

ZW32-12 Series


Outdoor High Voltage Permanent
magnet Vacuum Circuit Breaker

OPERATION INSTRUCTION

Standard: IEC 62271-100

CNC

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Power For Better Life

 Before installing and using this product,
please read this manual carefully and
pay more attention to safety.

ZW32-12 series

Outdoor High Voltage Permanent magnet Vacuum Circuit Breaker

Installation and Operation Manual

1 General

ZW32-12 series outdoor high voltage vacuum circuit breaker is rated voltage 12kV, three phase AC 50Hz outdoor distribution equipment, mainly used for load current, overload current and short-circuit current in opening closing power system in distribution network. Applicable to substations and power distribution in industrial and mining enterprises for protection and control purposes, rural power network and places with frequent operation, especially reformation of urban and rural power network.

The installation instructions provided for the principles and methods of the circuit breaker main technical parameters, product structure, operation, installation and maintenance.

2 Type description

ZW 32 - 12 M / 630 - 20

Rated short circuit breaking current (kA)

Rated current (A)

Permanent magnetic mechanism

Rated voltage (kV)

Design number

Outdoor vacuum circuit breaker

3 Environmental conditions

- Altitude: $\leq 2000\text{m}$;
- Air temperature: $-35^{\circ}\text{C} \sim +45^{\circ}\text{C}$;
- Wind speed $\leq 35\text{m/s}$;
- Filthy level: IV;
- Installation places: No fire, explosion hazard or serious filthy;
- Earthquake intensity: ≤ 8 level.

4 Technical Data

Table 1 Vacuum circuit breaker main technical parameters

No.	Item	Unit	Value
1	Rated voltage	KV	12
2	Power frequency withstand voltage (1min)	(dry) inter-phase, earth/fracture	KV 42
		(wet) inter-phase, earth	KV 48
3	Lightning impulse withstand voltage (peak) inter-phase, earth/fracture	KV	75
4	Rated current	A	630(1250)
5	Rated short circuit breaking current	KA	20(25)
6	Rated operating sequence		O-0.3S-CO-180S-CO
7	Rated short-circuit breaking current breaking times	Times	30
8	Rated short-circuit closing current (peak)	KA	50
9	Rated peak value withstand current (peak)	KA	50
10	Rated short time withstand current	KA	20
11	Rated short circuit duration	S	4
12	Mechanical Life	Times	10000
13	Rated operating voltage and auxiliary circuit voltage	V	AC-DC 220V
14	Allowable wear thickness of dynamic and static contacts	mm	3

Table 2 Vacuum circuit breaker mechanical characteristic parameters

No.	Item	Unit	Value
1	Clearance between open contacts	mm	9 ± 1
2	Over travel	mm	2 ± 0.5
3	Closing speed	m/s	0.6 ± 0.2
4	Opening speed	m/s	1.3 ± 0.2
5	Contact closing bounce duration	m/s	≤ 2
6	Three phase closing and opening asynchronism	m/s	≤ 2
7	Closing time	ms	≤ 100
8	Opening time	ms	≤ 60
9	Each phase conductive circuit resistance	$\mu\Omega$	≤ 80 without G; ≤ 150 with G; ≤ 200 with 2G;
10	Inter-phase center distance	mm	340 ± 5

5 Disconnect switch structural features

5.1 The overall structure of circuit breaker adopts the form of operating mechanism and arc extinguishing chamber, and up and down arrangement. The arc chamber is mounted longitudinally in a tubular insulating

cylinder. The insulation cylinder is made of outdoor epoxy resin, with performance of anti-fouling and anti-creepage. The structure can not only stop the vacuum arc extinguishing chamber from being damaged by external factors, but also ensure that the voltage effect can be high resistance state even in hot and humid environment and serious pollution.

5.2 The operating mechanism of circuit breaker adopts permanent magnet operating mechanism, with three function of electric closing, electric breaking, emergency breaking. The chassis of the circuit breaker also serves as the frame of the operating mechanism, which are respectively equipped with energy storage part (electrolytic capacitor), transmission part, tripping part and buffer part. Using the whole size layout can make the operating performance of the operating mechanism more consistent with the performance required by the opening and closing of the arc extinguishing chamber.

Reduce unnecessary intermediate transmission links, reduce energy consumption and noise, and make the circuit breaker operational performance more reliable.

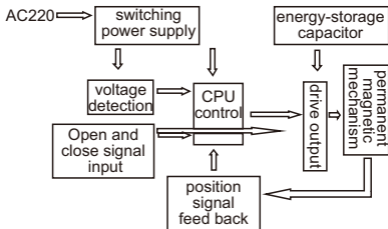
6 Working principle

6.1 arc quenching principle

The vacuum arc extinguishing chamber used for circuit breaker has high vacuum degree($\leq 1 \times 10^{-3}$ Pa). When the moving and static contacts are breaking under the action of the operating mechanism, vacuum arc will be generated between the contacts; At the same time, due to the special structure of the contact, an appropriate magnetic field is generated in the clearance of the contact to make vacuum arc maintains a diffusive type and maintains the arc voltage. When the current crosses zero, the residual ions, electrons and metal vapors can recombine or condense on contact surface and shielding cover in microseconds, the dielectric insulation strength of the arc extinguishing chamber fracture is quickly recovered to reach the goal of breaking.

6.2 principle of controller

The core component of the controller adopts a high-performance single-chip microcomputer chip, which precisely controls the permanent magnet mechanism of the high-voltage switch, and controls the secondary circuit of the switch through position signal detection and voltage detection of the energy storage capacitor. The specific control principle is shown in the figure below:



6.3 Working principle of circuit breaker

Closing principle and anti-hop function: After power on, the energy storage capacitor can complete energy storage in more than 10 seconds, when the controller receives the closing command, determine the circuit breaker is at opening position through the position (auxiliary) switch, the controller controls the energy storage capacitor for closing discharge of the coil of mechanism body. The main circuit is closed by pushing the moving end of the arc extinguishing chamber through the transmission link. When the core of the mechanism is closed, The controller controls the energy storage capacitor to stop discharging the coil of mechanism body. The iron core of the mechanism will be kept in the closing position under the action of the magnetic

force, the energy storage capacitor complete the energy supplement charge in 3 seconds. This circuit breaker has anti-hop function, when receiving the effective closing instruction, as long as the current closing instruction is not revoked, the closing instruction will not be accepted again for closing operation. The next closing instruction can only be executed when the closing circuit is disconnected (release the closing button and remote closing button).
Opening principle and free trip function: No matter where the circuit breaker is located, when the opening command or over-current signal is received, the controller sends out the opening command. the controller controls the energy storage capacitor for opening discharge of the coil of mechanism body, so that the magnetic field of the core on the suction surface is weakened and the mechanism tripping , the circuit breaker completes the opening operation under the action of the opening spring.
Emergency manual opening principle: through the cam top movement and the connecting rod connected with the mechanism moving iron core, when the moving and static core of the mechanism is separated from a certain distance, the contact spring and the opening spring drive the mechanism to open, and complete the emergency opening.

7.Installation, use and maintenance

The debugging and operation of the circuit breaker

should be carried out by trained professionals who understand the performance of the switch, and the corresponding protection and precautions must be taken into account.

7.1 Installation and use

7.1.1 Check before installation

After unpacking, check whether the outdoor epoxy insulating tube of the circuit breaker is broken, whether the box is deformed, whether the product nameplate and certificate are in accordance with the order, whether the packing list is in accordance with the physical object, make sure that it is intact and correct before cleaning the surface dust and dirt. Then use the power frequency voltage method to check the vacuum degree of the vacuum arc extinguishing chamber (power frequency voltage test).

7.1.2 Check before running

Before the circuit breaker is put into operation, it should be carefully checked whether the rated voltage and rated current of each operating component are consistent with the actual situation, connect the power supply to the control part (the power supply voltage is according to the order requirements).

7.2 Maintenance

The following periodic maintenance must be performed by professional equipment maintenance personnel.

① Check whether the screws on the circuit breaker

are loose. If they are loose, harden them.

② Over travel and open distance shall be detected by trained professionals, and parameters of each phase shall be adjusted to the requirements in Table 2;

③ The circuit resistance between the upper and lower outlet lines in the closing state must be checked again before using the circuit breaker after readjusting the over travel. The circuit resistance value must meet the requirements in Table 2.

④ The mechanical characteristics of circuit breakers measured by a mechanism characteristic tester must meet the requirements in Table 2.

⑤ Before use, the circuit breaker should be retested for voltage resistance. Port, phase and ground detection shall be carried out according to the requirements in Table 1.

⑥ The vacuum arc extinguishing chamber shall be replaced when its service life reaches the number of short circuit current breaking or electrical life specified in the technical parameter table.

8 Transportation and Storage

8.1 Circuit breakers must be packed in closed packing boxes and reliably fixed during transportation;

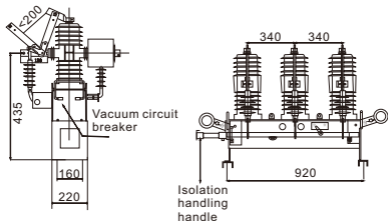
8.2 The products shall be packed or unpacked in a dry room, and the products and parts shall be checked

for completeness and conformity with the packing list;
8.3 The circuit breaker should be stored in a dry, ventilated, moisture-proof, shockproof room without harmful gas erosion. In the long term storage, the transmission part should be coated with lubricating grease, and regularly check whether the environment meets the requirements.

9 Enclosed Documents

- One quality certificate
- One factory test report
- One operation manual

10 Overall and mounting dimensions(mm)





CERTIFICATE

Product Model: ZW32-12 Series

Standard: IEC 62271-100

Inspector : **CNC003**

Production date: Printed on the product
or package.

This product is qualified according
to the delivery inspection

CNC

ZW32-12 Series

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