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NXSAFE

Movable-type indoor AC metal-enclosed switchgear

HZM POWER®

THE POWER OF ENGINEERING

Belief in the power of technical engineering

Be the master of knowledge, become the leader of technology and manufacturing engineering, achieve the sustainable development of the enterprise, and continuously meet the needs of power users.

NXSAFE

Features of Cabinet

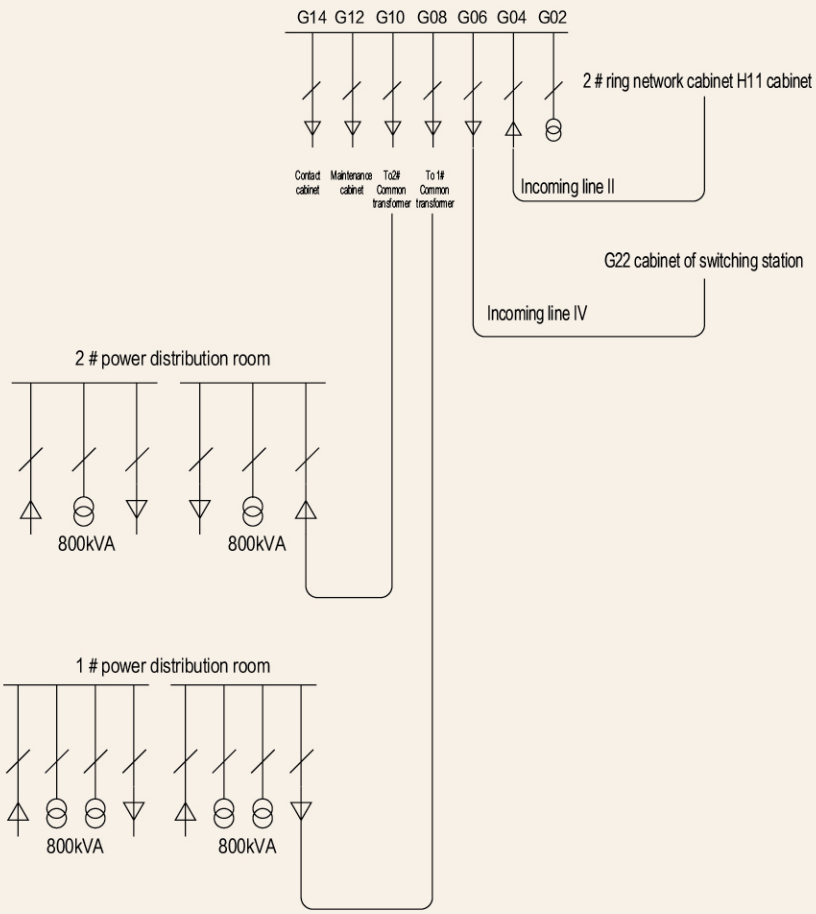
NXSAFE removable enclosed switchgear is mainly intended for primary distribution system including transformer substation, and also available for switching station and other secondary distribution system, or user terminal power supply system.

Typical Application

Power Station
Transformer Substation
Switching Station

Heavy Chemical Industry
Industry
Mine
Transportation
Infrastructure

Commercial Centre
Public Building
Architecture



NXSAFE
Features of Cabinet

Technical Features

Cabinet type is designed to safeguard duty operators to the greatest extent.

All operations are made when cabinet door is closed. Separate compartment, independent pressure relief channel.
Cabinet’s compartment, door lock, components, among others, are flame-resistant arc designed, and this guarantees the safety of persons outside the cabinet in case of failure of internal arc.
Partition class PM (metal enclosure status under earthing continuity)
Safe damper of static contact guarantees the safety of service personnel.
“Five-protection” interlocking mechanism.
Earthing of all kinds of components.
Earthing switch with closing capacity.

Standardization concept and air insulation design procure the continuous power supply performance and this can reduce the operational interruptions and enhance the productivity.

Metal-enclosed air insulation type
Combination of functional units
Compartment
Main circuit breaker/contactor interchangeability

Compliance with standards of global public power supply service sector and users, simple to install, easy to operate, friendly man-machine interface

Single column installation
Face-to-face double-column installation
Available for installation against wall
Available for back-to-back installation
Cabinet front maintenance and operation
Segmented display-connected busbar enables easy cabinet assembly
Cable compartment set at the back of cabinet makes connection simple

Equipped DAVIDCLOUD system and optional intelligent elements that can realize automatic and intelligent power distribution; iVHZ4 circuit breaker with contact based temperature measurement and online monitoring of operating mechanism status

Electric chassis
Electric earthing switch
Microcomputer protection and distributed DTU
Status indicator
Digital twins software and monitoring
Switchgear with online monitoring of partial discharge
Online monitoring of lightning arrester
Seamless monitoring of all parts of laboratory cabinet

NXSAFE
Parameters

Product Quality Standard and Management

ISO quality assurance systems
Advanced technology and technique
Digital sheet metal process
Detection of switch running-in and switch status
Insulation test
Partial discharge test
Electrical resistivity test

Operating Conditions

Indoor, free of serious filth in the air
Ambient temperature -25 – +40℃
Maximum daily mean relative humidity 95%
Maximum monthly mean relative humidity 90%
Maximum altitude 1000m
Maximum earthquake intensity 8

At the time of condensation, put into operation of temperature and humidity controller and heater (or condensing humidity controller).
When the elevation of environment is greater than 1000m, make sure to negotiate with manufacturer to take measures of reinforced insulation.
When ambient temperature exceeds 40 ℃, make sure to confirm capacity reduction factor with manufacturer.

Reference Standards

NXSAFE complies with Chinese national standards and IEC standards, including but not limited to:
Design and manufacture of switchgear
Switchgear open/close, isolation, insulation, partial discharge performance

- Mutual inductor
- Low-voltage control equipment
- Power equipment
- Cable
- Conductor
- Fuse
- Graphics and symbols
- Test
- Electrotechnical terminology

NXSAFE complies with current Chinese national standards and IEC standards

NXSAFE state grid standardization and customization version meets the requirements of State Grid Corporation of China for standardization and customization.
NXSAFE complete automation equipment version meets the requirements for China Southern Power Grid’s complete automation equipment standard.
Customize relevant compliance products according to local regulations in different countries.

Chinese National Standards	International Electrotechnical Commission Standards
GB/1984	IEC27701-1
GB/T3906	IEC27701-100
GB/T11022	IEC-27701-102
GB/T16927.1	IEC-27701-200
DL/T 404 – 2007	
JB/DQ2182—87	

Parameters

No.	Name		Unit	Value
1	Rated voltage		kV	12
2	Rated frequency		Hz	50
3	Rated currency		A	⩽ 4000
4	Temperature rise test			1.1Ir
5	Rated power frequency withstand voltage (1min)		kV	42
6	Rated lightning impulse withstand voltage (peak value)		kV	75
7	Rated short-circuit breaking current		kA	40
8	Rated short-circuit close current		kA	100
9	Rated short-time withstand current and duration time		kA/s	40/4
10	Rated peak withstand current		kA	100
11	Auxiliary and control circuit short-duration power-frequency withstand voltage		kV	2
12	Partial discharge	Test voltage	kV	1.1 × 12
		Single insulator	pC	⩽ 3
13	Protection grade	Housing		IP4X
		Compartment		IP2X
14	Creepage distance	Porcelain material (to earth)	mm	⩾ 216
		Organic materials (to the ground)		⩾ 240
15	Phase-to-phase and phase-to-earth clearance (air insulation)	Test voltage	mm	⩾ 125
16	Lost running continuity category	Single insulator		LSC2
17	Minimum clearance between SMC partition (is any) and charged conductor	Housing	mm	⩾ 30
18	SMC partition thickness	Compartment	mm	⩾ 5
19	Cooling method	Porcelain material (to earth)		Self cooling[1)]
20	Allowable duration of internal arc	Organic materials (to the ground)	s	⩾ 0.5

Note: 1) Air cooling will be adopted at rated current ⩾ 3150A.

Environmental protection

The product observes the regulations of ISO14001 environmental management systems for the whole service life.
No materials with known chemical hazards and environmental hazards are used in manufacturing links.
After the product’s service life ends, some materials can be recycled.
After the product’s service life ends, some materials that can be recycled are harmless to the environment.

Safety design

Precision sheet metal processing technique and high-standard protection grade
Fully enclosed primary loop
Separate compartment and independent pressure relief channel; high-temperature and high-pressure gas produced by internal arc under extreme conditions are pressure-relieved through pressure relief channel.
Cabinet door, circuit breaker and earthing switch are mechanically interlocked; “Five-protection” interlocking mechanism is designed to guarantee the safety of personnel in case of misoperation.
Interlocking of latching electromagnet with other equipment
Earthing switch has the closing capacity at earthing short circuit and good earthing design.
Door closing operation design
Equipped with prevention padlock for the operation of earthing switch
Equipped with prevention padlock for operation the of separating brake
与主回路隔离的电压带电显示器

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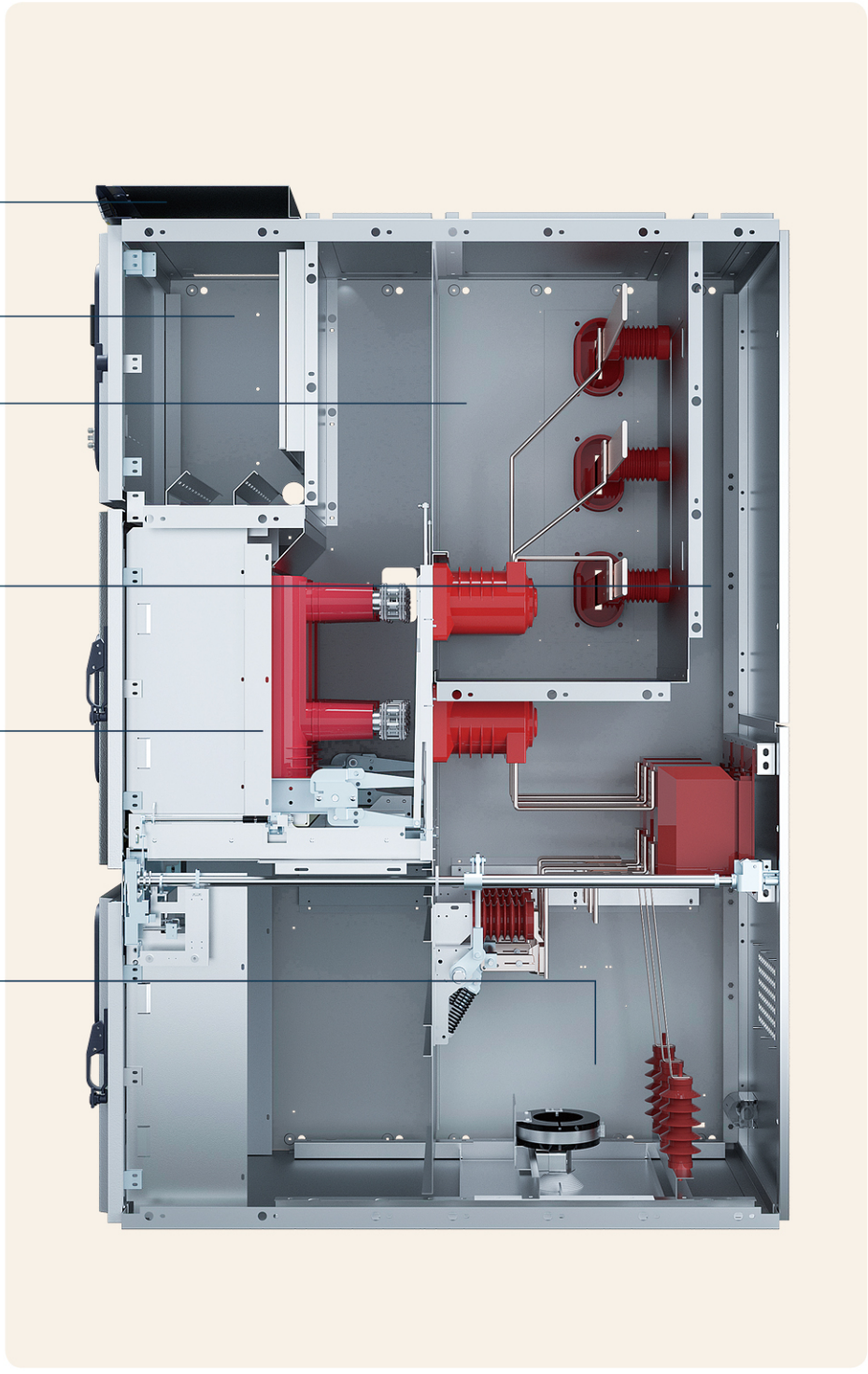
Cabinet Design



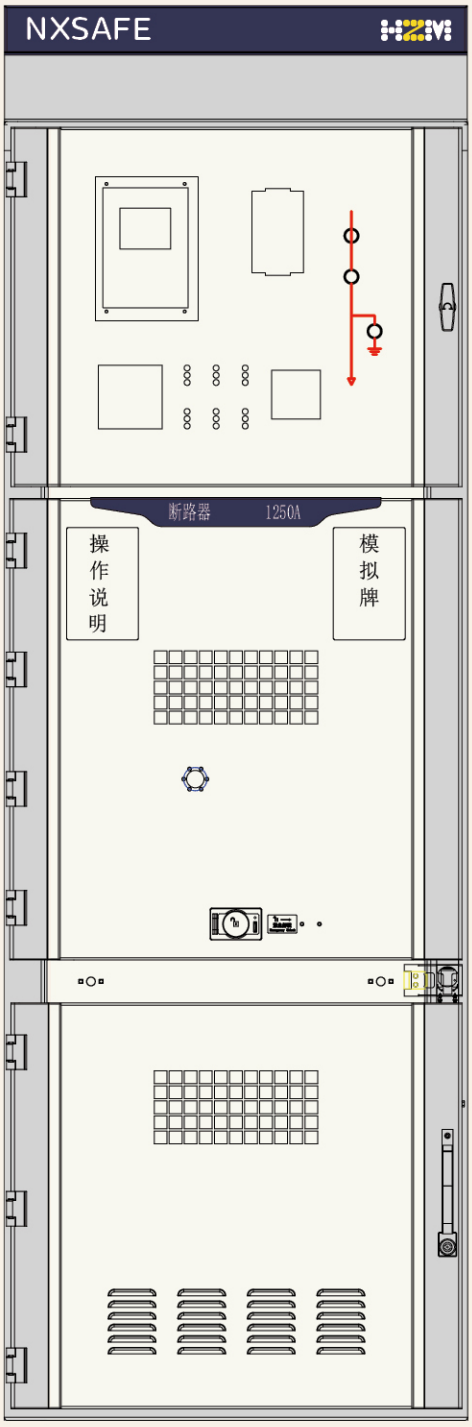
Sheet metal process

High-strength corrosion-resistant aluminum and zin plated plates go through CNC machining equipment’s sheet metal process and are assembled with high precision double-flanged process, and connected with high-strength bolt and rivet to guarantee the cabinet’s precision and strength.

Cabinet door panel and side panel are processed with cold-rolled steel sheets and plastic spray treatment for surface, and cabinet door adopts double sealing tape dustproof process, in order to ensure the high-protection class of cabinet.

High-precision splicing process guarantees the interchangeability of circuit breaker handcarts and the high precision of varied positioning devices and interlocking devices.

Man–machine Interface



Operation Instructions and Five–protection lock

Circuit breaker’s ON status: Unavailable to move handcart in/out; at non–test or non–working position, circuit breaker can not be switched on.

When secondary aviation plug is not properly plugged, it's not allowed to move in circuit breaker handcart; when circuit is at non–test or non–working position, it's not allowed to pull out secondary aviation plug.

When circuit breaker is at working position, it's not allowed to turn on earthing switch; when earthing switch is turned on, it's not allowed to move in circuit breaker handcart.

When earthing switch is at OFF position, it's not allowed to open cable compartment door; when cable compartment door opens, it's not allowed to turn off earthing switch.

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Mechanical Interlocking and Locking

Contact interlock

Through tulip contact (moving contact) on contact arm and static contact box’ s static contact, removable circuit breaker connects to conductive system.
Metal materials are set between static contact box and movable contact.
When circuit breaker is pushed from test position to working position, synchronized linkage starts; when circuit breaker quits from working position to test position, synchronized linkage turns off lock.
Close status can not be opened manually or with a tool, unless circuit breaker handcart and auxiliary handcart follow the regulations.

Operation Procedure – Five–protection Interlocking

Earthing interlocking
Circuit breaker’ s ON status: Unavailable to move handcart in/out; at non–test or non–working position, circuit breaker can not be switched on.
When secondary aviation plug is not properly plugged, it's not allowed to move in circuit breaker handcart; when circuit is at non–test or non–working position, it's not allowed to pull out secondary aviation plug.
When circuit breaker is at working position, it's not allowed to turn on earthing switch; when earthing switch is turned on, it's not allowed to move in circuit breaker handcart.
When earthing switch is at OFF position, it's not allowed to open cable compartment door; when cable compartment door opens, it's not allowed to turn off earthing switch.

Secondary Aviation Plug Interlocking

When secondary aviation plug is not properly plugged, it's not allowed to move in circuit breaker handcart; when circuit is at non–test or non–working position, it's not allowed to pull out secondary aviation plug.

Locking Electromagnet

Locking of circuit breaker handcart (in/out) and earthing switch (OFF/ON)
Locking of circuit breaker cabinet door (Open/Close) and cable door (Open/Close)
Locking of busbar system’ s charged status (energized/de–energized) and earthing switch (OFF/ON)

Padlock

Circuit breaker chamber door closed and padlocked
Cable compartment door closed and padlocked
Circuit breaker handcar in/out and padlocked
Earthing switch OFF/ON operation and padlocked
Padlock

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Mechanical interlock

C–LOCK mechanical program lock

C–LOCK mechanical program lock device is used to establish the interlocking relationship between separated (non–mechanically connected) components or equipments

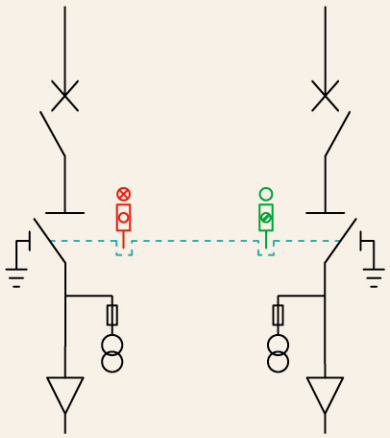
C–LOCK key interlock device
NXSAFE can be equipped with C–LOCK key interlocking device to realize functional interlocking of the system.
The load switch (circuit breaker) is interlocked by two locks and one key. Cabinet A and cabinet B are equipped with key interlocking devices respectively, but one key is configured. The key is configured on the cabinet unit to be closed. When the unit is closed, the key cannot be removed or rotated; When the other cabinet has no key, the operating shaft cannot operate. Thus, the "two locks and one key" interlocking function is realized, that is, cabinet A and cabinet B can only close one of them.
The load switch (circuit breaker) is interlocked with three locks and two keys. Cabinet A, cabinet B and cabinet C are equipped with key interlocking devices respectively, but one key is configured. The key is configured on the two cabinet units to be closed. When the two units are closed, the key cannot be removed or rotated; When the other cabinet has no key, the operating shaft cannot operate. Thus, the "three locks and two keys" interlocking function is realized, that is, cabinet A, cabinet B and cabinet C can only be closed the two of three.
The load switches (circuit breakers) of different cabinets are interlocked with the grounding switches by two locks and one key, and the outgoing cables of cabinet A and cabinet B are interconnected. According to the system function requirements, the two cabinets are respectively equipped with two locks and one key for interlocking, respectively locking their load switches (circuit breakers) and grounding switches, to prevent one cabinet from closing the grounding switch of the other cabinet by mistake when the load switches (circuit breakers) of one cabinet are not disconnected; This function can evolve other functions required by the system function according to the above logic.
The switchgear cabinet and the transformer are interlocked by two locks and one key. The grounding switch of the switchgear cabinet and the protective door of the transformer outer chamber are respectively equipped with a key interlock device, but one key is configured. When the grounding switch is in the opening state, the key cannot be removed or rotated, and the protective door of the transformer outer chamber cannot be opened without a key. Thus, the "two locks and one key" interlocking function is realized to prevent the door from accidentally opening and touching the transformer when the primary side of the transformer is not grounded.

C–LOCK interlocking application

C–LOCK key interlock device

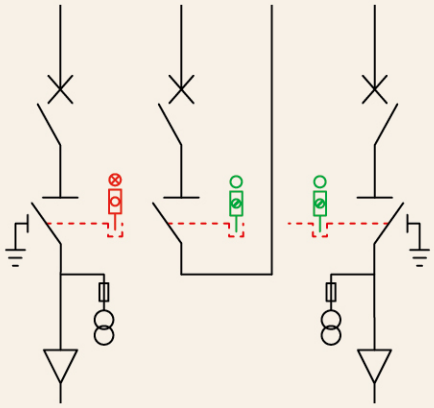
V circuit breaker cabinet
Interlocking of two incoming lines (two locks and one key)

When the disconnecting switch of 1 # incoming switch is disconnected at the time position, turn the key to lock the knife switch off, and operate the 2 # incoming knife switch to close position after taking out the key, it is allowed to close the 2 # switch.



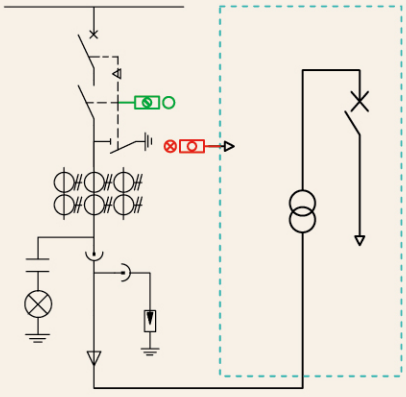
V circuit breaker cabinet
Two incoming lines+contact cabinet interlock (Three locks and two keys)

When the disconnecting switch of 1 # incoming switch is disconnected at the time position, turn the key to lock the knife switch opening, and operate the incoming knife switch of the contact cabinet to the closing position after taking out the key, then it is allowed to close the contact switch.



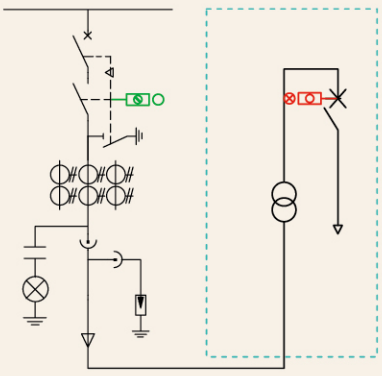
Locking transformer door of circuit breaker cabinet (two locks and one key)

When the V cabinet is in the OFF position and the disconnector is in the ON position, turn the key to lock the grounding position. Only after the key is taken out the transformer reticular door can be opened for maintenance.



Circuit breaker cabinet locks the low–voltage side circuit breaker of transformer (two locks and one key)

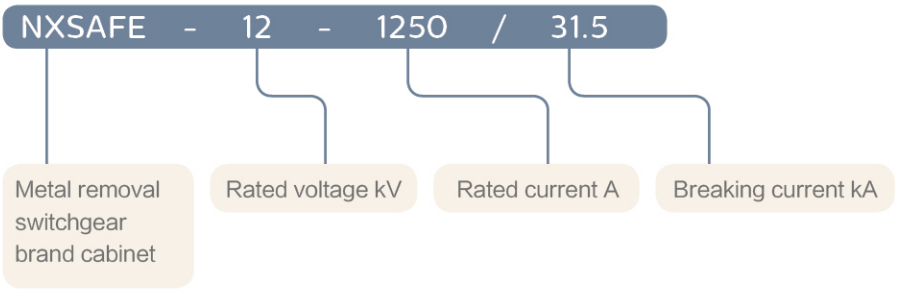
When the circuit breaker at the low–voltage side is disconnected, turn the key to lock the low–voltage circuit breaker position. After the key is taken out to prevent reverse power transmission at the low–voltage side, the high–voltage side disconnecting switch can be operated.



Keyless equipment locking status
Unlock status of keyed equipment

NXSAFE
Standard Cabinet

Definition of Model

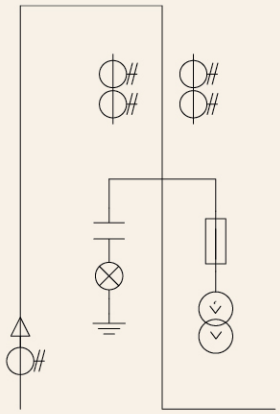


NXSAFE Standard Cabinet

DM	Incoming cable + measuring cabinet
PT	PT cabinet
VL	Segmented busbar switchgear
GL	Segmented isolation switchgear
T	Busbar voltage transformer cabinet
F	Combined switchgear of load switch fuse
D	Busbar lifting cabinet
V+	Cable upper entry cabinet
V	Cable incoming cabinet
VE	Outgoing cabinet
FC	Contactor cabinet
ATS	Dual-power cabinet

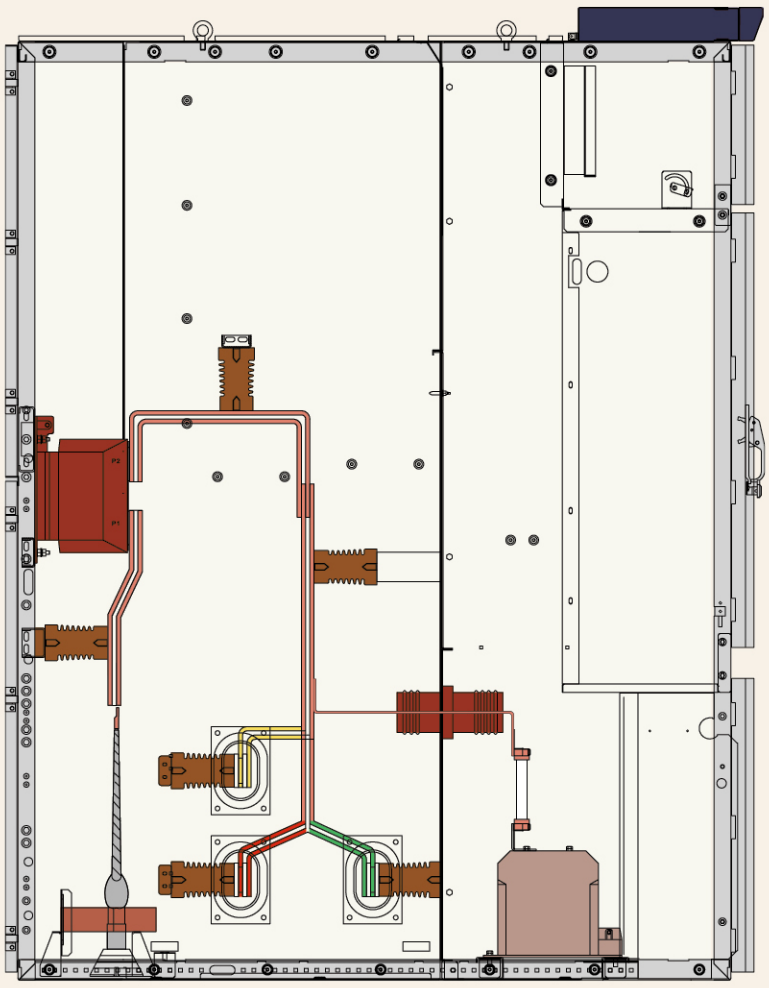
NXSAFE
Standard Cabinet

NXSAFE–DM Incoming cable + measuring cabinet



Standard Configuration

- Current transformer
- Voltage transformer
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Standard hanging table device
- Temperature and humidity controller and drying device

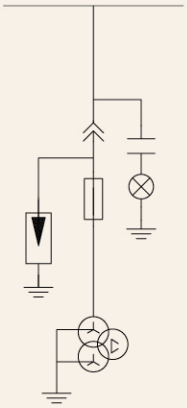


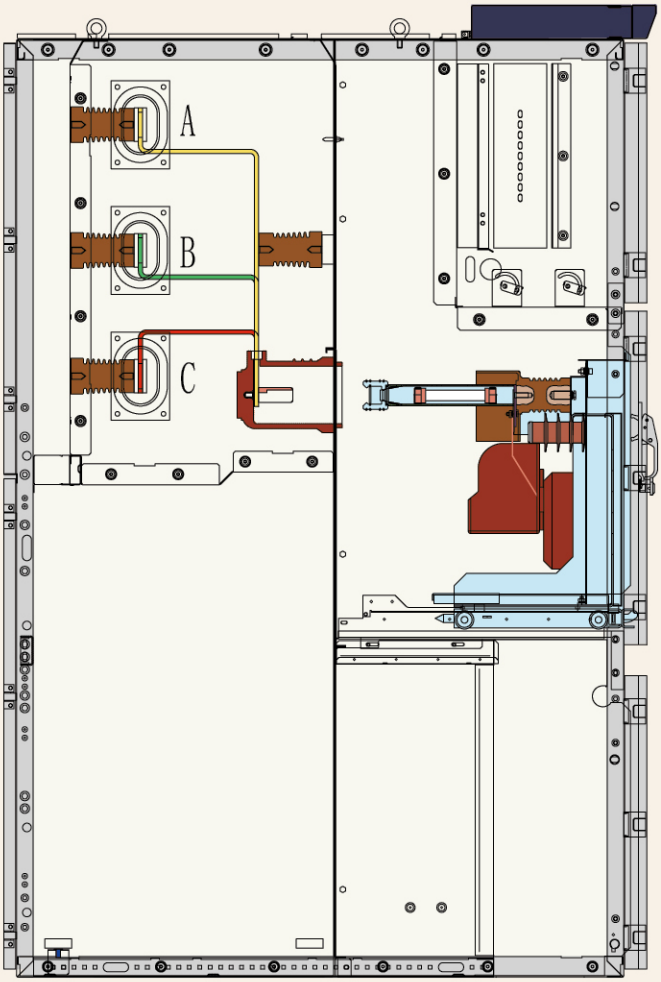
Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window

NXSAFE
Standard Cabinet

NXSAFE–PT PT cabinet





Standard Configuration

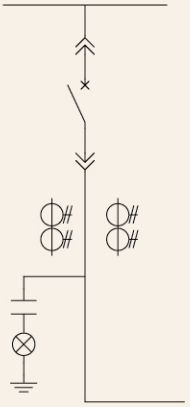
- PT handcart
- Busbar
- Live display
- Earthing busbar
- Standard hanging table device
- Temperature and humidity controller and drying device
- Lightning arrester

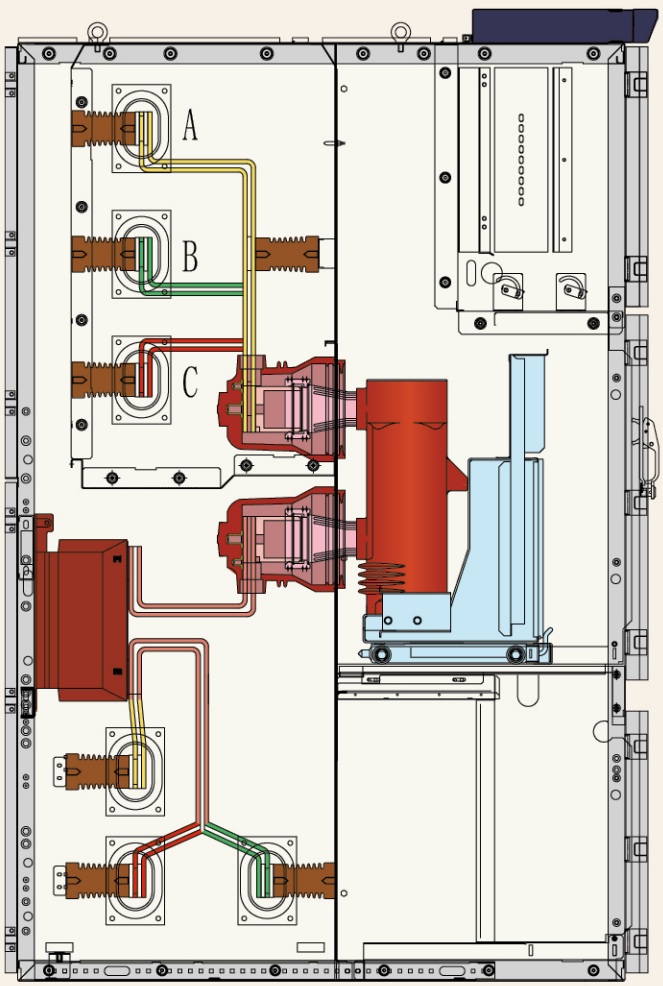
Optional

- Short-circuit and earthing fault indicator
- Cable door with infrared temperature window

NXSAFE
Standard Cabinet

NXSAFE–VL Segmented busbar switchgear





Standard Configuration

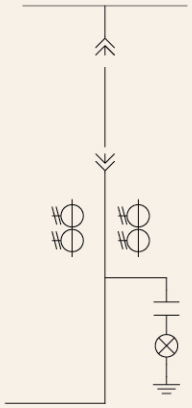
- Circuit breaker handcart
- Protective device
- Current transformer
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

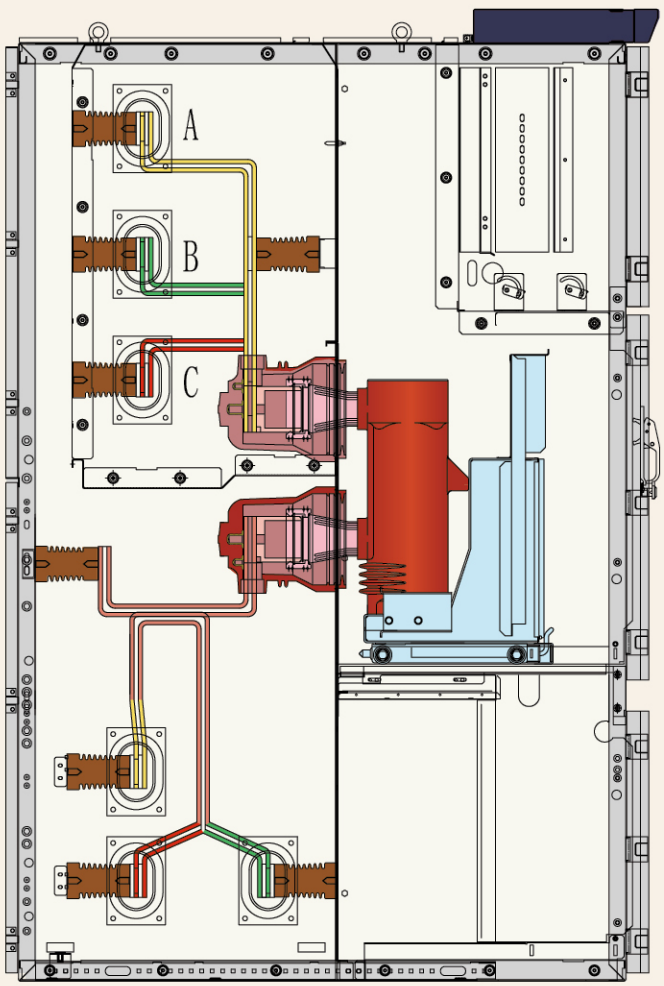
Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window

NXSAFE
Standard Cabinet

NXSAFE–GL Segmented isolation switchgear





Standard Configuration

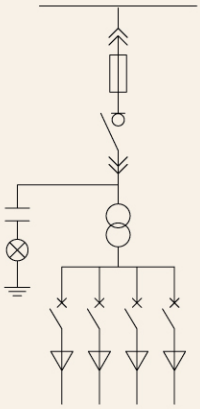
- Isolation handcart
- Switch indicator
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

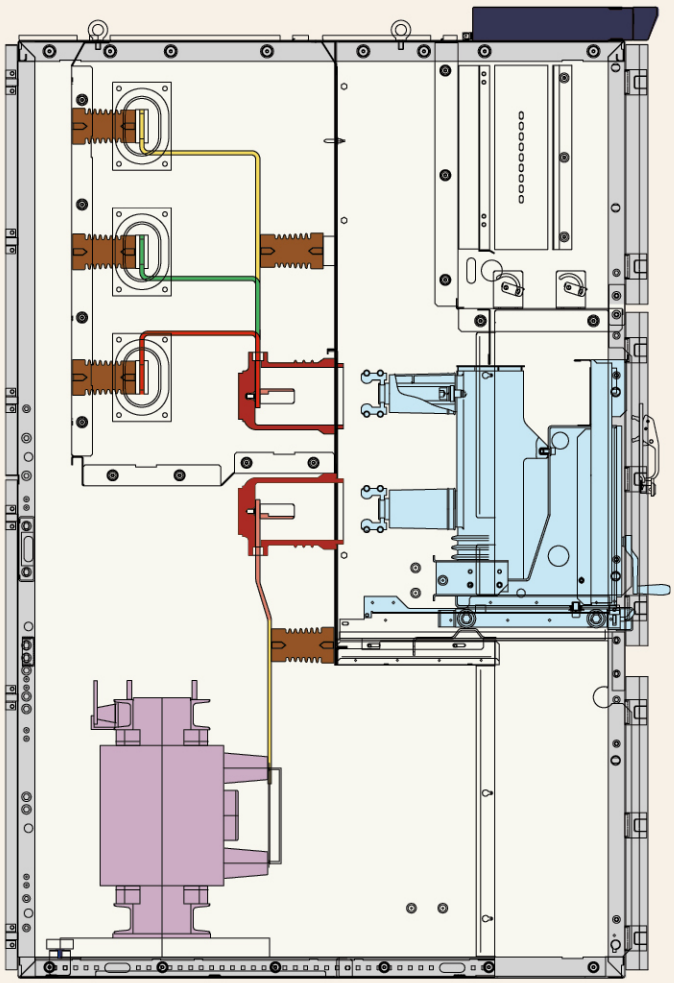
Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window

NXSAFE
Standard Cabinet

NXSAFE–T Busbar voltage transformer cabinet





Standard Configuration

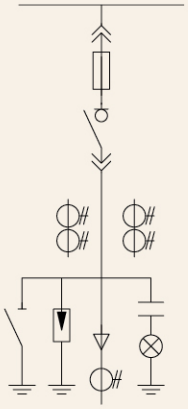
- Load switch fuse combined electric appliance handcart
- Protective device
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device
- Station transformer

Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window

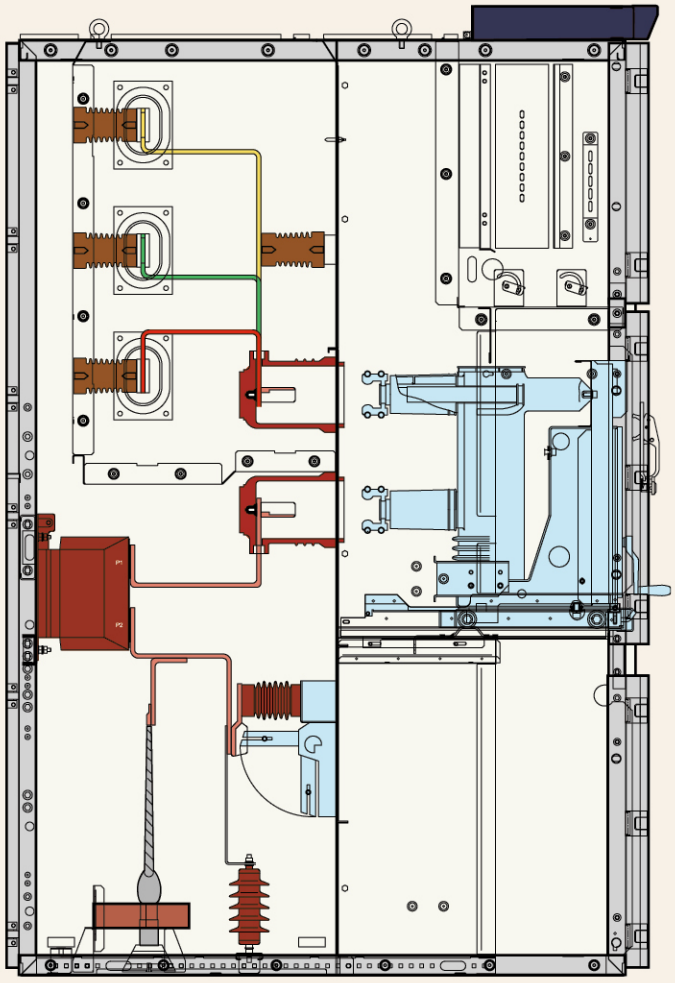
NXSAFE
Standard Cabinet

NXSAFE–F Combined switchgear of load switch fuse



Standard Configuration

- Load switch fuse combined electric appliance handcart
- Earthing switch
- Current transformer
- Protective device
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

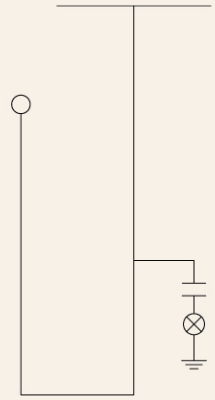


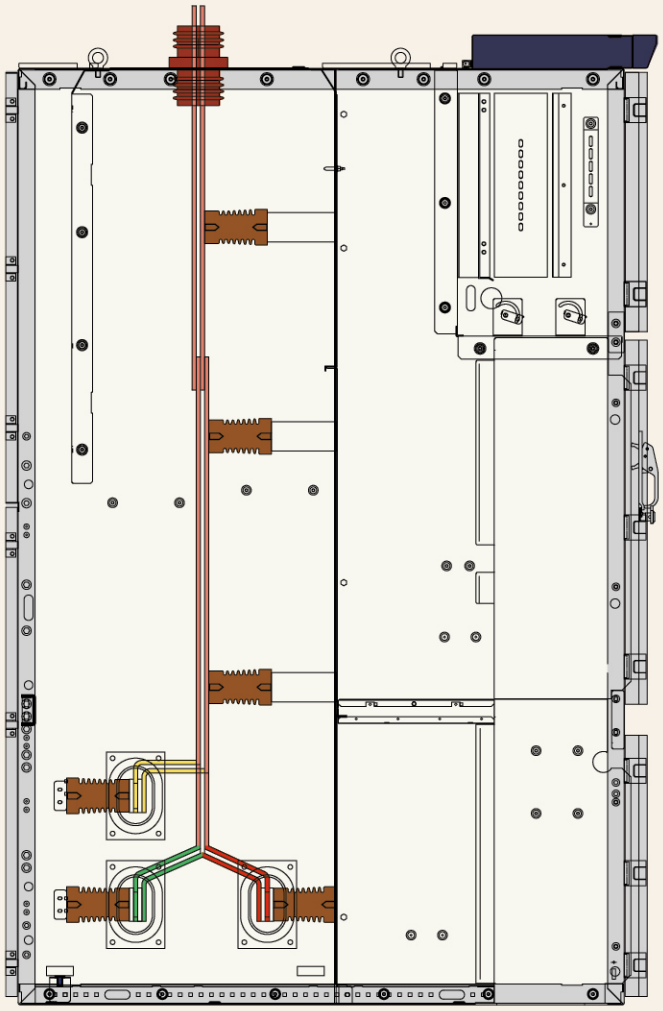
Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window

NXSAFE
Standard Cabinet

NXSAFE–D Busbar lifting cabinet





Standard Configuration

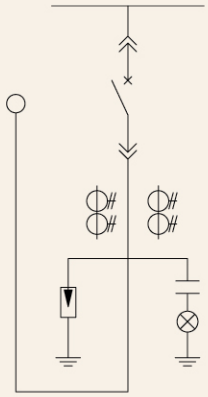
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

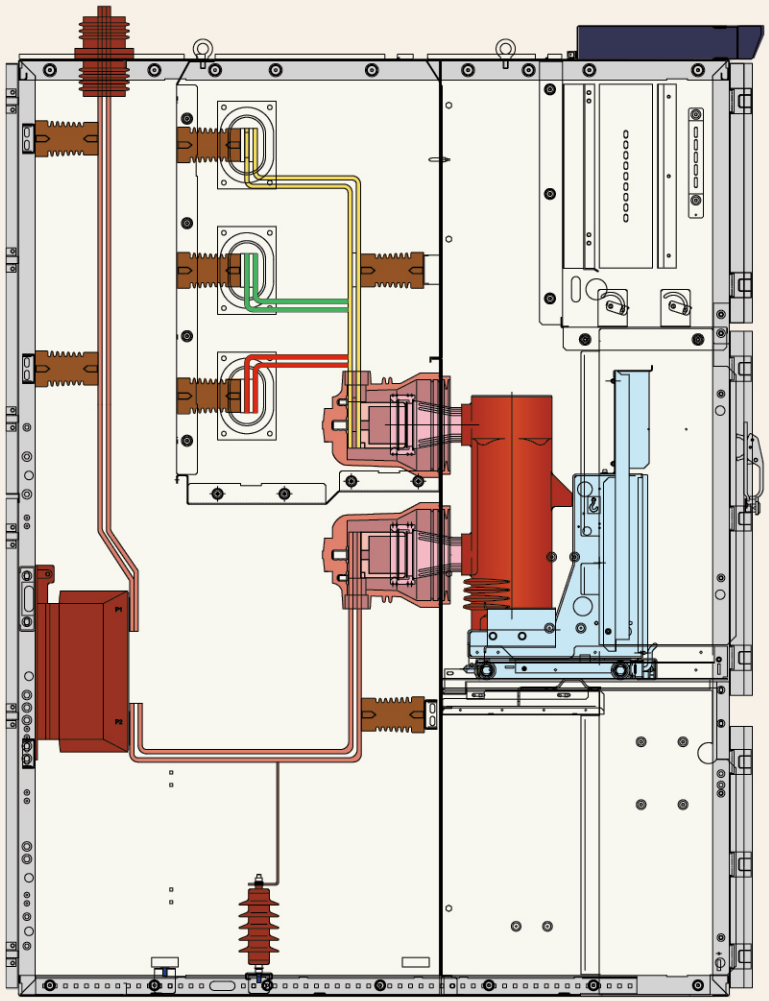
Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window

NXSAFE
Standard Cabinet

NXSAFE–D Busbar lifting cabinet





Standard Configuration

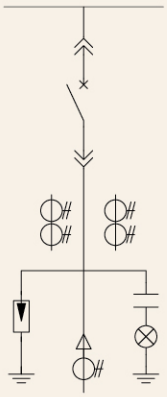
- Circuit breaker handcart
- Protective device
- Current transformer
- Lightning arrester
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

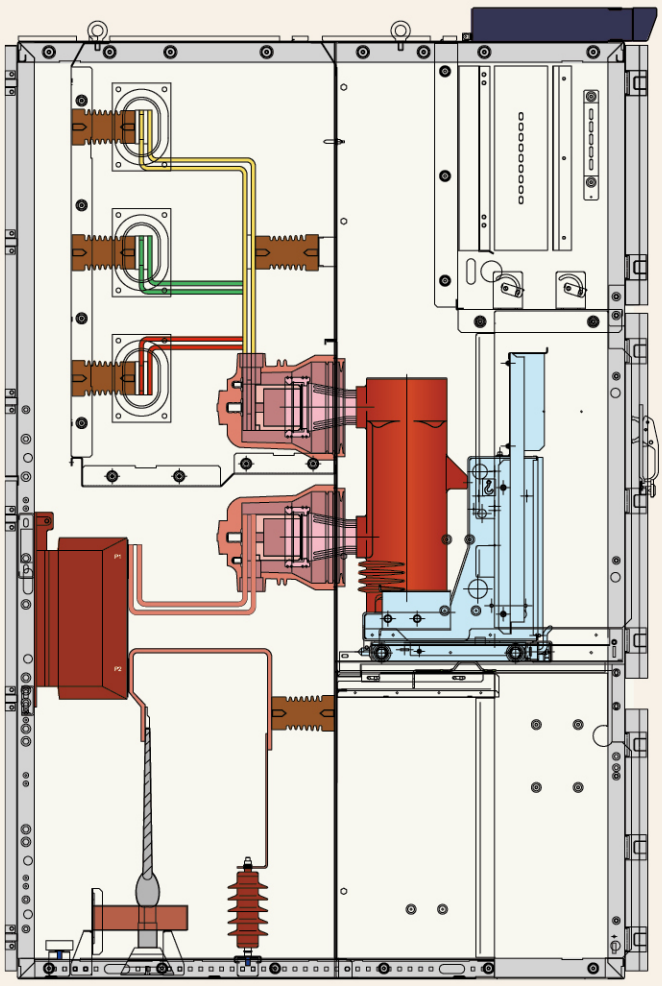
Optional

- ●短路与接地故障指示器
- ●带红外测温窗的电缆门
- ●电压互感器

NXSAFE
Standard Cabinet

NXSAFE–V Cable upper entry cabinet





Standard Configuration

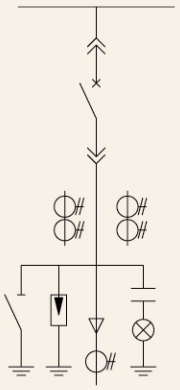
- Circuit breaker handcart
- Protective device
- Current transformer
- Lightning arrester
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

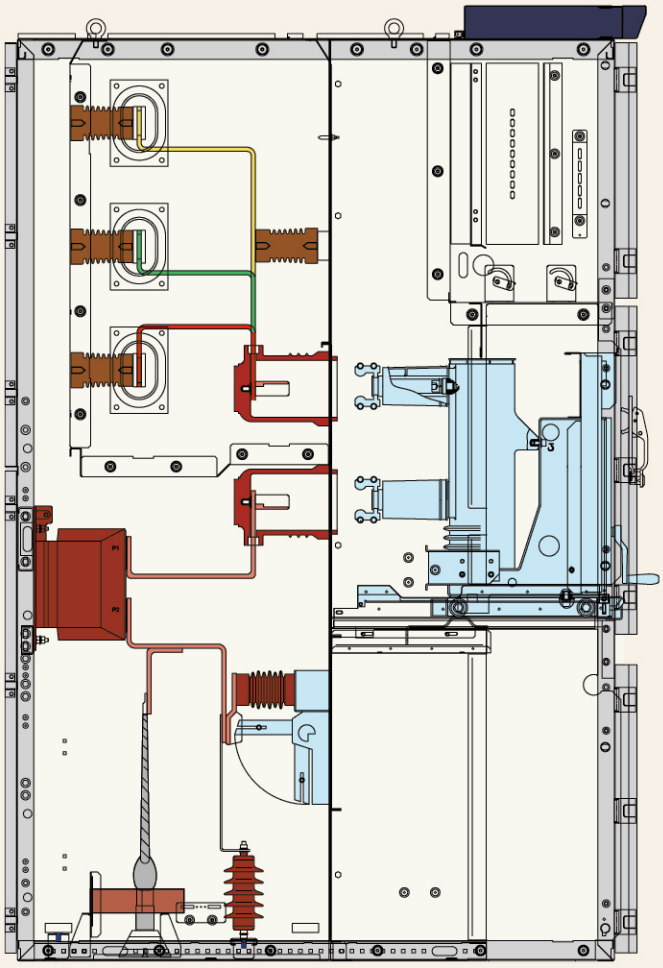
Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window

NXSAFE
Standard Cabinet

NXSAFE–VE Outgoing cabinet





Standard Configuration

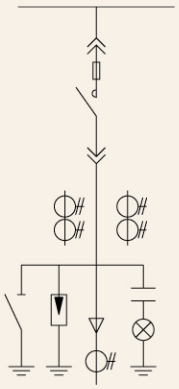
- Circuit breaker handcart
- Protective device
- Earthing switch and interlocking mechanism
- Current transformer
- Lightning arrester
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window
- Zero sequence transformer

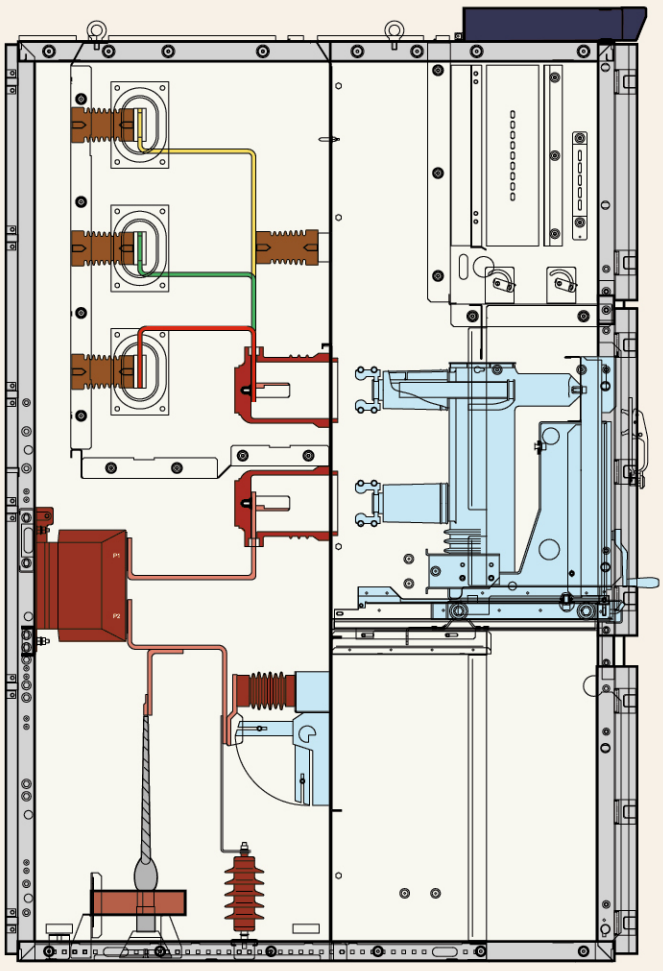
NXSAFE
Standard Cabinet

NXSAFE–FC Contactor cabinet



Standard Configuration

- Contactor handcart
- Protective device
- Earthing switch and interlocking mechanism
- Current transformer
- Lightning arrester
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

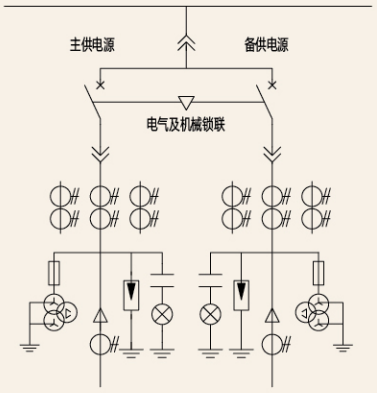


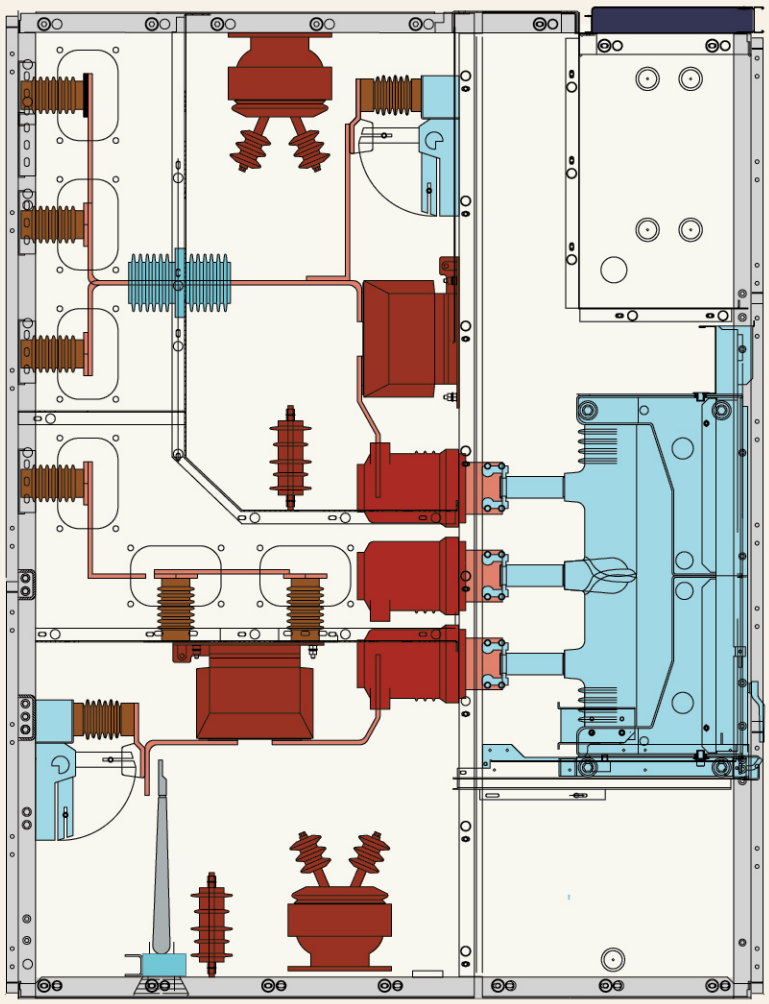
Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window
- Zero sequence transformer

NXSAFE
Standard Cabinet

NXSAFE–ATS Dual–power cabinet





Standard Configuration

- Medium–voltage dual power supply circuit breaker handcart
- Self input protection device
- Current transformer
- Voltage transformer
- Lightning arrester
- Busbar
- Live display
- Earthing busbar
- Standard padlock device
- Temperature and humidity controller and drying device

Optional

- Short–circuit and earthing fault indicator
- Cable door with infrared temperature window
- Earthing switch and interlocking mechanism

NXSAFE

Primary Main Element

Spring Operating Mechanism VHZ4 Circuit Breaker

IEC62271-100 Standard
Solid sealed pole and vacuum arc-extinguishing chamber
Simple ‘less parts’ design concept brings about high reliability
Modular design allows overall removal of case
Single spring energy storage and gear drive work together to enable long mechanical life
Standard configuration of mechanical anti-jump device
Locking mechanism of error proof operation
Secondary accessory for simple installation and general AC/DC application
Energy storage handle built-in

Chassis

Interlocking achieved for locking mechanism, switchgear door and the like
Earthing copper conductor by friction

Optional electric drive device improves the efficiency and safety operation, so as to realize remote control and distribution automation

Intelligent iVHZ4

Spring Operating Mechanism VHZ4 Circuit Breaker
IEC62271-100 Standard
Solid sealed pole and vacuum arc-extinguishing chamber
Simple ‘less parts’ design concept brings about high reliability
Modular design allows overall removal of case
Single spring energy storage and gear drive work together to enable long mechanical life
Standard configuration of mechanical anti-jump device
Locking mechanism of error proof operation
Secondary accessory for simple installation and general AC/DC application
Energy storage handle built-in

Wireless Passive RFID Contact Arm Temperature Measurement Technology
Online monitoring of mechanical features
Contact pressure
Contact wearing
Working status

NXSAFE

Primary Main Element

VHZ4M Three-phase Separable Permanent Magnet Quick Circuit Breaker

Three-phase Separable Permanent Magnet Quick Circuit Breaker
IEC62271-100 Standard
Solid sealed pole and vacuum arc-extinguishing chamber
Simple ‘less parts’ design concept brings about high reliability
Three-phase separable permanent magnet drive
Breaking time 5-7ms
Mechanical life 100,000 times
Standard configuration of mechanical anti-jump device
Secondary accessory for simple installation and general AC/DC application

NXATS Dual-Power Circuit Breaker

Spring operation mechanism
IEC62271-100 Standard
Solid sealed pole and vacuum arc-extinguishing chamber
Patent for invention: With mechanical locking dual operation mechanism
Patent for invention: Monopole column double vacuum tube structure
Single spring energy storage and gear drive work together to enable long mechanical life
Standard configuration of mechanical anti-jump device
Locking mechanism of error proof operation
Secondary accessory for simple installation and general AC/DC application

NXSAFE

Primary Main Element

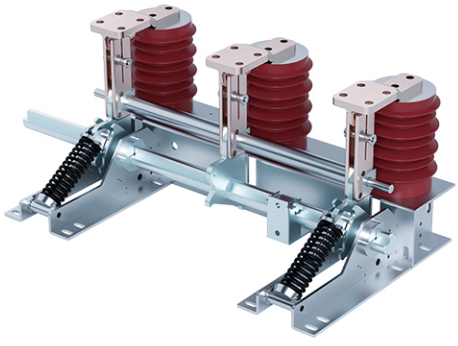
VHC Vacuum Contactor Fuse Combined Electric Appliance

Used to operate and protect motor
Used to operate and protect capacitor
Mechanical life 100,000 times

Equipped with fuse, constitute F–C appliance combination
Contactor subject to IEC60470 standard and IEC60632–1 standard.
Fuse subject to IEC60282–1 standard.
Fuse dimensions and firing pin subject to DIN43625

VHF Load Switch Fuse Combined Electric Appliance

Used for opening and closing small capacity load, for example station transformer.
Combined electric appliance shall be subject to IEC6265–1 standard.
Fuse dimensions and firing pin subject to DIN43625



HIES Earthing Switch

HIES–12 earthing switch
Rated short–time withstand current/duration time 31.5kA/3s
Rated peak withstand current
Rated making current 80KA
Rated making times 5 times
Mechanical life 3000 times

Functional Handcart equipped for NXSAFE Switchgear

Isolation handcart

Used with supporting system; after handcart is moved away, static contact’ s upper and lower fractures form physical isolation.
By way of circuit breaker pole, upper and lower contacts are connected with copper bar directly.
Earthing handcart is provided with locking mechanism to prevent its entrance into compartment wrongly under energization.
Used with circuit breaker cabinet scheme, form a busbar connection scheme with isolation.
Access (output) connection isolation scheme when needed to connect to another system cable.
Incoming/outgoing cable isolation scheme

PT Handcart

Used with the system; removable handcart with contact arm and connection system for PT.
Earthing handcart is provided with locking mechanism to prevent its entrance into compartment wrongly under energization.
PT with fuse wire.
Form a combined measuring cabinet scheme together with in-cabinet current transformer.

Earthing Handcart

During inspection or maintenance, additional and clear earthing requirements are needed to ensure personal safety.
Earthing handcart is provided with locking mechanism to prevent its entrance into compartment wrongly under energization.
When main busbar advances, only lift up the static contact of connecting the main busbar system at the upper part for earthing.
When cable earthing handcart advances, only lift up the static contact of connecting the main busbar system at the lower part for earthing.
Inside the earthing handcart, quick earthing switch with short-circuit closing capacity is installed.

Cable Test Handcart

During inspection or maintenance, cable needs to be tested without cable removal and entrance into cable compartment.
Cable test handcart is provided with locking mechanism to prevent its entrance into compartment wrongly under energization.
When cable test handcart advances, only lift up the static contact connected to the test cable at the lower part for connection.

NXSAFE

Power collection and measurement

HiCVT Electronic Voltage Sensor

Capacitive voltage divider technology
Compliance with IEC60044–8 standard
Three–phase voltage acquisition
Zero–sequence voltage acquisition
Three–phase independent sensor

Output of 0–10 mV signal, configuration of low–voltage signal modulator
Free of shortcomings like electromagnetic transformer saturation, ferroresonance and secondary open circuit.
No need of fuse protection
Wide input range

Voltage Indicator Adaptation Capacitor Parameter Table

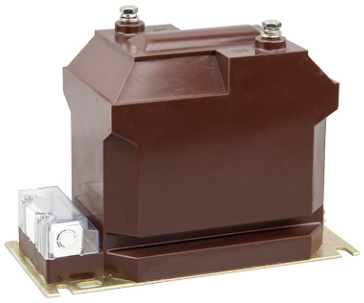
Rated voltage class (KV)	Rated phase voltage				Adapted sensor capacity (pF)
	Working voltage (V)	Working current (UA)	Phase–to–phase Voltage when the phases between test points match （V）	Phase–to–phase voltage (V) when the phases etween the test points do not match	
3.6	80–100	117	<Ac30	> Ac60	185（±15）
7.2	80–100	196			150（±15）
12	80–100	250			115（±15）
12	60–100	32–65			15–30
24	80–100	348			80（±10）
40.5	80–100	330			45（±10）

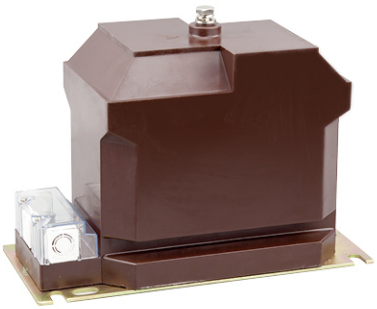
Parameter category	Technical indicators
Voltage level	10kV
Primary input voltage	10KV √3
Secondary output voltage	3.25V/√3(Phase voltage) 6.5V/3(zero sequence voltage)
Accuracy class (three–phase voltage)	0.5
Accuracy level (zero sequence voltage)	1
Rated frequency	50Hz
Insulation level (1min power frequency withstand voltage)	42kV
Lightning impulse withstand voltage (peak)	75kV
Partial Discharge	≤ 10pC 14.4kV
Executive standard	IEC 60044–7; GB/T20840.7–2007; GB/T20840.1–2010
Rated load	≥ 5MΩ

NXSAFE

Power collection and measurement

voltage transformer





Comply with GB/T20840.l and standard IEC61869–l, 3 standards

Electromagnetic induction single–phase Electromagnetic induction three–phase, Y/delta connection Pluggable Fuse protection Capacity optional 1KVA, 2KVA, 3KVA, etc.

Technical Data Sheet

Name	Unit	parameter	parameter
Structure type	–	Epoxy resin casting insulation type	
Rated voltage	kV	12	
Rated frequency	Hz	50	
Primary side voltage	kV	10	
Secondary side voltage	V	Busbar PT: $\frac{100}{\sqrt{3}}/\frac{220}{\sqrt{3}}/\frac{100}{\sqrt{3}}$	incoming line PT: 100/220
Rated Capacity	VA	busbarPT:30/300/100	incoming line PT:30/500
output capacity	KVA	1	1
impedance	–	15% (3kVA)	15% (3kVA)
precision	1v	busbarPT:1/3/3P	incoming line PT:1/3
Fuse Type	–	XRNP–12	XRNP–12
Rated current of fuse	A	1	1
PT cabinet group screen requirements	1) When the busbar PT adopts the Y/Y sequence port delta or VV wiring PT fixed form to be installed in an independent group cabinet, it is equipped with an isolating switch and a replaceable fuse. 2)The incoming line PT adopts two incoming lines and two groups of three–phase PT (optional VV wiring or YY wiring). When the fixed form independent group cabinet is installed on the upper and lower floors, the two groups of PTs are divided into two independent compartments, and the PT incoming cables are arranged in a dislocation with independent passage compartments. The secondary grounding wire can be separated (when one PT is overhauled, it will not affect the live running of the other PT). 3)The door of the incoming PT cabinet should be equipped with an observation window and an electromagnetic lock. If the PT is powered on, the cabinet door cannot be opened. If the PT is not powered, the cabinet door can be opened.	

NXSAFE

Power collection and measurement

Current Transformer

Comply with
IEC-60044-1
"Current Transformer"

Technical Data Sheet

S/N	CONTENT	UNIT	Three-phase CT parameters	Zero sequence CT parameters
1 2 3	Rated voltage Rated freq-uency Ratio	V HZ A	12 50 Entry and exit cabinet: 600/5 (protection,measurement) Distribution cabinet: 600/5 (protection), 200/5 (measurement)	12 50 100/5 or 20/1 (customized)
4	Accurate class combination	Iv	10P20 (protection), 0.5 Iv (measurement)	0-5 A error <=3% 5-60 A error <=5% 100/5:60A-600A error less than 10% The error changes linearly, and the secondary output is required to be >=3A 20/1: 60A~120A, and the error is less than 10%. The error changes linearly, and the secondary output is required to be >=3A
5	Capacity	VA	⩾ 2.5	When CT ratio is 20/1, ⩾ 0.5; CT transformation ratio ⩾ 2.5 at 100/5
6	Others	Configure three-phase protection CT, measuring CT and independent zero sequence CT, and independently collect three-phase current and zero sequence current The CT shall be of casing type, and the zero sequence CT shall be of through center or open type.		

Metering current transformer

S/N	Content	Unit	Data	
1	Voltage	kV	Rated voltage	10
			Maximum voltage	12
			Rated short-time power frequency withstand voltage (root mean square value)	42/30，（28） 75，（60）
2	Rated frequency	Hz	Rated lightning impulse withstand voltage (peak)	
3	Ratio	A		
4	level of accuracy	pole	0.2S	
5	secondary load	VA	Rated load ⩾ 15, lower limit load 3.75	

current sensor

Rogowski coil
Comply with
IEC60044-8 standard

There are no shortcomings such as saturation, ferromagnetic resonance,and secondary open circuit of electromagnetic transformers. Wide input range
Output 0-10mV signal

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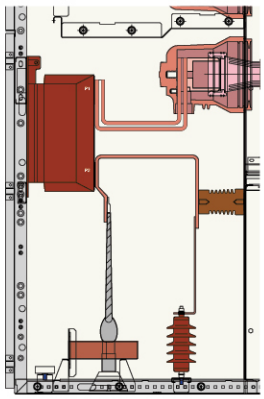
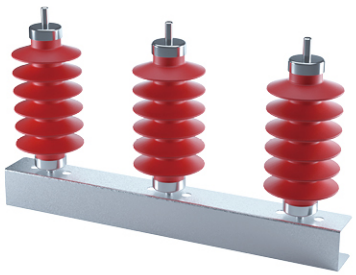
附件



Cable Compartment

Cable compartment
Cable compartment door can be opened only at isolation open and earthing.
Adopt supporting M16 bolt
Standard cable holder
Optional cable seal plugger
Optional cable compartment door with infrared temperature measurement viewing window
Application of single cable
Application of double cables
Available for configuration of lightning arrester
Standard cable height 750mm (casing centre point to cable compartment’s bottom plate)



Lightning Arrester

Overvoltage features of zinc oxide’s low residual voltage, high through current and quick response
Ethylene-Propylene-Diene Monomer material is adopted for insulation and protection

Cable

7.2-17.5KV copper core and aluminum core cable
Single core, three core
Cross-linked polyethylene insulated cable, armored cross-linked polyethylene insulated cable

NXSAFE
Attachment

Charged Displays and Sensors

Comply with IEC61243-5 standard
Panel type live display
With 485 communication
Voltage indication
The live indicator has the function of electricity inspection and secondary phase verification, and the red LED flashes.

When the operating voltage is applied, the live indicator flashes to ensure that it is clearly visible in bright or dark environments, and reminds the staff to pay attention to the live equipment.
The output voltage is between 20V and 36V.
The live indicator can be replaced live.
The live indicator is a plug-in indicator light

cable fault indicator

Short circuit or ground fault indication
Short circuit or ground fault location
Ring network power supply and distribution network
Radiated power distribution network
Neutral grounding system

Internal three-phase composite ground Optional with cable temperature test
Optional models with 485 communication for distribution automation
Optional models with fiber optic communication for distribution automation.

Technical parameter

Applicable voltage level	6-35kV
Applicable load	0-600A
Applicable lead current	I ⩽ 1000A
Applicable wire path	25mm2 ⩽ d ⩽ 300mm2
Action response time	0.06S ⩽ T ⩽ 3S
Static power	⩽ 10μA
Action reset time	6、8、12、24、36hours optional
Use ambient temperature	-40℃⩽ T ⩽ 75℃
number of actions	> 4000 Times
Ground fault limit start value	50A(The specific number can be communicated with the manufacturer)
Short-circuit fault pickup value	800A

NXSAFE
户外箱

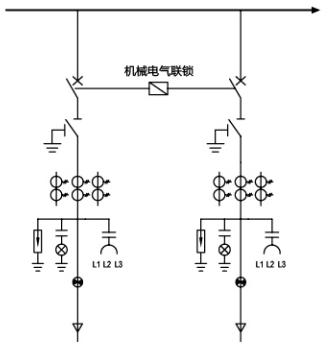
Outdoor Cabinet or Prefabricated Cabin

NXSAFE outdoor switchgear consists of switchgear and control device that fit together outdoor cabinet in set.
Outdoor cabinet can be made of stainless steel, aluminum and zinc plated steel plates, GRC cement and other materials; it can be also made as per the type of prefabricated cabin of outdoor container type; so it can meet the requirements for weather-proof, anti-corrosion and high-protection outdoor application and varied applications.
Cabinet adopts structural members in process and is riveted or bolted. The overall protection grade is IP4X.
Conviction channel is set inside the cabinet and works for thermal insulation, temperature reduction and ventilation. Top cover is set with drainage slope.
Optional cable seal plugger may effectively prevent cable duct from intrusion of moisture.
Dedicated outdoor padlock; intelligent padlock can be chosen.
Simple for hoisting and installation.

NXSAFE

Dual power system

NXSAFE–ATS



NXSAFE better guarantees the power supply continuity of important loads and secondary distribution network systems, and provides dual power switching solutions.It has the function combination and setting of dual power supply automatic switching and automatic recovery, dual power delay automatic switching without automatic recovery, dual power delay automatic switching and automatic recovery, two incoming lines and one bus tie automatic switching, which can meet the needs of users in different application scenarios. demand to ensure the continuity of power supply.

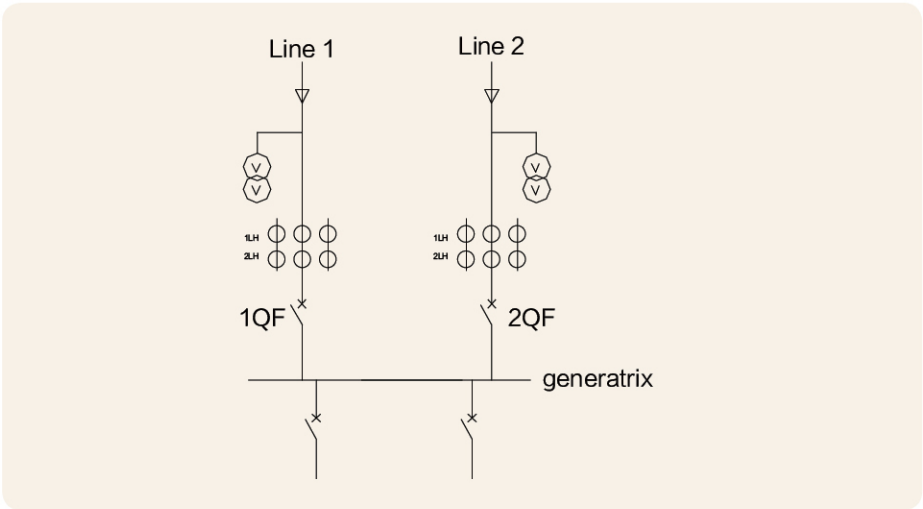
Voltage sensor
mechanical lock
millisecond switching
Intelligent BZT device
automatic charge and automatic recovery
Quick cut and limited time quick cut
Overcurrent protection
automatic phase verification
Delay function
clock
communication

Two–way incoming line power auto–charing logic

The automatic charge logic of the two–way incoming power supply is considered as the main supply line of line I. If line II is used as the main supply line, adjust accordingly.

Daul power ATS

Switching between two medium voltage network power supplies. 2 working modes (can be selected from the MIC500 unit)



I、IQF automatic charge and automatic recovery or 2QF automatic charge and automatic recovery mode

If line 1 is the main supply line (1QF), and line 2 is in the hot standby state (2QF), when there is a voltage loss on line 1, the ATS will switch to the standby line 2QF after a delay T1 after the MIC500 judges it. (1QF open, 2QF closed). If line 1 restores the voltage, the ATS will return to the main line (2QF open, 1QF closed) after a delay (T2).

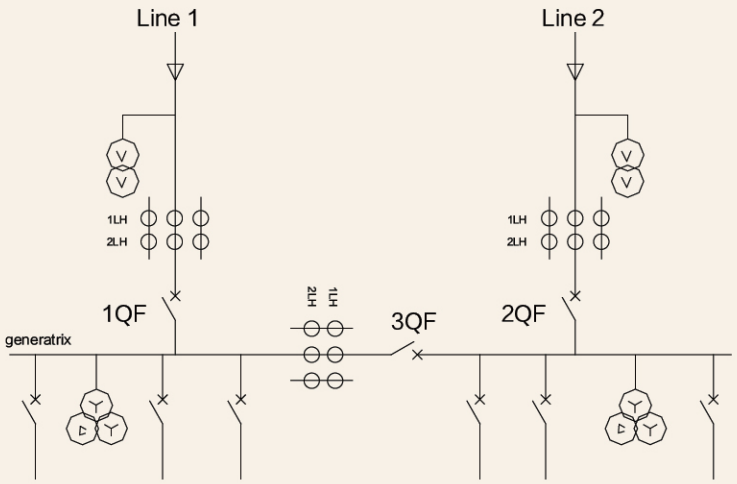
If line 2 is the main supply line (2QF), and line 1 is in the hot standby state (1QF), when there is a voltage loss on line 2, the ATS will switch to the standby line 1QF after a delay T1 after being judged by the MIC500. (open 2QF, close 1QF). If line 2 restores the voltage, the ATS will return to the main line (1QF open, 2QF closed) after a delay (T2).

2、IQF,2QFmutual mapping mode

This mode does not distinguish between primary and backup operation.
If line 1 is the power supply line (1QF) at this time, line 2 is in the hot standby state (2QF). If there is a voltage loss on line 1 (1QF), the ATS will switch to the standby line 2QF (open 1QF, close 2QF) after a delay T1 after the MICSOO judgment. If line 1 regains voltage, the ATS will not return to the main line.

If line 2 is a power supply line (2QF) at this time, line 1 is in a hot standby state (1QF). If there is a voltage loss on line 2 (2QF), the ATS will switch to the standby line 1QF after a delay T1 after being judged by the MIC500 (2QF is disconnected, 1QF is closed). If line 2 regains voltage, the ATS will not return to the main line.

Busbar connection ATS



Power switching between 2 incoming lines (1QF and 2QF) and bus tie switch (3QF). 4 working modes (can be selected from the MIC500 unit)

1 . Mode 1 self − switching and self − recovery (I Q Fclosed state, 2 Q F open state , 3 Q F closed state)

Line 1 with full load,lQF closed state, 2QF open state, 3QF closed state. If line 1 is the main supply line (1QF), and line 2 is in the hot standby state (2QF), when there is a voltage loss on line 1, the ATS will switch to the standby line 2QF after a delay T1 after being judged by the MIC500. (open 1QF, close 2QF). If line 1 restores voltage, the ATS will return to the main line after a delay (T2) (2QF open, 1QF closed).

2. Mode 2: self−switching and self− ecovery (lQF open state, 2QF closed state, 3QF closed state)

Line 1 with full load, lQF open state, 2QF closed state,3QF closed state. If line 2 is the main supply line (2QF),and line 1 is in the hot standby state (1QF), when there is a voltage loss on line 2, the ATS will switch to the standby line 1QF after a delay T1 after being judged by the MIC500. (open 2QF, close 1QF). If line 2 restores voltage, the ATS will return to the main line (1QF open, 2QF closed) after a delay (T2). The above mode 1 and mode 2 can choose the daul−switching mode regardless of the active and standby mode.

If line 1 is a power supply line (1QF) at this time, line 2 is in a hot standby state (2QF). If there is a voltage loss on line 1 (1QF), the ATS will switch to the standby line 2QF
after a delay T1 after being judged by the MIC500 (open 1QF, close 2QF). If line 1 regains voltage, the ATS will not return to the main line.

If line 2 is a power supply line (2QF) at this time, line 1 is in a hot standby state (1QF). If there is a voltage loss on line 2 (2QF), the ATS will switch to the standby line 1QF after a delay T1 (disconnect 2QF, close 1QF) after being judged by the IC500. If line 2 regains voltage, the ATS will not return to the main line.

3. Mode 3 self−switching and self−recovery
(lQF closed state, 2QF close state, 3QF
open state)

Line 1 carries the corresponding busbar load, and Line 2 carries the corresponding busbar load. That is, 1QF is closed, 2QF is closed, and 3QF is open. When there is a
voltage loss on line 1, the ATS will switch to the standby line 2QF after a delay T1 after being judged by the MIC500. (1QF open, 3QF closed). If line 1 restores the voltage, the ATS will return to the main line after a delay (T2) (open 3QF, close 1QF).

4. Mode 4 self−switching and self−recovery
(lQF closed state, 2QF close state, 3QF open state)

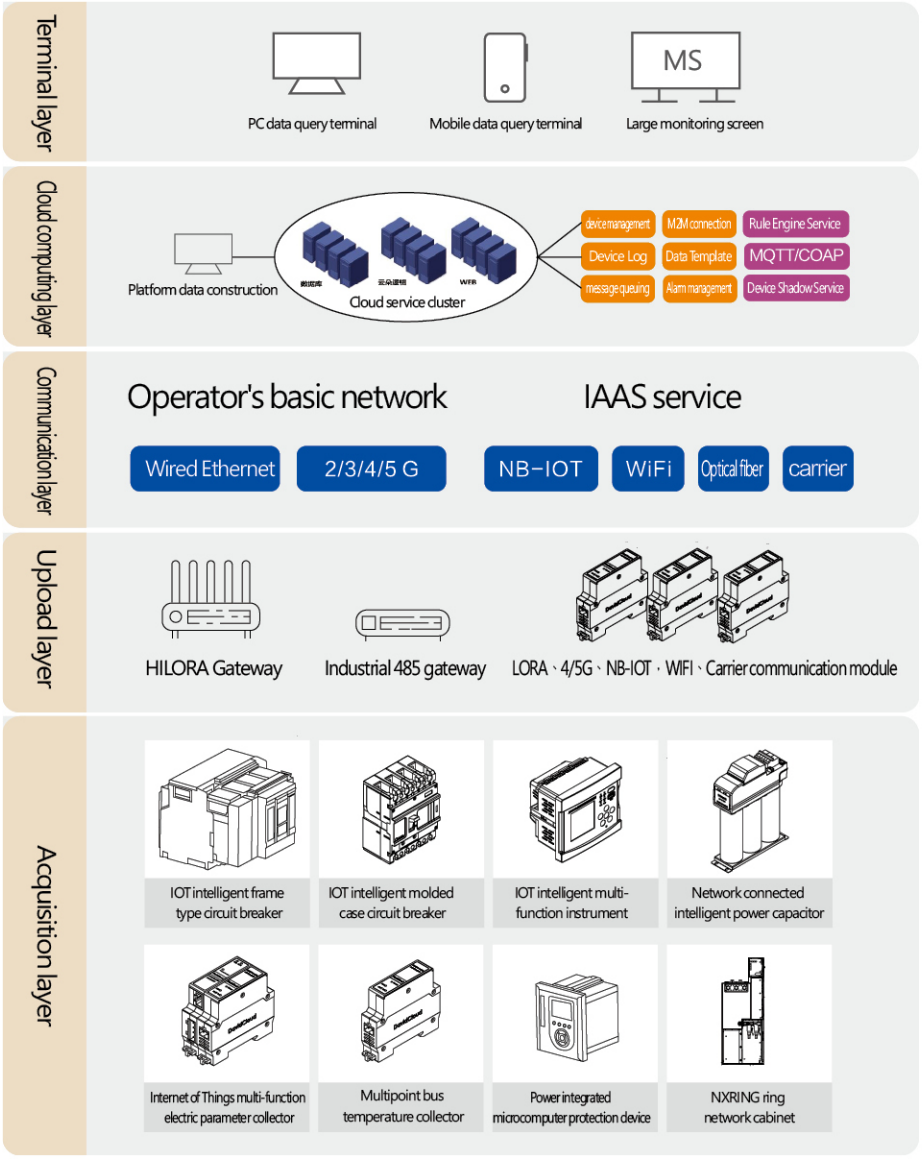
Line 1 carries the corresponding busbar load, and Line 2 carries the corresponding busbar load. That is, 1QF is in position, 2QF is in position, and 3QF is divided. When there is a voltage loss on line 2, the ATS will switch to the standby line 1QF after a delay T1 after being judged by the MIC500. (open 2QF, close 3QF). If line 2 restores the voltage, TS will return to the main line after a delay (T2) (open 3QF, close 2QF).

NXSAFE

Smart Power Distribution Solution

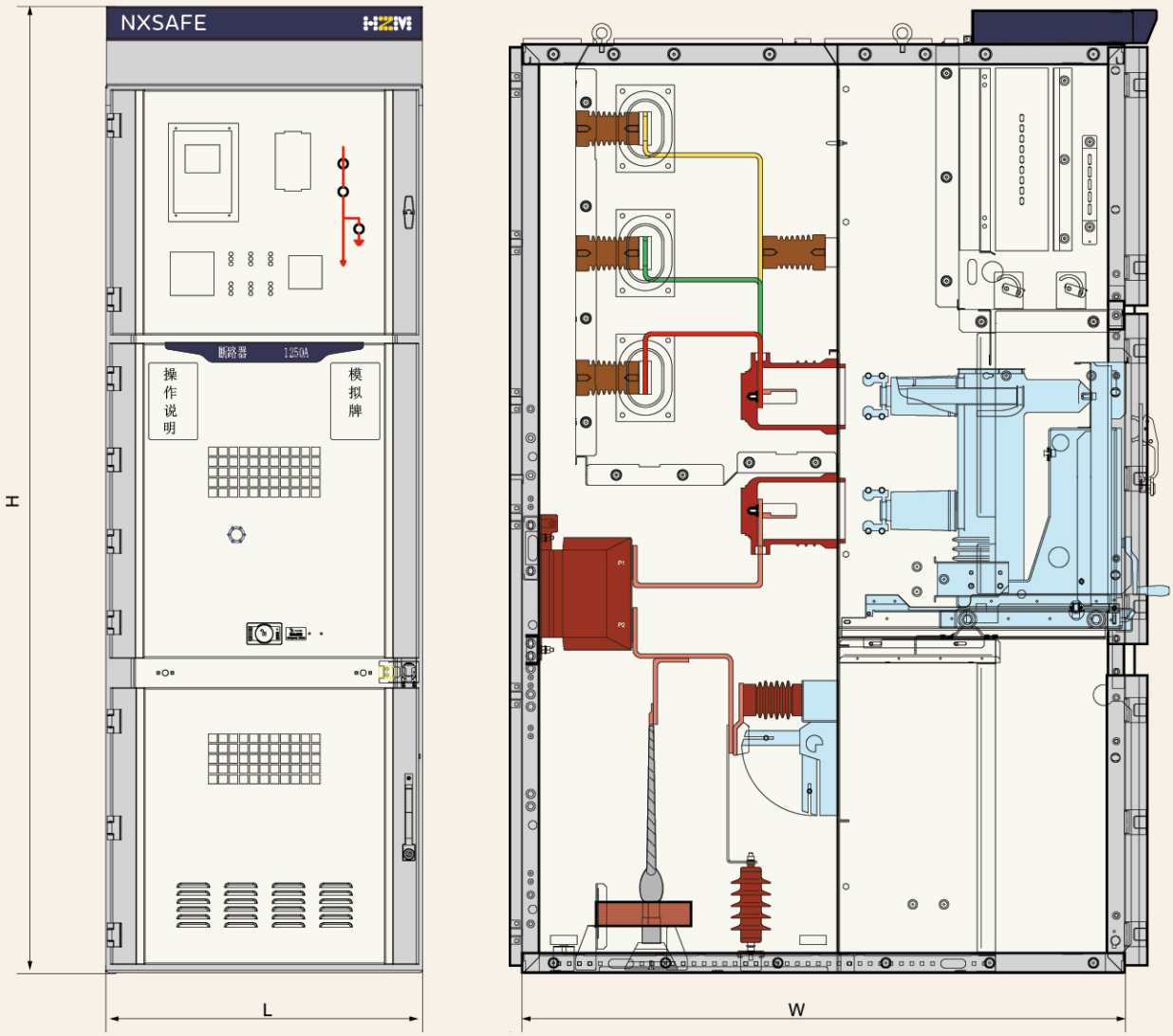
DAVID CLOUD intelligent power distribution management platform based on IoT technology and cloud computing

DAVIDCLOUD power generation and maintenance cloud intelligent operation and maintenance system is an overall package solution for intelligent operation and maintenance of power equipment based on Internet of Things technology, cloud computing technology and edge computing technology. It adopts wireless transmission physical sensor and wireless transmission power collector. The data is collected and calculated by the edge computing terminal and communicated to the cloud computing
center. Taking the DAVIDCLOUD system of the cloud platform as the operation center, through the application of professional operation and maintenance knowledge and the implementation of service capabilities, the overall security reliability and operation efficiency of equipment and systems are improved. NXSAFE is the main component of medium voltage power distribution of DAVIDCLOUD power generation and maintenance cloud intelligent operation and maintenance system.



NXSAFE
Dimensions

Outline dimension drawing

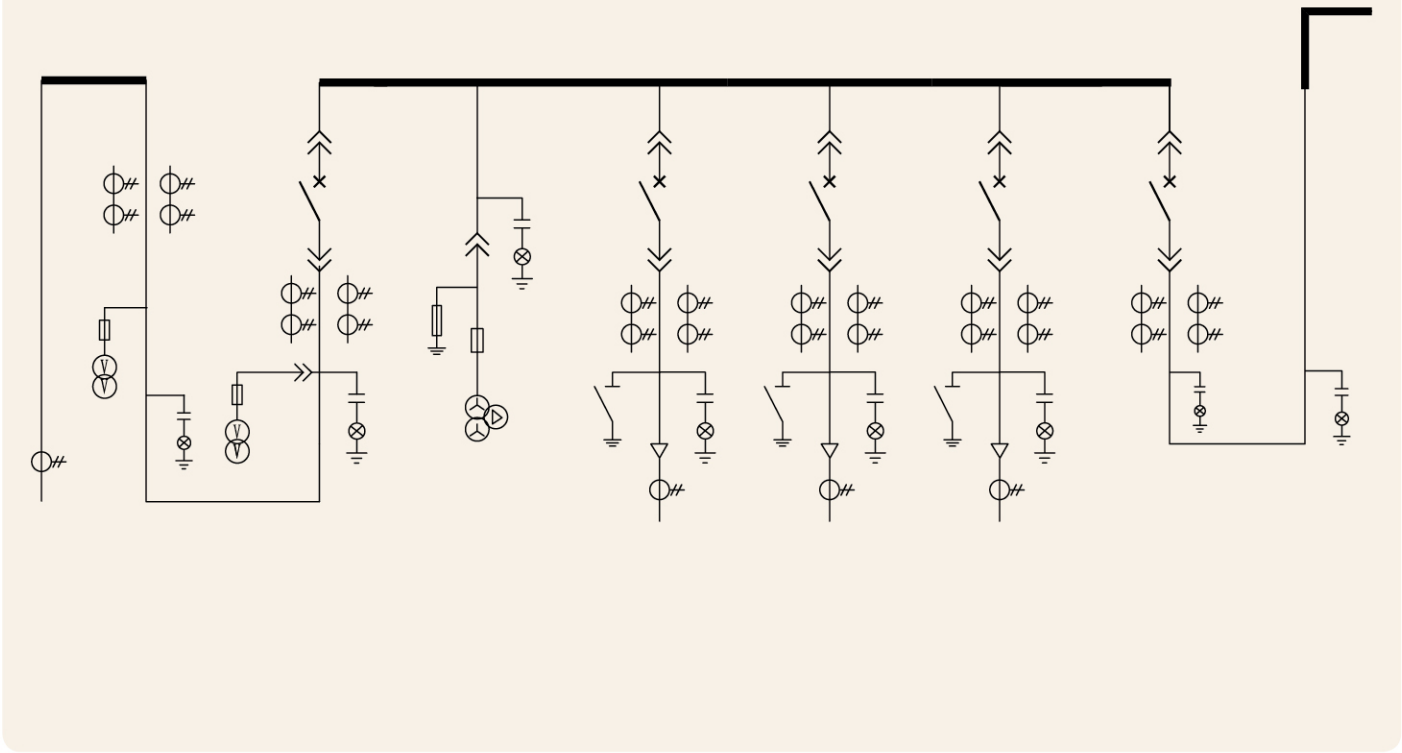


Standard	wide L	deep W	high H
DM	800(1000)	1700	2320
PT	800(1000)	1450	2320
VL	800(1000)	1450	2320
GL	800(1000)	1450	2320
T	800(1000)	1450	2320
F	800(1000)	1450	2320
D	800(1000)	1450	2320
V+	800(1000)	1700	2320
V	800(1000)	1450	2320
VE	800(1000)	1450	2320
FC	800(1000)	1760	2320
ATS	800(1000)	1760	2320

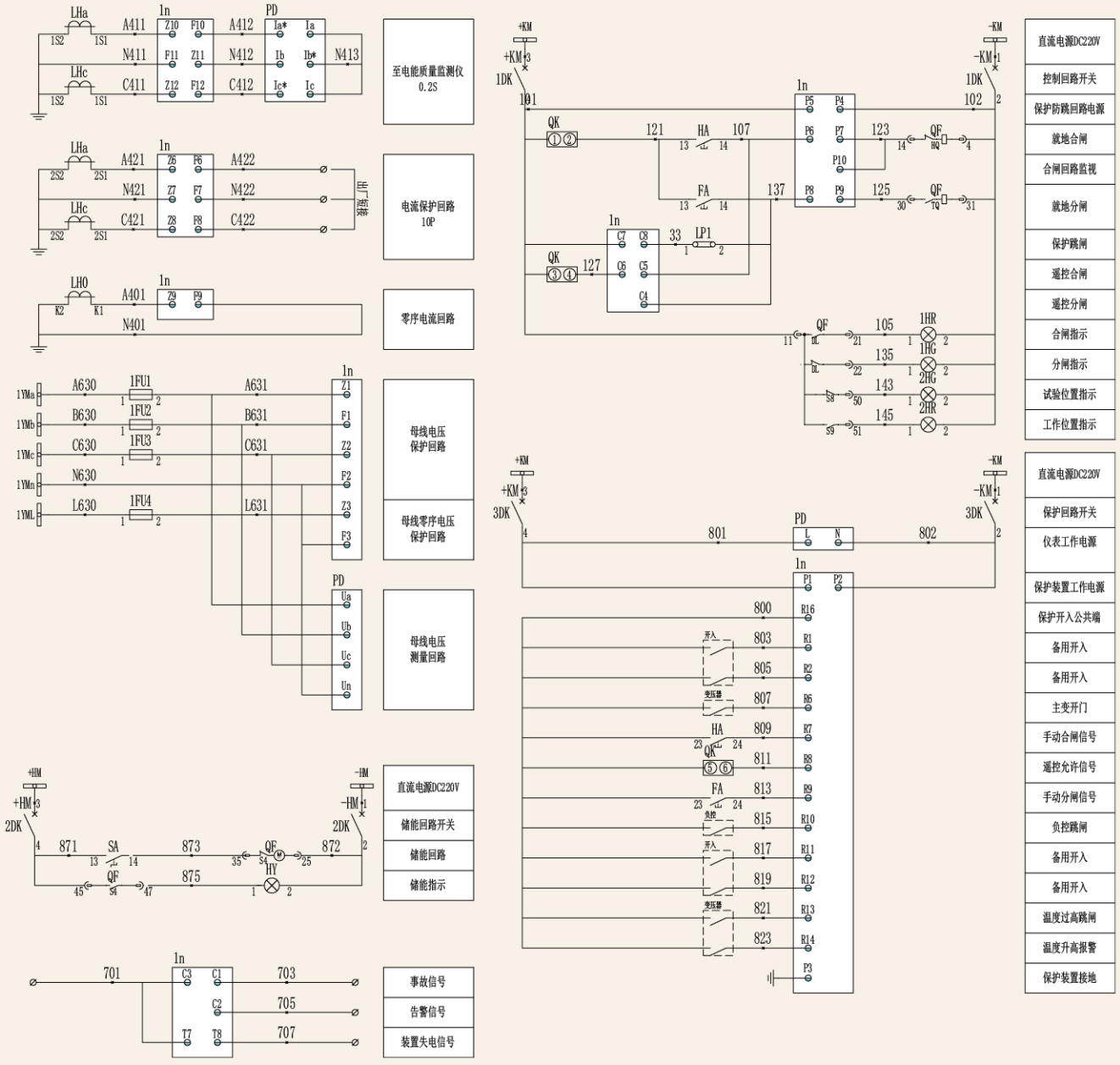
Remarks: When the cable is fed upwards, only the lower pressure relief channel can be used.

Typical application project

A commercial center’s 10KV transformer substation double-circuit system.



Typical Secondary Schematic Diagram



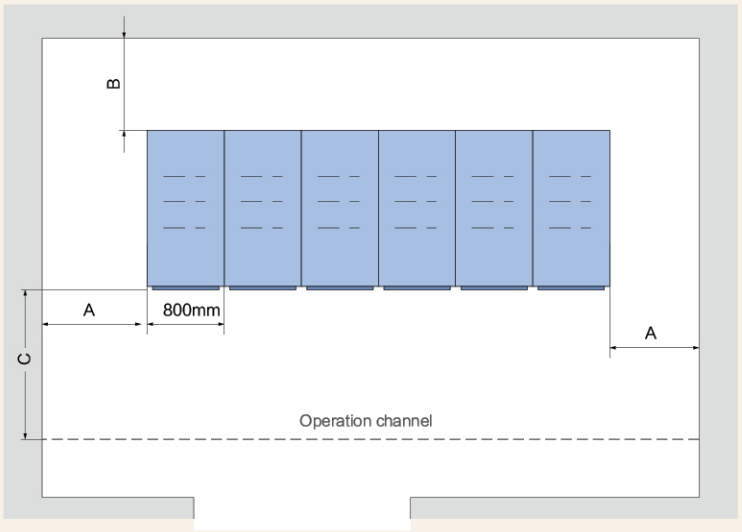
NXSAFE

Installation space

The construction of qualified personnel with professional skills shall comply with the relevant provisions of the Technical Code for Construction and Acceptance of Electric Power Construction.
The switchgear is installed on the installation steel components, which can be assembled and welded by angle steel, channel steel or square steel. The components are embedded in the civil concrete. The finished concrete floor (or ceramic tile) should be 3–5 mm lower than the installation components of the switchgear. The completed installation components should meet the horizontal standard of ± 1mm/m2.
When the cabinet is arranged in a single row, an operation channel no less than 1.5m shall be reserved in front of the cabinet. When the double row is arranged opposite to each other, an operation channel no less than 2m shall be reserved in front of the cabinet.

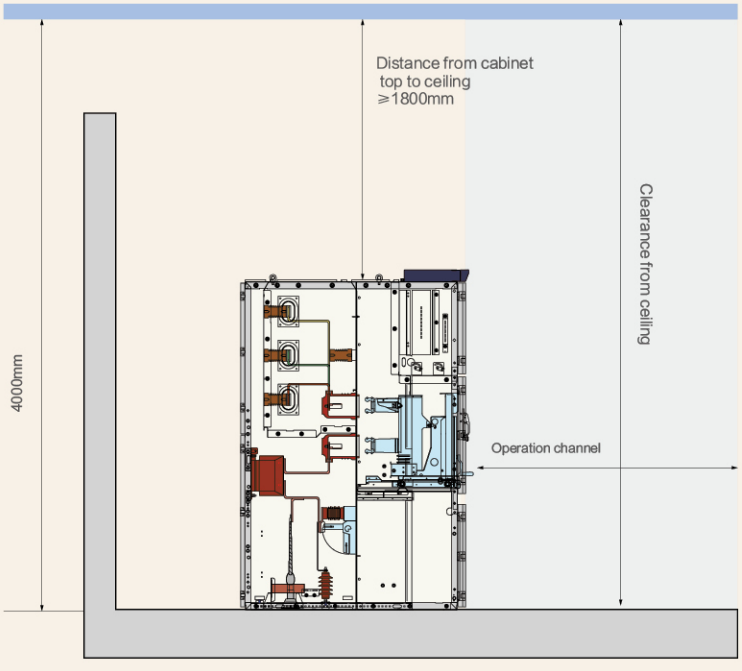
NXSAFE installation space

vertical view



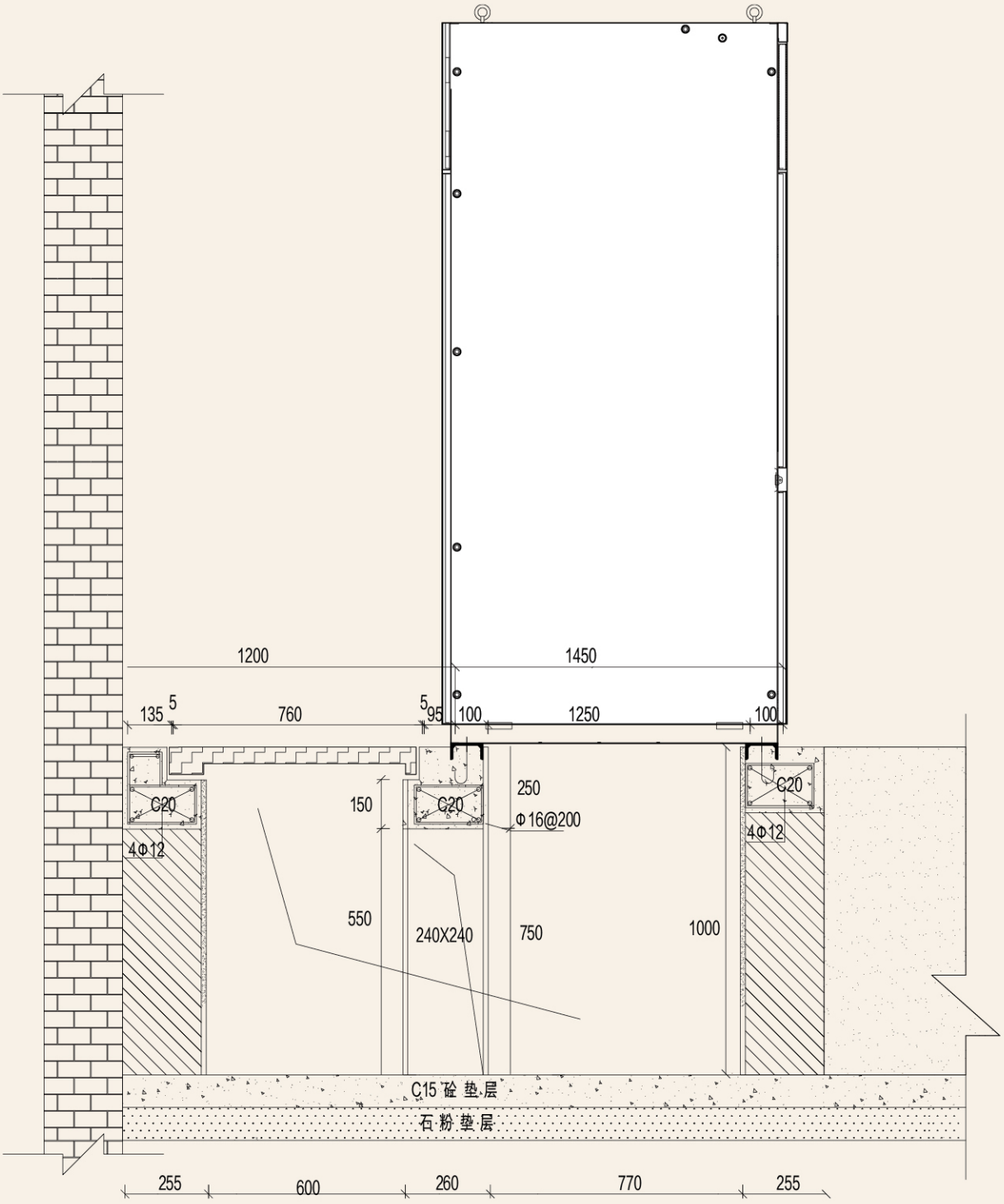
Distance between functional unit and wall

	Functional unit and distance		Spacing (mm)
A	Side plate of end cabinet and Distance between walls		1200 (recommended)
B	When installing against the wall Back plate and wall Distance between	Back up pressure relief	1000 (recommended)
C	Channel in front of cabinet		> 2500mm (recommended)



Minimum operating clearance channel in front of the switch cabinet when the switch cabinet is against the wall (m)
Single row layout ⩾ 2.5m
Double row face–to–face arrangement ⩾ 2.5m
Double row back–to–back layout ⩾ 1.5m

Installation dimension



NXSAFE Foundation section

inspect

The inspection work is to patrol the switchgear under normal operation conditions, and the switchgear does not need to be powered off.
Whether the voltage and polarity of control power supply and energy storage power supply are normal.
Whether the status and position indicators of the circuit breaker, grounding knife status indicators and other indicators are normal.
Whether the indication of current meter and voltmeter is correct.
Whether the power indication of the protection relay is normal
Whether all pre alarm or alarm indications are normal.
Whether there is abnormal sound, odor, glow, etc. in the switch cabinet.
Check whether the heater power supply and its indicator in the cabinet are normal.
In case of the above abnormal phenomena, please analyze the causes in time, eliminate the fault or replace the components.
Whether there is partial discharge trace on insulating parts
Whether there are traces of leakage current on insulating parts

maintain

Safety measures: when the switch cabinet is powered off for maintenance, it is necessary to isolate the area where the work is to be carried out, and ensure that the power supply will not be reconnected. Grounding work should be done well, and special personnel should be assigned for monitoring.

- Open the main busbar chamber and check the fastening of each connecting bolt.
- Check whether the main bus and branch bus are damp and rusty.
- Check whether the side plates are damp and rusty.
- Check whether there are sundries in the main bus room.
- Check the fastening and surface condition of the static contact
- Open the cable chamber and check the cable connection
- Check the sealing of primary and secondary cable holes.
- Check whether the heater heats normally.
- Check whether there are sundries in trolley room and cable room.
- Check whether the secondary wiring of current transformer is tightened.
- Check the current terminals in the low-voltage compartment to ensure that the secondary current circuit is not open, and ensure that the secondary loads of current transformers such as protective relays, ammeters, and watt hour meters are put into use.
- Carry out single transmission and overall transmission for each switchgear.
- Verify whether various functions of the protection relay are normal
- Verify that the intermediate relay coil is intact and the contact is normal
- For lubricating grease on sliding parts and bearing surfaces in the cabinet, please refer to the operation manual of each switchgear.
- Remove the pollutants in the cabinet, especially the surface of each insulating material
- Check whether pins in aviation plugs and sockets are loose

Services and upgrades

Provide life-cycle services
consulting service
Design
install
test
Put into operation
inspect
maintain
repair
replace
recovery
The DAVIDCOULD intelligent distribution management system can be upgraded
Remote operation and maintenance software and services of