



INDUSTRIAL SOLUTION SYSTEMS



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NRTem-12

NRTem-12 MV Safe Gas Ring Main Units



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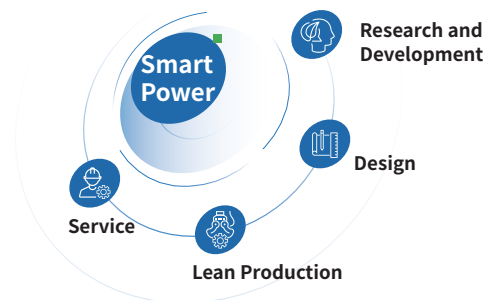
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NATUS ELECTRIC GROUP CO.,LTD.

Group Business



The Group specializes in system integration, EPC turnkey services, R&D, production, and sales of core products within the medium and low-voltage power industry. In the field of power equipment, we have deep expertise in intelligent electrical switchgear systems, high-end power components, advanced power quality management products, intelligent control instruments, and control systems. Leveraging accumulated expertise in artificial intelligence and big data analytics, we provide comprehensive solutions for meteorological disaster prevention equipment and the safe operation of substations and transmission lines. In the domain of new technologies, we focus on small-area, low-altitude meteorological high-precision prediction technology, providing integrated products and services to support the development of the low-altitude economy.

Group Vision



Natus Electric Group originates from Germany, is firmly rooted in China, and serves the global market. Since its establishment in 1956, the group has built upon German technology deeply integrating Chinese expertise and a global perspective. Supported by a robust Chinese R&D and manufacturing team.

We precisely respond to global market demands, delivering professional intelligent power solutions for clients across various industries. Adhering to a customer-centric approach, the group is committed to innovative products, reliable technology, and lean manufacturing.

Working hand-in-hand with global users to build a smarter, more efficient, and sustainable future for the power and energy sector.



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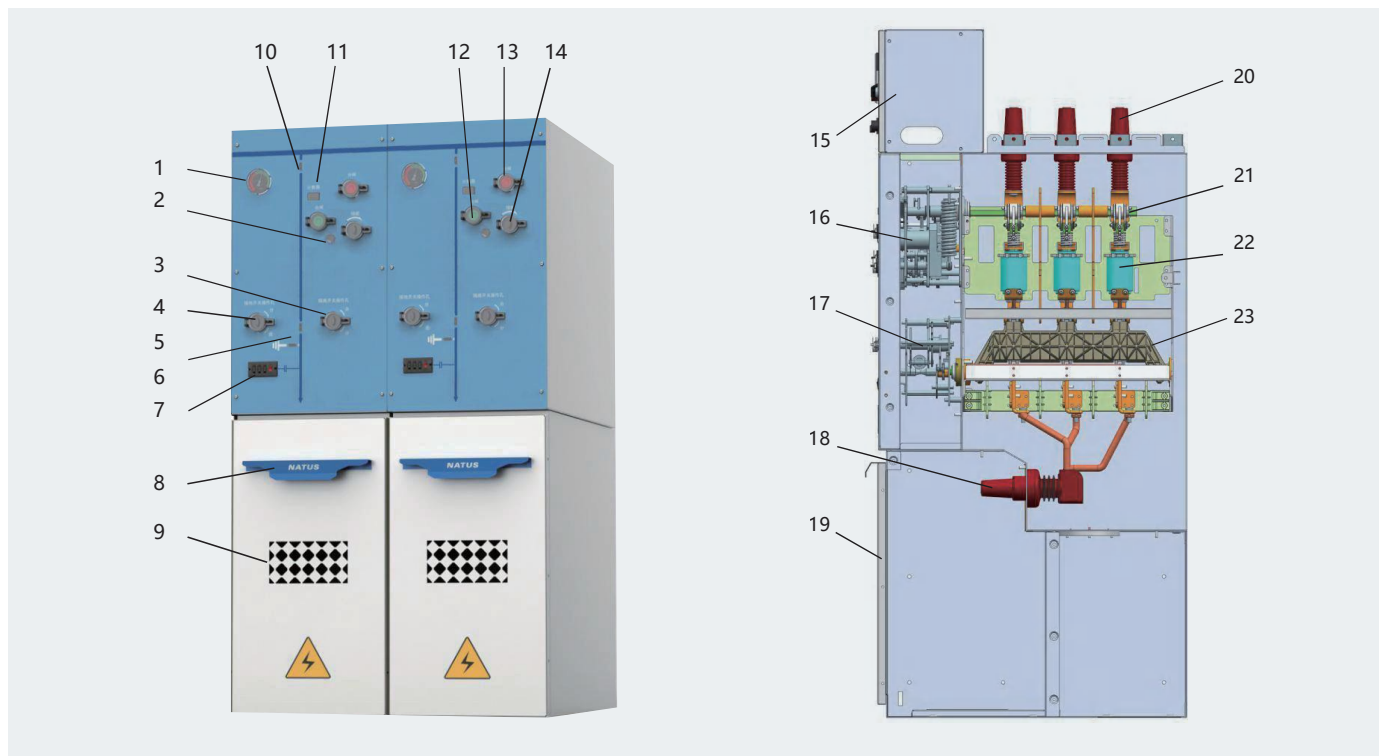
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Main wiring scheme diagram

09~11

General Information

NRTem-12 environmentally friendly gas-insulated high voltage metal enclosed switchgear. It is a kind of intelligent cloud switchgear with environmental friendly materials and convenient operation. It has the features of simple structure, flexible operation, reliable interlocking, convenient installation. The primary main electrical parts are all sealed in the stainless steel box cavity and the neighboring cabinets are connected with each other through insulated busbars. The secondary circuit adopts integrated control technology and supports data transmission function. Through the intelligent module, the main station will obtain the health status, coordinate position, operating environment and the operating parameters of the equipment, which is convenient for the operation and maintenance personnel to grasp the operating status of the equipment in time.



Switchgear Structure Schematic

- | | |
|---|--|
| 1. Pressure Indicator | 12. Close Button |
| 2. Spring Charging Status Indicator Hole | 13. Trip Button |
| 3. Isolator Operating Hole | 14. Spring Charging Operating Hole |
| 4. Earthing Switch Operating Hole | 15. Low-Voltage Instrument Compartment |
| 5. Earthing Switch Status Indicator Hole | 16. Load Switch (Circuit Breaker) Operating Mechanism |
| 6. Isolator Status Indicator Hole | 17. Isolator Operating Mechanism |
| 7. Capacitive Voltage Indicator | 18. Incoming/Outgoing Cable Bushing |
| 8. Lower Door Handle | 19. Cable Compartment Door Panel |
| 9. Observation Window | 20. Extended Bus Bushing |
| 10. Load Switch (Circuit Breaker) Status Indicator Hole | 21. Load Switch (Circuit Breaker) Transmission Mechanism |
| 11. Counter | 22. Load Switch (Circuit Breaker) Vacuum Interrupter |
| | 23. Isolator Transmission Mechanism |

Product Characteristics

Typical Application

In order to reduce the environmental pollution and personal injury caused by the decomposition of SF6 greenhouse effect gases, Natus has developed NRTem environmentally friendly gas-insulated ring main unit, which is a new generation of green and environmentally friendly products, and is also the best choice for replacing non-environmentally friendly ring main unit equipments such as SF6.



1. Applied in areas requiring high environmental protection:

Adopting N2 gas or dry compressed air as insulation medium, completely cancelling SF6 gas, without any pollution and harm to the environment and people.

2. Applied to places with narrow space.

The volume of single equipment is small, only 420X850 X 1600(2050).

3. Applied in plateau, strong wind and sand, low lying or humid areas.

All high-voltage charged parts are sealed in 304 stainless steel gas chamber with IP67 protection level, which can be installed in humid, sandy and dusty, box-type substation or places that are easy to cause pollution.

4. Applied in smart grid:

The main switch can be electrically operated and with the optional intelligent module of our company it can carry out remote control, telemetry and telecommunication on the switchgear and substation site, which can be used for both decentralised control and convenient centralised control.

Environmental protection

All non-toxic and harmless materials, stainless steel cavity filled with N2 gas compressed air, will not discharge any highly toxic and harmful substances. The material can be recycled after the life cycle. This determines the use of environmental protection.

High safety

- The primary circuit is sealed in a stainless steel box with protection class IP67 and the enclosure with protection class IP4X. Perfect logic and mechanical interlocking system avoids accidental operation. Completely eliminating SF6 gas, avoiding the explosion caused by the degradation of insulation and arc extinguishing ability of SF6 ring network cabinet due to insufficient gas pressure.
- Adoption of vacuum interrupter with explosion-proof performance and solid sealing of poles to enhance the protection performance of the switch.

Ease of operation

The disconnecting switch and earthing switch share a common operating handle to prevent misoperation. When the circuit breaker is running neither the disconnecting switch nor the earthing switch can be operated, thus preventing operational errors.

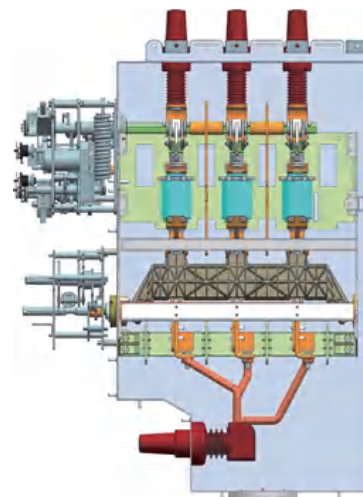
Maintenance-free

- The primary high-voltage switching part of the product is in a fully sealed state which is free from cleaning and maintenance and reduces the cost of operation and maintenance.
- The online detection system can be configured to upload the operation of the equipment in real time, realising the automation of the distribution network. Reduce the labour cost, the production cost of electric power enterprises.

Masterpiece design

Main switch design

- 1、The core component of NRTem-12 is the gas tank which is made of 304 stainless steel by laser static seal welding technology.
- 2、Simple primary circuit design, uniform cavity electric field distribution structure without more composite insulation to meet the good heat dissipation ;
- 3、The protection class of the gas tank is IP67.
- 4、the gas box is equipped with explosion-proof diaphragm, when the pressure inside the gas chamber exceeds the predetermined value, the pressure release device will release the pressure from the bottom of the gas box through the explosion-proof diaphragm;
- 5、Using rectangular contact spring the force value is stable and the product life is long.



Disconnect switch design

- 1、The disconnecting switch adopts three-station design, completely avoiding the occurrence of misoperation;
- 2、The contact design is favourable for ground closure, which improves the speed of ground closure and ensures the stability of contact pressure;
- 3、The isolation spindle is driven by a spring mechanism to ensure reliable ground and isolation break distance;

Integrated operating mechanism design

- 1、The spring operating mechanism has two types: load switch operating mechanism and circuit breaker operating mechanism, which can be operated manually/electrically;
- 2、the operating mechanism has a double error-proof operating system, so that the operator must operate in accordance with the specified operating procedures, otherwise, the operation cannot be realised;
- 3、For the case where an earthing switch is not required, the earthing operation can be cancelled.

Implementation standards

- GB3906: 3.6 kV~40.5 kV AC metal-enclosed switchgear and controlgear
- GB3804: 3.6 kV~40.5 kV High-voltage AC load switch
- GB/T11022: Common technical requirements for standards of high-voltage switchgear and controlgear
- GB1984: High-voltage AC circuit-breakers
- GB1985: High-voltage AC disconnectors and earthing switches
- GB3309: Mechanical tests at ambient temperature for high-voltage switchgear
- GB4208: Degrees of protection provided by enclosures (IP Code)
- DL/T404: 3.6 kV~40.5 kV AC metal-enclosed switchgear and controlgear
- DL/T593: Common technical requirements for standards of high-voltage switchgear and controlgear
- JB8738: Vacuum interrupters for 3.6 kV~40.5 kV AC high-voltage switchgear



Technical characteristics

Cable compartment

The cable compartment can only be opened when the feeder is earthed;
The casing complies with DIN EN 50181.
One-piece CT can be located on the side of the casing for easy cable installation;
The height from the casing installation to the ground is more than 650mm ;

Pressure relief channel

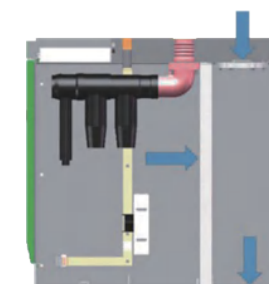
The special pressure relief device installed in the lower part of the body will be activated automatically in case of internal arc-firing fault.

Busbar connection method

Using fully insulated, fully enclosed standard European top expanding busbar system, easy to install; Adopt special busbar connection device to expand busbar externally. It can be expanded flexibly.

Cable connection

Adopt silicone rubber touchable flood-proof type cable plug installed on standard type casing.
A lightning arrester can be added and connected to the rear of the T-type cable head.



Technical Specifications



General Electric Parameters

Rated insulation voltage	rated voltage	kV	12
	Ratedshotime		
	Interspersed,relatively	kV	42
	disconnect	kV	48
	Rated shock withstand		
	Interspersed relatively	kV	75
protection class	disconnect	kV	85
	outer shell		IP4X
	ai-filled compartment		IP67
rated current	busbar	A	630
rated fequency		Hz	50Hz
intemal combustion of arcs		kA/s	25/1
Annual gas leakage rate		%	≤0.01
Rated inflation pressure(20°C)		Mpa	0.02
Minimum functional pressure(20°C)		Mpa	0
Pressure relief device to release pressure		Mpa	0.16
electro magnetic compatibiliy(EMC)			3

Load switchgear cabinet

dielectnc medium			N2
rated current		A	630
Rated short-time withstand current	Main Loop	kA/s	25/4
	grounding loop	kA/s	25/4
Rated peak withstand current	Main Loop	kA	63
	grounding loop	kA	63
Rated short circuit closing current	peak value	kA	63
Number of closures and opens	load switch		E2
Mechanical ife span	load switch	times	20000
	disconnect switch	times	5000
	grounding switch	times	5000

circuit breaker cabinet

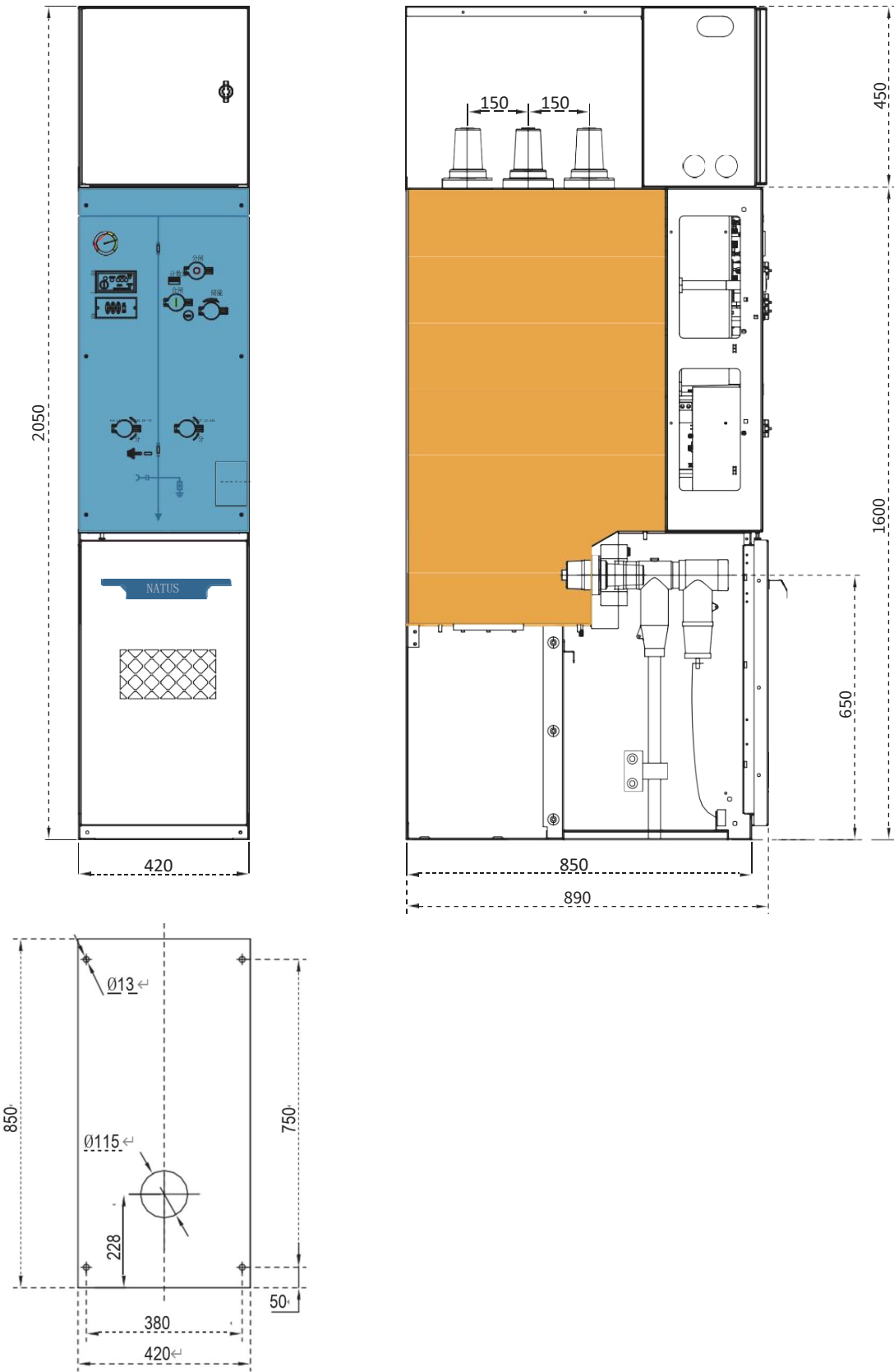
dielectric medium			N2
rated current		A	630(Max 1250)
Rated short-time withstand curent	Main Loop	kA/s	25/4
	grounding loop	kA/s	25/4
Rated peak withstand current	Main Loop	kA	63
	grounding loop	kA	63
Rated short circuit closing current	peak value	kA	63
Circuit Breaker Ratea Sequence of Operafons			0.3s-CO-180s-CO
Number of closures and opens			E2
Mechanical life span	load switch	times	20000
	grounding loop	times	5000
	grounding switch	times	5000

Product structure



Overall dimensions

NRTem-12-C/V



Product structure

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Overall dimensions

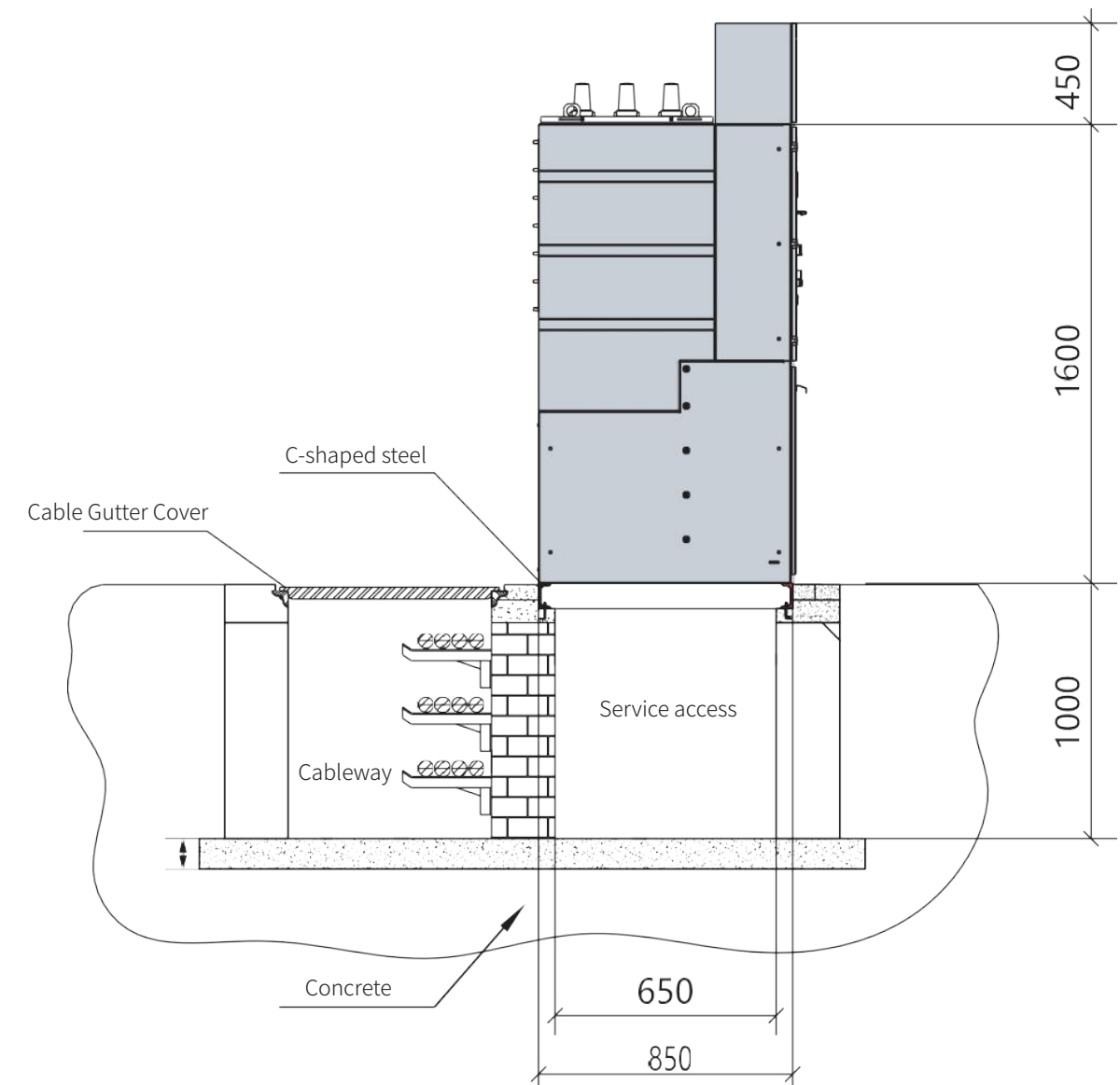
NRTem-12-CVV



Product structure

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Installation Basis



The product should be mounted on a concrete table base pre-embedded channel, which should be sufficient to support the total weight of the equipment.

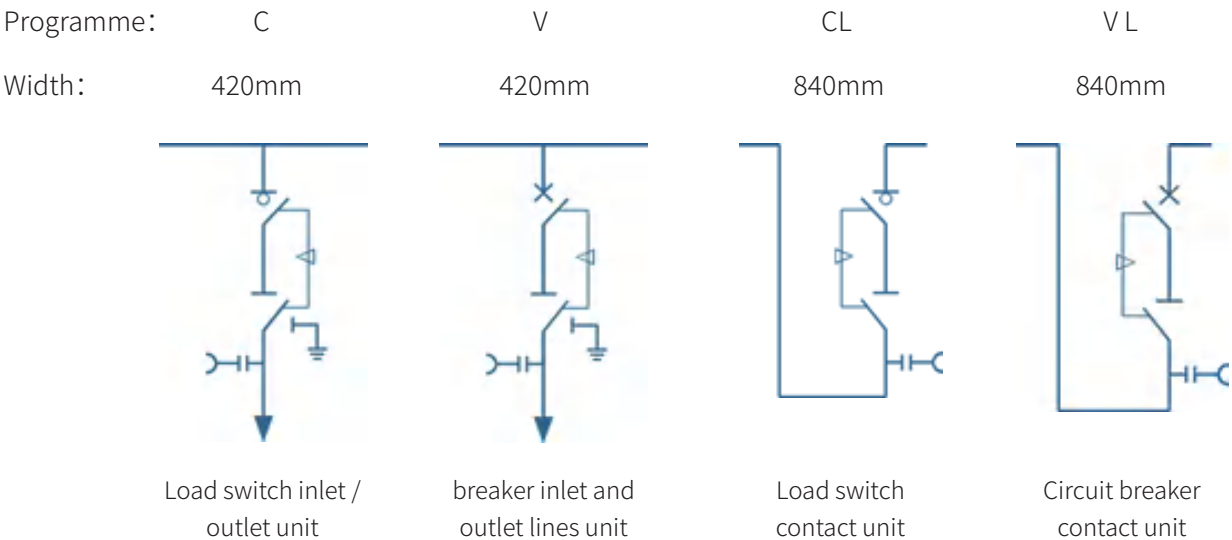
Notes:

- 1, the second pouring of the foundation channel steel counter-buckling, unevenness per metre is not more than 1mm;
- 2, Switchgear fixed on the foundation channel steel allows welding;

Main wiring scheme diagram



Configuration scheme



Basic Configuration

Triplex Disconnect Switches	Triplex Disconnect Switches	Duplex Disconnect Switches	Duplex Disconnect Switches
Load Switch	Vacuum Circuit Breaker	Load Switch	Vacuum Circuit Breaker
Bandwidth indicator	Bandwidth indicator	Bandwidth indicator	Bandwidth indicator
Standard busbar	Standard busbar	Standard busbar	Standard busbar
	Current Transformer	Contact busbar	Contact busbar

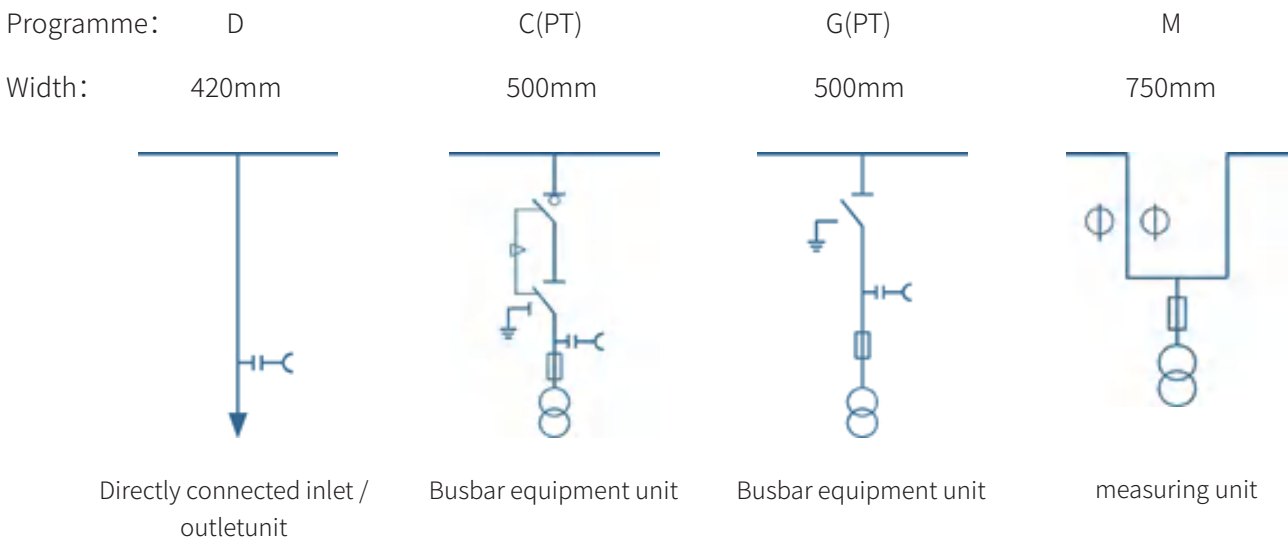
Optional accessories

Electrically Operated Mechanisms	Lightning arrester	Pointer Gauge
Cable accessories	Electromagnetic door lock	Two-in-one mechanical interlock
Low-voltage chambers	Fault Indicator	Three and two mechanical interlocking
Microcomputer protection	Fault Indicator (Temperature Measurement)	Inlet earth interlocking device
Digital display instrumentation	Through-core current transformer	Chassis Raised Seat
Rectifier module	Zero-sequence current transformer	Backpack Side cabinet

Main wiring scheme diagram



Configuration scheme



Basic Configuration

Bandwidth indicator	Duplex Disconnect Switches	Duplex Disconnect Switches	Bandwidth indicator
Standard busbar	Load Switch	Bandwidth indicator	Standard busbar
	Bandwidth indicator	Standard busbar	Adapter busbar
	Standard busbar	Voltage transformer (incl.fuse)	Current transformers
	Voltage transformer (incl.fuse)	Elbow plugs (incl.cable)	Voltage transformer (incl.fuse)
	Elbow plugs (incl.cable)		Electricity Bureau supply transformers

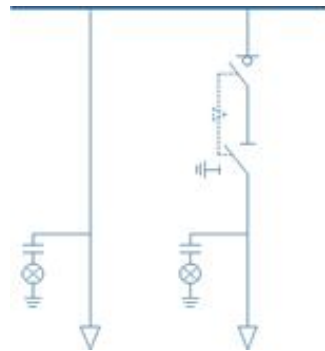
Optional accessories

Electrically Operated Mechanisms	Lightning arrester	pointer gauge
Cable accessories	Electromagnetic door lock	Incoming blocking device
Low-voltage chambers	Fault Indicator	Chassis Raised Seat
pointer gauge	Fault Indicator (Temperature Measurement)	Backpack sub-cabinet
Digital Display Meter	Through-core current transformer	
Rectifier module	Zero sequence current transformer	

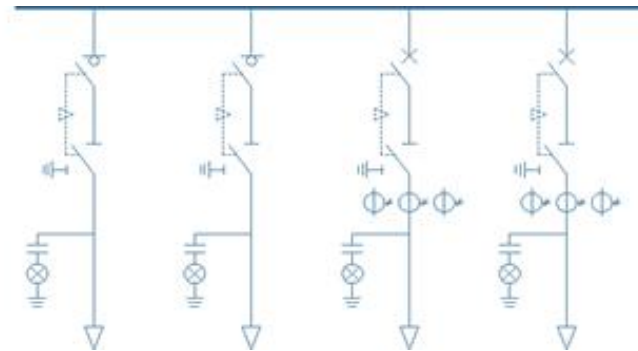
Main wiring scheme diagram

Configuration scheme

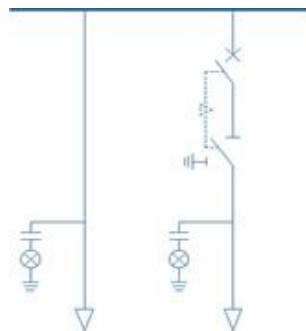
Programme No.: D+C



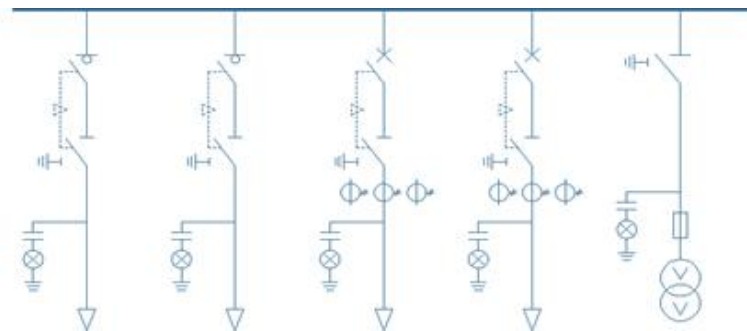
Programme No.: C+C+V+V



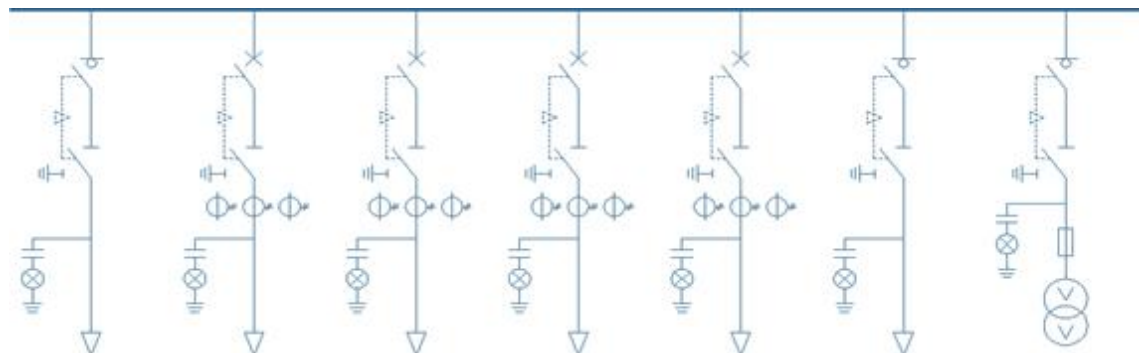
Programme No.: D+V



Programme No.: C+C+V+V+G(PT)



Programme No.: C+V+V+V+V+C+C+G(PT)



Note: 1、The above combination scheme is for reference only, various combinations can be provided as required, please consult the company for details;

2、Special non-standard programme or cabinet size, please contact our company;



PRECISION IN DETAIL