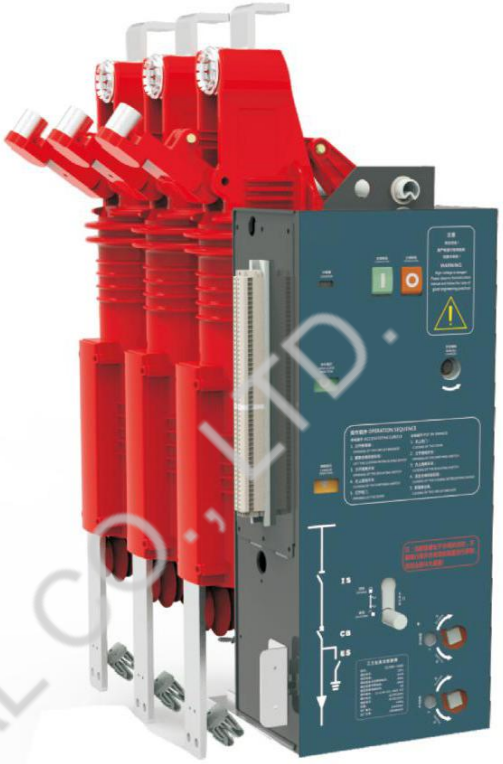
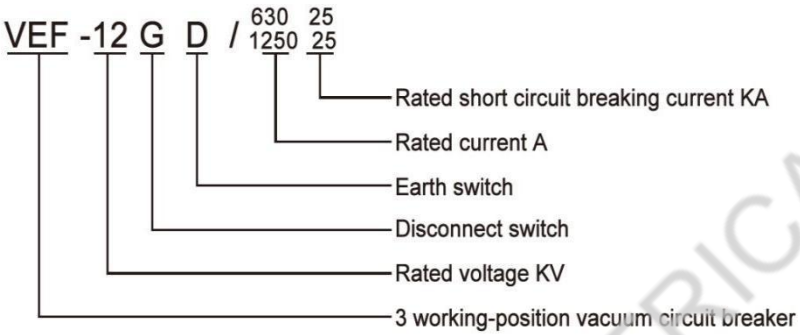
VEF-12GD Side Installation Type 3 Working Position Vacuum Circuit Breaker

Integrated, side installation, with disconnect switch, with earth switch (upper/lower earthing), interlocking mechanism integrated miniaturized



- 12KV, 630~1250A, 20~31.5KA
- For cabinet width 500mm
- Patented technology
- Solid sealing technology
- Outgoing terminal with non-contact charged display sensor
- The cabinet door block adjustment free

◆ Type description



◆ Use environment

Normal use environment

- Ambient temperature: -15~40℃, daily average temperature ≤+35℃;
- Humidity: The average value of relative humidity measured within 24 hours is ≤95%; the average value of water vapor pressure measured within 24 hours is ≤2.2kpa; the average value of relative humidity is <90%; the average value of monthly water vapor pressure is <1.5 kpa;
- Altitude ≤1000m;
- Sunlight radiation can be ignored;
- Vibration from outside the switchgear and control equipment can be ignored;
- The surrounding air is not significantly polluted by dust, smoke, corrosive or flammable gas, steam or smoke.

Special use environmental conditions

For the use of circuit breakers under special conditions, the user shall negotiate with the manufacturer. Usually the following use conditions will be considered by the manufacturer:

- The installation location of the equipment >1000m above sea level
  ——The external insulation strength will be reduced
  ——Or order plateau type products, and meet the corresponding insulation requirements

- Higher ambient temperature

  ——The circuit breaker needs to reduce the rated current

  ——Or install a fan to force heat dissipation

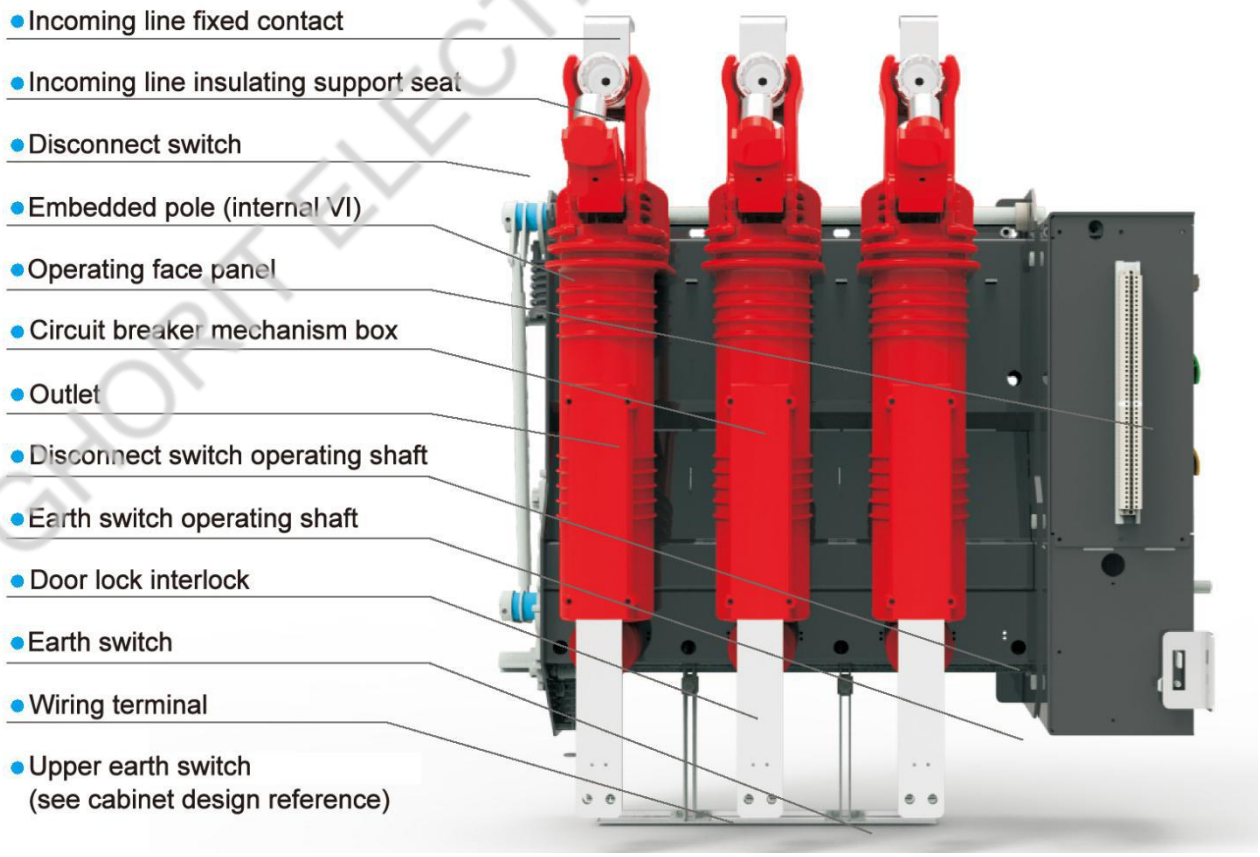
- Others shall be dealt with in consultation with the manufacturer in accordance with clause 2.2 of the GB/T11022 standard.
- The user must make relevant calculations when selecting the switch.
- Suggested calculation method:

  Find out the height H of the designated place, calculate the relevant height coefficient Kα according to GB311.1 (Formula 1), multiply the lightning impulse withstand voltage and power frequency withstand voltage of the switch by Kα, and the value obtained is for the switch at high altitude H, the withstand voltage parameters that must be achieved in an environment <1000m at the same time.

  Formula 1: $K\alpha = \frac{1}{1.1 - H \times 10^{-4}}$

◆ Structure

The main circuit of VEF-12GD series side installation type 3 working position vacuum circuit breaker is arranged longitudinally. The upper part is the disconnect switch, the middle part is the vacuum circuit breaker, and the lower part is the earth switch. The operating mechanism, the circuit breaker mechanism and the interlocking mechanism are located in the front of the switch. The switch can be installed upside down.



Safety and excellent embedded pole

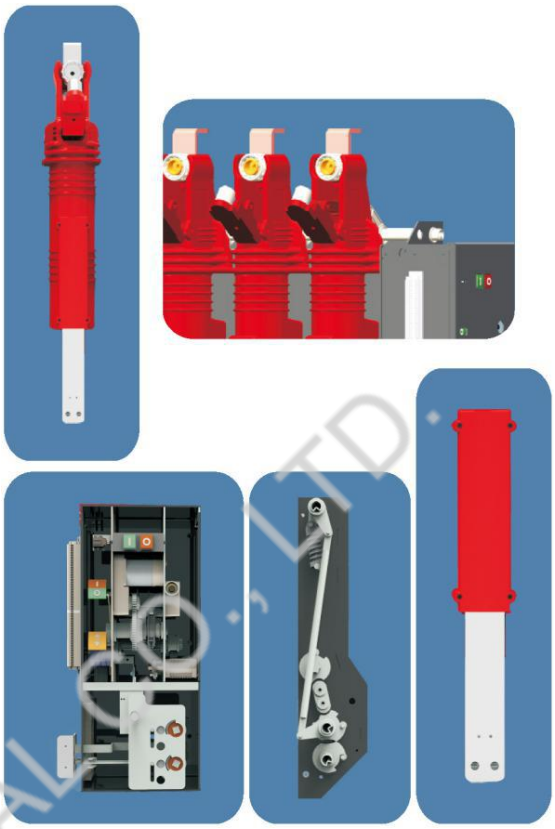
High reliability, stable insulation performance, stronger structure, miniaturization, maintenance-free, more environmentally friendly, and high mechanical resistance.

Visual disconnect open contacts

Rotary disconnect switch with visible disconnect open contacts after opening.

Modular operating mechanism

The circuit breaker adopts a modular operating mechanism, which can be replaced or overhauled independently, and has good interchangeability. It can be operated manually, or can be operated by AC or DC energy storage to realize remote control.



Three-shafts step-by-step operation, reliable mechanical interlocking

The disconnect switch, circuit breaker, and earth switch are operated on a single shaft respectively, and there is a forced mechanical interlock between the 3 shafts to prevent misoperation.

Outgoing wire end with non-contact charged display sensor

No capacitance, using non-contact induction technology, safe and reliable.

The cabinet door and the earth switch are designed with a reliable interlocking structure

To ensure the safety of the operator, the adjustment-free cabinet door with cabinet door block.

◆ Configurations

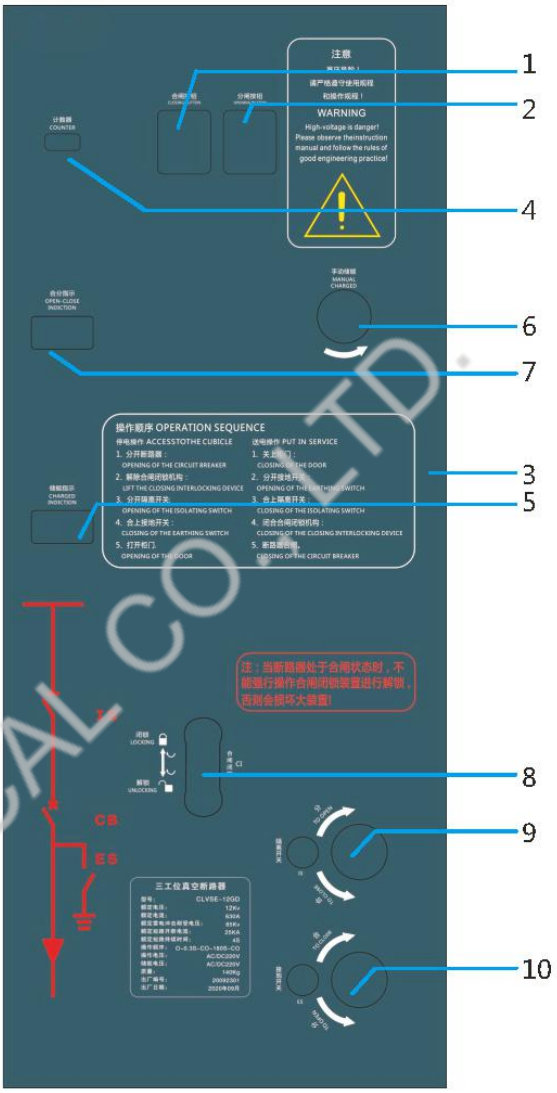
Standard configurations: Connect according to the standard wiring schematic diagram, with anti-trip device, without block device, overcurrent device or undervoltage device.

Configuration	Parameter	Remarks
Charging motor	120W	Standard
Closing coil	AC/DC24～220V	Standard
Opening coil	AC/DC24～220V	Standard
Auxiliary switch of disconnect switch	1NO 1NC 5A	Standard
Auxiliary switch of earth switch	1NO 1NC 5A	Standard
Auxiliary switch of charging motor	2NO 1NC 5A	Standard
Auxiliary switch of circuit breaker	8NO 8NC 5A	Standard
Anti-trip device	AC/DC24～220V	Standard
Charged sensor (induction type)	Non-contact type	Standard
Block device	AC/DC24～220V	Optional
Overcurrent release	3.5A, 5A	Optional
Undervoltage device	AC/DC24～220V	Optional

◆ Precautions of Product Use

Refer to the switch operation indicator on the right, and the instructions are as follows:

- Double interlocking: forced mechanical interlocking operation for circuit breaker, disconnect switch and earth switch;
  The circuit breaker, disconnect switch, and earth switch are designed with anti-misoperation blocking devices.
- The disconnect switch and the earth switch are operated step by step on an independent shaft, and a forced mechanical interlock operation is set between the two operating shafts.
- After the switch is opened and closed, please confirm the respective opening and closing status from the inspection window.



1. Closing button
2. Opening button
3. Operating sequence instructions
3. Counter
5. Charging indication
6. Manual charging
7. Circuit breaker ON/OFF indication
8. Closing block
9. Disconnect switch operating shaft
10. Earth switch operating shaft

Interlocking of circuit breaker, disconnect switch, earth switch, and cabinet door

- The disconnect switch and the earth switch are mutually forced mechanical interlocked, and they can only be two in one, and they cannot be closed at the same time;
  Only after the earth switch is opened, the disconnect switch can be closed; after the disconnect switch is closed, the earth switch cannot be closed.
- The circuit breaker can be closed when the closing block is in the blocked position, and the disconnect switch and earth switch cannot be operated.
- When the closing block is in the unlocked position, the circuit breaker cannot be closed, and the disconnect switch and earth switch can be operated.
- After the circuit breaker is closed, the closing block cannot be unlocked, and the disconnect switch and earth switch cannot be operated.
- The cabinet door can be opened only after the earth switch is closed.
- After closing the cabinet door, the earth switch can be opened.

Operation of closing block

1. Blocking

   Rotate the outer ring of the blocking operating shaft 90° (releasing positioning), push it to the limit position

in the blocking direction, and then rotate the outer ring of the operating shaft 90° (positioning).

2. Unlock

Rotate the outer ring of the blocking operating shaft 90° (releasing positioning), push it to the limit position in the unlocking direction, and then rotate the outer ring of the operating shaft 90° (positioning).

Operation of circuit breaker

● Manual operation

1. Open the charging cover and use the special charging rod to charge.
2. Closing: Press the closing button. (If it is equipped with a closing block or undervoltage device, it can be closed only after the secondary circuit is energized)
3. Opening: Press the opening button.

● Electric operation

1. After the secondary circuit is energized, the charging mechanism automatically charge.
2. Closing: Press the closing button in the control circuit.
3. Opening: Press the opening button in the control circuit.

Operation of disconnect switch

● Clockwise direction opens the disconnect switch.

● The counterclockwise direction is to close the disconnect switch.

Operation of earth switch

● Turn clockwise to close the earth switch.

● Counterclockwise to open the earth switch.

Operation of cabinet door block

● When the cabinet door is closed, the block between the cabinet door and the earth switch is automatically unlocked.

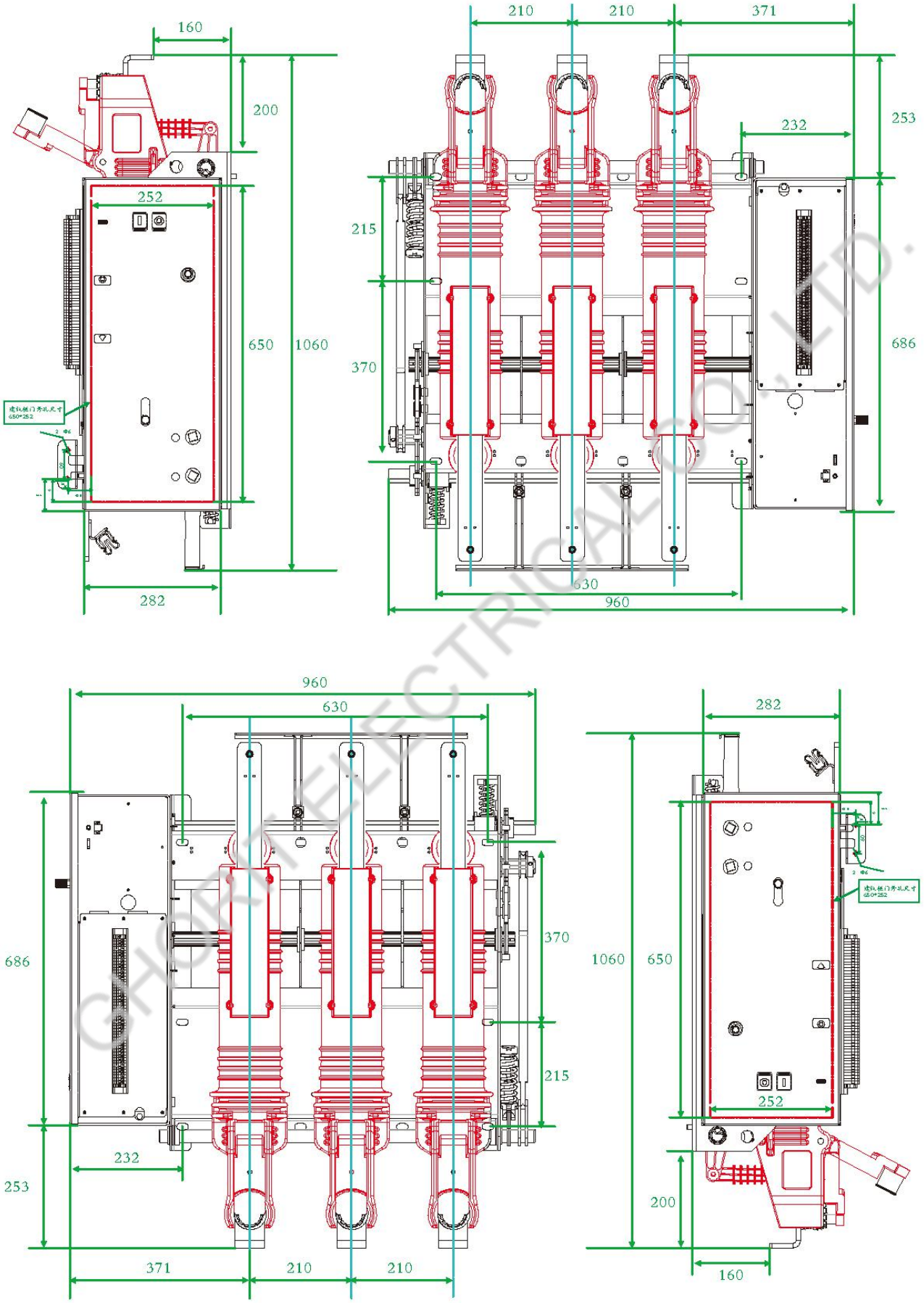
● After the earth switch is closed and the cabinet door is opened, the earth switch is automatically blocked and cannot be operated.

◆ Main technical parameters

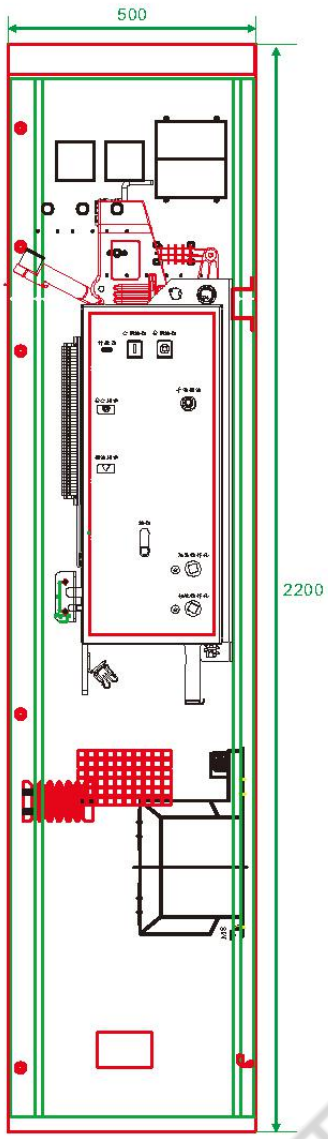
NO.	Items	Unit	Parameters		
1	Rated voltage	kV	12		
2	(1min) rated short time power frequency withstand voltage: phase-to-phase, across open contacts		42/48		
3	Rated lightning impulse withstand voltage (peak): phase-to-phase, across open contacts		75/85		
4	Primary circuit power frequency withstand voltage (1min)	V	2000		
5	Rated frequency	Hz	50		
6	Rated current	A	630, 1250		
7	Rated short circuit breaking current	kA	20	25	31.5
8	Rated peak withstand current	kA	50	63	80

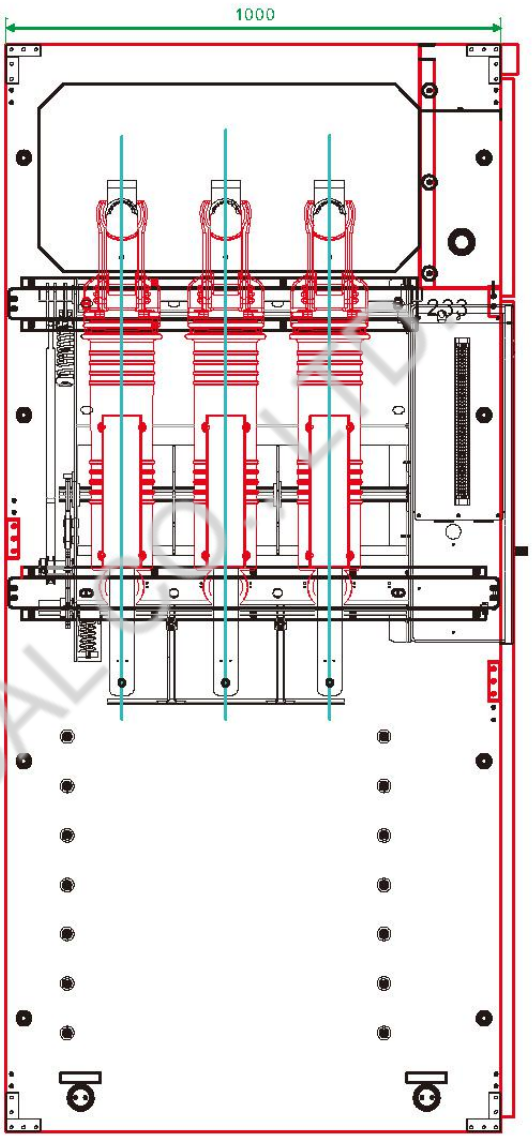
9	Rated short circuit making current	kA	50	63	80
10	4S rated short time withstand current	KA	20	25	31.5
11	Rated short time withstand current duration	S	4		
12	Rated single/back-to-back capacitor bank breaking current	A	630/400		
13	Rated capacitor bank making inrush current	kA	12.5(frequency ≤1000Hz)		
14	Rated short circuit current breaking number	times	30		
15	Mechanical life (disconnect switch/circuit breaker/earth switch)		3000/10000/3000		
16	Allowable cumulative wear thickness of moving and fixed contact	mm	3		
17	Rated closing operating voltage	V	AC24/48/110/220, DC24/48/110/220		
18	Rated opening operating voltage				
19	Rated voltage of motor				
20	Rated power of motor	W	70		
21	Charging time	S	<15		
22	Clearance between open contacts	mm	9±1		
23	Overtravel		3.5±1		
24	Contacts closing bounce time	ms	<2		
25	Three phase opening and closing asynchronism		<2		
26	Opening time (rated voltage)		<40		
27	Closing time (rated voltage)		<60		
28	Average opening speed (contacts just opened~6mm)	m/s	0.9-13		
29	Average closing speed (6mm~contacts just closed)		0.5-11		
30	Contacts opening rebound amplitude	mm	<2		
31	Contacts closing contact pressure	N	2400±200(20-25kA) 3100±200(31.5kA)		
32	Rated operating sequence		O-03S-CO-180S-CO		

◆ Overall dimensions

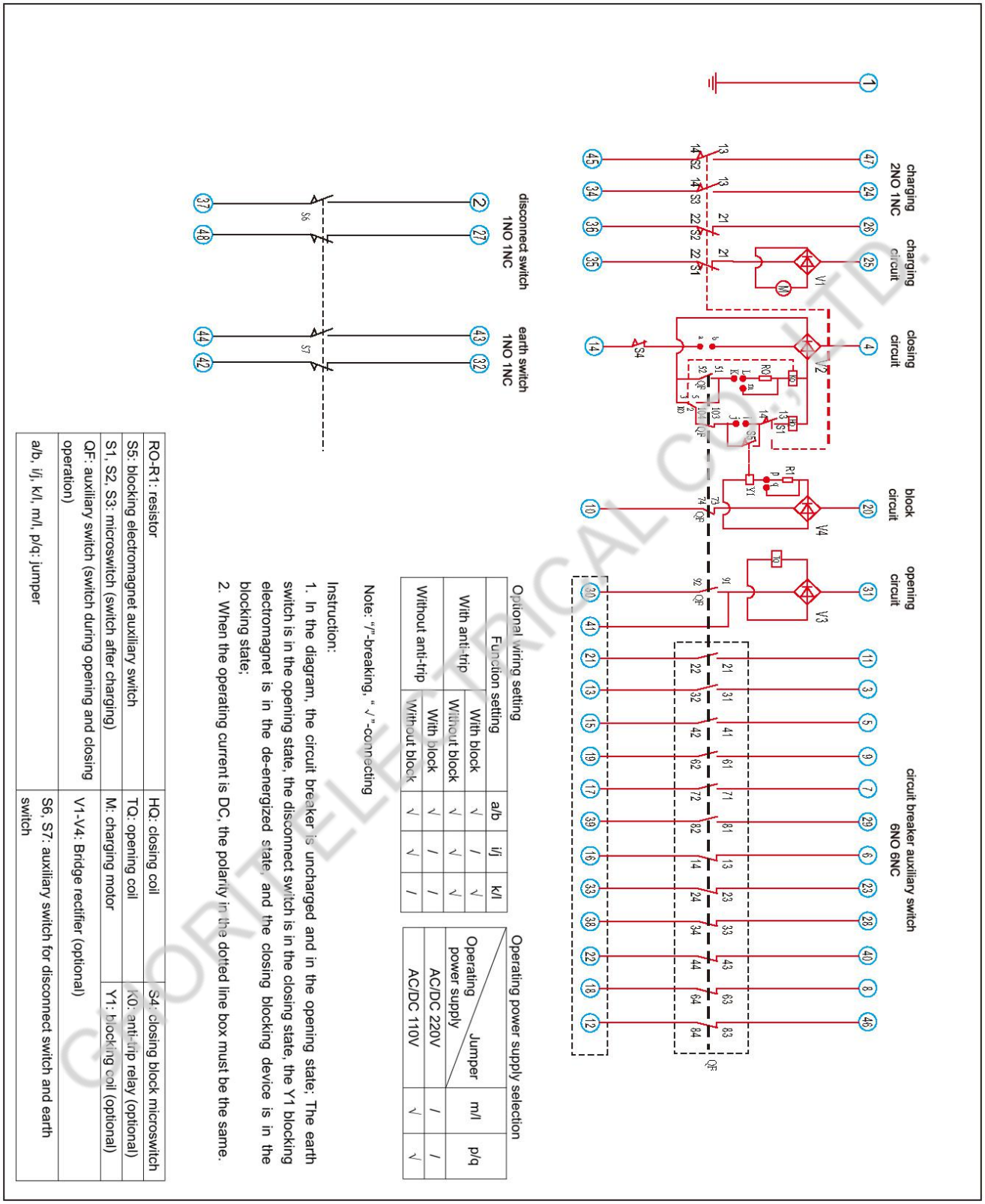


Upside down left installation circuit breaker lower incoming cabinet reference dimensions (cabient depth:1000)





◆ Standard schematic diagram (for reference only)



Optional wiring setting

Function setting			a/b	i/j	k/l
With anti-trip	With block		√	/	√
	Without block		√	√	√
Without anti-trip	With block		√	/	/
	Without block		√	√	/

Operating power supply selection

Operating power supply \ Jumper	m/l	p/q
AC/DC 220V	/	/
AC/DC 110V	√	√

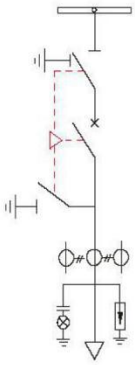
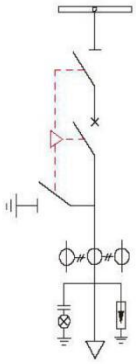
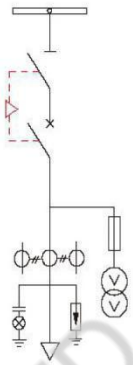
Note: "/"-breaking, "√"-connecting

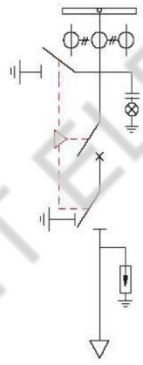
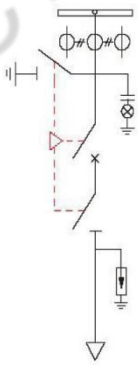
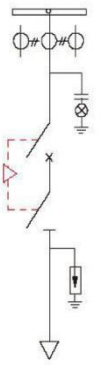
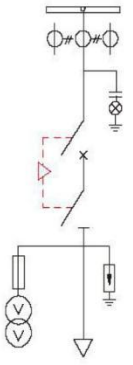
Instruction:

1. In the diagram, the circuit breaker is uncharged and in the opening state; The earth switch is in the opening state, the disconnect switch is in the closing state, the Y1 blocking electromagnet is in the de-energized state, and the closing blocking device is in the blocking state;
2. When the operating current is DC, the polarity in the dotted line box must be the same.

RO-R1: resistor	HQ: closing coil
S5: blocking electromagnet auxiliary switch	S4: closing block microswitch
S1, S2, S3: microswitch (switch after charging)	TQ: opening coil
QF: auxiliary switch (switch during opening and closing operation)	KO: anti-trip relay (optional)
	M: charging motor
	Y1: blocking coil (optional)
a/b, i/j, k/l, m/l, p/q: jumper	V1-V4: Bridge rectifier (optional)
	S6, S7: auxiliary switch for disconnect switch and earth switch

◆ Primary scheme example

Primary main wiring				
Scheme NO.	01	02	03	04
Rated voltage (kV)	12	12	12	12
Rated current (kV)	630-1250	630-1250	630-1250	630-1250
Circuit breaker (circuit breaker, disconnect switch, earth switch, interlocking mechanism integrated)	VEF-12GD/630-25 VEF-12GD/1250-31.5	VEF-12GD/630-25 VEF-12GD/1250-31.5	VEF-12GD/630-25 VEF-12GD/1250-31.5	VEF-12GD/630-25 VEF-12GD/1250-31.5
Fuse				3
PT				2
CT	3	3	3	3
Arrester	3	3	3	3
Charged display	3	3	3	3
W×D×H (mm)	500×1000×(1700-2200)	500×1000×(1700-2200)	500×1000×(1700-2200)	500×1000×(1700-2200)

Primary main wiring				
Scheme NO.	05	06	07	08
Rated voltage (kV)	12	12	12	12
Rated current (kV)	630-1250	630-1250	630-1250	630-1250
Circuit breaker (circuit breaker, disconnect switch, earth switch, interlocking mechanism integrated)	VEF-12GD/630-25 VEF-12GD/1250-31.5	VEF-12GD/630-25 VEF-12GD/1250-31.5	VEF-12GD/630-25 VEF-12GD/1250-31.5	VEF-12GD/630-25 VEF-12GD/1250-31.5
Fuse				3
PT				2
CT	3	3	3	3
Arrester	3	3	3	3
Charged display	3	3	3	3
W×D×H (mm)	500×1000×(1700-2200)	500×1000×(1700-2200)	500×1000×(1700-2200)	500×1000×(1700-2200)

◆ Installation, adjustment and operation

1. Before installation, check whether the product is intact and whether the fasteners are loose.
2. Remove the dirt, especially the dirt on the surface of the insulating parts. These dirt phenomena may be caused by passing through the packaging material during transportation or during storage. Check the connection status of the primary and secondary circuit wiring and the grounding body.
3. Connect the auxiliary power supply for electric charging, or use the charging handle for manual charging. When the charging indicator shows charged, it means that the motor has finished charging.
4. Use the buttons to perform opening and closing operations, and observe the action of the opening and closing position indicator of the circuit breaker.
5. In each operation, the counter on the circuit breaker automatically records. The closing and opening positions of the circuit breaker indicated by the opening and closing indicator of the circuit breaker can be observed on the panel of the circuit breaker.

◆ Maintenance

General requirements

Maintenance is used to maintain the trouble-free operation of the circuit breaker and obtain the longest service life.

Because the vacuum circuit breaker has the characteristics of simple structure and durability, it has a long service life. During the entire service period, the operating mechanism of the circuit breaker is maintenance-free, and the vacuum interrupter does not need to be overhauled. Even frequent opening operations and breaking short circuit current will not affect the vacuum degree.

Maintenance work is related to the wear and aging of the parts. In order to make the circuit breaker work reliably, the interval of maintenance work and the scope of overhaul will depend on the influence of the working environment, the number of operations, the operating time, and the breaking number of short circuit current, etc. Under normal conditions of use, due to careful inspection and maintenance, the service life of the secondary auxiliary components meets more than 10,000 operations.

Note:

Maintenance work can only be performed by trained personnel who are familiar with the characteristics of this switch.

During maintenance work, all auxiliary power supplies must be disconnected and there is no danger of retransmission.

◆ Inspection and maintenance

Circuit breaker body part

Under normal circumstances, the pole part of the circuit breaker does not need to be repaired, and the vacuum degree should be checked only when it is fully suspected that the circuit breaker may have been subjected to external forces and damaged the interior of the vacuum interrupter. The service life of the vacuum interrupter depends on the total current limit value. The vacuum interrupter can only be replaced when the total current limit

value is reached.

Operating mechanism

Under normal conditions of use, inspections within the operating times of the service life are unnecessary. In the following cases, the operating mechanism should be inspected and property tested:

- After a certain number of operations.
- Under special operating conditions, including severe weather conditions and severe pollution and corrosive gas environments.

  Open the circuit breaker before the property test:

  property test range:
- Switch on the auxiliary power supply.
- Perform several opening and closing operations under no-load conditions to check the correctness of the action.

General requirements for vacuum circuit breakers

After the circuit breaker has been in operation for about 5 years or when the operating mechanism is being repaired, the vacuum circuit breaker body should also be inspected, especially the appearance:

After the appearance inspection, the dirty and damp parts of the appearance surface should be cleaned. Wipe the surface of the insulator with a dry cloth, and then wipe off other dirt with a thick cloth moistened with detergent.

For switches operating under some special use occasions or particularly harmful environmental conditions (such as in an environment with high pollution and heavy corrosive gas), the minimum time interval for the above inspection work should be less than 5 years.

◆ Packaging, transportation and storage

Ex-factory condition

The vacuum circuit breaker must undergo a complete performance test before leaving the factory, and perform 300times mechanical operation condition to ensure the reliability of each product shipped from the factory.

Packaging

When the vacuum circuit breaker is packaged, it should be in the opening state. It should be sealed with a plastic bag with an appropriate amount of desiccant inside, then fixed on the wooden bottom plate and finally installed with plywood.

Transportation

Only cranes, forklifts, cranes and other tools can be used when loading and unloading the packing box. When lifting is required during transportation, it should be carried out strictly according to the position marked on the outside of the packing box.

Open box to check

After receiving the product, the user should check it immediately. Check the packaging and transportation of the circuit breaker for damage, check whether the accessories are consistent with the packing list, and check whether the product model specifications are the same as the order.

Storage

The product should be stored in a ventilated, dry, non-violent vibration, and non-corrosive gas room.

◆ Attached documents and accessories

- manual
- qualified certificate
- factory test report
- packing list
- electric schematic diagram
- charging handle
- operating handle