TIANCHI
天驰电气

Company Address:

Seven Stars Industrial Park, Jiangnan High-tech Development Zone, Licheng District,

QUANZHOU,FUJIAN

Tel:Mr.Wang 15005059589 Mr.Zhu 18850161727 Mr.Wang 13959908615

Website£º https://www.tianchielectric.com

E-mail:sales1@tianchielectric.com

sales2@tianchielectric.com

sales3@tianchielectric.com

P.C:362000

七星电气
7·Stars

MH201208-LTD Technical specifications are subject to change without prior notice

ZS8N Series Switchgear

—— Metal-clad & Metal-enclosed

PRODUCT SALES MANUAL

Content

1 Overview

1.1 Summary

Under the modular design concept, ZS8N (KYN□-12/24) metal-clad removable AC switchgear greatly adopts structural components of high technical standard. It can be equipped with withdrawable circuit breaker, contactor and load break switch, and is applicable to three-phase AC distribution system of 3.6-24kV.

1.2 Application Fields

- Power station, substation, switching station, main and subsidiary switch station, etc.
- Papermaking, cement, textile, chemicals, food, automobile, petroleum, metallurgy, mine and other industrial fields
- Airport & seaport, railway & metro, land transport and other transportation enterprises
- Offshore drilling rig, drilling platform, offshore oil exploitation, steamer and other marine and offshore operation fields
- Service industry, real estate industry, residential community construction, etc.

1.3 Operating conditions

- Ambient temperature:
  - -Maximum +40℃
  - -Minimum -15℃
  - -Average temperature within 24 hours ≤+35℃
- Humidity
  - -Average daily relative humidity ≤95%
  - -Average monthly relative humidity ≤90%
- Altitude: ≤1000m
- Earthquake intensity: ≤8 magnitude

The switchgear shall be installed in places free from fire, explosion, serious pollution, chemical and corrosive gas and violent vibration.

Special operating conditions: In case the switchgear is to be installed in highland area with an altitude beyond 1000 meters, necessary reinforced insulation measures must be taken through negotiating with the manufacturer at the time of ordering. When the ambient temperature is above +40℃, the rated current-carrying capability of the switchgear will fall as per certain coefficient, which must be confirmed by the manufacturer when ordering.

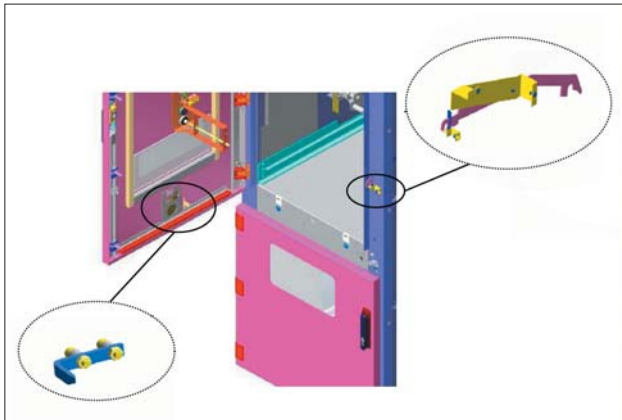
Note: There will be condensation once the switchgear operates in such environment that is of high humidity and fast & big temperature fluctuation which are common in many areas of China. Therefore:

1) After the installation of switchgear, heater shall be put into operation as soon as possible.
2) The heater shall be put into operation all day long when the switchgear is under backup and operating status.
3) The heater can stop when the actual load current of the switchgear reaches or surpasses 1250A

1.4 Switchgear's Advantages in Technical Performance

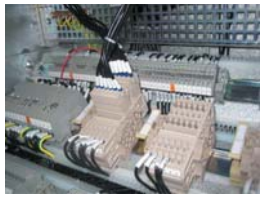
Structural features of the enclosure

- Modular structure, contact and standard arrangement, high space utilization rate
- Three specifications of 650mm, 800mm and 1000mm are optional for enclosure width as per different rated current and breaking capability
- Each compartment is partitioned by metal plates and bushings. And the three HV compartments (busbar, circuit breaker and cable terminal compartments) are all equipped with upward pressure release duct used to release arcing pressure and make sure the safety when there is inner arcing.
- The truck is of interchangeability and the driving unit with precise lead screw mechanism guarantees the reliability and flexibility of the truck that can operate with the door closed.
- The circuit breaker truck and the grounding device can realize electrical operation.
- The structural design guarantees that all operation and maintenance can be conducted in front of the switchgear and the switchgear can be installed against the wall.
- The whole enclosure adopts imported Al-Zn-coated plate with high mechanical strength.
- Only when the truck is in test or withdrawal place, the compartment door of the circuit breaker can be opened.
- Mounting-panel-type emergency trip device can quickly eliminate fault as it occurs so as to guarantee personnel and device safety.
- The V-Sa circuit breaker developed by our company through introducing German technology is selected. Special notes shall be made for configuring circuit breaker of other model.



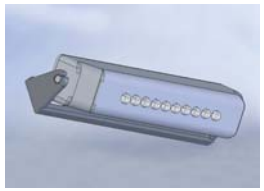
The propelling mechanism of the circuit breaker is locked when the door is opened.
The circuit breaker truck is unable to propel.

Emergency trip device

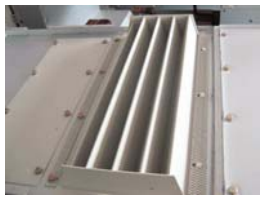


Plug-in miniature busbar

Lighting device in cable compartment



LED lighting resource in LV comparmentr



Wave-form meshed pressure-releasing device

Features of control and protection configuration

- ZS8N switchgear, as a product for mid-and-high-end market, chooses internationally and domestically famous brands for its secondary components so as to guarantee the high quality;
- ZS8N switchgear is equipped with PRD300 series of relay protection products manufactured by our company (products of internationally and domestically famous brands are also available) which enable it to meet various protection requirements of current power system and reach a perfect, uniform and integrated coordination;
- Plug-in miniature busbar technology is adopted for convenient installation and replacement;
- The lighting of LV and cable compartment uses LED of good color rendering as light-emitting component. Under the same brightness, the energy consumption is only 25% of that of commonly used auxiliary lights;
- Multiple LEDs in series and protective circuit can guarantee that the remaining LEDs are in normal work even if certain LED goes wrong.
- Special design structure can eliminate the lighting effect problem caused by small divergence angle of LED lighting.
- The design of wide power supply applies to the power environment of AC/DC110~230V and is especially suitable for that of control feeder.

Features of safety protection

- ZS8N has safe and reliable interlocking to guarantee correct operation sequence and the safety of personnel and device;
- Pass 40kA inner arcing test;
- Pass temperature rising test of 1.1 times rated current;
- Pass electromagnetic compatibility test;
- Wave-form meshed board is applied in pressure releasing channel, which guarantees a high protection grade of IP4 and is helpful for ventilation and heat dissipation of primary circuit.

1.5 Model and its meaning

ZS8N (K Y N □) – 12 (□) / □

- No. of primary circuit scheme
- Configuration type of main switch
- Rated voltage (kV)
- Design no.
- For in-door use
- Removable
- Metal-clad
- Model

2 Compliance Standards and Technical Parameters

2.1 Compliance Standards

IEC62271-100	High-voltage alternating-current circuit breakers
IEC62271-102	High-voltage alternating-current disconnectors and earthing switches
IEC62271-200	High-voltage alternating-current metal-enclosed switchgears and controlgears for rated voltages above 1kV and up to and including 52kV
IEC60694	Common specifications for high-voltage switchgears and controlgear standards
IEC60071-2	Insulation co-ordination-Part 2: Application guide
IEC60265-1	High voltage switches-Part 1: Switches for rated voltage above 1kV and less than 52kV
IEC60470	High voltage alternating-current contactors and contactor-based motor-starter

2.2 Technical Parameters

Technical parameters of ZS8N switchgear

No.	Name		Unit	Value			
1	Rated voltage			7.2	12	17.5	24
2	Rated insulation level	Power frequency withstand voltage (1 min)	kV	20	28	38	50
		Lightning impulse withstand voltage (peak)		60	75	95	125
3	Rated frequency		Hz	50/60			
4	Rated current of main busbar		A	630, 1250, 1600, 2000, 2500, 3150, 4000[a]	630, 1250, 1600, 2000, 2500, 3150	630, 1250, 1600, 2000, 2500	
5	Rated current of branch busbar			630, 1250, 1600, 2000, 2500, 3150, 4000[a]	630, 1250, 1600, 2000, 2500, 3150	630, 1250, 1600, 2000, 2500	
6	Rated short-time withstand current (rated short-circuit duration:4s)		kA	20, 25, 31.5, 40, 50	20, 25, 31.5	25	
7	Rated peak withstand current			50/52, 63/65, 80/82, 100/104, 125/130	50/52, 63/65, 80/82	63/65	
8	Rated short-circuit breaking current			20, 25, 31.5, 40, 50	25		
9	Rated short-circuit making current			50/52, 63/65, 80/82, 100/104, 125/130	63/65		
10[b]	Breaking times of rated short-circuit breaking current		times	50 (30 times for 50kA)	30		

a) Refers to that the rated current can reach to 4000A with forced ventilation
b) The breaking times of rated short-circuit breaking current here refers to the status when ZS8N is equipped with V-Sa circuit breaker and the parameters are subject to change while configuring other types of circuit breaker.

Overall dimensions of ZS8N switchgear

Standard 7.2/12/17.5 kV switchgear (Unit: mm)		Standard 24kV switchgear (Unit: mm)	
Rated current of branch busbar Ie	W x D x H	Rated current of branch bus Ie	W x D x H
Ie≤1250A	650 (800)x1500x2250	Ie≤1250A	800/1000x1800 x2250
1600A= Ie =4000A	800x1500x2250	Ie ≤2500A	1000x1800x2250/
The switchgear width is 1800 when the busbar (cable) is top in and out.			

Main technical parameters of V-Sa vacuum circuit breaker

No.	Item		Unit	Value		
1	Rated voltage			12	17.5	24
2	Rated insulation level	Rated short time line frequency withstand voltage (1 min)	kV	28	38	50
		Rated lightning impulse withstand voltage (peak value)		75	95	125
3	Rated frequency		Hz	50/60		
4	Rated current		A	630, 1250, 1600, 2000, 2500, 3150, 4000	630, 1250, 1600, 2000, 2500, 3150	
5	Rated short-circuit breaking current		kA	20, 25, 31.5, 40, 50	20, 25, 31.5	
6	Rated short time withstand current					
7	Rated peak withstand current			50/52, 63/65, 80/82, 100/104, 125/130	50/52, 63/65, 80/82	
8	Rated short-circuit making current (peak)					

* Refer to that the rated current can reach to 4000A with forced ventilation.

Main technical parameters of vacuum contactor

Item	Unit	Data
Rated voltage	kV	7.2, 12, 17.5, 24
Rated insulation voltage	kV	7.2, 12, 17.5, 24
Power frequency withstand voltage (1 min)	kV	20, 28,38, 50
Rated current	A	400
Rated breaking current	A	4000
Breaking times	Time	25
Rated making current	A	4000
Making times	Time	100
Opening time	ms	<30
Closing time	ms	<90
Electrical life	Time	1000000
Mechanical life	Time	1000000

Main technical parameters of Disconnector switch

Rated voltage	Un	kV	12kv			17.5kV			24kV		
Rated current	In	A	400	630	1250	400	630	1250	400	630	1250
Max. rated current	I	A	400	630	1150	400	630	1150	400	630	1150
Short circuit making capacity	Ima	kA peak	67	67	67	50	50	50	50	50	50
Peak withstand current*	Idyn	kA peak	82	82	82	82	82	82	82	82	82
Short time current 1sec.	Ith	kA eff	31.5	31.5	31.5	31.5	31.5	31.5	25	25	31.5
2sec.	"	"	25	25	25	25	25	25	25	25	25
3sec.	"	"	16	16	16				20	20	20
Mainly active load breaking capacity [2] (test duty 1 and 2, IEC 60265-1 (IEC 265))	I	A	400	630	1250	400	630	1250	400	630	1250
Mainly capacitive breaking capacity (test duty 4, IEC 60265-1 (IEC 265))	I	A	150	150	150	45	45	45	80	80	80
Mainly inductive breaking capacity cosφ=0.15		A	16	16	16	16	16	16	16	16	16
Rated earth fault breaking capacity, IEC 60265-1 (IEC 265)											
Earth fault breaking capacity , fig.6	I	A	150	150	150	70	70	70	75	75	75
Capacitive breaking cpaacity, fig.7	I	A	90	90	90	40	40	40	31.5	31.5	
Max. breaking capacity in co-operation with fuses IEC 62271-105 (IEC 420 1990-11)		A	1600	1600		1600	1600		900	900	
MAX. fuse size4) (value for ABB fuese type CEF)	In	A	125	125		125	125		80	80	
Power frequency withstand voltage 50 Hz 1 min. – to earth and between poles		kV		42			45			55	
– across isolating distance		kV		45			60			70	
Impulse withstand voltage 1.2/50μs – to earth and between poles		kV		75			95			125	
– across isolating distance		kV		85			110			145	
Pole distance	P	mm	150.170 and 210			170 and 210			170***, 235 and 275		

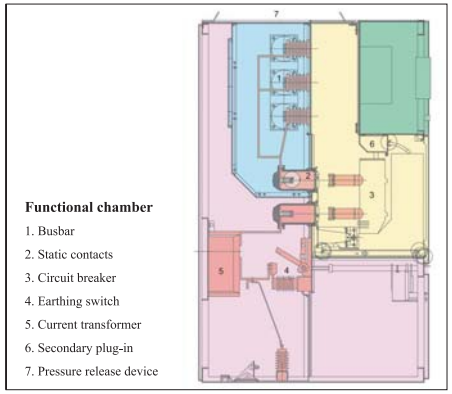
Selection table of fuses for protection transformers

kV	Rated power of the transfarmer (kVA)																	
	25	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600
	Rated normal current of the fuse (A)																	
3	10	16	25	25	40	40	63	63	100	100	100	100						
5	6	10	16	16	25	25	40	40	63	63	100	100	100	100				
6	6	6	10	10	16	16	25	25	25	40	40	63	63	100	100			
10	6	6	10	10	16	16	25	25	25	40	40	63	63	100	100			
12	6	6	6	10	10	16	16	25	25	40	40	40	63	63	100	100	100	
15	6	6	6	10	10	16	16	25	25	25	40	40	40	63	63	100	100	
17	6	6	6	6	6	10	16	16	25	25	25	40	40	63	63	63	100	100
20	6	6	6	6	6	10	16	16	16	25	25	40	40	40	63	63		
24	6	6	6	6	6	6	10	16	16	16	25	25	40	40	40	63	63	

3 Switchgear's Structure

The switchgear is composed of fixed parts and removable circuit breaker truck. The enclosure and the partition of various functional units are all Al-Zn-coated steel plates bolted after the processing and bending of numerical control machine. The switchgear is strong and of high mechanical strength. The enclosure is of high resistance to corrosion and oxidation. The door plate of the switchgear is made of cold-roll steel sheets after bending, processing and electrostatic spraying. The surface is resistant to shock and corrosion and is beautiful in appearance.

The inner part of the switchgear can be divided into circuit breaker compartment, busbar compartment, cable terminal compartment and LV compartment (as shown in the right picture)



3.1 Circuit breaker compartment

The circuit breaker compartment is equipped with specific rail for the truck to move and position on it. When the truck is withdrew or at the test position, the shutter will isolate the primary static contacts, so as to guarantee that the operators will not contact the live parts. When the truck moves from the test position to the operating position, the shutter will all open until the truck positions at the operating position. The secondary plug-in are connected through when the truck is at the test position, being convenient for various operation tests. Through the observing window, the operating position and conditions of the circuit breaker truck can be monitored.

3.2 Busbar compartment

The busbar compartment is at the upper rear side of the switchgear. When the busbars get through the partitions between switchgears, they are isolated through special busbar bushings to prevent the fault of the device from affecting the neighboring switchgear and guarantee the mechanical strength of the busbar installed.

3.3 Cable terminal compartment

Current transformer and earthing switch are installed in the cable compartment to monitor HV sensor, lightning arrester and so on. Multiple cables can be installed. Constructors can construct by entering the cable terminal compartment from the front or the back side of the switchgear. The cable compartment has abundant space that is convenient for the constructors to operate and install.

3.4 LV compartment

The dismountable LV compartment facilitates the assembling, the measuring meters, relay protection components and operation buttons are all installed in the LV compartment. Moreover, miniature busbar supports that can accommodate 20 miniature busbars are equipped in this compartment. The secondary plug-in equipped on the bottom board can be connected with that on the circuit breaker truck, so as to operate the circuit breaker on the panel of this compartment and conduct various measurement, control and protection operations to the circuit breaker. On the left side of the bottom board are equipped with a secondary cable outgoing hole for the user to connect while installing.

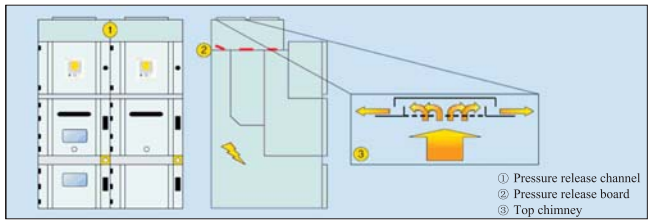
3.5 Interlocking device to prevent maloperation

The switchgear is equipped with reliable mechanical locking device for the safety of operators:

- Circuit breaker can be operated only when the truck is at test or operating position
- Truck can be moved only when the circuit breaker is in opening status
- Truck can be pushed into operating position only when the earthing switch is at opening status
- Earthing switch can be closed only when the truck is at test position or being withdrew
- Secondary plug-in is locked and can't be pulled out only when the truck is at operating position
- The door of the cable terminal compartment can be opened for equipment maintenance only when the earthing switch is closed
- The switchgear can be otherwise equipped with electrical interlocking as per user requirements

3.6 Pressure release device

The upper sides of the corresponding circuit breaker compartment, busbar compartment and cable terminal compartment are all equipped with pressure release device that adopts wave-form meshed board technology to guarantee a high protective grade of IP4X and facilitate the ventilation and heat dissipation of primary circuit. When certain compartment goes wrong, the air pressure in this compartment will rise and the arc will generate. The pressure release device equipped at the upper of the enclosure will act with the pressure release board automatically opens to release pressure and air, so as to guarantee the safety of operators.



3.7 Earthing system

The earthing busbar of the switchgear is installed at the bottom board of the cable terminal compartment. The circuit breaker truck is earthed by connecting its earthing contacts with the earthing busbar which is copper busbar of 50xmm^2 in section. The earthing busbar of the neighboring switchgear is reliably connected through special connecting board.

3.8 Truck

The truck chassis is made of cold-roll steel sheets after processing and rivet weld. According to the purposes, the truck can be divided into circuit breaker truck, voltage transformer truck, metering truck and isolating truck, etc. With the precise lead screw driving mechanism and the unique design of the truck chassis, the truck is very smooth and convenient to be pushed in and pulled out. The trucks of the same model are of good interchangeability. The truck in the switchgear has a positioning mechanism for the operating and test position. Even if the compartment door is closed, the truck is able to move between the two positions.

4 Primary Components

All electrical components of the primary circuit of ZS8 switchgear are supplied by internationally and domestically renowned suppliers, so as to guarantee that the switchgear is advanced in technology, stable in performance, safe and reliable.

4.1 Vacuum circuit breaker

V-Sa vacuum circuit breaker which totally complies with international standard and Chinese national standard is adopted.

The framework of the circuit breaker truck is made of cold-rolled steel sheets after bending and welding. The circuit breakers of the same specifications are of complete interchangeability.

The vacuum arc interrupter installed in the three-phase vertical insulating poles can effectively prevent the vacuum arc interrupter from being damaged by external force, avoid surface flashover caused by the accumulation of dust and dirt and improve the electric-field distribution around the arc interrupter.

The dynamic contacts on the circuit breaker truck adopts compressed-spring contact system that is reasonable in design, convenient for installation and maintenance, excellent in electrical properties such as low contact resistance and high thermal and dynamic stability withstand currents. When the truck is being rocked-in or rocked-out, the contact system touches or separates smoothly with optimal directionality and the truck is very convenient for operating.

4.2 Current transformer and voltage transformer

Current transformer and voltage transformer of domestically renowned brands are adopted, so as to guarantee that the technical performance is uniform with that of the switchgear, complies with international standards and Chinese national standards and satisfies the needs of different users.

4.3 Earthing switch

JN15 earthing switch having manual operating mechanism and short-circuit current breaking and making ability is adopted. Mechanical interlocking mechanism is installed on the operating rod of the earthing switch to interlock with the circuit breaker truck. Besides, locking electromagnet can also be installed to realize electrical interlocking.

The earthing switch is equipped with auxiliary contacts to provide opening and closing signals of earthing switch.

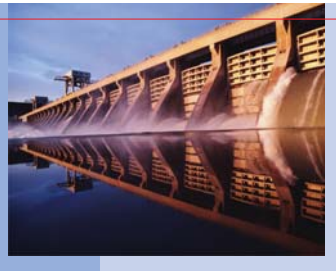
4.4 Lightning arrester

Reliable zinc oxide lightning arrester is adopted. It is of excellent nonlinearity, low protection residual voltage value, strong energy absorption ability, long protection distance and good ageing resistance.

4.5 Voltage display device

A voltage display device used to detect the live status of primary circuit is equipped in the switchgear. This device is composed of high-voltage sensor and voltage displayer. By selecting a voltage displayer with locking function to match with the mechanical interlocking device, it can lock high-voltage electrical equipments simultaneously, prevent maloperations of electrical devices and protect personnel safety.

ZS8N



5 Intelligent Switchgear

Functional features of intelligent switchgear:

Protection function

- Protection function is one of the most important functions of PDR300 relay protection. The protection function modules are independent with each other and have their own setting value group and data record, etc.
- The user can select corresponding protection as per actual operation needs, so as to realize a real tailor-made configuration.
- Protection setting value, time limit, locking condition and switching can be set and configured independently.
- Compared with regular relay protection, it is more satisfactory to meet the requirements of users for the selectivity, rapidity, sensitivity and reliability of protection.
- The realization of protection function is not relied on communication network and can satisfy the requirements of power system for the protection reliability.

Measurement function

The measurement includes:

- Current: Ia, Ib, Ic, Voltage: Uab, Ubc, Uca
- Power: P, Q
- Various protection-related data: 3U0 3I0
- Frequency: Hz, Power factor: PF
- Electrical work: kWh, kvarh
- Automatically transform the work amount and display the first and secondary measuring value as per CT and PT transformation ratio and wiring mode

Control function

- The control function is used to display the status information of switchgears, such as circuit breaker and disconnecting switch and realize the control of switchgear. All control functions and control logics can be set through software.
- It can realize various complicated automation controls including auto transfer switch, automatic adjustment of transformer tap, PT automatic switching, control interlocking/linkage, anti-override trip, circuit breaker malfunction protection, etc.
- Equipped with circuit breaker operating interface and have better connection with circuit breaker, which include:
  a) Circuit breaker remote control/local operation and locking
  b) Circuit breaker external linkage control
  c) Circuit breaker anti-trip locking control

Monitoring function

- Supporting input of external passive contact signal, supporting direct trip or alarm
- With 11 switching value input points

- Hardware circuit adopts filter technology to eliminate remote signaling mis-shifting caused by switch contact jitter, electromagnetic interference and others and to guarantee the accurate rate of remote signaling. The monitoring content includes:
  - a) Position of circuit breaker, load break switch or disconnecting switch
  - b) Operating or test position of truck
  - c) Spring energy storage status, gas pressure
  - d) CT/PT disconnection alarm
  - e) Other contact signals, such as temperature, gas and interlocking signal, etc.
  - f) Failure alarm of control power supply

Communication function

- CAN/485 field bus is adopted to make sure that the information is transmitted in a real-time and reliable manner with a highest velocity of 1Mbps and a longest distance of 2km;
- Send all operating information (including remote metering, remote signaling, protection setting value system parameters, etc.) to the upper-level SCADA system in a real-time manner through communication network;
- Receive various commands such as remote control, remote regulating, protection value setting, protection switching in/out and system parameter modification issued by the upper-level SCADA system and realize unattended substation scheme.

6 Typical Scheme

6.1 Main wiring scheme

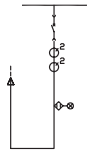
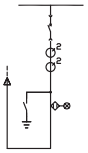
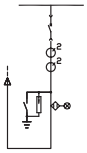
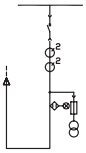
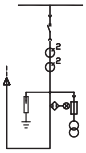
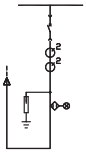
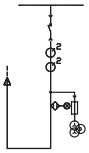
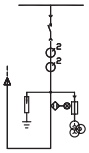
Incoming feeder or outgoing feeder scheme-cable entry modes

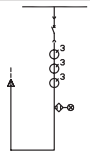
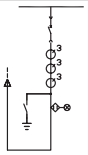
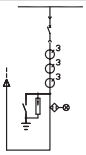
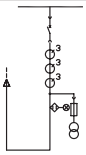
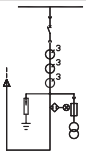
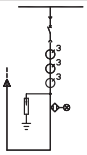
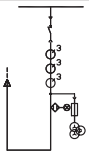
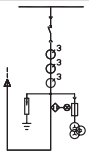
Scheme No.		001	002	003	004	005	006	007	008
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000
Main device	Vacuum circuit breaker	1	1	1	1	1	1	1	1
	Lightning arrester			3		3	3		3
	Voltage transformer				2	2		3	3
	Current transformer	2	2	2	2	2	2	2	2
	HV fuse				3	3		3	3
	Earthing switch		1	1					
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500
Remark		Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out

Scheme No.		009	010	011	012	013	014	015	016
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000
Main device	Vacuum circuit breaker	1	1	1	1	1	1	1	1
	Lightning arrester			3		3	3		3
	Voltage transformer				2	2		3	3
	Current transformer	3	3	3	3	3	3	3	3
	HV fuse				3	3		3	3
	Earthing switch		1	1					
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500
Remark		Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out	Cable bottom in/out

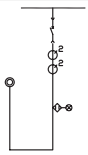
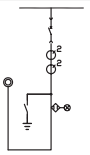
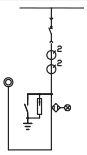
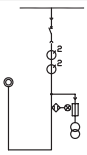
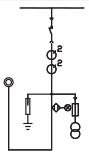
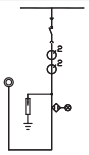
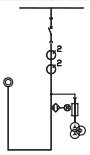
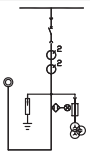
Remark: forced air-cooling is needed for 4000A.

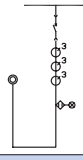
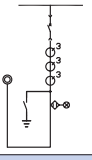
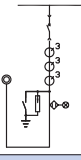
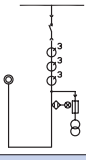
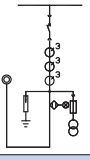
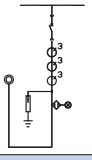
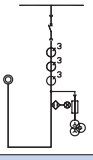
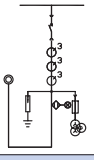
Incoming feeder or outgoing feeder scheme-Deepened switchgear with cable top in/out

Scheme No.		017	018	019	020	021	022	023	024
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000
Main device	Vacuum circuit breaker	1	1	1	1	1	1	1	1
	Lightning arrester			3		3	3		3
	Voltage transformer				2	2		3	3
	Current transformer	2	2	2	2	2	2	2	2
	HV fuse				3	3		3	3
	Earthing switch		1	1					
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs
Overall dimension(WxHxD)		800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800
Remark		cable top in/out	cable top in/out	cable top in/out	cable top in/out	cable top in/out	cable top in/out	cable top in/out	cable top in/out

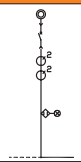
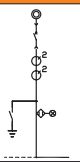
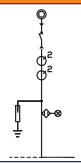
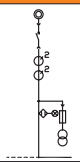
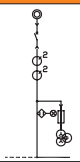
Scheme No.		025	026	027	028	029	030	031	032
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000
Main device	Vacuum circuit breaker	1	1	1	1	1	1	1	1
	Lightning arrester			3		3	3		3
	Voltage transformer				2	2		3	3
	Current transformer	3	3	3	3	3	3	3	3
	HV fuse				3	3		3	3
	Earthing switch		1	1					
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs
Overall dimension(WxHxD)		800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800
Remark		cable top in/out	cable top in/out	cable top in/out	cable top in/out	cable top in/out	cable top in/out	cable top in/out	cable top in/out

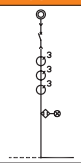
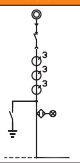
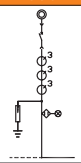
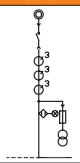
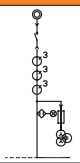
Incoming feeder or outgoing feeder scheme-Deepened switchgear with main busbar top in/out

Scheme No.		033	034	035	036	037	038	039	040
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000
Main device	Vacuum circuit breaker	1	1	1	1	1	1	1	1
	Lightning arrester			3		3	3		3
	Voltage transformer				2	2		3	3
	Current transformer	2	2	2	2	2	2	2	2
	HV fuse				3	3		3	3
	Earthing switch		1	1					
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs
Overall dimension(WxHxD)		800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800
Remark		busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out

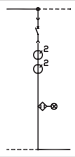
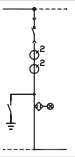
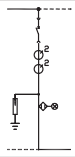
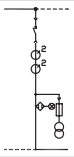
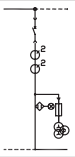
Scheme No.		041	042	043	044	045	046	047	048
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000
Main device	Vacuum circuit breaker	1	1	1	1	1	1	1	1
	Lightning arrester			3		3	3		3
	Voltage transformer				2	2		3	3
	Current transformer	3	3	3	3	3	3	3	3
	HV fuse				3	3		3	3
	Earthing switch		1	1					
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs
Overall dimension(WxHxD)		800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800	800(1000)x2240x1800
Remark		busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out

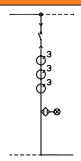
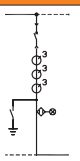
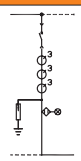
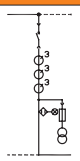
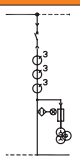
Incoming feeder or outgoing feeder scheme-Busbar top in/out

Scheme No.		049	050	051	052	053	054	055	056
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000			
Main device	Vacuum circuit breaker	1	1	1	1	1			
	Lightning arrester			3					
	Voltage transformer				2	3			
	Current transformer	2	2	2	2	2			
	HV fuse				3	3			
	Earthing switch		1						
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs			
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500			
Remark		busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out			

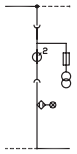
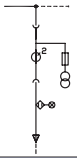
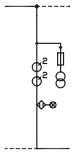
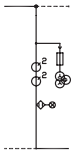
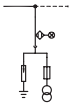
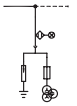
Scheme No.		057	058	059	060	061	062	063	064
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000			
Main device	Vacuum circuit breaker	1	1	1	1	1			
	Lightning arrester			3					
	Voltage transformer				2	3			
	Current transformer	3	3	3	3	3			
	HV fuse				3	3			
	Earthing switch		1						
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs			
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500			
Remark		busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out	busbar top in/out			

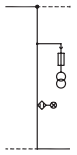
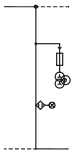
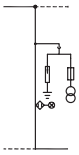
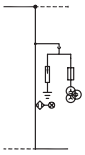
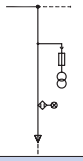
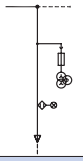
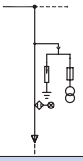
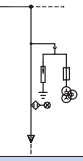
Bus coupler scheme

Scheme No.		065	066	067	068	069	070	071	072
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000			
Main device	Vacuum circuit breaker	1	1	1	1	1			
	Lightning arrester			3					
	Voltage transformer				2	3			
	Current transformer	2	2	2	2	2			
	HV fuse				3	3			
	Earthing switch		1						
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs			
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500			
Remark		Connecting with left and right switchgear	Connecting with left and right switchgear	Connecting with left and right switchgear	Connecting with left and right switchgear	Connecting with left and right switchgear			

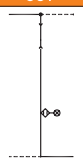
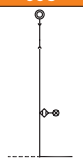
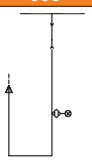
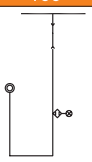
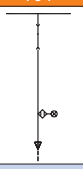
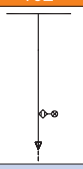
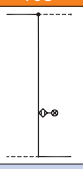
Scheme No.		073	074	075	076	077	078	079	080
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000			
Main device	Vacuum circuit breaker	1	1	1	1	1			
	Lightning arrester			3					
	Voltage transformer				2	3			
	Current transformer	3	3	3	3	3			
	HV fuse				3	3			
	Earthing switch		1						
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs			
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500			
Remark		Connecting with left and right switchgear	Connecting with left and right switchgear	Connecting with left and right switchgear	Connecting with left and right switchgear	Connecting with left and right switchgear			

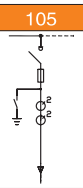
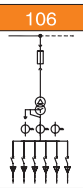
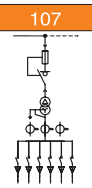
Metering feeder or PT feeder scheme

Scheme No.		081	082	083	084	085	086	087	088
Diagram of main wiring scheme									
Rated current (A)		630~1250	630~1250	630~4000	630~4000				
Main device	Vacuum circuit breaker								
	Lightning arrester							3	3
	Voltage transformer	2	2	2	3	2	3	2	3
	Current transformer	2	2	2	2				
	HV fuse	3	3	3	3	3	3	3	3
	Earthing switch								
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs
Overall dimension(WxHxD)		800x2240x1500	800x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500
Remark		metering	metering	metering	metering	Voltage measuring	Voltage measuring	Voltage measuring	Voltage measuring

Scheme No.		089	090	091	092	093	094	095	096
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000
Main device	Vacuum circuit breaker								
	Lightning arrester			3	3			3	3
	Voltage transformer	2	3	2	3	2	3	2	3
	Current transformer								
	HV fuse	3	3	3	3	3	3	3	3
	Earthing switch								
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500
Remark		Voltage measuring	Voltage measuring	Voltage measuring	Voltage measuring	Voltage measuring	Voltage measuring	Voltage measuring	Voltage measuring

Scheme of isolation feeder, bus riser, load break switch feeder and substation-used transformer feeder

Scheme No.		097	098	099	100	101	102	103	104
Diagram of main wiring scheme									
Rated current (A)		630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	630~4000	
Main device	Vacuum circuit breaker								
	Lightning arrester								
	Voltage transformer								
	Current transformer								
	HV fuse								
	Earthing switch								
	Meter	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	According to user needs	
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500	
Remark		Bus coupler isolation	Top in isolation	Top in isolation	Top in isolation	Bottom in isolation	Bottom in lifting	Busbar lifting	

Scheme No.		105	106	107	108	109	110	111	112
Diagram of main wiring scheme									
Rated current (A)		400~630	所用变50KVA	所用变50KVA					
Main device	Vacuum circuit breaker	1	1	1					
	Lightning arrester								
	Voltage transformer								
	Current transformer	2							
	HV fuse	3	3	3					
	Earthing switch		1	1					
	Meter	According to user needs	According to user needs	According to user needs					
Overall dimension(WxHxD)		800(1000)x2240x1500	800(1000)x2240x1500	800(1000)x2240x1500					
Remark		Load break switch	Substation used transformer	Substation used transformer					

6.2 Scheme application

Switchgear type: ZS8N Metal-clad Switchgear

Rated voltage: 12kV

Power frequency/lightning impulse withstand voltage: 42/75kV

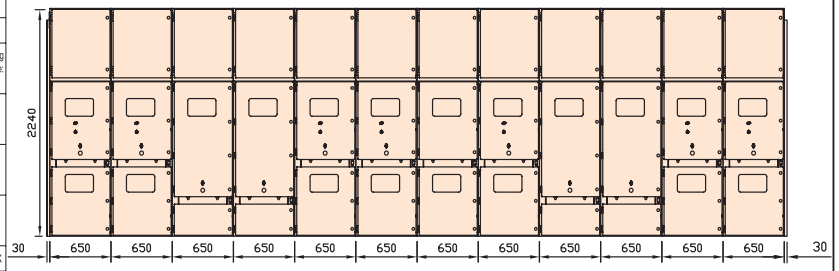
Main busbar current: 1250A (1xCu)

Control power supply: 220VDC

Energy storage motor power supply: 220VDC

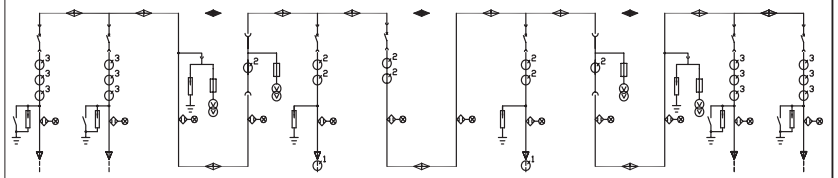
Protection grade: IP4X

Unit: mm



Single line diagram

10kV-1250A(1xCu)-25kA

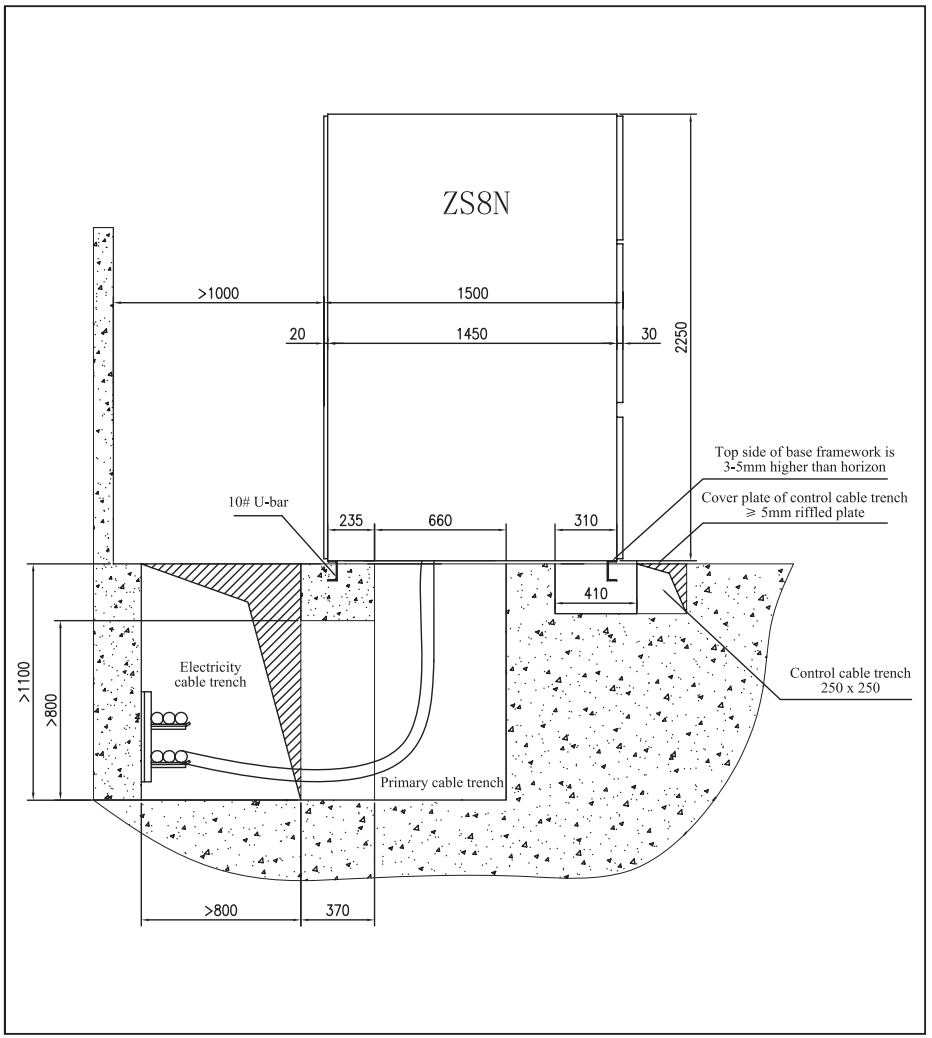


Switchgear no.	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
Application	Transformer feeder	Transformer feeder	#1 PT & Lightning arrestor feeder	Metering feeder	#1 incoming feeder	Bus coupler	Bus riser	#2 incoming feeder	Metering feeder	#2 PT & Lightning arrestor feeder	Transformer feeder	Transformer feeder
Main circuit	V-Sa-1206-25	V-Sa-1206-25			V-Sa-1212-25	V-Sa-1212-25		V-Sa-1212-25			V-Sa-1206-25	V-Sa-1206-25
Earthing switch	JN15	JN15									JN15	JN15
Voltage display device	DXN	DXN	DXN	DXN	DXN	DXN	DXN	DXN	DXN	DXN	DXN	DXN
Current transformer	150/5/5A CL0.5,15VA 5P10,15VA	150/5/5A CL0.5,15VA 5P10,15VA		200/5A CL0.2S,15VA	400/5/5A CL0.5,15VA 5P10,15VA	300/5/5A CL0.5,15VA 5P10,15V		400/5/5A CL0.5,15VA 5P10,15VA	200/5A CL0.2S,15VA		150/5/5A CL0.5,15VA 5P10,15VA	150/5/5A CL0.5,15VA 5P10,15VA
Zero-sequence current transformer					100/5A,2.5VA/10P10			100/5A,2.5VA/10P10				
Voltage transformer			10/0.1kV CL0.5,50VA	10/0.1kV CL0.5,50VA					10/0.1kV CL0.2,30VA	10/0.1kV CL0.5,50VA		
Lightning arrestor	3xYH5WS-17/50	3xYH5WS-17/50	3xYH5WS-17/50		3xYHWSS-17/50			3xYH5WS-17/50		3xYH5WS-17/50	3xYH5WS-17/50	3xYH5WS-17/50
HV fuse			2A	2A					2A	2A		
Integrated relay protection	1xPDR300F	1xPDR300F			1xPDR300F	1xPDR300F		1xPDR300F			1xPDR300F	1xPDR300F
Control method	Local/Remote	Local/Remote			Local/Remote	Local/Remote		Local/Remote			Local/Remote	Local/Remote
Measuring meter	1xA	1xA	1xV(VS)	The meter is provided by power supply bureau	1xA	1xA		1xA	The meter is provided by power supply bureau	1xV(VS)	1xA	1xA
Transmitter				1500								
Switchgear depth	1500	1500	1500		1500	1500	1500	1500	1500	1500	1500	1500
Remark	Voltage loss timer is provided by power supply bureau							Voltage loss timer is provided by power supply bureau				

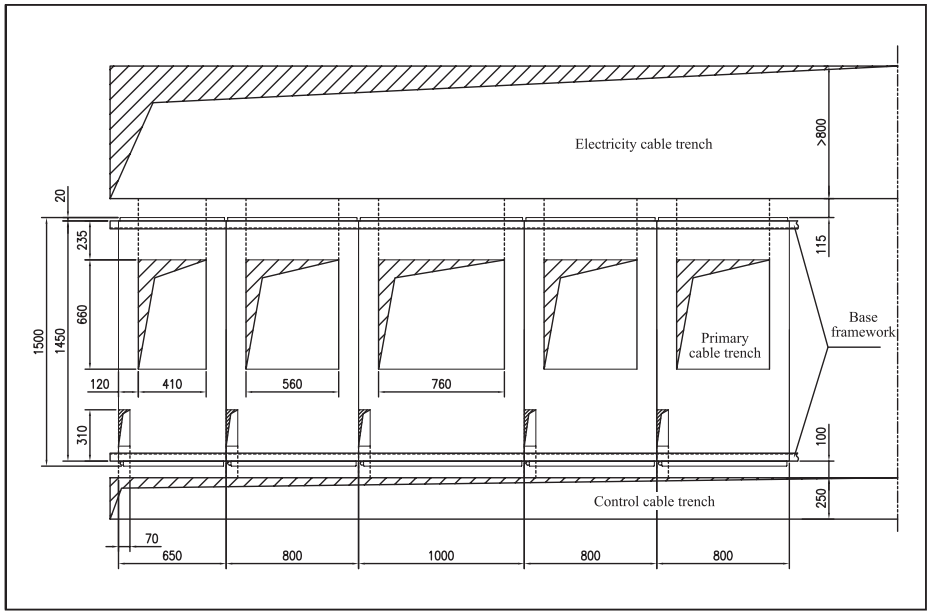
Note: 1) When the rated voltage is 12KV and the system current is 1250A and above, typical scheme can be provided as per customer requirements.
2) When the rated voltage is 24KV, typical scheme can be provided as per customer requirements.

7 Switchgear Layout and Installation

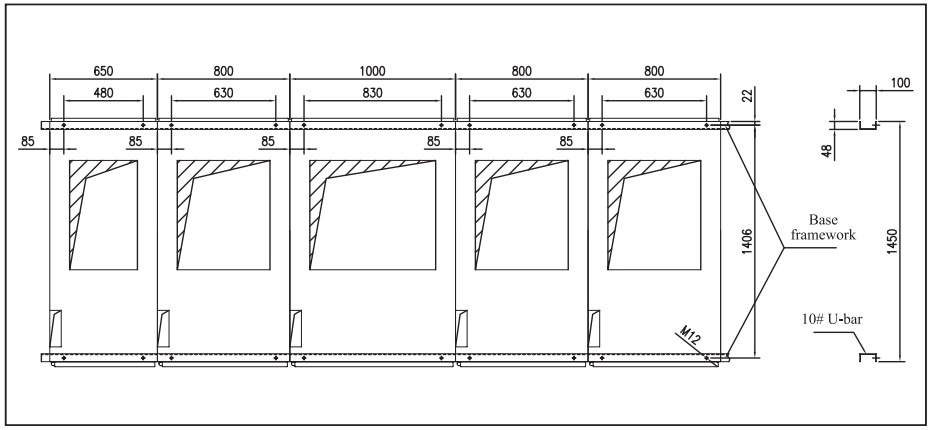
7.1 Typical section layout diagram of ZS8N distribution room



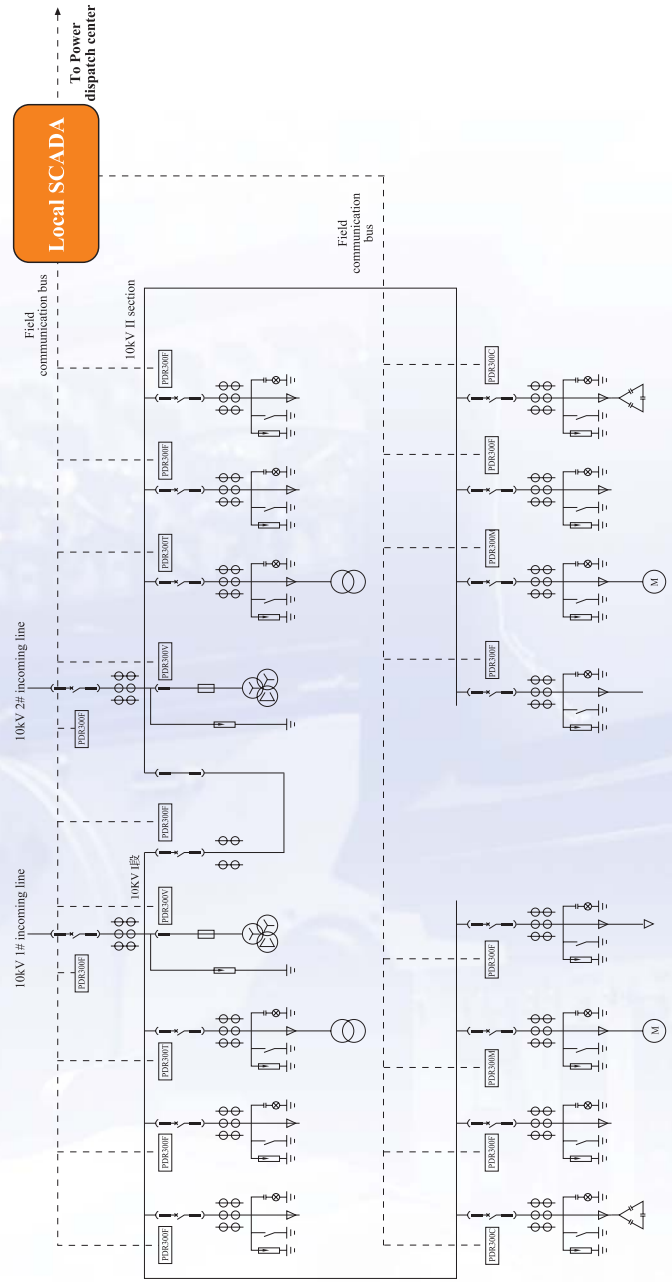
7.2 Typical layout diagram of cable trench of ZS8N distribution room



7.3 Typical processing diagram of ZS8N base framework



8 Application Cases of ZS8N Switchgear and SCADA System



Note:

PDR300F Transmission Line Protection and Supervision Relay
PDR300C Capacitor Protection and Supervision Relay
PDR300V Voltage Parallel Relay
PDR300T Transformer Backup Protection and Supervision Relay
PDR300M Electric Motor Protection and Supervision Relay