HONGFA GROUP

宏发股份
HONGFA GROUP

Indoor Medium Voltage Vacuum Circuit Breaker

HFEV series

INTRODUCTION

Hongfa, (Shanghai Stock Exchange: 600885), founded in 1984, has been adhering to the enterprise spirit of “persevere for progress, strive for excellence”, and has built a complete industry system with complete categories and supporting facilities. At present, Hongfa has more than 30 subsidiaries and has established three districts of R & D and production bases. Its products cover various categories, such as medium and low voltage products, relays, high and low voltage switchgear, capacitors, precision parts and automation equipment.

Xiamen Hongfa Electric Co., Ltd. is a subsidiary of Hongfa, specializing in the manufacturing of medium and low voltage power distribution switchgear, medium voltage vacuum circuit breakers, intelligent switchgear, charging piles, and other products for industries such as industrial, power generation & grid, infrastructure, and construction.

In the United States, Europe, Southeast Asia and other regions, Hongfa has established localized marketing and service networks with global market operation and technical service. Relying on professional and rigorous technical support, fast response and all-round service, safe and reliable product quality and high cost performance, Hongfa has reached business cooperation relationship with many global top 500 enterprises and other well-known enterprises, such as Enel, GE, Honeywell, Carrier, Trane, Johnson Controls, Danfoss, State Grid, China Southern Power Grid, CRRC, China Mobile, China Unicom, etc.

Donglin Industrial Park

Haicang Industrial Park

Zhongjiang Industrial Park

Zhangzhou Industrial Park

Zhoushan Industrial Park

Xi'an Factory

In terms of technology R & D and manufacturing, taking the national enterprise technology center as the platform, Hongfa has set up postdoctoral research workstation, academician and expert workstation. Now it has developed into a leading scientific research and production base in the industry. From product development, mold manufacturing, parts manufacturing, automated product assembly and online testing, Hongfa has successfully built an integrated whole industry chain of medium and low voltage products. In terms of product testing, Hongfa testing center has passed the certification of VDE, UL, CNAS and other international organizations, and has complete testing and analysis equipment for low-voltage products, such as 50kA ultimate short circuit test, 8kA electrical life test, 80kA characteristic test, mechanical simulation and testing system, electro-magnetic simulation and testing system.

Hongfa always adheres to the policy of "focused on the market, winning through quality", and has a completed quality assurance system. Its products have passed UL / CUL, VDE, CQC, CCC and other international safety certification. In the process of quality management, Hongfa actively implements the advanced quality concept, constantly improves the quality management system, continuously promotes the product process quality control and testing, strengthens the supply chain management, and is committed to providing each customer with high-quality products and creating greater value.

Advanced technology and strict quality control have created Hongfa's brand strength. Hongfa is willing to work hand in hand with global customers to share the convenience and well-being brought by science and technology.

CONTENT

Content List

HFEV Indoor AC Vacuum Circuit Breaker

Product Overview

General

- Core components: Independently developed vacuum interrupter
- Complete specifications of the third generation of indoor medium-voltage embedded pole vacuum circuit breaker
  (Rated current: 630A.... .5000A; rated breaking 20kA, 25kA.... .50kA)
- Passed the whole set of product type test;
- Modular spring-operated mechanism is highly reliable and easy to maintain;
- Rated current: up to 5000A
- Rated short-circuit breaking current up to 50kA
- Rated short-circuit current breaking times: 50 times
- Rated mechanical life up to 50,000 fully meet the requirements of GB, IEC standards.
- Environmentally friendly design: the plating adopts environmentally friendly plating process without trivalent chromium, and the epoxy resin does not contain harmful and carcinogenic substances such as epichlorohydrin.

Standards and Norms

HFEV type AC vacuum circuit breaker complies with:
GB/T 1984-2014 'High-Voltage AC Circuit Breaker',
IEC 62271-100:2021'High-voltage switchgear and controlgear-Part 100:Alternating-current circuit-breakers'
DL/T403-2017'High-voltage alternating-current vacuum circuit-breaker'
GB/T 11022-2020'Common specifications for high-voltage alternating-currentswitchgear and controlgear'

Scope of application

HFEV type AC vacuum circuit breaker is suitable for air-insulated switchgear, which is widely used in electric power system, petrochemical industry, industrial and mining enterprises, data centres, port terminals, large and medium-sized buildings and other fields.

Normal application Environment

ambient temperature	Highest	Ambient temperature Maximum value +55℃, and the average value measured within 24 hours does not exceed +35℃; minimum value -45℃
	minimum	-45℃
ambient humidity	mbient humidity The average value of relative humidity measured within 24 hours does not exceed 95%, and the monthly average does not exceed 90%; Water vapour pressure The average of water vapour pressure values measured over a 24-hour period not exceeding 2.2kPa. The average value of water vapour pressure value measured in 24 hours does not exceed 2.2kPa, and the average value of water vapour pressure value in month does not exceed 1.8kPa;	
altitude	≤2000m;	
Polluted conditions	The surrounding air is not obviously polluted by dust, smoke, corrosive and/or combustible gases, vapour or salt spray. The surrounding air is not obviously polluted by dust, smoke, corrosive and/or flammable gases, vapours or salt spray. If the user does not have special requirements, the manufacturer can assume that these conditions do not exist.	

Special application Environment

The use of the circuit breaker under special conditions is to be negotiated and agreed upon between the user and the manufacturer. Normally, the following special conditions of use will be considered by the manufacturer:

Installation location exceeds 2000m above sea level

- The external insulation strength will be reduced

- Alternatively, the manufacturer may provide a plateau type product.

Ambient air temperature

- High temperature circuit breakers need to reduce the rated current or install fans to force heat dissipation.

- Low-temperature conditions should be specially noted when ordering.

Indoor switchgear is not normally used in climatic conditions with high humidity or temperature fluctuations, otherwise precautions must be taken to avoid corrosion or other damage.

- Preventive measures must be taken to avoid corrosion or other hazards.

- Installation of preventive devices (e.g. electric heaters) to eliminate condensation.

Product appearance

Product characteristics

Hongfa vacuum interrupter

Hongfa vacuum interrupter technology and product characteristics The core component of HFEV vacuum circuit breaker vacuum interrupter is independently developed by Hongfa. The vacuum interrupter has the following characteristics:

A. Low resistance

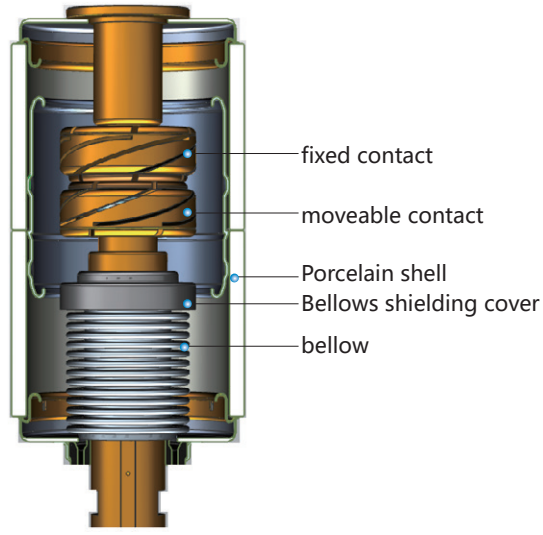
Taking TD-12/1250-31.5 model as an example, adopting CuCr contact material, combined with good manufacturing process, the circuit resistance value is 7.5-9uΩ;

B. High breaking capacity (full short circuit)

Take TD-40.5/2500-31.5 model as an example, the product can be matched with the customer's organisation to pass 50 shots of full short circuit making and breaking tests in the test lab,and the contact surface evaporation is good after the productis dissected.the maximum number of full short circuit making and breaking test of 12kVseries products is up to 89 times.

C. High voltage withstand ability

Take 12kV series vacuum interrupter as an example, the voltage withstand level can reach the level of 24kV series vacuum interrupter, the fracture withstand voltage can reach 79kV, the lightning impact voltage level＞125kV.



Epoxy embedded pole technical characteristics

The embedded pole adopted by HFEV type vacuum circuit breaker can withstand mechanical, electrical and thermal effects through advanced APG process, and adopting high-performance epoxy resin as the insulating medium, which seals the vacuum interrupter chamber and the upper and lower outgoing terminals and other primary conductive parts into a single unit.

A. High reliability

compared with the traditional assembly pole , the number of parts, conductor overlap surface and fasteners for connection of the fixed sealing pole is greatly reduced, thus simplifying the assembly of the main circuit, reducing the circuit resistance and improving the reliability of the main electrical circuit connection.

B. Stable insulation performance

the vacuum interrupter is embedded in epoxy resin , the column of the external environment on the vacuum interrupter is reduced to a minimum, the external insulation capacity can be free from dust, moisture, small animals, condensation and filth, to fully meet the requirements of the IEC/GB standard.

Embedded pole technical characteristics

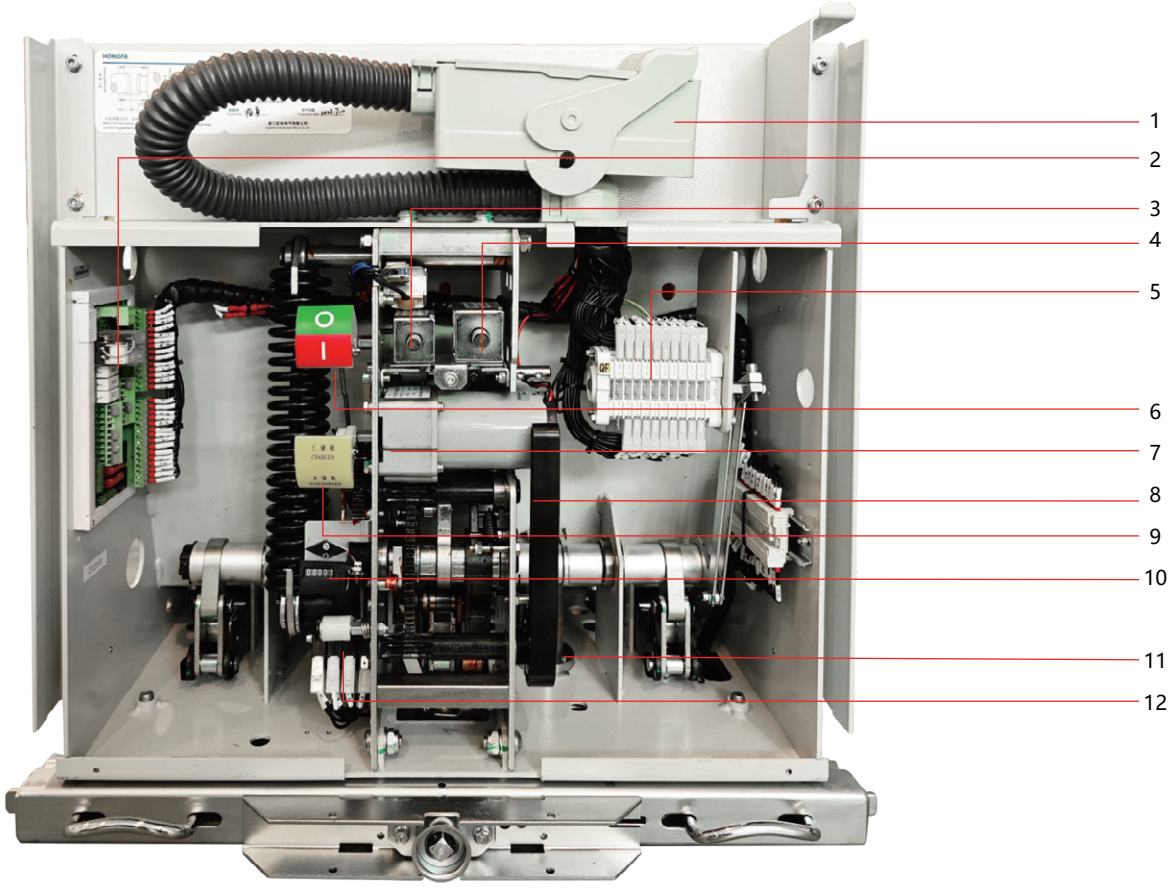
C. Stronger structure

It can provide more adequate protection for the vacuum interrupter and make it free from accidental mechanical impact during assembly or transport.

D. Maintenance-free

As the whole pole column is cast as a whole, the vacuum interrupter chamber is fully protected, and the maintenance-free vacuum interrupter chamber provides conditions for the maintenance-free circuit breaker.

Product internal structure



1. plug
2. control unit
3. closing coil
4. opening coil
5. auxiliary switch
6. closing and opening status indication
7. spring charging motor
8. spring charging lever
9. spring charging status indicator
10. counter
11. damper
12. charging status auxiliary contacts

Operation mechanism

HFEV vacuum circuit breaker adopts high-reliability spring operating mechanism, which has the features of stability and reliability, short energy storage time and long service life of the mechanism.

- The integrated modular spring operating mechanism has a compact structure, which saves more space of the operating mechanism and is conducive to function expansion;
- energy storage spring integrated design, which is conducive to production assembly and customer site maintenance, to avoid disassembling the module at the same time need to disassemble the energy storage spring;
- three-phase independent compression type splitter spring, overcoming the domestic mainstream tension type splitter spring hook part easy to break the defects;
- gear drive energy storage, compared with the traditional chain drive, the transmission ratio is stable, less noise, there is no risk of chain breakage and failure;

Transmission mechanism

The specially designed four-link drive mechanism provides stable motion characteristics for the main contacts, meets the requirements of the mechanical characteristics of closing and splitting, and achieves reliable closing and splitting of the rated current, as well as reliable opening and breaking of the rated short-circuit breaking current.

- Highly rigid four-link mechanism;
- High-strength chrome steel main drive shaft with special heat treatment;
- open cam and bearing high sub-drive, reducing the tripping interference and ensuring the reliability of tripping opening and breaking;
- unique slamming limit buffer, special customised structure, stable oil performance, long service life thus ensuring a smooth and reliable slamming process.

Product selection

Model Description

HFE V- □/□□-□/□□□-□□□□□□□□□-□

Manufacturer code:
Xiamen Hongfa Electric Co., Ltd.

Product Code:
V: Vacuum Circuit Breaker

Rated Voltage
3.6：3.6kV　7.2:7.2kV　12:12kV

Operating mechanism
T: spring-operated mechanism

Rated current
630：630A　1250:1250A　1600:1600A
2000:2000A　2500:2500A　3150:3150A　4000:4000A
5000:5000A

Rated short-circuit breaking current
20: 20kA　25：25kA　31.5:31.5kA　40:40kA　50:50kA

Rated operating voltage
1:220VAC　2:220VDC　3:110VAC　4:110VDC

Installation method
W:handcart type　F:fixed type

Phase spacing
1:150mm；　2:210mm；　3:275mm；

Auxiliary contact
1: 5 open and 5 closed　2:7 open and 7 closed

Grounding method
Blank: no grounding; B: bottom copper row grounding;
S: both sides grounding clamp grounding;

Latching
Blank: no closing latch, no handcart latch;　Y0: handcart latch;
Y01: closing latch, handcart latch; Y1: closing latch;

Electrical anti-tripping
Blank: no electrical anti-tripping;　K0: electrical anti-tripping;

Electric hand truck
Blank: no electric hand truck; M: electric hand truck;

Special disconnectors
Blank: no special release; Y7: overcurrent release; Y4: undervoltage release;

Optional code
Specified according to the customer's needs: can be any letter, number or combination of letters and numbers.

Example of full model number:

HFEV-12/T1250-31.5/1F2-1 Indicates 12kV HFEV indoor AC vacuum circuit breaker, spring-operated mechanism, rated current 1250A, rated short-circuit breaking current 31.5kA, rated operating voltage 220VAC, fixed mounting, phase spacing 210mm, auxiliary switching reserved contacts are five normally open and five normally closed;

HFEV-12/T1250-31.5/1W2-1SY1K0-X indicates 12kV HFEV indoor AC vacuum circuit breaker, spring-operated mechanism, rated current 1250A, rated short-circuit breaking current 31.5kA, rated operating voltage 220VAC, trolley-mounted, phase distance 210mm, auxiliary switching contacts reserved for five normally open and five normally closed, with grounding clips grounded, with closing The auxiliary switch has five normally open and five normally closed contacts, grounding clamps on both sides, with closing latch Y1, with electrical anti-tripping K0, and customer-specific agreement code X;

Product series

Model	Rated voltage kV	Rated current A	Rated short-circuit breaking current kA	Phase Spacing mm	Weight kg	
					Handcart type	Fixed type
HFEV-12/T630-20	12	630	20	150	102	75
				210	112	83
HFEV-12/T630-25	12	630	25	150	102	75
				210	112	83
HFEV-12/T1250-25		1250		150	104	77
				210	115	85
HFEV-12/T630-31.5	12	630	31.5	150	104	77
				210	115	85
HFEV-12/T1250-31.5		1250		150	104	77
				210	115	85
HFEV-12/T1600-31.5		1600		210	135	100
				275	165	130
HFEV-12/T2000-31.5		2000		275	180	150
HFEV-12/T2500-31.5		2500		275	230	160
HFEV-12/T3150-31.5		3150		275	244	180
HFEV-12/T1250-40	12	1250	40	210	131	100
				275	155	124
HFEV-12/T1600-40		1600		210	135	100
				275	155	124
HFEV-12/T2000-40		2000		275	180	124
HFEV-12/T2500-40		2500		275	230	160
HFEV-12/T3150-40		3150		275	244	180
HFEV-12/T4000-40		4000		275	244	180
HFEV-12/T5000-50	12	5000	50	275	244	180

Technical Parameter

Technical parameters of HFEV vacuum circuit breakers

Parameter name		Unit	Parameter values				
UrRated voltage U_r		kV	12				
Rated insulation level	Lightning impulse withstand voltage U_p (peak)	kV	Phase to phase/Gronnd			Across the isolation gap	
			75			85	
	Rated short-time frequency withstand voltage U_d (rms)	kV	Phase to phase/Gronnd			Across the isolation gap	
			42			48	
Rated frequency f_r		Hz	50				
Rated current		A	630 1250	630 1250	630 1250 1600 2000 2500 3150	1250 1600 2000 2500 3150 4000*	4000* 5000*
Rated short-circuit breaking current		kA	20	25	31.5	40	50
Rated short-time withstand current		kA	20	25	31.5	40	50
Rated peak withstand current		kA	52	65	82	104	130
Rated short-circuit closing current (peak)		kA	52	65	82	104	130
Rated short-circuit current duration		s	4				
Rated short-circuit current opening times		次	50	50	50	50	30
Mechanical life		次	50,000 / M2 class			30000/ M2 class	10000
Rated cable charging opening and closing current		A	25				
Rated back-to-back capacitor bank/ individual opening current		A	630				
Rated operating sequence			O-0.3s-CO-180s-CO				

note: The above technical parameters may be adjusted due to the application of new standards, new technologies, new materials, etc.; if there is a requirement for specified parameters, the manufacturer should be consulted.*If the rated current is 4000A and above, the switchgear cabinet should be equipped with forced air-cooling.

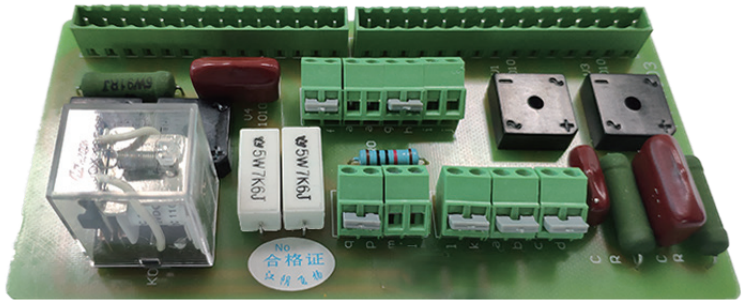
Mechanical characteristic parameters of HFEV vacuum circuit breaker

Parameter name	Unit	31.5kA 及以下	40kA、50kA
Contact opening distance	mm	9±1	
Contact overtravel	mm	4±1	
Closing time (at rated operating voltage)	ms	30-80	
Opening time (under rated operating voltage)	ms	20-60	
Closing bounce	ms	≤2	≤3
Closing non-simultaneous	ms	≤1	≤2
Closing time (at rated operating voltage)	ms	≤1	≤2
Splitting bounce	mm	≤2	
Allowable contact wear thickness	mm	≤3	
Closing speed (average speed of 6mm just before closing)	m/s	0.5~1.1	
Splitting speed (average speed of 6mm just after splitting)	m/s	1.0~1.8	

Secondary unit

Control unit - CU

Standard configuration: Control unit - CU 1 pc.



Control unit

- The control unit is used to process the input power and signals and pass them on to the various actuating electrical components, and at the same time outputs the circuit breaker status signals, etc. via the aviation plug-in kit.

Note: (1) The standard configuration is to enable the electrical anti-trip relay-K0, and the optional function of cancelling the electrical anti-trip relay-K0 is available;

(2) AC and DC power supply can be universal, when the control unit power supply type is selected, the power supply type of other executive electrical components without special requirements that is the default and the control unit.

Characteristics

Rated voltage Un	220 V DC/AC	110 V DC/AC
Withstandingvoltage level	2500V 50Hz (1min)	

Electrical anti-trip relay - K0

Contact load (resistive)	10A 250VAC/10A 30VDC
Rated coil power	0.9~1.1W
Contact resistance	≤100mΩ (23℃)
Withstanding Voltage Level	2500V 50Hz (1min)

Tripper

Standard configuration: closing coil (-HQ) 1 pc.
opening coil (-TQ) 1pc

Tripper

- The opening coil is used for the closing control of the circuit breaker, and can realise the remote closing control of the circuit breaker, and realise the common use of AC and DC power supply through the control unit-CU;
- The opening coil is used for the tripping control of the circuit breaker, which can realise the remote tripping control of the circuit breaker, and is common to both AC and DC power supply through the control unit-CU;

Note: An optional second tap release, whose characteristics are consistent with those of the opening coil-TQ, can be powered by another set of power supply independent of the opening coil-TQ, and can also realise the function of remotely tripping circuit breakers.

Characteristics

	closing coil-HQ		opening coil-TQ	
Rated voltage Un	220V DC	110 V DC	220 V DC	110 V DC
Coil resistance (20°C)	31.5kA 200Ω	50Ω	31.5kA 200Ω	50Ω
Operating Voltage Range	85%~110%Un		65%~120%Un	
Withstanding Voltage	2500V 50Hz (1min)			

Secondary unit

Spring charging motor - M

Standard configuration: (-M) 1 pc

Energy storage motor

- Is used for automatic energy storage operation of the closing spring of the circuit breaker operating mechanism.
  The energy storage motor automatically re-stores energy in the closing spring as soon as the closing of the circuit breaker is completed.
- Universal AC and DC power supply via control unit-CU.
- In case of power failure or maintenance, the closing spring can be manually energised by means of the energising handle of the operating mechanism.

Characteristics

Rated voltage Un	220 V DC	110 V DC
Rated power Pn	90W	
Energy storage time t	≤15s	
Operating voltage range	85%~110%Un	
Withstanding voltage level	2500V 50Hz (1min)	

Counter

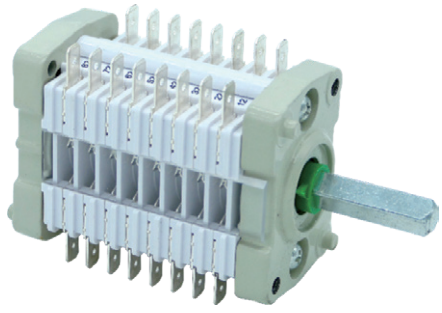
Standard configuration: 1 counter

Counter

- This counter is a mechanical counter, when the energy storage is completed, the counter counts 1 time.

Auxiliary switch

Standard configuration: 1 auxiliary switch



Auxiliary switch

- The auxiliary switch is directly driven by the drive spindle and is used to provide a signal for the closing and opening status of the circuit breaker. The standard configuration provides 5 groups (5 normally open and 5 normally closed) of contacts for customer use, if there are special quantity requirements, please consult the manufacturer.

Characteristics

Rated voltage Un	AC 220~380 V
Contact load current In	10A
Contact resistance (20℃)	4.4mΩ
Withstanding voltage level	2500V 50Hz (1min)

Secondary unit

spring charging

Standard configuration: 1 set of energy storage contacts

spring charging

- Energy storage contact provides the circuit breaker energy storage spring energy storage/non-energy storage state signal, one energy storage contact switch can provide 1 normally open and 1 normally closed signal (without energy storage), standard configuration One energy storage contact switch can provide 1 normally open and 1 normally closed signal (when energy is not stored), the standard configuration of one set of energy storage contact contains three energy storage contact switches.

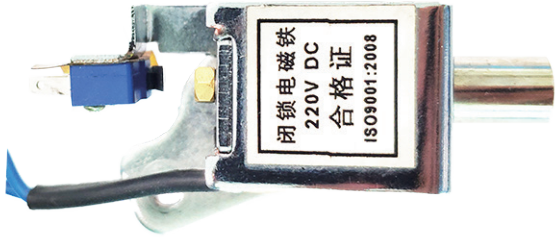
Characteristics

Rated voltage Un	220 V
Rated current In	DC=5A；AC=16A
Contact resistance (20°C)	4mΩ
Withstanding voltage level	2500V 50Hz (1min)

Aerial plug assembly

Standard configuration: 1 set of aviation plug assembly

Closing latch electromagnet



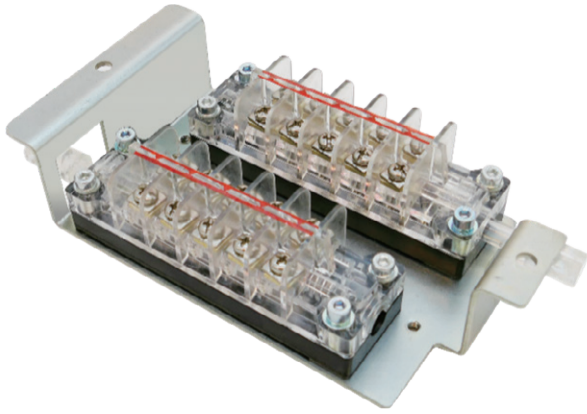
Closing latch electromagnet

- The circuit breaker is unable to perform closing operation (including manual closing) in case of power loss of the secondary control power supply.

Secondary unit

Trolley position signal switch

Standard configuration: 1 set of position signal switch



position signal switch

- Mounted on the trolley, used to provide trolley position signal, only applicable to the withdraw-able circuit breaker.

Characteristics

Rated voltage Un	220 V AC/DC
Rated current In	10A
Contact resistance (20℃)	≤50mΩ
Withstanding voltage level	2500V 50Hz (1min)

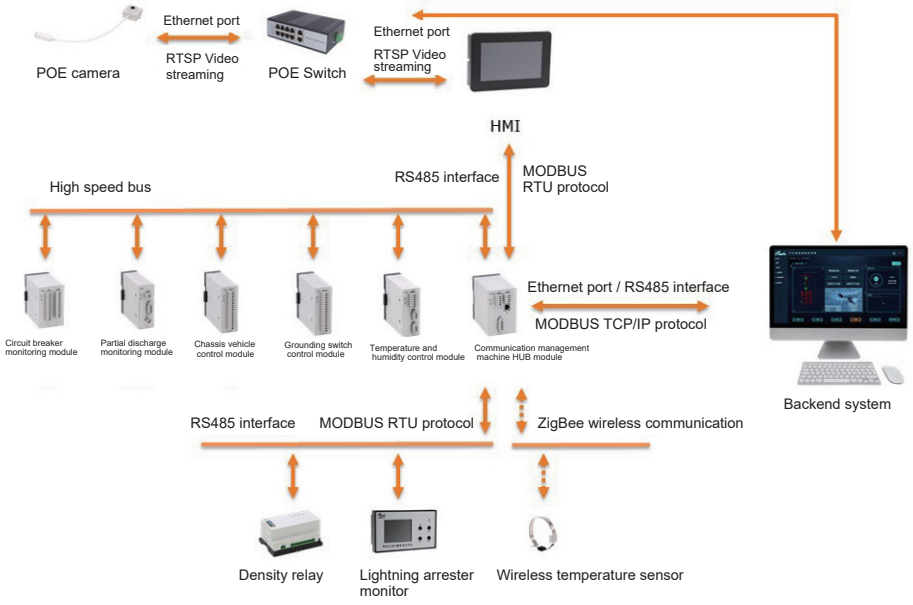
Grounding device

- Standard configuration: bottom copper bar grounding, bottom grounding using the trolley bottom copper bar friction contact grounding;
- Optional configuration: symmetrical grounding on both sides, using sliding grounding clamp device and switchgear trolley guide rail friction contact.
- Both grounding methods can make the withdraw-able circuit breaker reliably grounded at any position. For details, please refer to Chapter 4.3 in this manual.

Intelligent function (optional)

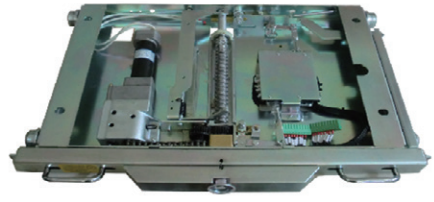
Product overview

The switchgear modular intelligent product system consists of a communication management host HUB that realises data interaction with the backend via MODBUS TCP/IP protocol. The product consists of communication manager HUB (with built-in wireless temperature measurement function) and function expansion module (chassis vehicle control module, ground switch control module, circuit breaker monitoring module, DI/DO module, local emission monitoring module, temperature and humidity control module), the function expansion module realises the data and command transmission with communication manager HUB through the fast bus, HUB can be connected to the HMI externally, and the data of the module will be centralized and displayed by the HMI, the POE camera can be connected to the HMI externally, and the data of the module will be centralized and displayed by the HMI. The HUB can be connected to HMI to display the module data centrally, and the POE camera can be cascaded through POE switch to display through HMI, or can be connected to the background display, and the HUB can also be connected to other external sensory layer devices (e.g., lightning arrester monitors, density relays, power meter lamps, etc.) through the RS485 interface.



Motorized trolley control Unit

Motorized trolley control Unit



motorized trolley

The Motorized trolley control Unit can realise the control and protection of the motorized trolley, with two operation modes: local and remote. The controller can brake the motor immediately when the electric operation is obstructed (such as installation not in place or mechanism jammed) to reach the protection conditions, and reverse drive the motor to lift the bogie truck jammed state, and at the same time, it can monitor the current of the trolley.

Online monitoring of mechanical characteristics

Angle sensor: Determine the angle to be measured by sensing the change of magnetic field direction. Generally, the rotating machine shaft provided by the customer is equipped with a magnetic block, and the rotation of the machine shaft causes a change in the direction of the magnetic field, which is reacted by the integrated circuit of the sensor and calculated to produce an analogue angle signal output. The following features are available Non-contact measurement technology, no mechanical wear and tear, magnetic field induction measurement.

- Magnetic block and sensor space isolation
- Operating range up to 360°
- Linearity ± 0.5 %
- Easy to install
- Allowance for ±1.5 mm left/right offset in magnet centre alignment.
- Protection class IP67 / IP69k
- Single or redundant outputs available
- Unlimited mechanical life
- Resolution 12 bits
- Cost-effective
- Compact size

Angular displacement sensor

Magnetic block

The circuit breaker monitoring module integrates both electrical and mechanical characteristics monitoring. It can regulate the closing and opening processes while providing timeout protection.The mechanical characteristics monitoring function captures real-time data from the current and angular displacement sensors of the opening and closing coils, as well as the spring charging motor. Through data processing and calculations, it determines parameters such as the motor current, opening and closing coil current, number of opening and closing operations, coil motor runtime, closing time, closing speed, and overall breaker speed. Further analysis provides additional data, including total travel, overtravel, breaking time, breaking speed, and opening distance.

Circuit breaker monitoring module

Intelligent function (optional)

Online monitoring of partial discharging

The partial discharge monitoring module uses the local discharge measurement technology for the early detection of insulation damage, using TEV sensors and ultrasonic sensors to display the amplitude and frequency of partial discharge at each monitoring point in real time.
Using the TEV sensor and ultrasonic sensor, it can real-time display the partial discharge amplitude, frequency, total discharge energy, determine the relative position of the discharge point, and give an alarm when necessary, so as to timely detect the insulation defects of the switchgear.
If necessary, it can give alarms, discover the insulation defects of the switchgear in time, and provide judgement for assessing the insulation level and aging degree, which can be used for later maintenance work.

ultrasonic sensor

Transient ground wave sensor

Partial discharge module

Online temperature monitoring

Using electromagnetic energy to provide working energy, maintenance-free, long life. The passive temperature sensor obtains electrical energy from the electromagnetic energy induced around the high-voltage line.
The passive temperature sensor obtains electrical energy through the electromagnetic induction around the high-voltage line. The collected temperature data is transmitted to the display terminal via a wireless link.

Online temperature measurement module

Wireless temperature sensor

Temperature sensor

Installation diagram of wireless temperature sensor touch arm

Installation diagram of wireless temperature sensor busbar

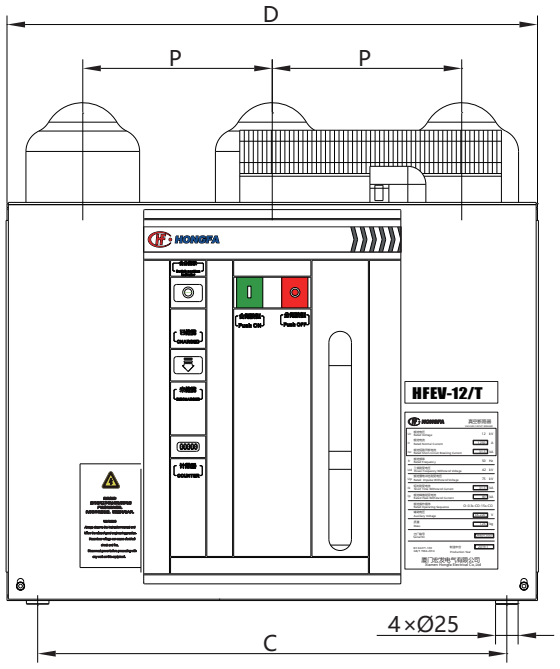
Video Online monitoring

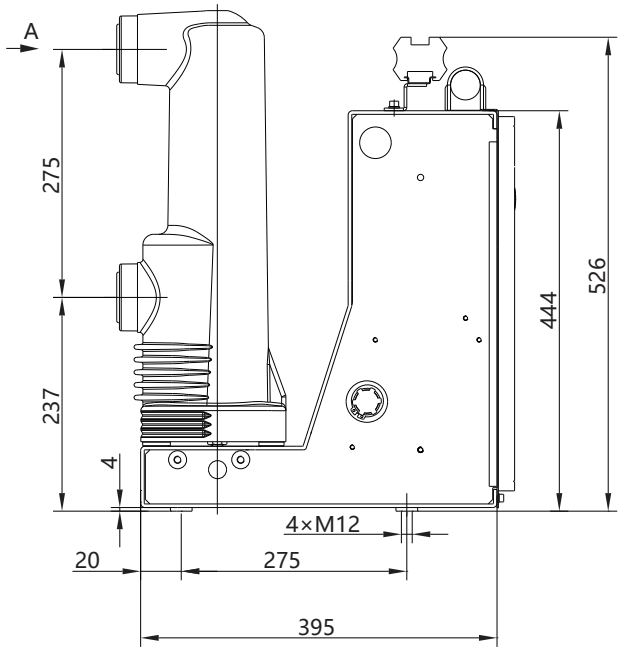
The circuit breaker room and cable room are equipped with cameras, which can monitor the status of the plum blossom contacts and earthing switch in real time, detect abnormalities in time, effectively ensure the personal safety of users, and also facilitate operation and maintenance.

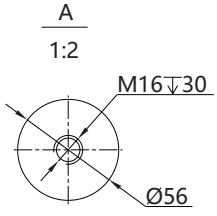
POE camera

Overall Dimensions

HFEV-12kV fixed type 630A-1600A



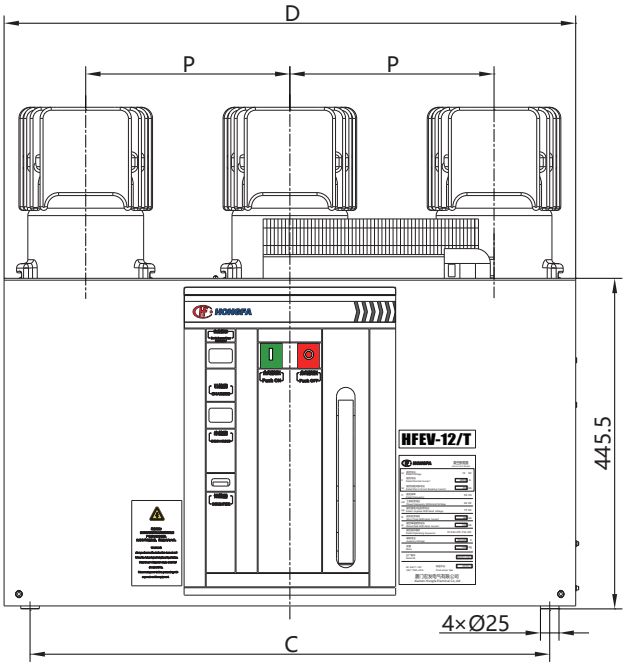


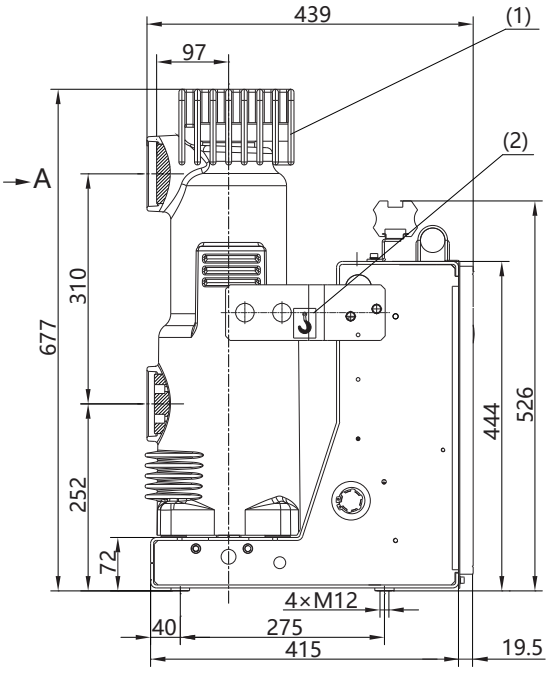


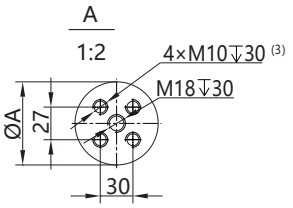
Unit: mm

Rated current Ir	Rated short-circuit breaking current Isc	P	C	D
630A、1250A	20kA、25kA、31.5kA	150	400	460
		210	520	588
1250A	40kA	210	520	588
		275	720	770
1600A	31.5kA、40kA	210	520	588
		275	720	770

HFEV-12kV fixed type 2000A-5000A







Note:

(1) Circuit breaker with heat sink for rated current 2500A and above;

(2) The lifting plate must be removed before commissioning!

(3) 4×M10 screw holes are used for connecting busbar.

* Forced air cooling is required for switchgear when rated current is 4000A and above.

Unit: mm

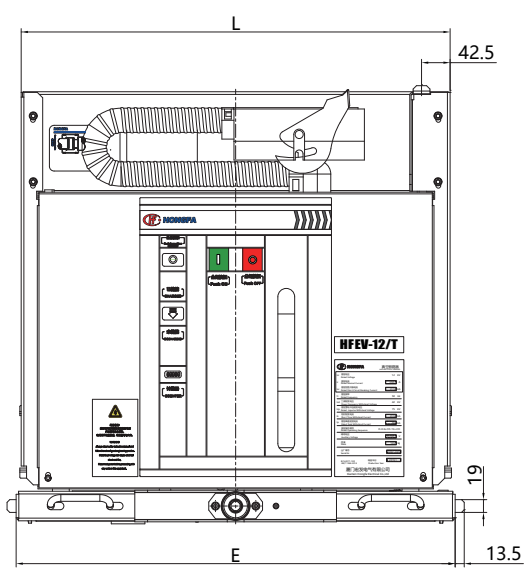
Rated current Ir	Rated short-circuit breaking current Isc	P	C	D	A
2000A	31.5kA、40kA	275	720	770	70
2500A	31.5kA、40kA	275	700	770	80
3150A	31.5kA、40kA	275	700	770	80
4000A*	40kA	275	700	770	80
5000A*	40kA、50kA	275	700	770	80

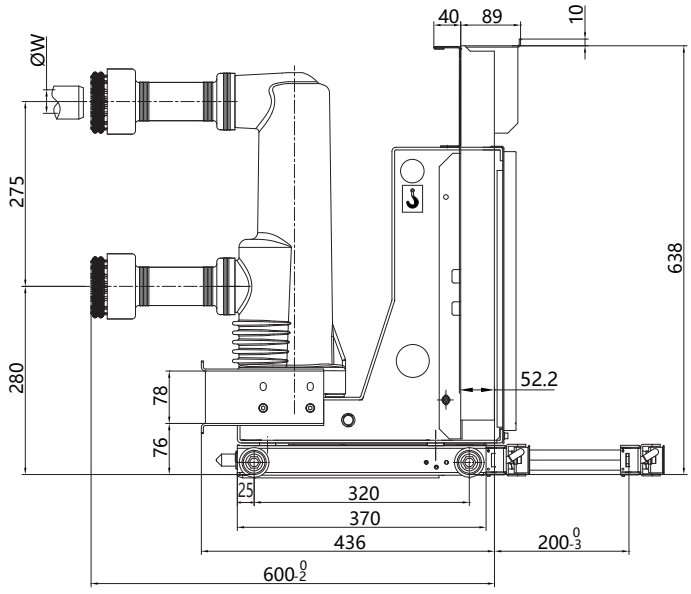
Note: Fixed HFEV circuit breakers are installed in fixed switchgear, if the spindle needs to be extended for mechanical interlocking, the user needs to specify the length and direction of the spindle in the contract, otherwise the spindle of standard HFEV circuit breaker products will not be extended.

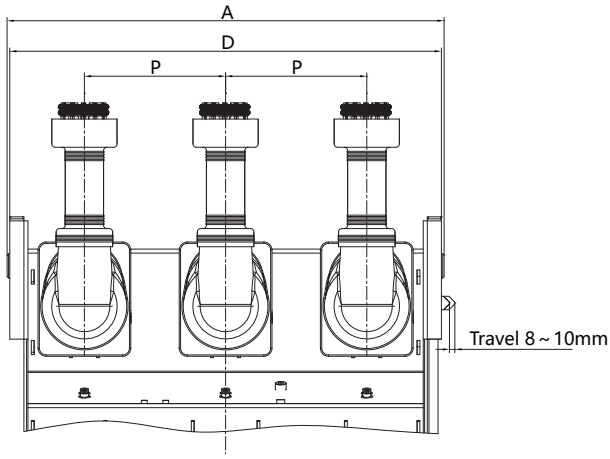
If it is necessary to extend the spindle for mechanical interlocking, the user needs to specify the length and direction of spindle extension in the contract, otherwise the spindle of standard HFEV circuit breaker products will not be extended.

Overall Dimensions

HFEV-12kV Withdraw-able type 630-1600A



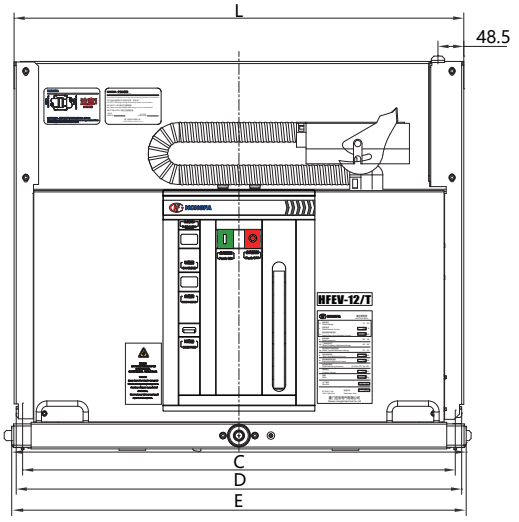


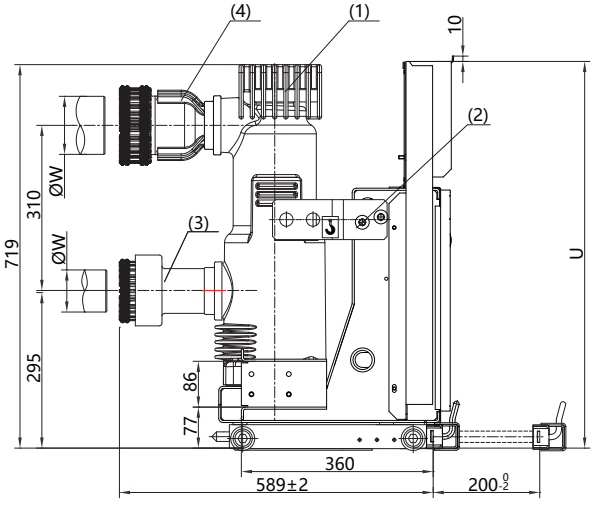


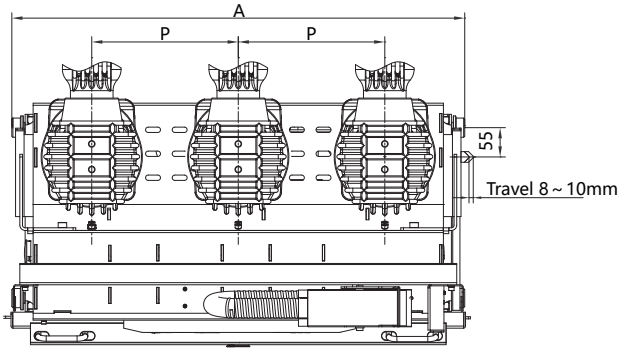
Unit: mm

Rated current Ir	Rated short-circuit breaking current Isc	P	A	D	E	L	W	Matching cabinet type
630A	20kA	150	500	496	502	492	35	650
		210	650	640	652	638	35	800
	25kA	150	500	496	502	492	35	650
		210	650	640	652	638	35	800
	31.5kA	150	500	496	502	492	35	650
		210	650	640	652	638	35	800
1250A	25kA、31.5kA	150	500	496	502	492	49	650
		210	650	640	652	638	49	800
1250A	40kA	210	650	640	652	638	49	800
		275	850	836	852	844	49	1000
1600A	31.5kA、40kA	210	650	640	652	638	55	800
		275	850	836	852	844	55	1000

HFEV-12kV Withdraw-able type 2000A-5000A







Note:

(1) Circuit breaker with heat sink for rated currents 2500A and above;

(2) The lifting plate must be removed before commissioning!

(3) Heat-shrinkable tubing for rated current 1250-2000A;

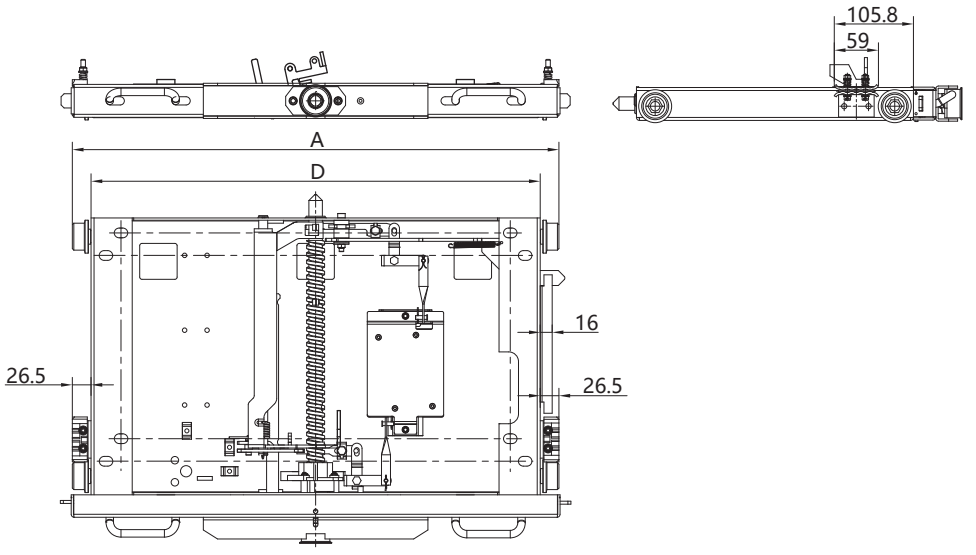
(4) For 2500A and above; for rated current 4000A and above, switchgear with forced air cooling is required.

Unit: mm

Rated current Ir	Rated short-circuit breaking current Isc	P	A	C	D	E	L	U	W	Matching cabinet type
2000A	31.5kA、40kA	275	850	812	836	852	844	725	79	1000
2500A	31.5kA、40kA	275	850	812	836	852	844	725	109	1000
3150A	31.5kA、40kA	275	850	812	836	852	844	725	109	1000
4000A*	40kA	275	850	812	836	852	844	725	109	1000
5000A*	40kA、50kA	275	850	812	836	852	844	725	109	1000

Overall Dimensions

Grounding device on both sides of the trolley

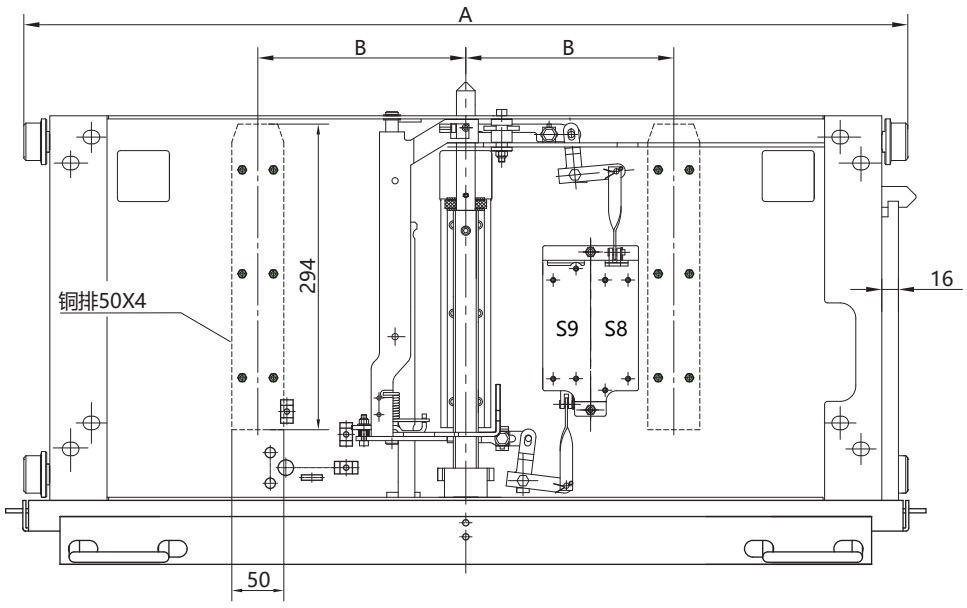


Note: When the chassis is equipped with this type of grounding device, the guide rail on the switchgear cabinet needs to be processed with copper plate.

Unit: mm

Pole spacing P	A	D
150	500	450
210	650	600
275	850	800

Grounding device at the bottom of the trolley



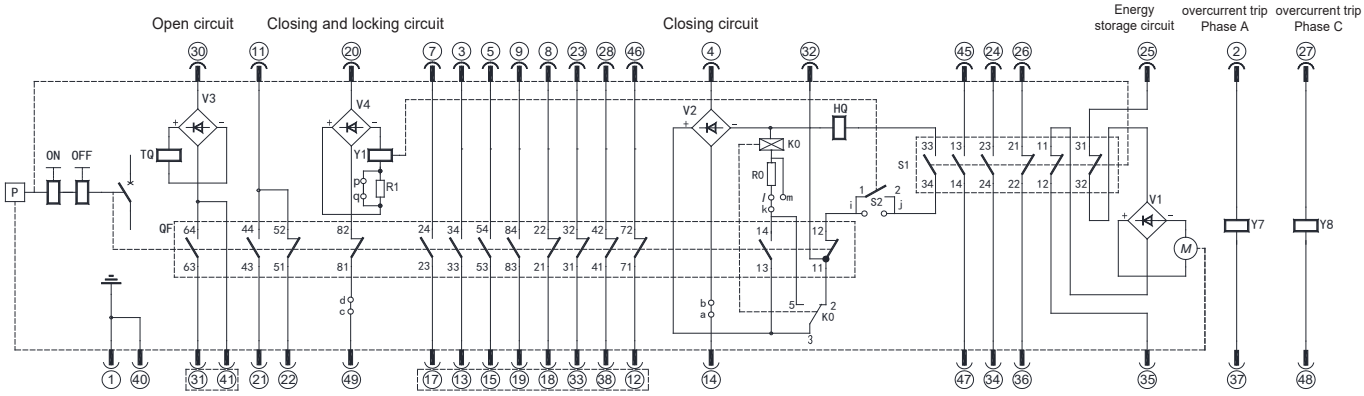
Unit: mm

Pole spacing P	A	B	Quantity of copper bars
150	500	100	The one on the left
210	650	160	The one on the left
275	850	200	One on each side

Electrical schematic diagram

Fixed electrical schematic diagram (5 open and 5 closed)

The circuit breaker is in the test position, spring is discharged, and in the open state



Optional wiring settings, "/" indicates disconnection; √ "indicates connection

Jumper status / Jumper cables / to configure		a-b L1	c-d L4	a-f L5	a-g L6	b-c L7	i-j L8	l-k L9
Equipped with anti jump measures	locked	√	/	/	/	/	/	√
	Not locked	√	/	/	/	/	√	√
No anti jumping measures	locked	√	/	/	/	/	/	/
	Not locked	√	/	/	/	/	√	/

HQ:Closing coil	R0～R1:Resistance
TQ:Opening coil	V1～V4:Rectifier bridge
S2:Auxiliary switch (closing locking electromagnet)	Y1:Closing locking electromagnet
S1:Auxiliary switch (energy storage motor)	Y7～Y8:Overcurrent release coil (optional)
QF:Auxiliary switch	K0:Anti bounce relay (optional)
M:Energy storage motor	P:Manual energy storage

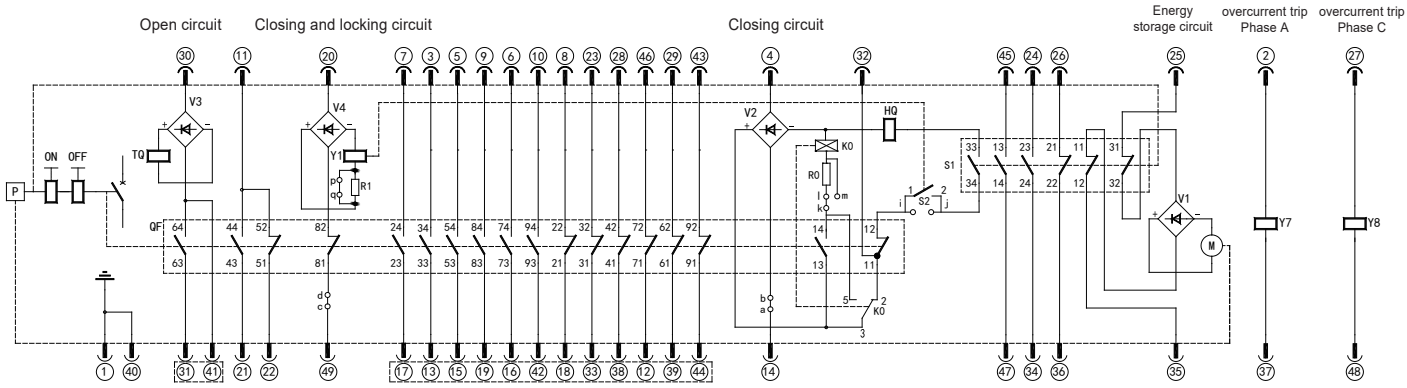
Note: When the secondary operation power supply is DC, the polarity of the motor should be as shown in the diagram, and the polarity of the terminals in the dashed box should be consistent.

Operation power selection

Jumper cables / Operating power supply	m-l	p-q
AC/DC220V	/	√
AC/DC110V	√	√

Fixed electrical schematic diagram (7 open and 7 closed)

The circuit breaker is in the test position, spring is discharged, and in the open state



Optional wiring settings, "/" indicates disconnection; √ "indicates connection

Jumper status / Jumper cables / to configure		a–b L1	c–d L4	a–f L5	a–g L6	b–c L7	i–j L8	l–k L9
Equipped with anti jump measures	locked	√	/	/	/	/	/	√
	Not locked	√	/	/	/	/	√	√
No anti jumping measures	locked	√	/	/	/	/	/	/
	Not locked	√	/	/	/	/	√	/

HQ:Closing coil	R0～R1:Resistance
TQ:Opening coil	V1～V4:Rectifier bridge
S2:Auxiliary switch (closing locking electromagnet)	Y1:Closing locking electromagnet
S1:Auxiliary switch (energy storage motor)	Y7～Y8:Overcurrent release coil (optional)
QF:Auxiliary switch	KO:Anti bounce relay (optional)
M:Energy storage motor	P:Manual energy storage

Note: When the secondary operation power supply is DC, the polarity of the motor should be as shown in the diagram, and the polarity of the terminals in the dashed box should be consistent.

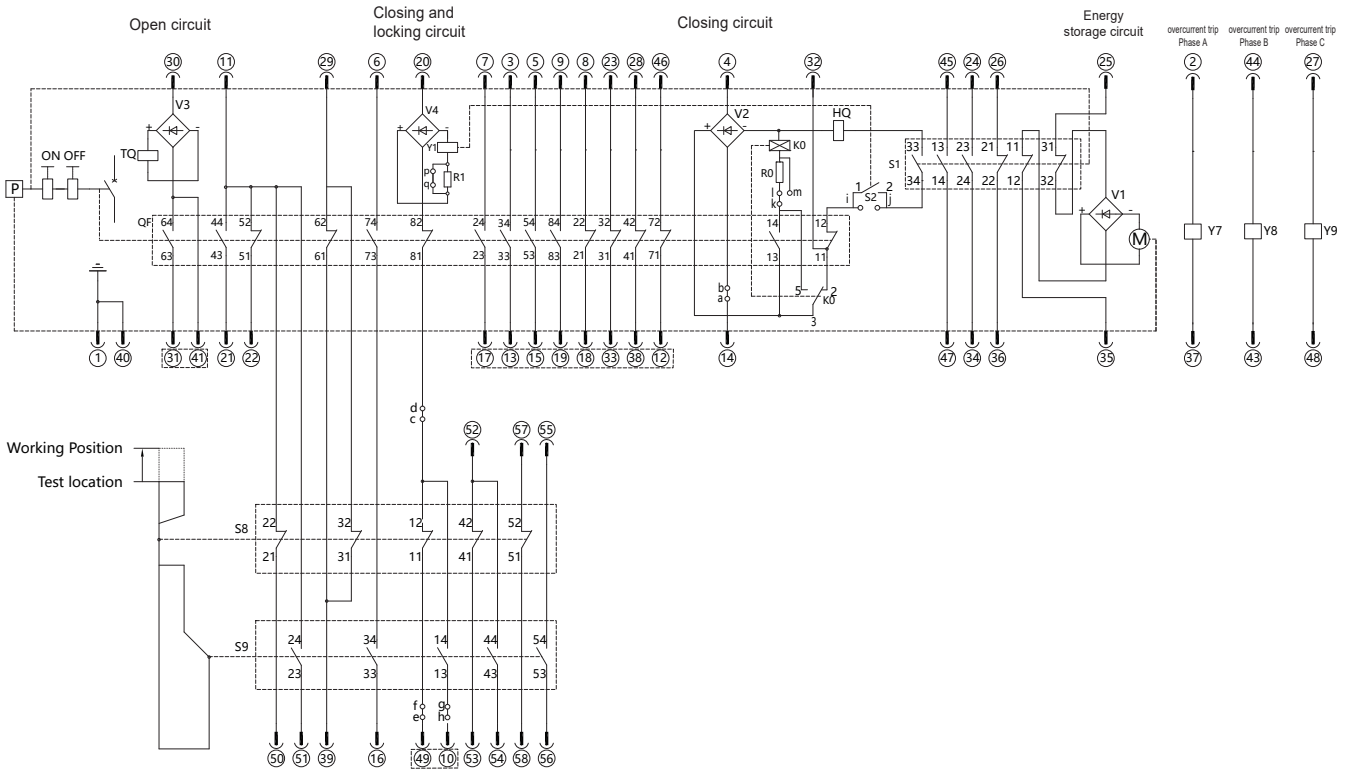
Operation power selection

Jumper cables / Operating power supply	m–l	p–q
AC/DC220V	/	√
AC/DC110V	√	√

Electrical schematic diagram

Withdraw-able type electrical schematic (5 pairs of auxiliary contacts)

The circuit breaker is in the test position, spring is discharged, and in the open state



Optional wiring settings, "/" indicates disconnection; √ "indicates connection

Jumper status / Jumper cables / to configure		a–b L1	c–d L4	a–f L5	a–g L6	b–c L7	i–j L8	l–k L9
Equipped with anti jump measures	locked	√	/	/	/	/	/	√
	Not locked	√	/	/	/	/	√	√
No anti jumping measures	locked	√	/	/	/	/	/	/
	Not locked	√	/	/	/	/	√	/

Operation power selection

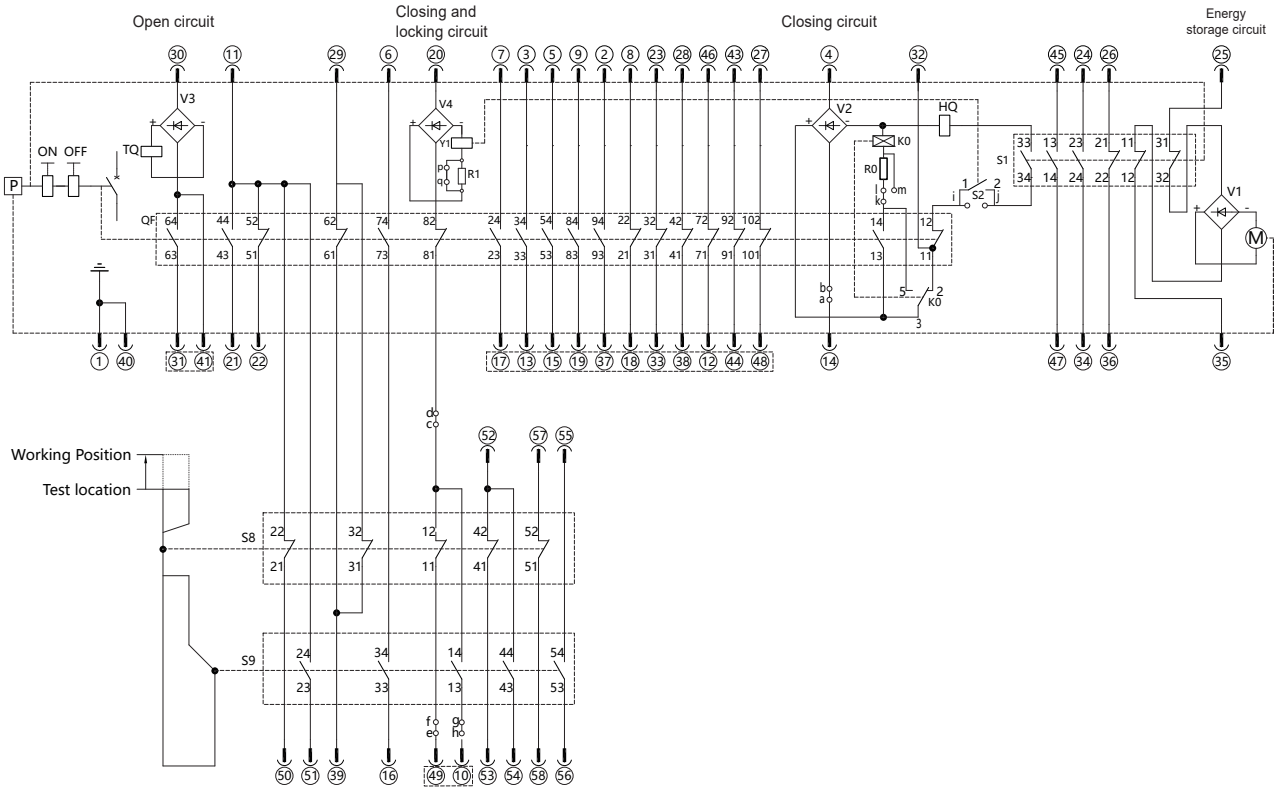
Operating power supply / Jumper cables	m–l	p–q
AC/DC220V	/	√
AC/DC110V	√	√

S8: Test position auxiliary switch	HQ:Closing coil
S9: Work position auxiliary switch	TQ:Opening coil
S2: Auxiliary switch (closing locking electromagnet)	V1～V4 ：Rectifier bridge
S1: Auxiliary switch (energy storage motor)	Y1: Closing locking electromagnet
QF: Auxiliary switch	Y7～Y8 ：Overcurrent release coil (optional)
M: Energy storage motor	K0: Anti bounce relay (optional)
R0～ R1: Resistance	P: Manual energy storage

Note: When the secondary operation power supply is DC, the polarity of the motor should be as shown in the diagram, and the polarity of the terminals in the dashed box should be consistent.

Electrical schematic diagram of Withdraw-able type (7 pairs of auxiliary contacts)

The circuit breaker is in the test position, spring is discharged, and in the open state



Optional wiring settings, "/" indicates disconnection; √ "indicates connection

Jumper status to configure / Jumper cables		a-b L1	c-d L4	a-f L5	a-g L6	b-c L7	i-j L8	l-k L9
Equipped with anti jump measures	locked	√	/	/	/	/	/	√
	Not locked	√	/	/	/	/	√	√
No anti jumping measures	locked	√	/	/	/	/	/	/
	Not locked	√	/	/	/	/	√	/

Operation power selection

Jumper cables / Operating power supply	m-l	p-q
AC/DC220V	/	√
AC/DC110V	√	√

S8: Test position auxiliary switch	HQ:Closing coil
S9: Work position auxiliary switch	TQ:Opening coil
S2: Auxiliary switch (closing locking electromagnet)	V1～V4 ：Rectifier bridge
S1: Auxiliary switch (energy storage motor)	Y1: Closing locking electromagnet
QF: Auxiliary switch	Y7～Y8 ：Overcurrent release coil (optional)
M: Energy storage motor	K0: Anti bounce relay (optional)
R0～ R1: Resistance	P: Manual energy storage

Note: When the secondary operation power supply is DC, the polarity of the motor should be as shown in the diagram, and the polarity of the terminals in the dashed box should be consistent.

Product quality and environmental protection

HFEV vacuum circuit breakers follow the requirements of the international standards ISO 9001 for quality management systems and ISO 14001 for environmental management systems. These systems stipulate extremely high requirements for quality certification and environmental management.

End of product life

- strictly follows the relevant legislation and the provisions of the ISO14001 standard environmental management system.
- The company actively promotes the recycling and disposal of its products.
- Recycling and disposal must be done in strict compliance with local laws.

Product Recycling

The methods listed in the table are recommended for recycling and disposal, and end-of-life products can also be incinerated or buried.

Types of raw materials	Recommended recycling and disposal methods
Metal materials (Fe, Cu, Al, Ag, Zn, W, etc.)	Separation and reuse
Plastic sheets	Recycling or scrapping
Epoxy resin	Recycling or scrapping after selecting metals in it
Rubber	Scrap
Wooden packaging materials	Recycle or scrap
Sheet metal packaging materials	Recycle or scrap

Ordering specifications

HFEV-12 VCB order specifications

End Customer: project: contact no: sales person:

Production type		Quantity	
Rated voltage	□ 3.6kV □ 7.2kV □ 12 kV		
Rated current	□ 630A □ 1250A □ 1600A □ 2000A □ 2500A □ 3150A □ 4000A □ 5000A		
Rated short-circuit breaking current	□ 20kA □ 25kA □ 31.5kA □ 40kA □ 50kA		
Distance from upper and lower terminal/lower terminal to the bottom	□ 275mm/280mm □ 310mm/295mm		
Moving contact diameter	□ φ35mm □ φ49mm □ φ55mm □ φ79mm □ φ109mm		
*Auxiliary Voltage: Gear motor M (standard)	□ AC220V □ DC220V □ AC110V □ DC110V □ others _____		
*Auxiliary Voltage: Closing coil HQ(standard)	□ AC220V □ DC220V □ AC110V □ DC110V □ others _____		
*Auxiliary Voltage: Opening coil TQ(standard)	□ AC220V □ DC220V □ AC110V □ DC110V □ others _____		
Installation method	□ withdraw-able type □ fixed type		
Phase distance	□ 150mm □ 210mm □ 275mm		
No of auxiliary switch contacts	□ 5NO5NC (standard)* □ 7NO7NC □ non-standard (Attachment, fig. no:)		
Grounding method	□ Bottom grounding sliding copper bar (standard)* □ Side contact (Non-standard with optional parts)		
*Auxiliary Voltage: Closing latch coil Y1 (Non-standard with optional parts)	□ no □ AC220V □ DC220V □ AC110V □ DC110V □ others _____		
*Auxiliary Voltage: latching coil of trolley Y0 (Non-standard with optional parts)	□ no □ AC220V □ DC220V □ AC110V □ DC110V □ others _____		
Anti-pumping relay K0	□ yes(Standard configuration)* □ no		
Motorized trolley	□ yes □ no		
Over current coil Y7、Y8、Y9 (Non-standard with optional parts)	□ no □ Y7/Y9（AC5A）（Namely: double overcurrent） □ Y7/Y8/Y9（AC5A）（Namely: Three overcurrent）		
Under voltage coil Y4 (Non-standard with optional parts)	□ no □ AC220V □ DC220V □ AC110V □ DC110V □ others _____		
Fix type（F type）	Secondary line lead out method: □ Terminal block wiring at the top of the box □ Equipped with secondary aviation plug and aviation socket □ Install aviation socket on the top of the box, equipped with aviation plug □ others _____		
	mechanical interlock type □ no □ left or □right spindle extends _____mm（Non-standard with optional parts） □ with closing coil mechanical interlock □ others_____		
Others	(If have special requirements, please list them in this column and attach relevant drawings or information.) 1、 2、 3、		

Explanation: (1), please black or tick in the selected item '□' (2), if the user does not choose non-standard options HFEV-12 configuration will not appear in this part; if the user chooses non-standard options, there will be a certain fee, the specific cost standard please refer to our product price list or ask our commercial staff to process the order. Please refer to our product price list for specific cost standard, or ask our commercial staff for order processing.

Note: This order specification is to be filled in by the customer, please blacken or tick the selected item '□', sign it, and return it together with the order to Xiamen Hongfa Power Generation Co.
(Tel: 0592-5781203, Fax: 0592-8262203).

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