution system under contract No.16,package No 03 of value US $ 1,24,200.00

This is to certify that during October 2010, we purchased 180 sets (540 Nos) of 11kV 200 KVAr capacitors with accessories, against the above contract, from Chint Electric Co. Ltd. ,Shanghai, China.

The supply schedule of the supplier was satisfactory and the performance of the capacitors installed in service during February 2011, is reported to be very good.

No complain ,what so ever, has yet been received by this Directorate from any of the field users.

Best regards

Mohan B. Kayastha
Director



Kevitsa Mining

8 February 2012

Running Declaration

To whom it may concern,

We, FQM Kevitsa Mining Oy confirm that CHINT Electric Co., Ltd has supplied power transmission & distribution products to us for Kevitsa Project in Finland.

The products are:

Two unit **315kV 315MVA** power transformer with type **SFSZ9-315000/315**
4SU unit **11kV 2500KVAR** shunt capacitor bank with type **BAM11/√3-250-1W**

The above mentioned products have been installed succesfully at our site and are energized now. These two transformers are operating well on site by now.

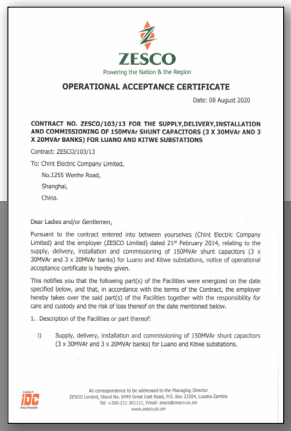
Best Regards

FQM KEVITSA MINING OY

Willem-Jan Plessis
Construction Manager
FQM Kevitsa Mining Oy

Kevitsantie 715
FI-99670 PETKULA
Finland

Email: Willie.Zeydelaan@fqml.com



ZESCO
Powering the Nation & the Region

OPERATIONAL ACCEPTANCE CERTIFICATE

Date: 08 August 2020

CONTRACT NO. ZESCO/103/13 FOR THE SUPPLY,DELIVERY,INSTALLATION AND COMMISSIONING OF 150MVAr SHUNT CAPACITORS (3 X 30MVAr AND 3 X 20MVAr BANKS) FOR LUANO AND KITWE SUBSTATIONS

Contract: ZESCO/103/13

To: Chint Electric Company Limited,
No.1255 Wenhe Road,
Shanghai,
China.

Dear Ladies and/or Gentlemen,

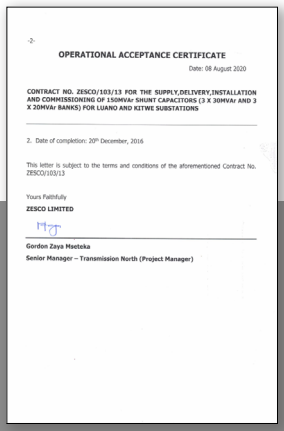
Pursuant to the contract entered into between yourselves (Chint Electric Company Limited) and the employer (ZESCO Limited) dated 21st February 2014, relating to the supply, delivery, installation and commissioning of 150MVAr shunt capacitors (3 x 30MVAr and 3 x 20MVAr banks) for Luano and Kitwe substations, notice of operational acceptance certificate is hereby given.

This notifies you that the following part(s) of the Facilities were energized on the date specified below, and that, in accordance with the terms of the Contract, the employer hereby takes over the said part(s) of the Facilities together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below.

1. Description of the Facilities or part thereof:

i) Supply, delivery, installation and commissioning of 150MVAr shunt capacitors (3 x 30MVAr and 3 x 20MVAr banks) for Luano and Kitwe substations.

All correspondence to be addressed to the Managing Director
ZESCO Limited, Stand No. 6949 Great East Road, P.O. Box 33304, Lusaka-Zambia
Tel: +260-211-361111, Email: enquiries@zesco.co.zm
www.zesco.co.zm



-2-

OPERATIONAL ACCEPTANCE CERTIFICATE

Date: 08 August 2020

CONTRACT NO. ZESCO/103/13 FOR THE SUPPLY,DELIVERY,INSTALLATION AND COMMISSIONING OF 150MVAr SHUNT CAPACITORS (3 X 30MVAr AND 3 X 20MVAr BANKS) FOR LUANO AND KITWE SUBSTATIONS

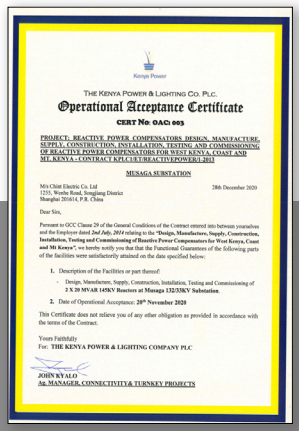
2. Date of completion: 20th December, 2016

This letter is subject to the terms and conditions of the aforementioned Contract No. ZESCO/103/13

Yours Faithfully

ZESCO LIMITED

Gordon Zaya Mseteka
Senior Manager – Transmission North (Project Manager)



Kenya Power

THE KENYA POWER & LIGHTING CO. PLC.

Operational Acceptance Certificate

CERT No. OAC: 005

PROJECT:- REACTIVE POWER COMPENSATORS DESIGN, MANUFACTURE, SUPPLY, CONSTRUCTION, INSTALLATION, TESTING AND COMMISSIONING OF REACTIVE POWER COMPENSATORS FOR WEST KENYA, COAST AND MT. KENYA – CONTRACT KPLC/11CR1/ACTIVEPOWER/1-2013

MUSAGA SUBSTATION

M/s Chint Electric Co. Ltd
1255, Wenhe Road, Songjiang District
Shanghai 201614, P.R. China

28th December 2020

Dear Sirs,

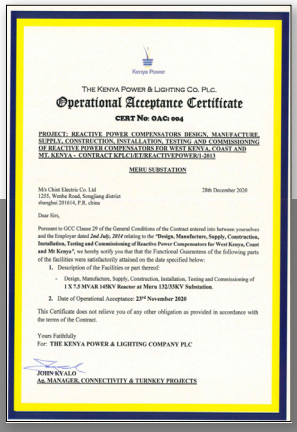
Pursuant to GCC Clause 29 of the General Conditions of the Contract entered into between yourselves and the Employer dated **2nd July, 2014** relating to the **"Design, Manufacture, Supply, Construction, Installation, Testing and Commissioning of Reactive Power Compensators for West Kenya, Coast and Mt Kenya"**, we hereby notify you that that the Functional Guarantees of the following parts of the facilities were satisfactorily attained on the date specified below:

1. Description of the Facilities or part thereof:
   - Design, Manufacture, Supply, Construction, Installation, Testing and Commissioning of **2 X 20 MVAR 145KV Reactors at Musaga 132/33KV Substation**.
2. Date of Operational Acceptance: **28th November 2020**

This Certificate does not relieve you of any other obligation as provided in accordance with the terms of the Contract.

Yours Faithfully
For: **THE KENYA POWER & LIGHTING COMPANY PLC**

JOHN KYALO
Ag. MANAGER, CONNECTIVITY & TURNKEY PROJECTS



Kenya Power

THE KENYA POWER & LIGHTING CO. PLC.

Operational Acceptance Certificate

CERT No. OAC: 004

PROJECT:- REACTIVE POWER COMPENSATORS DESIGN, MANUFACTURE, SUPPLY, CONSTRUCTION, INSTALLATION, TESTING AND COMMISSIONING OF REACTIVE POWER COMPENSATORS FOR WEST KENYA, COAST AND MT. KENYA – CONTRACT KPLC/11CR1/REACTIVEPOWER/1-2013

MERU SUBSTATION

M/s Chint Electric Co. Ltd
1255, Wenhe Road, Songjiang district
shanghai 201614, P.R. china

28th December 2020

Dear Sirs,

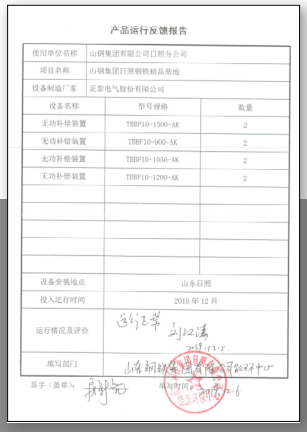
Pursuant to GCC Clause 29 of the General Conditions of the Contract entered into between yourselves and the Employer dated **2nd July, 2014** relating to the **"Design, Manufacture, Supply, Construction, Installation, Testing and Commissioning of Reactive Power Compensators for West Kenya, Coast and Mt Kenya"**, we hereby notify you that that the Functional Guarantees of the following parts of the facilities were satisfactorily attained on the date specified below:

1. Description of the Facilities or part thereof:
   - Design, Manufacture, Supply, Construction, Installation, Testing and Commissioning of **1 X 7.5 MVAR 145KV Reactor at Meru 132/33KV Substation**.
2. Date of Operational Acceptance: **23rd November 2020**

This Certificate does not relieve you of any other obligation as provided in accordance with the terms of the Contract.

Yours Faithfully
For: **THE KENYA POWER & LIGHTING COMPANY PLC**

JOHN KYALO
Ag. MANAGER, CONNECTIVITY & TURNKEY PROJECTS



产品运行反馈报告

使用单位名称	山钢集团有限公司日照分公司	
项目名称	山钢集团日照钢铁精品基地	
设备制造厂家	正泰电气股份有限公司	
设备名称	型号规格	数量
无功补偿装置	TBBF10-1500-AK	2
无功补偿装置	TBBF10-900-AK	2
无功补偿装置	TBBF10-1050-AK	2
无功补偿装置	TBBF10-1200-AK	2
设备安装地点	山东日照	
投入运行时间	2018 年 12 月	
运行情况及评价		
填写部门		

签字（盖章）



产品运行报告

Operating Feedback

使用单位名称 User	中铝广西国盛稀土开发有限公司	
项目名称 Project	中铝广西国盛稀土开发有限公司项目	
设备制造厂家 Manufacturer	正泰电气股份有限公司 CHINT Electric Co., Ltd	
设备名称 Equipment	型号规格 Model	数量 Quantity
高压并联电容器补偿装置 HV shunt capacitor compensation equipment		
高压动态无功补偿装置 HV static VAR Generator	ZTSVG-C1.0/10	1 套
运行时间 Running time	2019 年 3 月 5 日	
运行情况及评价 Feedback & Evaluation	该设备运行状态稳定，性能良好	
填写部门 Signature	盖章 (Stamp) 2019 年 7 月 8 日	

4.0

Customer Service



Transportation

- To ensure the safety of product transportation, Products can be placed in the container transportation, saving space and transportation costs



Installation

- The product is transported in a whole bay and modularity, which greatly reduces the workload of on-site installation.
- With professional after-sales installation guidance Engineer and standardized installation process, to ensure the on-site installation quality of product.



Commissioning

- After the completion of on-site installation, the on-site test shall be carried out. The main on-site test items are as follows:
  - Appearance inspection
  - Dielectric test
  - Insulation resistance test of reactor
  - Check the operating performance of circuit breaker
  - Measurement of capacitance of capacitors
  - Check the electrical interlock



Maintenance

- Due to the excellent performance of the product, it ensures less maintenance or maintenance-free during operation stage.
- The equipment can be maintained according to the following principles:
  - Switch operation cycles have reached the cycles specified in the Instruction Manual.
  - The breaking cycles of the Circuit Breaker have reached the cycles specified in the Instruction Manual.



Service

- Quality Management in the Whole Process and Life Cycle:
  - Rapid response to Customer needs;
  - Technical Service Team for Customer needs with professional service, standardized operation and well-trained;
  - With the green emergency service emergency repair channel, to make the acceptance of Customer service demands more rapid and convenient.

5.0 Performance



Mexico wind power plant AMISTAD IV project TAL34.5-7560/315-BLW



Mexico wind power plant AMISTAD II project TBB34.5-6600/550-BLW



Afghanistan 220 kV Outdoor Capacitor Complete Plant Project TBB220-40000/346-BLW



Philippines138 kV Outdoor Capacitor Complete Installation Project TBB138-20000/496-BLW



Mexico EGP34.5 kV Capacitor Complete Plant Project TBB34.5-7500/470-BLW



Myanmar Konestone Capacitor Project TBB66-8000/381-BLW

5.0 Performance



Columbia union project shunt capacitor installation project TBB115-5000/446.3-BLW



Zambia State Grid Corporation 66kV shunt capacitor installation project TBB66-30000/489-BLW



Zambia State Grid Corporation 11 kV Shunt Capacitor Installation project TBB11-30000/430-BLW



Kenya KPLC Power Bureau Project TBBF33-21000/1000+2000+6×3000-BLW



Fengshun Hongbao Casting Factory,Guangdong,China 35 kV Shunt Capacitor Installation Project TBB35-10800/450-ACW



China Inner Mongolia Tongwei High Purity Crystalline Silicon Co., Ltd. 500kV substation project TBB66-60000/500-AQW

5.0 Performance



PetroChina-Changqing Oilfield Company Shanggu natural gas project TBBF10-4000/334-AK



CNPC-Changqing Oilfield Company the seventh oil production plant project TBBZ10-500/100J+200+200-A



Inner Mongolia Shuangxin Chemical Engineering Project MSVC-35kV-20000kvar/20000kvar



Yunnan Qujing Xiaoxin Street Substation Project MSVC-35kV-14400kvar/9600kvar



4# LF Refining Furnace Project of Xinyu Iron and Steel TSVC-35kV-27000kvar/27000kvar



Tangshan Rixin Energy Co., Ltd Submerged arc furnace project TSVC-35kV-25000kvar/20000kvar

5.0 Performance

Performance in ZTSVG Static Var Generator



Tanzania Voltage drop compensation project for Buly Gold Mine project ZTSVG-C15/6.6-O-W



Mexico Power Plant Project ZTSVG-C3/23T-O-W



High-power test Compensation project of Dekai Test Center ZTSVG-C50/10-O-W



Yueqing Bay CHINT Photovoltaic Power Generation Project SVG-C20.0/35-W



Golmud Photovoltaic Power Generation Project ZTSVG-C16/35-O-W



Guangdong Meizhou Fengshun Hongbao Casting Factory Project ZTSVG-C25/35

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A CHINT COMPANY

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