TDK

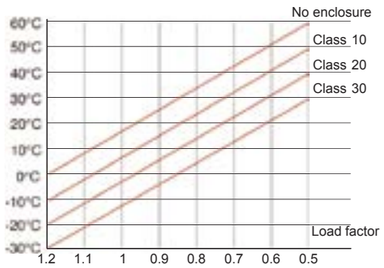
MV Prefabricated Substation

Catalogue

2017

TGOOD

tgood.com



Ambient temperature

Rated class of enclosure
The test demonstrate that the temperature rise of the transformer inside the enclosure do not exceed those measured on the same transformer outside the enclosure by more than the value which defines the class of enclosure, for example, 5K, 10K,15K,20K,25K or 30K.

TDK Series Introduction

General

TGOOD is leading prefabricated substation development in the world through its 10 years' of experience in design, installation and operation. The TDK series prefabricated substation is the compact solution for customers worldwide in power industry, infrastructure, renewable energy, commercial buildings, residential areas and factories. The new designed substation, which is based on abundant test data accumulated in technological research of aerothermodynamics performed in Germany, it is engineered and type-tested according to IEC62271-202.

Features

TDK prefabricated substation features:

Advanced ventilation technology
- Excellent performance originates from unique aerothermodynamics simulation
- Advanced natural ventilation technologies with class 10 enclosure
- Distinctive CAD for mechanical and thermal computation
- Research of ventilation technologies for harsh environments

Flexible solution
- 1 to 4 medium voltage feeders
- The same footprint for different feeders such as cable feeder,transformer feeder
- Customized design available for medium & low voltage
- Up to 1600kVA transformer fits the same enclosure
- More functions such as automation and communication systems as option

Environment friendly
- Low height
- Oil containment bund
- Low noise

Optimized structure
- Design against condensation, dust and splashing
- Engineered lifting points
- Optimal design for standardized manufacture
- Ventilation windows and doors
- Neat and aesthetic
- Internal hinges
- Centralized ventilation openings
- Optimized dimensions

Convenience
- Simple foundation
- One-stop equipment assembly
- Convenient connection of MV and LV cables
- Easy removable enclosure to access all components

Structure

- TDK series of prefabricated substation is characterized by diversified functions and flexible configurations. It is assembled through rivet and bolted connection. The industrialized production enhances the production efficiency remarkably.
- Through special paint spraying process, TDK is featured with excellent corrosion-resistance performance, to ensure corrosion-free for 30 years.
- The optimized structure, including natural ventilation system will ensure a class 10 enclosure of the substation.
- Removable enclosure to ensure flexible and convenient upgrade of product.
- The optional built-in oil containment bund will avoid possible contamination.

MV RMU

- TGOOD TGS series RMU is used for medium voltage switching. The internal arcing performance complies with IEC62271-200. High protection level (IP67) of gas tank enhances personal safety of users. This product is featured with superb environment compatibility, reliable quality, easy & fast installation, as well as a 30 years' life cycle.
- RMU TGS is IAC classified at AFLR 20kA 1s.
- Remote terminal unit (RTU) can be used on MV side to control remotely and inspect the MV switches (optional).

Transformer unit

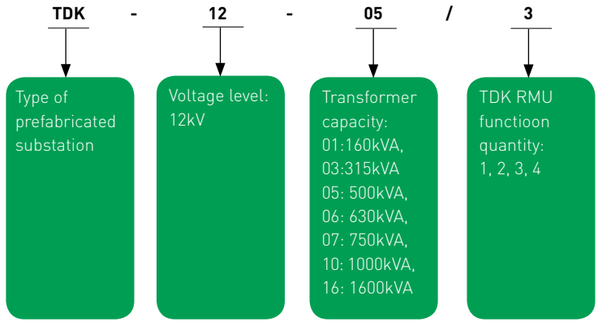
TGOOD TDT-I series oil-immersed transformer can be used, which is characterized by fast delivery and optimized design.

Low voltage unit

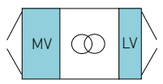
Air circuit breaker or MCCB can be used in LV switchgear for protection of incoming / outgoing circuits. The breakers can be mounted side by side, which can save space.

Types

Type description



Types and layout

Type	Layout	Transformer capacity	RMU type
TDK-12-01 TDK-12-02 TDK-12-03		160kVA 250kVA 315kVA	TGS 1 ~ 4 feeders
TDK-12-04 TDK-12-05		400kVA 500kVA	
TDK-12-06 TDK-12-07		630kVA 750kVA	
TDK-12-10 TDK-12-16		1000kVA 1600kVA	

Application condition

- Altitude: < 1000m (higher value optional)
- Ambient temperature: -25℃ ~ 40℃ (higher or lower temperature optional)
- Inclination degree: not exceed 3°

Note:

No violent vibration in the installation position, no corrosive / inflammable gas or vapor in the ambient air.

Parameters

	Tems	Unit	Parameter
Enclosure & base	Temperature rise level	Class	10 or 15
	Noise level	dB	≤44
	Walls, doors and roof thickness	mm	2 (galvanized sheet)
	Hinges diameter	mm	≥10 (IS stainless steel)
	Structural steel of the base	mm	5 (GBQ235)
MV unit	Rated frequency	Hz	50, 60
	Rated voltage	kV	12
	Rated power frequency withstand voltage	kV	28
	Rated lightning impulse withstand voltage	kV	95
	Rated current	A	630
	Rated short - time withstand current	kA	20/3s or 25/1s
	Rated peak withstand current (60Hz)	kA	50 or 63
	Protection level	IP54	
	IAC	IAC-AB-20kA-1s	
LV unit	Rated voltage	V	400, 415, 690
	Main circuit rated current	A	100~3200
	Rated thermal stability current	kA	30/1s
	Rated dynamic stability current	kA	63
	Quantity of feeder lines	1~8	
	Protection level	IP54	
	Compensation capacity	kVAR	0~480
Transformer unit	Rated capacity	kVA	100~1600
	Protection level	IP23D	

TDK Selection

Transformer capacity	Transformer primary current (A)	MV cable size (recommend) (50Hz)	Transformer protection fuse (A)	Transformer protection breaker/Current setting(A)	Transformer LV side rated current(A)	LV incoming breaker (recommend)(A)	Compensation current (A)
125kVA	7.22	50	20		180.	250	27~54
160kVA	9.24	50	25		231	400	35~69
200kVA	11.55	50	25		289	630	43~87
250kVA	14.43	50	31.5		31	630	54~108
315kVA	18.19	50	40		455	800	68~136
400kVA	23.09	50	50		577	800	87~173
500kVA	28.87	50	50	30	722	1000	108~217
630kVA	36.37	50	63	37	909	1250	136~273
750kVA	46.19	70	80	55	1155	1600	173~346
1000kVA	57.74	70	80	61	1530	2000	230~459
1600kVA	92.38	70	100	97	2449	3200	367~735

Note:

(1) Compensation capacity: 15%~30% of transformer capacity

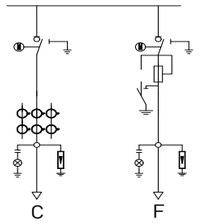
(2) Capacitor: Choose combination of capacitors to achieve required capacity

Solution & configuration

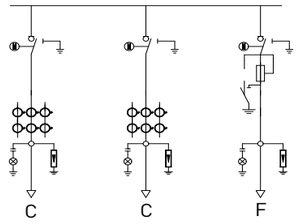
MV RMU Solution

Note:
- F Load switch and fuse functional unit
- V Circuit breaker functional unit
- C Load switch function unit

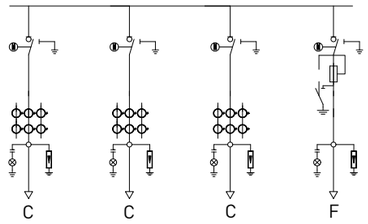
Transformer protection: Load-switch and fuse combination



TGS-12/24-CF

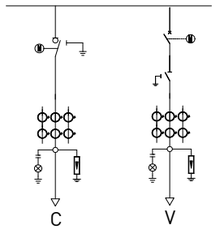


TGS-12/24-CCF

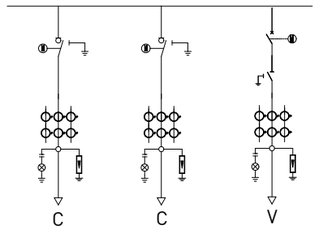


TGS-12/24-CCCF

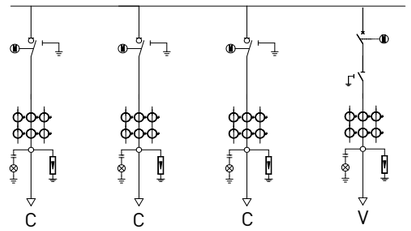
Transformer protection: 630A circuit breaker



TGS-12/24-CV



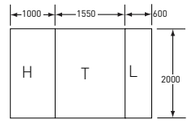
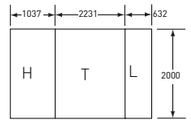
TGS-12/24-CCV



TGS-12/24-CCCV

Dimension & installation

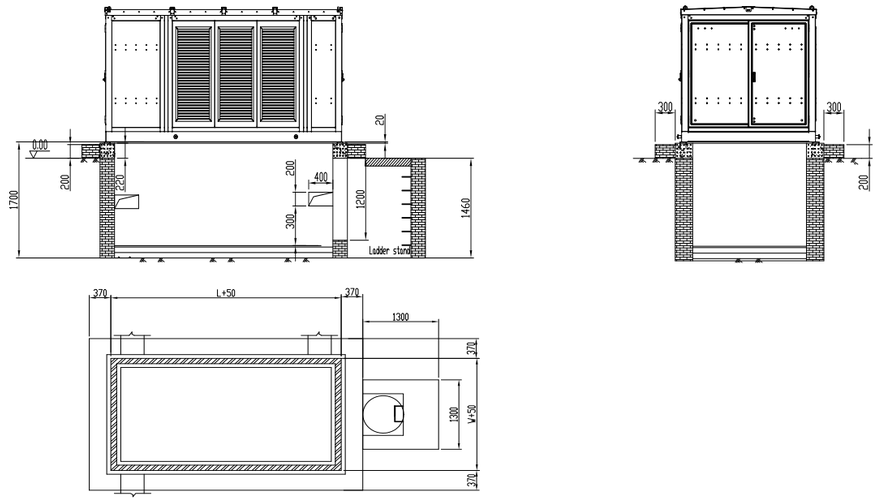
Dimensions

Type	Layout Dimension	Foot print (L*W*H)	Equipments
TDK-12-03		3150*2000*1580	TDT-I series oil transformer Transformer capacity: 315kVA MV TGS: 1~4 ways Weight: 3470kg
TDK-12-05			TDT-I series oil immersed transformer Transformer capacity: 500kVA MV TGS: 1~4 ways Weight: 5000kg
TDK-12-07			TDT-I series oil immersed transformer Transformer capacity: 750kVA MV TGS: 1~4 ways Weight: 5200kg
TDK-12-10		3900*2000*1950	TDT-I series oil immersed transformer Transformer capacity: 1000kVA MV TGS: 1~4 ways Weight: 6000kg
TDK-12-16			TDT-I series oil immersed transformer Transformer capacity: 1600kVA MV TGS: 1~4 ways Weight: 8900kg

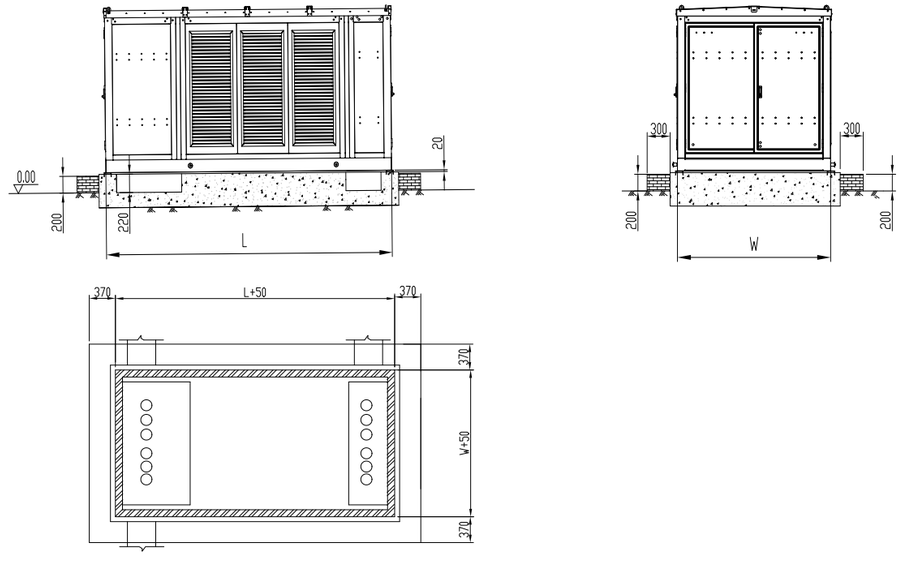
Dimension & installation

TDK Installation

Foundation 1



Foundation 2



Note

1: The dimension depends on numbers of feeder.

2: Outsize (L x W x H): 3150mmx2000mmx1580mm/ 3900mmx2000mmx1950mm

Foundation requirements:

1. The surface of foundation should be leveled.
2. The distance between TDK and other objects must be more than 1m to facilicate opening the door.
3. The internal surface must be sealed by 1:3 cement mortar, water proof treatment should be done.
4. Cable pipe should be embeded in foundation, the size, quantity and location refer to the drawing.
5. All the embeded metal parts and support accessories in foundation must be earthed, the earthing resistance must be less than 4Ω.
6. The location of gully drain is desided by on site condition, set it at lower position.

Components

Ring Main Unit TGS

TGS-12-20-6/CCV

TGOOD TGS is an integrated and modularized SF_6 RMU to protect transformer inside TDK substation. The switches and busbas are mounted in a fully sealed enclosure full of SF_6 gas. The switches are immune from external influences. TGOOD can provide the following transformer protections:

- Load switch+ fuse
- Circuit breaker

TGS production conforms to strict quality standards. Its advanced design and technology enhance safety of operators and equipment. Main technical parameters are as follows.

Content	Unit	Parameter	
Normal characteristics			
Rated voltage	kV rms	12	
Rated frequency	Hz	50, 60	
Insulation levels			
Rated power frequency voltage withstand (50 Hz /1 min)	kV rms	42	
Rated impulse voltage withstand (peak)	kV	95	
Main circuit and busbar			
Rated current	A	630	
Rated short-circuit current	kA rms/s	20/3	25/1
Load switch / disconnector / Earthing switch making current (peak)	kA	50	62.5
Breaking of transformer			
Rated current	A	200(Fuse) / 630(CB)	
Breaking capability	kA rms	20	25
Making capacity	kA peak	50	62.5

Each switch of TGS has three positions: open, close, earth; each position is ensured by interlock device to avoid misoperation. Earthing switch has complete making capability.

Operation mechanism is independent to ensure the irrelevance between the main contactor movement and operating speed of the operator. The position indicator is driven by main shaft to ensure indication accuracy.

TGS advantages:

- Low maintenance workload
- Electrically operated
- High reliability
- Standardized connection
- Immune to environmental influence
- Light in weight
- Compact structure
- Easy operation
- With locking device

Transformer

General introduction

TGOOD TDT-I type oil immersed transformer is installed in TDK prefabricated substation.

- Sealed tank type construction is used, all seams are welded and oil tight. On the external areas of the tank, welding of horizontal and vertical joints is on both sides of the joint.
- The lid of the transformer is capable of being removed without having to take off another components first
- The method of cooling transformer is ONAN as standard
- Transformer insulating oil is certified as (PCB- free)
- Oil level indication is provided by a permanent marking on the inside of the tank. An external oil level indicator is also provided.
- An oil drain valve is provided and located in a position easily accessible through an open door
- Transformers are fitted with a filler cap which is easily accessible.
- Low voltage terminal palms are made of copper with their contact surfaces tinned or silver plated.
- Each low voltage bushing part within the tank is completely covered with oil when the transformer is cold and can be readily accessible with the tank cover removed.

Technical data

Item	Unit	Data
Standard		IEC60076
Frequency	Hz	50
No. of windings		2
Rated voltage ratio	V	11000/ 415, 433, 690
Rated power	kVA	Up to 1600
Vector group		Dyn11
Type of cooling		ONAN
Winding material		Cu
Impedance voltage	%	4, 5, 6
Oil conservation system		Sealed
Sound pressure level at 0.3m	dB	≤45
Tap changer location		HV side
Tapping range		-5% to +10%
Tapping positions		7
Tapping method		Off load

Remote Terminal Unit

Remote Terminal Unit (optional)

- Remote terminal unit (RTU) will realize all necessary functions of TGS switchgear at MV side of TDK substation, such as remote control and monitoring.
- Working condition information can be collected, including switch status, load current and failure points, etc.
- Communicate open / close commands of switchgear
- Communication with central control room
- Practicability and reliability of RTU have been proved, which will ensure real-time remote control of switchgear from control room. Assembly and operation of interface are simplified.
- The remotely-controlled interface is applicable to MV power grid.
- Operation of the local / remote control switch on the front face is simplified, information of switching status can be indicated.
- During failure of auxiliary power supply, standby power supply will ensure several hours' of normal work.
- Plug-in type of connection is realized through connectors.
- RTU has special tools, which can be connected to electrical operation system easily.
- During installation or measurement, the connectors with polarities are used to ensure correct connection.
- Split-type current transformer is used, which is featured with easy installation.

Low Voltage Apparatus

Low voltage ACB

TGOOD selects high performance compact circuit breakers in the world. Besides the characteristics of traditional circuit breakers (withdrawable, selective and low maintenance workload), this product is also characterized by compact size, internal communication & measurement functions, which enhance the performance and safety of the product. This product is also featured with simple installation, friendly user interface and easy operation. Main incoming circuit breaker used in TDK substation will save space in LV side.

Technical Technical data:

Number of poles	3/4		
Rated insulation voltage (V)	1000		
Rated frequency (Hz)	50,60		
Rated operational voltage (V AC 50/60Hz)	690		
Rated current (A)	630~1000	1250~1600	2000~3200
Ultimate breaking capability (kA rms)	42	42	50
Service breaking capability (kA rms)	35	35	40
Short- time withstand current (kA rms 1s)	35	35	40

Note: Higher performance optional, consult us for more information.

Low voltage MCCB

The MCCB is in modularized structure, and featured with wide usage, reliability and safety.

The MCCB chosen by TGOOD for LV power distribution is used for AC 50/60Hz (<500V), which prevents overload and short circuit damage to circuit , and enhances the reliability and continuity of power supply.

Technical data:

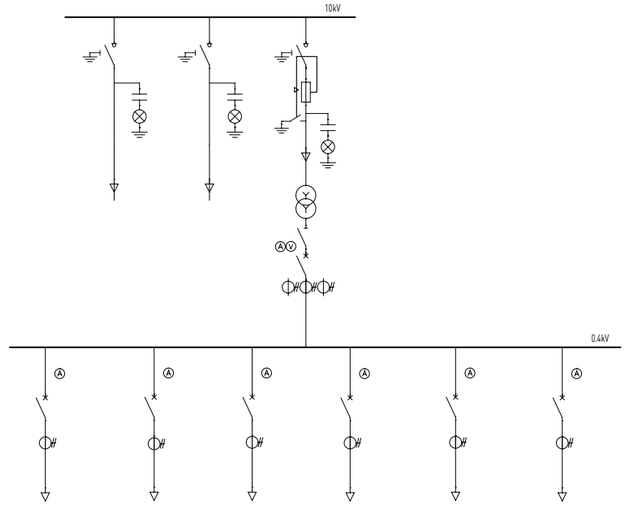
Rated current (A)			100/160/250/400/630
Rated insulation voltage (V)			800
Rated impulse voltage (kA, Peak)			8
Rated operational voltage (V)			690
Ultimate breaking capability	Icu (kA)	220V/230V	85
		380V/400V	35
Service breaking capability	Ics		75%~100% Icu

Note: Higher performance optional, consult us for more information.

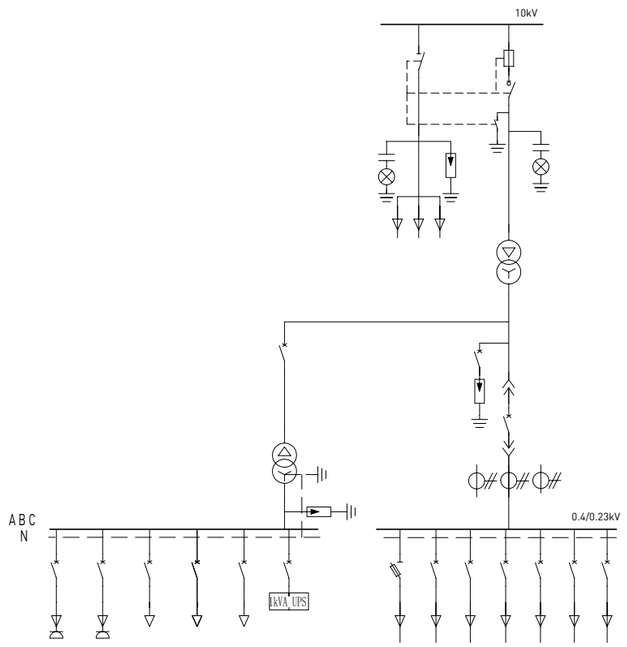
TDK Application

Application examples of prefabricated substation in power distribution

Utility



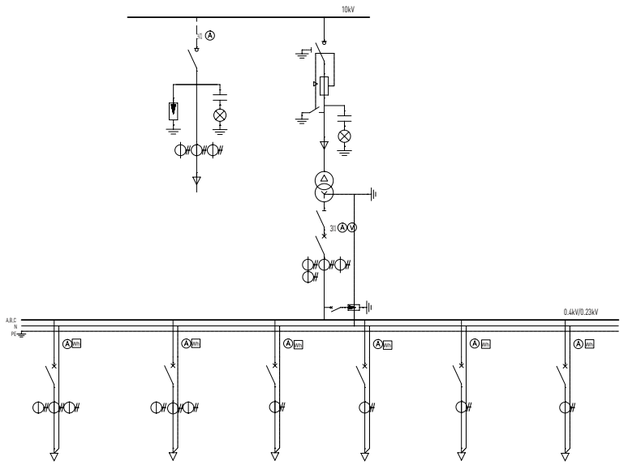
Renewable



Application

TDK Application

Transportation



Connection & maintenance

Cable Connection

TGS cable connection

Two kinds of cable connection are available – terminal with shielding (touchable) is applicable to single core XLPE cable; while terminals without shielding is applicable to all cables.

Cable box shall be added to ensure personal safety.

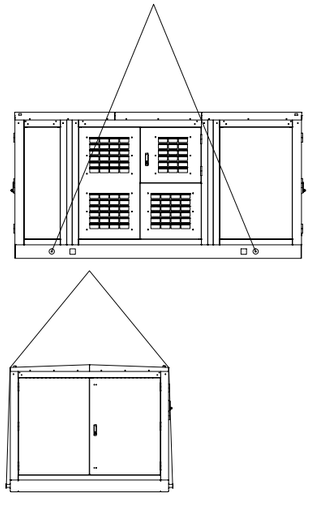
TGS RMU	Bushings	Cable	Elastimold	Heat shrink dismountable	Dismountable
12kV 400A 20kA / 1 sec	Universal	XLPE MIND	400LR N.A	EE RE EE RE	TCH TCH
12kV 630A 20kA / 3 sec	M16 bolt	XLPE MIND	400TB N.A	EE RE EE RE	TCH TCH
12kV 630A 25kA / 1 sec	M16 bolt	XLPE MIND	400TB N.A	EE RE EE RE	TCH TCH
24kV 400A 20kA / 1 sec	universal	XLPE MIND	K400LR N.A NO cable box required	RE* RE*	
				Require cable box	

Symbols:
XLPE: cross-linked PUR MIND: Oil-immersed paper insulation (without dripping);
Universal type: M14 insert type / M12 bolt
EE: EPKT + EAKT RE: RICS + EPKT
RE*: RICS + EPKT + additional cable box
TCH: T4PC + CC1 + heat shrinkable cable head

LV cable connection

The low voltage cable are connected directly to the breaker.

Transportation,Hoisting and Replacement



Hoisting

TDK transportation

- Appropriate forklift can be used for short-distance transportation of TDK prefabricated substation.
  - Weight of prefabricated substation shall not exceed the load carrying capacity of forklift.
- Take out the hoisting rod before hoisting
  - Under normal circumstance, 4 hoisting rods are hidden in the groove of base, which can be taken out directly before hoisting.

TDK enclosure hoisting

- The prefabricated substation can be hoisted through hoisting tools made according to TGOOD drawings.
  - It can effectively avoid surface damages, like paint scratch.
  - For long distance transportation, take out the hoisting rod, then secure the substation to the truck through tie downs and securing ring (made by customer)
- After finishing the hoisting, push the hoisting rods back into the substation base

Enter transformer chamber

Entry

- Enter MV / LV chamber: customers access into the MV and LV chamber through double-opening door for equipment operation or adjustment; when door is opened, fix the 2 door leaves with door supporting mechanism.
- Enter transformer chamber: both sides of transformer chamber are equipped with outwardly-opened doors, through which customers could go into transformer chamber for adjustment and inspection; the door can be fixed through door supporting mechanism.

Replacement or upgrading

- If large components (transformer, MV switchgear, LV cubicle, etc.) are to be replaced or upgraded, customer can remove the enclosure of substation to perform replacement or upgrading, and re-assemble the enclosure. The operation is very simple – the on-site replacement or upgrading can be finished within 30 minutes.

Replacement

Contact us

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