

## ZBW-12

Pre-installed Compact Substation  
(American type)



### Overview

ZBW series preassembled box-type substation (commonly known as American box-type transformer), its structure is "product" font structure, transformer and high and low voltage equipment are closely connected as one, among which, three sides of the transformer exposed to the air, good heat dissipation conditions, and can be separated from the high and low voltage equipment housing, easy maintenance.

The 813 series oil-immersed transformer with chip type oil tank, no oil cushion, fully enclosed, high and low pressure bushing, tap changer, oil level indicator, pressure release valve, oil release valve, etc. are installed on the end plate of the high-pressure chamber body, the position is reasonable, easy to observe and operate. The high-pressure chamber and low-pressure chamber are separated by steel plates. The high-pressure chamber and low-pressure chamber transformers are relatively independent and maintain a complete box as a whole, with compact structure, small volume and light weight. The power distribution switchgear is installed on the high and low voltage sides.

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## Model meaning

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Pre-installed substation	Performance level code		High voltage connection scheme		Rated capacity of transformer		Voltage level

## Environmental conditions of use

- Cooling condition: air self-cooling
- Use environment:

The outdoor ambient temperature is not higher than 40°C , not lower than -45°C , the altitude is not more than 1000m, the monthly average temperature is not more than 30°C , the annual average temperature is not more than 20°C ; At 25°C , the relative humidity of the air does not exceed 95%, and the monthly average does not exceed 90%;

- Horizontal acceleration is not more than 0.3g, vertical acceleration is not more than 0.15g;
- The installation environment should be free from obvious pollution, no explosive, corrosive gas and dust, and the installation site should be free from violent vibration and impact, requiring the installation on a cement platform or other flat and solid platform.

Note: In case of any other violation of this technical regulation, the user shall negotiate with the Company

## Product characteristics

- Small size, compact structure, easy installation:
- Can be used for ring network, can also be used for terminal, reliable protection of personal safety
- Low loss, low noise, superior performance;
- The box adopts anti-theft structure;
- Low temperature rise, strong overload capacity.

## Enforce standards

This product meets the following standards:

GB/T17467-1998 "High voltage/Low voltage pre-installed substation"

DL/T537-93 "6-35kV box-type substation ordering Technical Conditions"

## Main technical parameters

Serial number	Item	Units	Technical parameter
1	Rated voltage	KV	10/0.4(High/low pressure)
2	Maximum operating voltage	KV	12(High pressure side)
3	Rated frequency	Hz	50
4	Rated capacity	KVA	150-1600.
5	1min power frequency withstand voltage	KV	35
6	Lightning impulse voltage	KV	75
7	Cooling mode		Oil immersed in self-cooling
8	High voltage backup fuse breaking current	KA	50
9	Breaking current of plug-in fuse	KA	2.5
10	Ambient temperature	°C	- 35 ~ + 40
11	Coil allows temperature rise	k	65
12	No load voltage regulation		±5% or ±2 x 2.5%
13	Noise level	db	50
14	Class of protection	KV	IP43

## Transformer

Selected new S9 series transformer body, low loss, good overload capacity, strong short-circuit resistance, all fasteners are protected. The S11 series ring jointless core transformer with better performance can also be selected.

Capacity KVA	Voltage KV		Join group label	No-load current %			No load loss W			Impedance voltage %	Load loss
	High tension	Low pressure		S9	S10	S11	S9	S10	S11		
160	10±5% 或 2×2.5%	0.4	Dyn11 Yyno	1.4	1.4	0.2	400	320	255	4.0	2200
200				1.3	1.3	0.2	480	380	305		2600
250				1.2	1.2	0.2	560	450	360		3050
315				1.1	1.1	0.2	670	530	425		3650
400				1.0	1.0	0.15	800	650	505	4.5	4300
500				1.0	1.0	0.15	960	750	605		5100
630				0.9	0.9	0.15	1200	910	755		6200
800				0.8	0.8	0.15	1400	1080	980		7500
1000				0.7	0.7	-	1700	1260	-		10300
1250				0.6	0.6	-	1950	-	-		12000

## Fuse

The full range of protection is provided by the backup protection fuse and the plug-in fuse in series on the high voltage side of the American box, the principle is simple, economical and reliable; Backup protection fuse is oil-immersed high voltage current limiting fuse, breaking capacity is large, only in the transformer internal fault action plug-in fuse equipped with double sensitive fuse, can provide current and temperature double protection, after the double sensitive fuse is blown, can be easily replaced in the field.

## Load switch

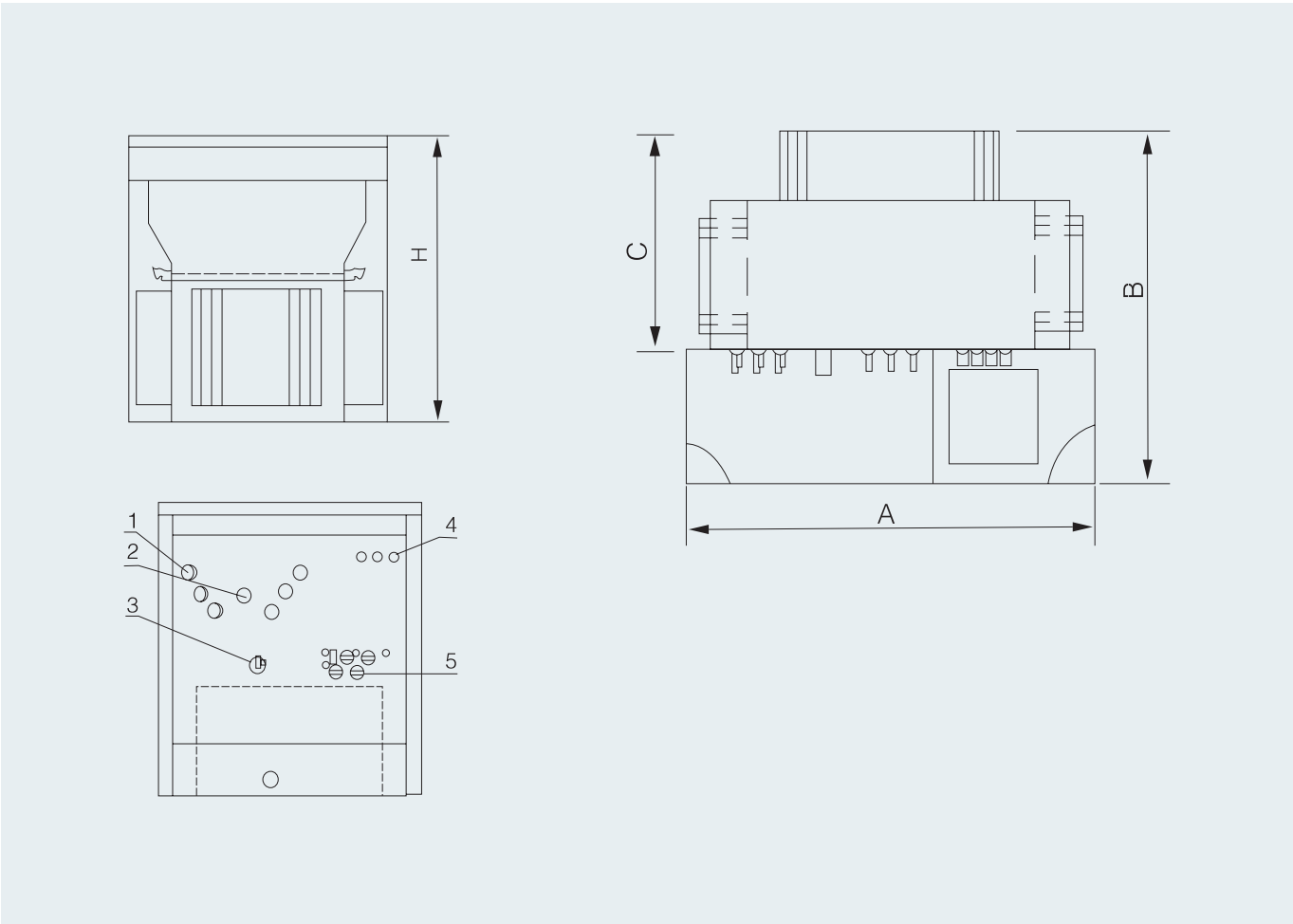
Load switch is oil-immersed, three-phase linkage switch, spring operating mechanism; It can be operated with load, and its closing speed has nothing to do with the operating force. There are two stations, four stations T type, four T position V type, etc., to choose from.

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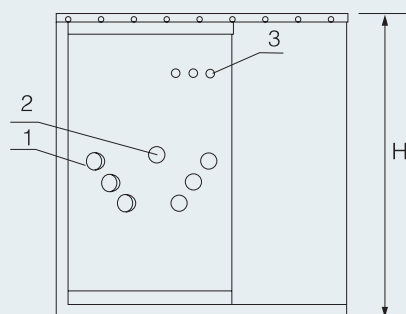
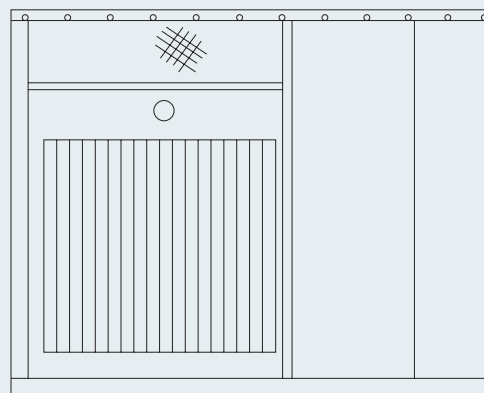
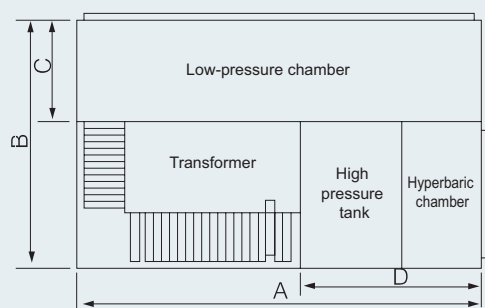
Item		Name	Units	315A	630A
Rated voltage			KV	12	12
Maximum current			A	315	630
Rated frequency			Hz	50	50
Rated short-circuit closing current			kA	31.5	50
Rated short-time withstand current			kA	12.5	50
Rated short endurance time			S	2	2
Mechanical life			次	2000	2000
Lightning impulse test	Phase to phase		KV	75	75
	Isolation fracture			85	85
1min power frequency withstand voltage	Phase to phase		KA	42	42
	Isolation fracture			48	48
Rated peak withstand current			KV	31.5	50

## Outline mounting dimension(mm)



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Capacity	A	B	C	H	Weight KG
200kVA and below	1830	1420	820	1850	小于 2800
250-400kVA	1830	1450	850	1980	3000-3300
500-630kVA	1830	1480	880	2070	3600-3950
800kVA	2200	1700	950	2170	4500

Note: The above is the standard size for reference.

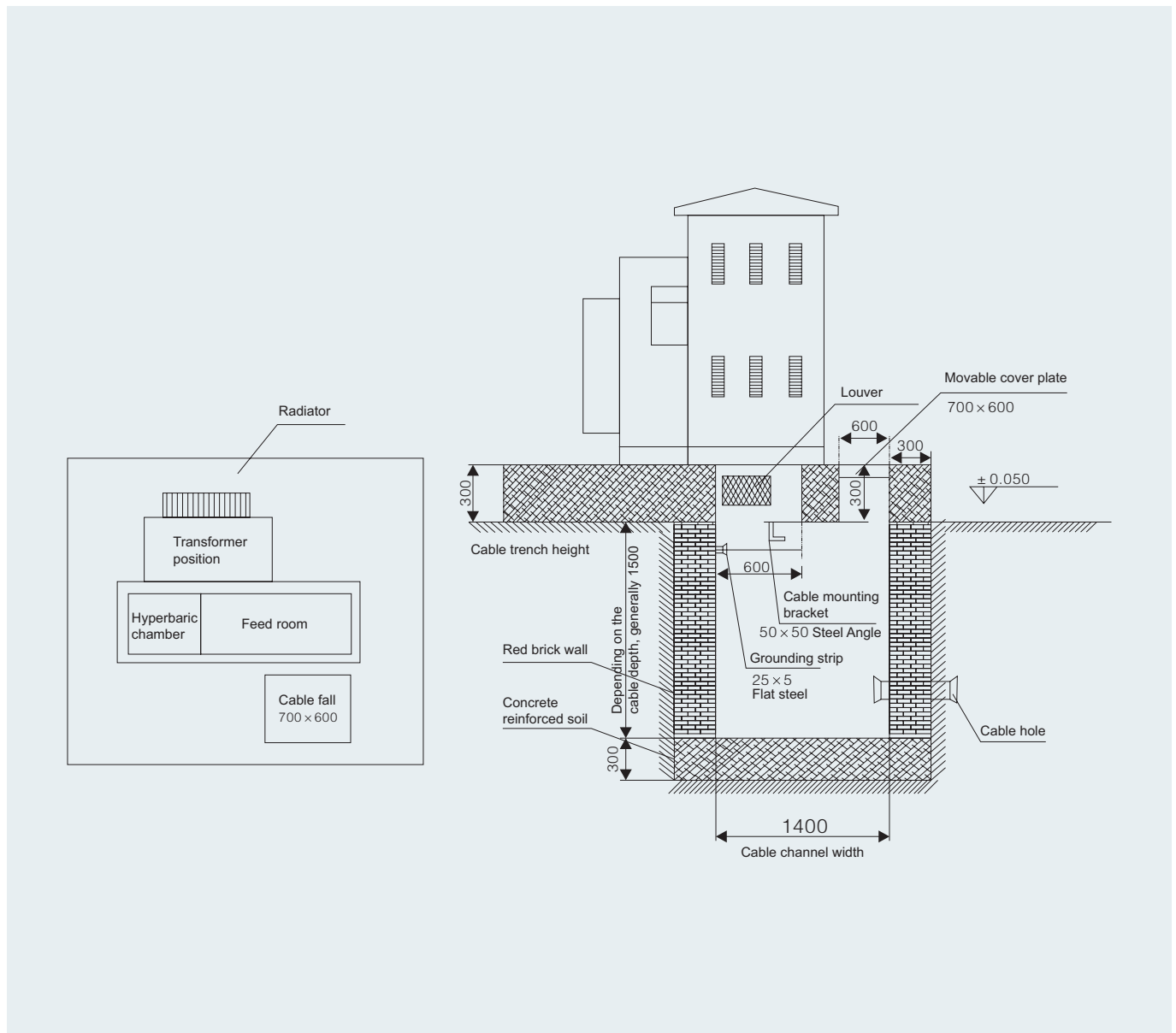
Capacity	A	B	C	H	Weight KG
315kVA	2560	1600	600	1000	3050
400kVA	2560	1600	600	1000	3270
500kVA	2560	1600	600	1000	3400
630kVA	2560	1600	600	1000	3900
800kVA	2760	1600	800	1000	4200
1000kVA	2760	1950	800	1000	4800
1250kVA	2910	1950	800	1000	5400
1600kVA	2200	1700	950	2170	4500

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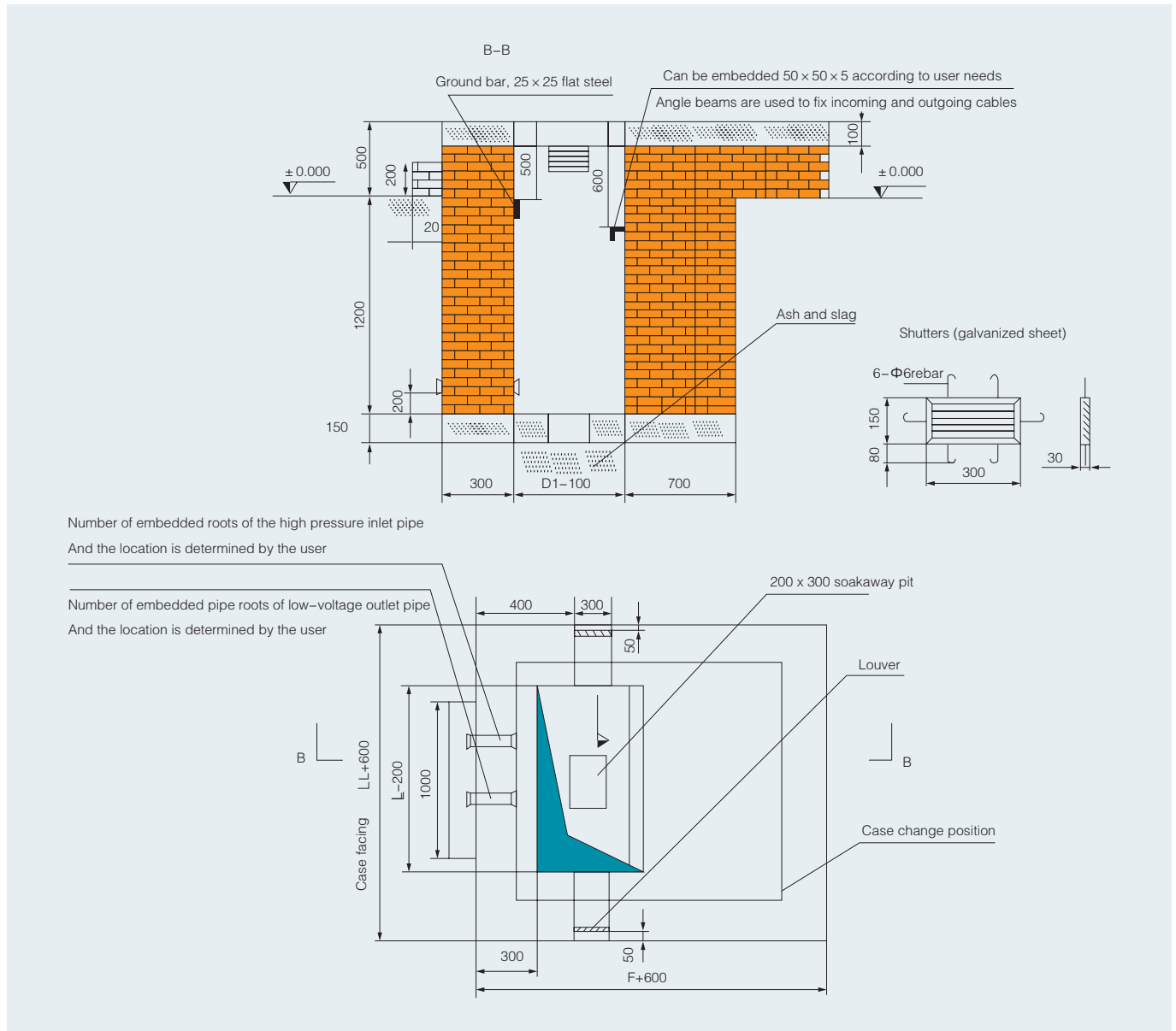
## Mounting dimension(mm)



## Technical requirement

- The surface of the concrete base should be flat, and after the installation of the combined substation, the base should be sealed with cement around;
- The shape of the ground bar and cable fixing bracket can be determined according to the actual situation;
- Cable fixing frame and ground bar should be embedded;
- The position of the inlet and outlet cable holes depends on the specific situation;
- There must be a gap of not less than 1.5m on the front of the switch after installation of the combination transformer to facilitate operation;
- The grounding net can be made of 12-plated round steel or 30×4 galvanized flat steel, and the grounding wire resistance should meet the requirements of the power department.

## Foundation drawing



- Standard type, enhanced type, basic construction requirements.
- The basic endurance is more than 100kPa.
- The foundation is located at a higher elevation, drained outwards on all sides, and constructed with red brick cement mortar. The inner and outer walls shall be coated with 1:2 cement mortar 20mm thick and mixed with 3% waterproofing agent.
- The bottom of the cable room should be slightly inclined to the side of the collection pipe to avoid water accumulation.
- 150×300 steel plate mesh (10×20) diamond-shaped eyes are welded on the inside side of the louver window frame, and the welding bar claws are embedded in the wall.
- Foundation construction shall comply with the relevant provisions of JGJ/T16-92 "Code for Electrical Design of Civil Construction".
- The practice of grounding trunk and grounding pole is still done as usual. After the grounding trunk is drawn from the cable trench, it can be arranged around the ring network cabinet, or the grounding pole can be extended from one side. Grounding resistance  $\leq 40\Omega$ .
- The dimensions in the figure are recommended values.
- In order to facilitate the user to enter the line, the cable can be set in three or four directions according to the actual situation on the site.

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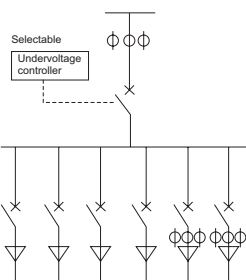
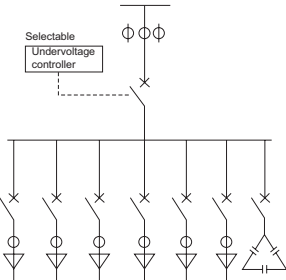
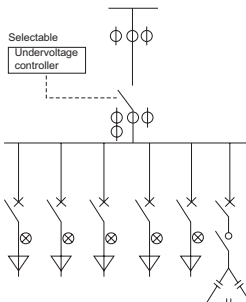
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High-pressure typical scheme

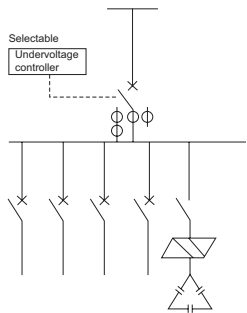
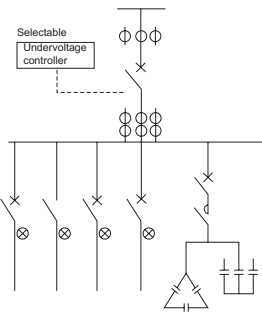
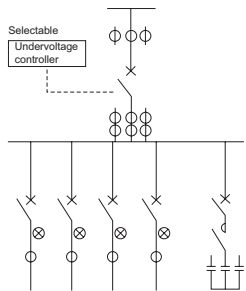
Scheme number	H-01	H-02	H-03
	10kV power supply I	10kV power supply I 10kV power supply II	10kV power supply I 10kV power supply II
Single line diagram of main loop			
Type	Terminal type with two-position load switch.	The ring network type is changed, and the four-position "V" type load switch is adopted.	The ring network type is changed, and the four-position "T" type load is opened close.
Switch selection	Single power supply, suitable for end users.	Ring network or dual power supply can be realized, but when the transformer is disconnected, the high-voltage power supply I and high-voltage power supply II are disconnected at the same time; Applicable ring network current 315A, 630A.	It can realize the ring network or dual power supply, but when the transformer is disconnected, the high-voltage power supply I and high-voltage power supply II are not connected to each other. Applicable ring network current 315A,630A.
Scheme number	H-04	H-05	
Single line diagram of main loop			
Type	The terminal type uses a four-position "V" type and a two-station load switch.	Terminal type with high voltage metering function.	
Switch selection	The scope of application can realize the ring network or dual power supply, is the most perfect ring network scheme, the selection of ring network current 315A, 630A.	Suitable for users requiring high voltage metering	



## Low pressure typical scheme

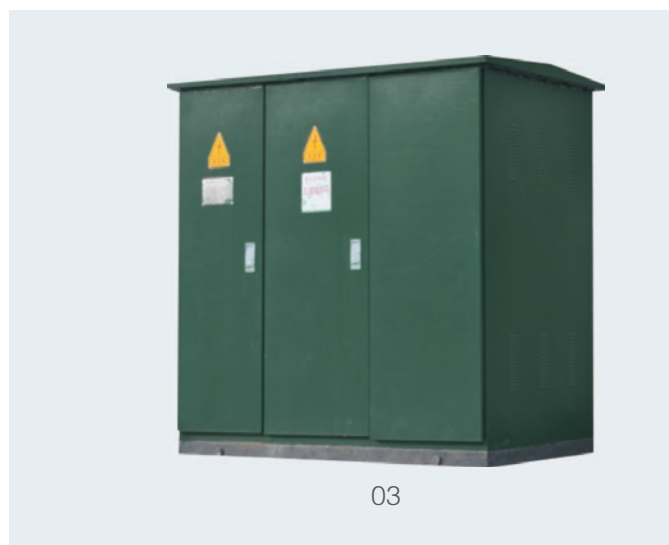
Scheme number	L01	L02	L03
Single line diagram of main loop			
Type			
Switch selection	Main switch, total metering (active and reactive power), two branch active power metering, 63-1250A, optional undervoltage controller, suitable for all capacities.	Main switch, total metering (active, reactive power), outlet 63-1250A, optional undervoltage controller, suitable for all capacities.	Main switch, total metering (active, reactive power), output line 63-1250A reactive power compensation 30-360kVar, optional undervoltage controller, suitable for all capacities.

Scheme number	L04	L05	L06
Single line diagram of main loop			
Type			
Switch selection	Main switch, total metering (active, reactive power) line 63-1250A, optional undervoltage controller, switching device use intelligent composite switch and capacitive contactless switch. Applicable to all capacities.	Main switch, total measurement (active, reactive power), outlet 63-1250A, optional undervoltage controller, compensation for total complement, sub complement. Applicable to all capacities.	Main switch, total measurement (active, reactive power), out of 63-1250A reactive power compensation 30-360kVar, optional undervoltage controller, compensation for compensating. Applicable to all capacities.

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