

ZN63A-24 Indoor Medium-voltage AC Vacuum Circuit Breaker

1 Overview



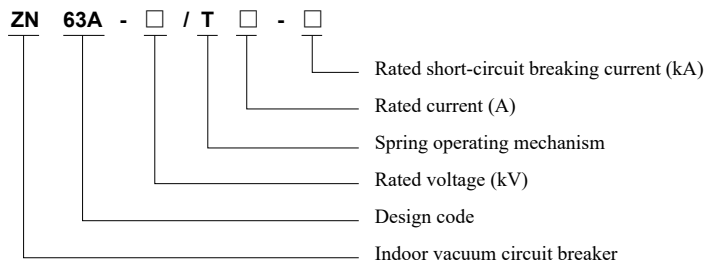
ZN63A (VS1)-24 indoor high voltage AC vacuum circuit breaker (hereinafter referred to as circuit breaker) is used in three-phase AC 50Hz indoor places with rated voltage of 24kV. It is suitable for applications with loads of different nature and frequent operations for the protection and control of electrical facilities used in industrial and mining, enterprises, power plants and substations, especially for metallurgy, chemicals, and coal industries.

The circuit breaker comply with GB/T 1984 "High-voltage alternating-current circuit-breakers", GB/T 11022 "Common specifications for high-voltage switchgear and controlgear standard", DL/T 402 "High-voltage alternating-current circuit-breakers", and IEC standard.

The operating mechanism of circuit breaker is designed as an integrated structure. The operating mechanism and the primary circuit are arranged at front and back. It can be used as a fixed installation unit (fixed cabinet) or form a handcart unit (handcart cabinet) together with the advance mechanism (chassis cart)



2 Type Designation



3 Technical Parameters

3.1 Main technical parameters of circuit breaker

No.	Item	Unit	Value		
1	Rated voltage	kV	24		
2	Rated power frequency withstand voltage (1 min)		65		
3	Rated lightning impulse withstand voltage (peak)		125		
4	Rated frequency	Hz	50		
5	Rated current	A	630 1250	630 1250 1600 2000 2500 3150	1250 1600 2000 2500 3150
6	Rated short-circuit breaking current	kA	20、25	31.5	40
7	Rated short-circuit making current (peak)		50、63	80	100
8	Rated short-time withstand current		20、25	31.5	40
9	Rated peak withstand current		50、63	80	100
10	Rated short circuit duration	s	4		
11	Rated operation sequence		O—0.3s—CO—180s—CO		O—180s—CO—180s—CO
12	Rated short-circuit breaking current breaking times	Times	50		30
13	Mechanical life		10,000(Customized)		
14	Rated operating voltage	V	220/110		
15	Allowable cumulative wear thickness of moving and fixed contacts	mm	3		

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3.2 Mechanical property parameters of circuit breaker

No.	Item	Unit	Value
1	Clearance between open contacts	mm	12±1
2	Overtravel		4±1
3	Contact closing bounce time	ms	1600A and below ≤ 2, 2000A and above ≤ 3
4	Three-phase closing and opening synchronization		≤ 2
5	Average opening speed	m/s	1.4±0.2
6	Average closing speed		0.8±0.2
7	Closing time	ms	30 ~ 70
8	Opening time		20 ~ 50
9	Main circuit resistance	μΩ	630A ≤ 70, 1250A ≤ 65 1600A ~ 2000A ≤ 55 2500A and above ≤ 45
10	Contact pressure of closing contact	N	20kA, 25kA: 2500±1300 31.5kA: 3200±300 40kA: 4500±300

3.3 Technical data of energy storage motor

This product has a permanent magnet single-phase DC motor equipped with a special reducer. The technical parameters of the motor are listed in table below.

Rated voltage (V)	Rated output power (W)	Normal operating voltage range	Energy storage time at rated voltage (S)
DC220	70	85% to 110% of rated voltage	≤ 15

3.4 Technical data of electromagnet

	Closing electromagnet	Opening electromagnet	Locking electromagnet	Anti-jump relay
Rated operating voltage (V)	DC220	DC220	DC220	DC220
Coil Power (W)	220	220	4	1
Rated current (A)	1	1	18mA	9.1mA
Working voltage range	80% to 110% of rated voltage	65% to 110% of rated voltage	85% to 110% of rated voltage	

4 Operating Conditions

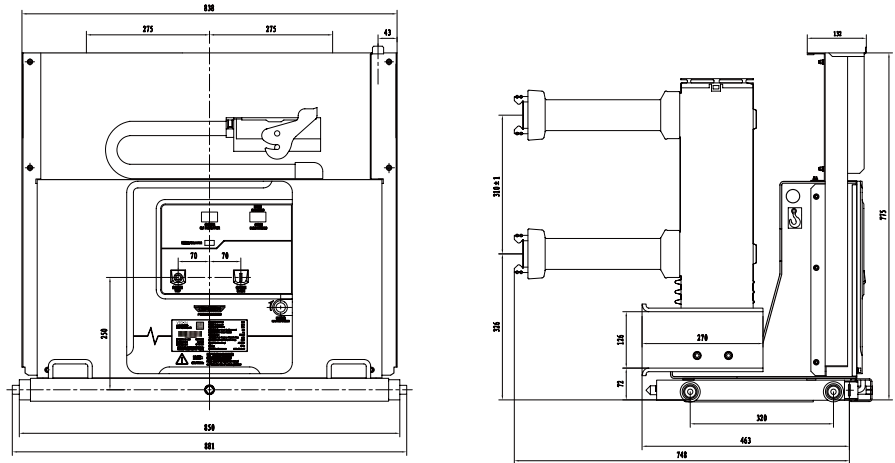
4.1 Normal Working Conditions

- 4.1.1 Ambient temperature: The max. temperature is +40°C, and the min. temperature is -15°C (storage and transport at -30°C are allowed);
- 4.1.2 Environmental humidity: The daily mean relative humidity is ≤ 95%, the monthly mean relative humidity is ≤ 90%; the daily mean vapor pressure is ≤ 2.2 × 10⁻³ MPa, and the monthly mean vapor pressure is ≤ 1.8 × 10⁻³ MPa;
- 4.1.3 The altitude does not exceed 1000m (customization is required if greater than 1000m);
- 4.1.4 The earthquake intensity does not exceed 8 degrees;
- 4.1.5 There is no water drops, no flammable materials, no chemical corrosive gas and no severe vibration at the site.
- 4.2 If the normal working conditions are not met, please contact the manufacturing unit.

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5 Outline and Installation Dimensions

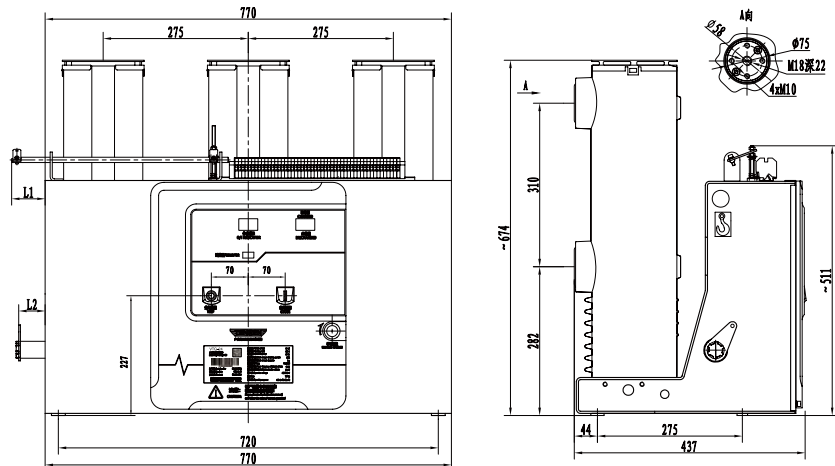
5.1 Outline drawings of handcart type circuit breaker



Note: The handcart stroke is 300mm.

Rated current (A)	630	1250	1600
Rated short-circuit breaking current (kA)	20、25	25/31.5/40	31.5/40
Size of matching fixed contact (mm)	φ35	φ49	φ55

5.2 Outline drawings of handcart type circuit breaker



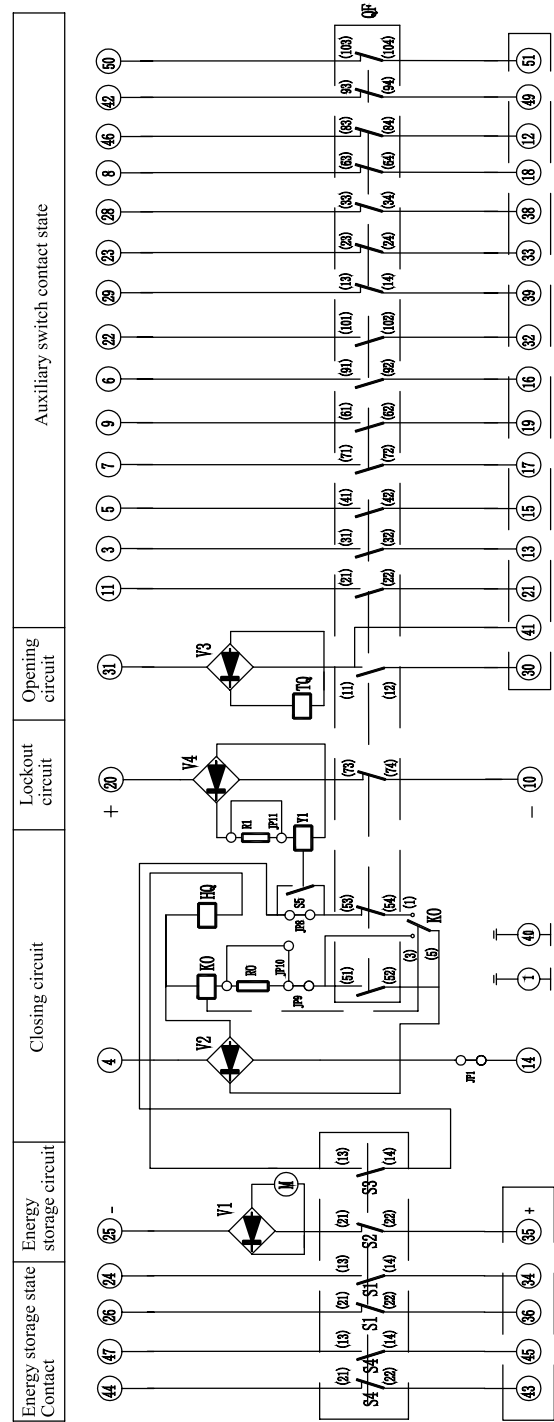
Note: The handcart stroke is 300mm.

Rated current (A)	1600、2000	2500、3150	4000
Rated short-circuit breaking current (kA)	31.5/40		40
Size of matching fixed contact (mm)	φ79	φ109	

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6 Electrical Schematic Diagram

6.1 Secondary Schematic Diagram for Fixed Type



- HQ: Closing coil
- TQ: Opening coil
- M: Energy storage motor
- R0-R1: Resistance
- V1-v4: Rectifier
- JP8-JP11: Jumper
- S1-S4: Microswitch (switched after energy storage of closing spring)
- SS: Microswitch (optional)
- QF: Aux. switch (switched when opening or closing operation)
- Y7, Y9: Indirect overcurrent trip (optional)
- Y1: Lockout electromagnet (optional)
- K0: Anti-jump relay (optional)

Notes:
 1. When operating under the DC power supply, the polarities in the dashed box shall be same.
 2. The figure shows the circuit breaker at the opening and discharged state, and the motor shall be wired according to the polarity shown in figure.

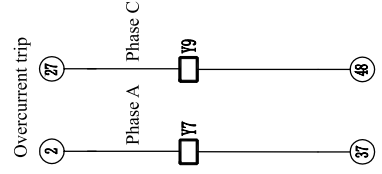
Option wiring layout:

Jumper state Configuration	JP1 (a-b)	JP2 (1-2)	JP3 (e-f)	JP4 (c-d)	JP5 (a-f)	JP6 (a-f)	JP7 (b-c)	JP8 (1-1)	JP9 (1-k)
With lockout	✓	/	/	/	/	/	/	/	✓
Without lockout	✓	/	/	/	/	/	/	/	✓
With lockout anti-jump	✓	/	/	/	/	/	/	/	/
Without lockout anti-jump	✓	/	/	/	/	/	/	/	/

Operating power selection:

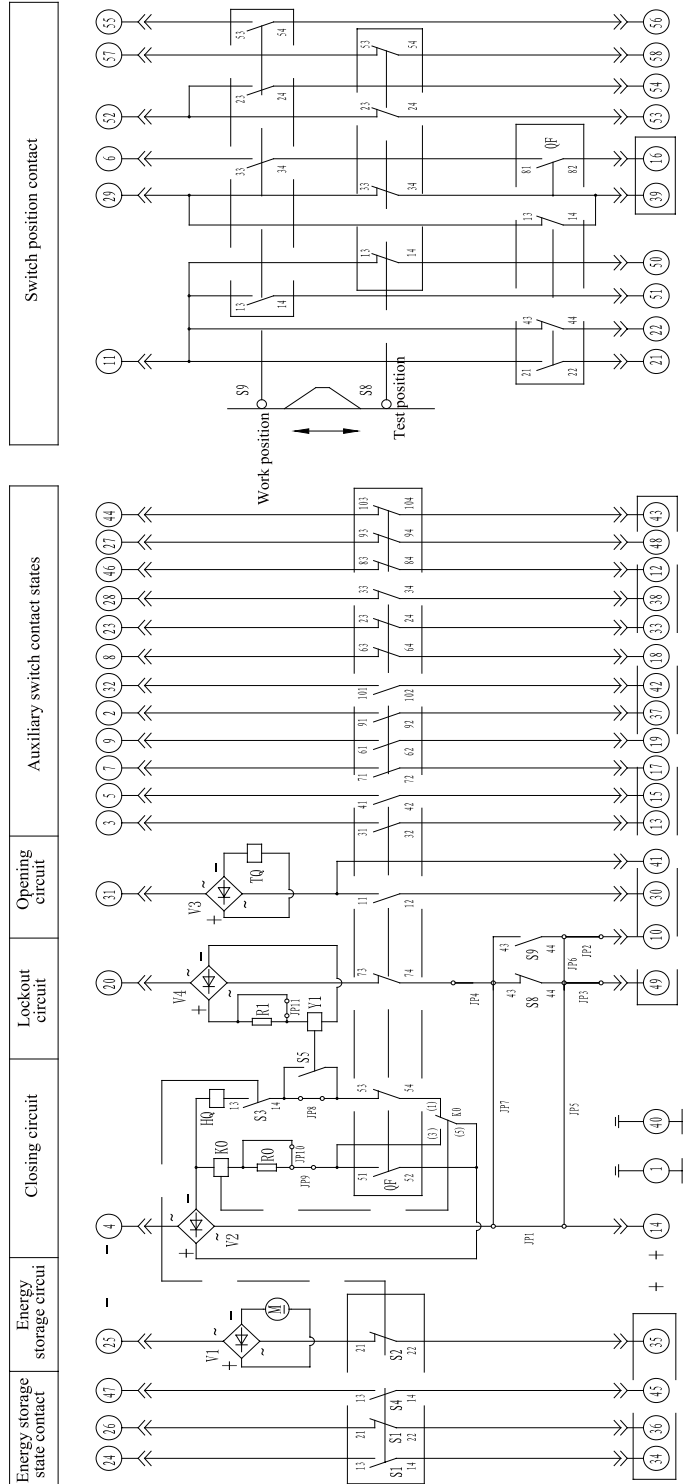
Operating power	JP10 (1-m)	JP11 (q-p)
A0/A221W	/	/
A0/A211W	✓	✓

Notes: “/” indicates disconnection; “✓” indicates connection



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6.2 Secondary Schematic Diagram for Handcart Type



Operating power selection: 1-m

Jumper state	JP10
Operating power	AC/DC220V
	AC/DC110V

Option wiring layout:

Jumper state Configuration	JP1	JP2	JP3	JP4	JP5	JP6	JP7	JP8	JP9
With anti-jump	✓	✓	✓	✓	✓	✓	✓	✓	✓
Without anti-jump	✓	✓	✓	✓	✓	✓	✓	✓	✓
With lockout	✓	✓	✓	✓	✓	✓	✓	✓	✓
Without lockout	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes:

- The circuit breaker is in the test position at the opening and discharged state.
- When operating under the DC power supply, the polarities in the dashed box shall be same, and the motor shall be wired according to the polarity shown in figure.

Operating power selection: 1-m

Jumper state	JP10
Operating power	AC/DC220V
	AC/DC110V

Notes:

- The circuit breaker is in the test position at the opening and discharged state.
- When operating under the DC power supply, the polarities in the dashed box shall be same, and the motor shall be wired according to the polarity shown in figure.

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7 Ordering Technical Confirmation Form

Technical Confirmation Form for Ordering ZN63A-24 Indoor Medium-voltage AC Vacuum Circuit Breaker

Please determine your requirements according to the items listed in table below:

Product model	<input type="checkbox"/> Handcart type <input type="checkbox"/> Fixed type		
Order Qty. (unit)		Primary structure	Insulated tube type air insulation
Rated current (A)	<input type="checkbox"/> 630 <input type="checkbox"/> 1250 <input type="checkbox"/> Others _____		
Rated short-circuit breaking current (kA)	<input type="checkbox"/> 20 <input type="checkbox"/> 25 <input type="checkbox"/> 31.5 <input type="checkbox"/> 40		
Phase spacing (mm)	<input type="checkbox"/> 275 (Standard configuration) <input type="checkbox"/> Others _____		
Clearance between poles (mm)	<input type="checkbox"/> 310 (Standard configuration)		
Operating voltage (V)	OFF, ON: <input type="checkbox"/> AC220 <input type="checkbox"/> DC220 <input type="checkbox"/> Others _____ Stored energy: <input type="checkbox"/> AC220 <input type="checkbox"/> DC220 <input type="checkbox"/> Others _____		
Anti-jump device	<input type="checkbox"/> Without anti-jump (Standard configuration) <input type="checkbox"/> With anti-jump		
Lockout device (no handcart lockout for fixed type)	Closing lockout: <input type="checkbox"/> No lockout (standard configuration) <input type="checkbox"/> With lockout, operating voltage _____ V		
	Handcart lockout (lock chassis cart): <input type="checkbox"/> Without lockout (standard configuration) <input type="checkbox"/> With lockout, operating voltage _____ V		
Overcurrent device	<input type="checkbox"/> Without overcurrent (Standard configuration) <input type="checkbox"/> Overcurrent of phases A and C <input type="checkbox"/> Overcurrent of phases A, B, and C Note: The action current is 5A for overcurrent coil as standard configuration		
Undervoltage trip device	<input type="checkbox"/> No (standard configuration) <input type="checkbox"/> Yes		
Handcart option (this option is not selected for fixed type)	Earthing: <input type="checkbox"/> Bottom friction earthing (Standard configuration) <input type="checkbox"/> Others Program lock (mechanical lock): <input type="checkbox"/> No (standard configuration) <input type="checkbox"/> Lock chassis cart <input type="checkbox"/> Lock circuit breaker baffle		
Fixed circuit breaker interlock output (mm) (this option is not selected for handcart type)	Top opening interlock extension: <input type="checkbox"/> Left (standard configuration 50)____ <input type="checkbox"/> Right____ <input type="checkbox"/> No		
	Spindle extension: <input type="checkbox"/> No (standard configuration 50) <input type="checkbox"/> Left____ <input type="checkbox"/> Right		
Secondary wiring scheme	<input type="checkbox"/> Tengen standard scheme (see Catalogue) <input type="checkbox"/> Non-standard scheme (please attach the Figure)		
Dimensions	<input type="checkbox"/> Tengen standard scheme (see Catalogue) <input type="checkbox"/> Non-standard scheme (please attach the Figure)		
Standard accessories	Cart type: one energy-storing handle, one cart handle (length 80mm), one aviation plug female connector (58 core with 40 pieces of 1.5mm ² pins), one coiled pipe (about 300mm length); 1250A and below standard Al contact arm contact surface is coated with common silver, and 1600A and above standard copper contact arm is coated with common silver. Fixed type: one energy-storing handle		
Other special requirements		Ordering unit (seal)	
		Signature: _____ Confirmation date: _____ Tel: _____	

Note: Options not checked are produced according to the TENGEN's standard configuration