



VS1-12kv Indoor Vacuum Circuit Breaker

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➤ Product overview

VS1-Series embedded pole. vacuum circuit breakers are applicable to 12kV, three-phase AC 50Hz indoor switchgear and can serve as protection and control units for industrial and mining establishment transformer substation equipment. With modular and independent-frame design for their spring operating mechanisms, VS1-Series circuit breakers can operate with KYN28-12(24) mid-set and fixed switchgear. These circuit breakers are subject to both fixed installation and assembly with truck as a handcart unit

➤ Normal service condition

Altitude		≤1000m
Ambient temperature	Max	+40°C
	Min	-15°C
Ambient humidity:		24 hours ≤95%
Maximum average humidity		1 month ≤90%
Maximum water vapor pressure		24 hours ≤2.2kpa
		1 month ≤1.8kpa

Solar radiation is negligible. Vibration from the outside of switchgears and control-gears is negligible. The ambient air has no obvious pollution of dust smoke, corrosive or combustible gases, steams or smog

➤ Special service condition

Special operating conditions are to be agreed on by the manufacturer and user the manufacturer must be consulted in advance about each special operating condition:

- Site altitude over 1000m
 - Allow for the reduction in the dielectric strength of the air
 - Or plateau type circuit breaker should be ordered, which shall meet corresponding insulation requirements.
- Increased ambient temperature
 - Current carrying capacity is reduced
 - Provide additional ventilation for heat dissipation
- Other considerations should be consulted with the manufacturer according to Section 2.2 in IEC 62271-1

➤ Description of VS1-Series vacuum circuit breaker

VS1-Series circuit breaker are complete independently developed by Knkong based on the advance design concept; it adopts modularized mechanism, which is easy for installation, maintenance, testing and operation. As compared with conventional VS1 circuit breaker. it features in higher operation stability, higher safety and extended service life. The product can satisfy customers'demand for application in 12kv and 24kV power transmission and distribution systems, which is extensively applied in such industries as power, energy, petrochemical engineering, metallurgy, manufacture, traffic, building and environmental protection as well as large-scale enterprises and national key projects

➤ VS1-Series circuit breakers are Class M2.c2 and E2 model

Vs1-Series circuit breaker is available for environment. Maintenance-free and capable of frequent operation. Compared with traditional circuit breaker products. These breakers have their mechanical endurance raised to 20 000 ops from 10, 000 ops with an enormous improvement. The type test for capacitive current breaking shows an extraordinarily low restrike probability. These products feature prolonged electrical endurance and free

maintenance.

➤ **VS1-Series circuit breaker features high stability and high reliability**

In terms of mechanisms, VS1-Series vacuum circuit breakers are given special optimization to transmission parts. Modular spring mechanisms have such advantages as convenient maintenance, short power-off maintenance, high versatility of parts, and boast better compatibility with vacuum interrupters which greatly improves the technical parameters and delivers more excellent performance.

➤ **Applicable standards**

1EC62271-100 High-voltage switchgear and control-gear-Part 100: Alternating-current circuit-breakers

➤ **Secondary circuit**

VS1-Series vacuum circuit breakers adopt modular design for their secondary control circuit boards. The electric connection of the mechanisms employs high-grade self-fastene plugs, which both facilitates replacement and ensures reliable electrical connection

➤ **High-performance oil buffer**

High-performance breaking buffer can markedly reduce the overshoot and rebounding amplitudes of the moving contact of a vacuum circuit breaker in breaking thus avoiding the loss of mechanical endurance due to partial over fatigue of vacuum interrupter bellows resulting from moving contact overshoot. As the rebounding amplitudes of the moving contact reduces, No re-ignition and restrike is found during the switching capacitor bank test

➤ **Sophisticated process equipment, testing instruments and strictly quality management systems**

All assembly lines adopt highly precise pneumatic tools and clamps, enabling the fully- automatic assembly lines and online testing to avoid errors due to manual handling and operation;

Advanced assembling jigs and testing equipments for the production lines effectively ensure the stability and conformity of mass production:

Precise spring performance testers provide force detection for the core spring elements of circuit breakers, ensuring stable and reliable operation of the circuit breakers:

The complete incoming inspection mechanism exercises tough control on the quality of purchased and outsourced parts

High-precision circuit breaker dynamic performance testers and loop resistance testers ensure the quality of VS1Series circuit breakers:

Before leaving the factory, circuit breakers have taken 300 times endurance tests;

Strict compliance with the ISO9001 quality management system ensures the consistent high quality of Series VS1-Series vacuum circuit breakers, and complete and swift technical support provides expert solutions.

- Switching synchronization
- Switching time
- Bounce time
- Insulation test of auxiliary and control circuits
- Endurance test
- Power-frequency withstand voltage test
- Mechanical characteristic test

- Loop resistance measurement

- **Operation safety**

With anti-maloperation locking protection these circuit breakers, working in switchgear cabinets, can realize "five-protection" interlocking functions, avoiding maloperat and maximizing the protection of an operator' s personal safety.

Only when circuit breaker and earthing switch are in the disconnected position can the truck of circuit breaker be racked to the service position from the test position

The circuit breaker can be closed only when in the service/test position.

With the circuit breaker closed its truck cannot be racked in or racked out which can be realized only when the circuit breaker is in the disconnected position.

The circuit breaker in closed position cannot be racked out from the service position to the test position.

The circuit breaker cannot be closed while it is being racked in.

When the circuit breaker is closed, if the closing signal fails to be removed timely, the internal anti-trip control circuit will cut off the closing circuit to prevent multiple reclosing (optional).

If electric closing lockout is selected, the circuit breaker will be unable to be closed when the secondary circuit fails to provide power or the power provided fails to meet the normal operation of the locking electromagnet(optional).

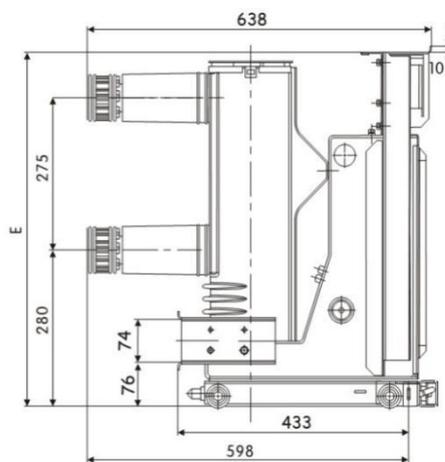
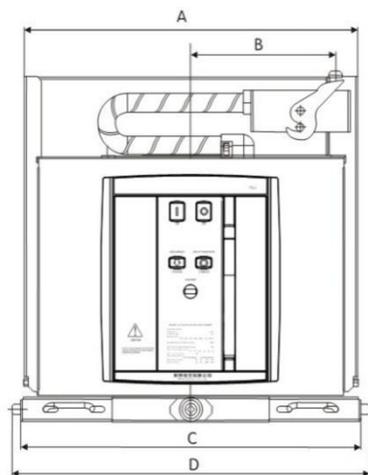
VS1-12KV Technical Parameters

No.	Item		Unit	Parameter			
1	Rated voltage		KV	12			
2	Rated frequency		Hz	50/60			
3	Rated insulation level	1min power frequency withstand voltage(r. m. s)	KV	42(phase-to-phase, phase-to-earth) 48(across the isolating distance)			
		Lighting impulse withstand voltage (peak)		75(phase-to-phase, phase-to-earth) 85(across the isolating distance)			
4	Rated current		A	630	630	1250	1600
				1250	1250	1600	2000
						2000	2500
						2500	3150
							4000
5	Rated short-circuit breaking current		KA	20	25	31.5	40
6	Rated short-time withstand current			20	25	31.5	40
7	Rated short-circuit marking current			50	63	80	100
8	Rated peak withstand current			50	63	80	100
9	Rated duration of short-circuit		s	4			
10	Rated operating sequence			O-0.3s-O/C-180s-O/C			
11	Breaking times of rated short-circuit current		Times	30/20 times(40KA)			
12	Mechanical endurance		Ops	20000			
13	Rated single capacitor bank breaking current		A	630			
14	Rated back-to-back capacitor bank breaking current			400			
15	Double-earth fault breaking current			27.4			
16	Allowable maximum contact erosion		mm	3			
17	Clearance between open contacts			10±1			
18	Over stroke			3.5±0.5			
19	Non-simultaneity of 3-phase opening and closing		ms	≤2			
20	Bounce duration of contact closing			≤2			
21	Average breaking speed (instant breaking 6mm)		m/s	1.1±0.2			
22	Average making speed			0.8±0.2			
23	Making time		ms	≤100			
24	Breaking time			≤50			
25	Resistance of each phase main circuit		μΩ	630A	≤50		
				1250A	≤45		
				1600A~2000A	≤35		
				≥2500A	≤25		
26	Contact breaking bounce amplitude		mm	≤2			
27	Rated operating voltage	Rated operating voltage(V)AC/DC	V	24*	110	220	
		Scope of normal operation voltage		Opening:65%-120% rated voltage, in case the voltage is lower than 30% rated voltage, opening operation is not allowed			
28	Rated voltage of energy storage motor		V	AC110/220,DC110/220			
29	Energy storage time		S	≤15			

*DC only-on request

VS1-12 series handcart type

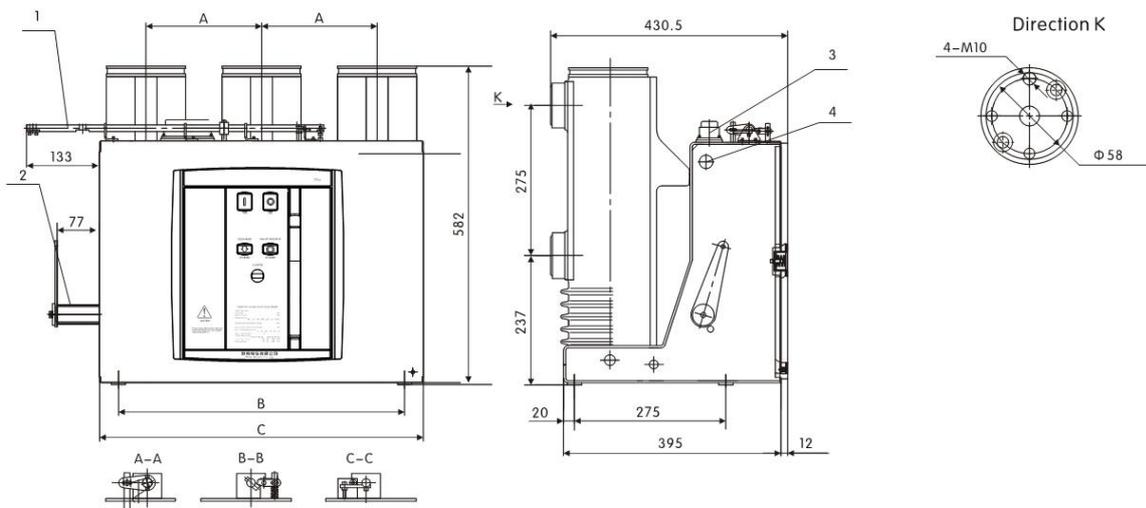
Pole Distance	Rated current(A)	Rated short-circuit breaking current (KA)	Fixed Contact(mm)
210	630	20、25、31.5	φ 35
	1250	20、25、31.5	φ 49
	1600	20、25、31.5	φ 55



Rated current (A)	Fixed contact (mm)
630	φ35
1250	φ49
1600	φ55

Cabinet width(mm)	Pole distance(mm)	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)
650	150	490	202.5	502	531	638
800	210	640	277	652	672	698
1000	275	838	377	852	881	698

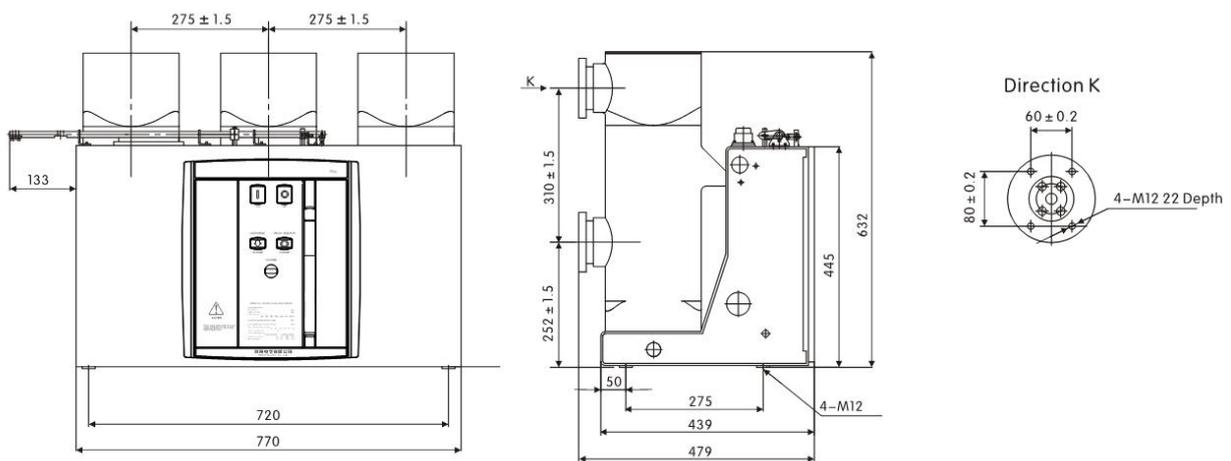
VS1-12 series: Fixed Type



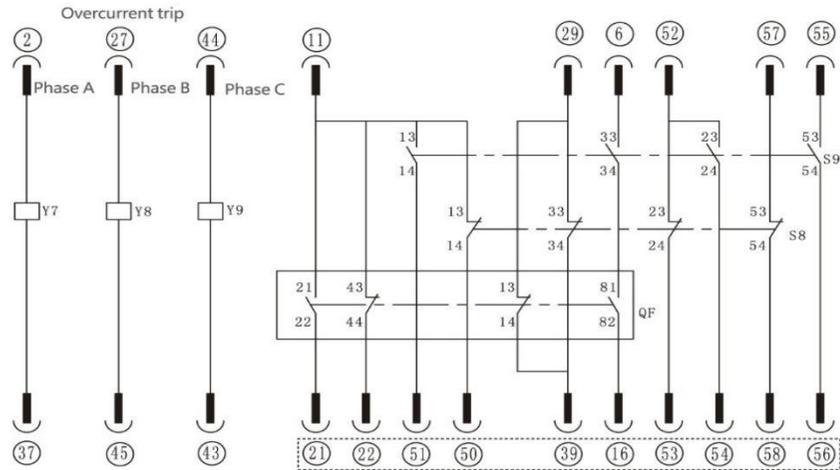
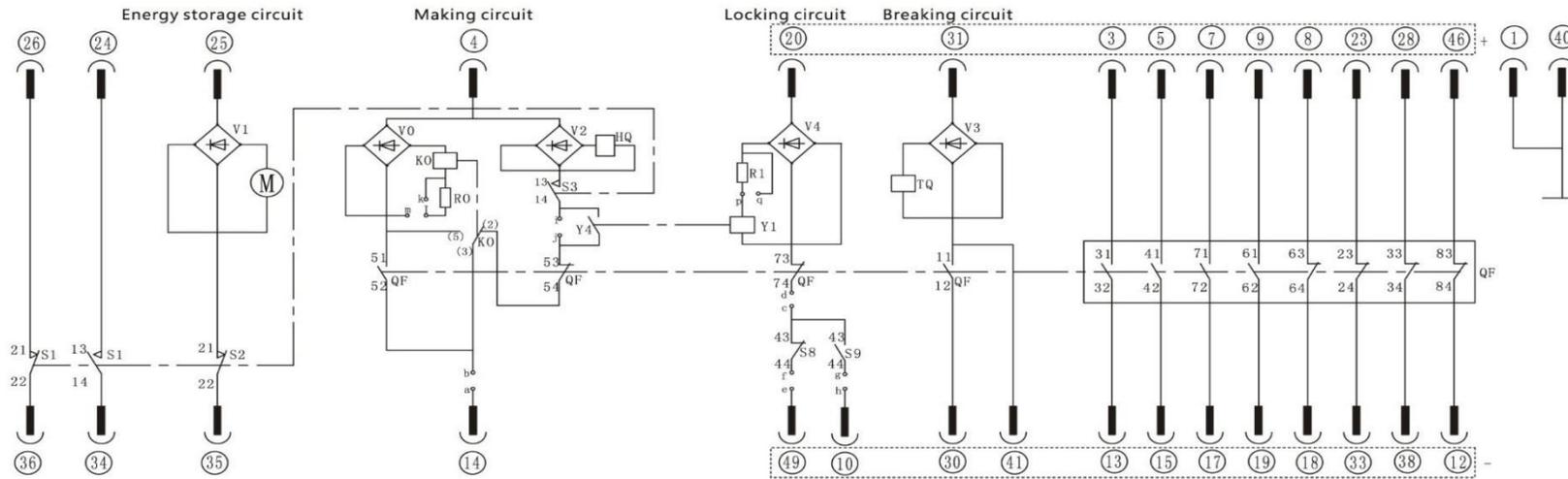
Cabinet width (mm)	Pole distance A (mm)	B(mm)	C(mm)
650	150	390	440
800	210	520	588
1000	275	720	770

Note:

- ①Opening mechanical interlock (left or right extension)
- ②Shaft interlock (left or right or no extension)
- ③46-plug secondary connector or secondary terminals
- ④Lifting holes



➤ Electric Circuit Diagram



Note:

- As shown in the figure, the circuit breaker is discharged and at opening state.
- When the operating power supply is alternating current, the polarity in the dashed box should be consistent, and the motor should be wired as following the shown polarity requirements.

Wiring setting of options

Jumper state Configuration	Jumper										
	a-b	c-d	e-f	g-h	a-f	a-g	b-c	i-j	l-m		
With anti-pumping	locking	✓	✓	✓	✓	/	/	/	/	✓	
	Without locking	/	/	/	/	✓	✓	✓	✓	/	
Without anti-pumping	locking	✓	✓	✓	✓	/	/	/	/	/	
	Without locking	/	/	/	/	✓	✓	✓	✓	/	

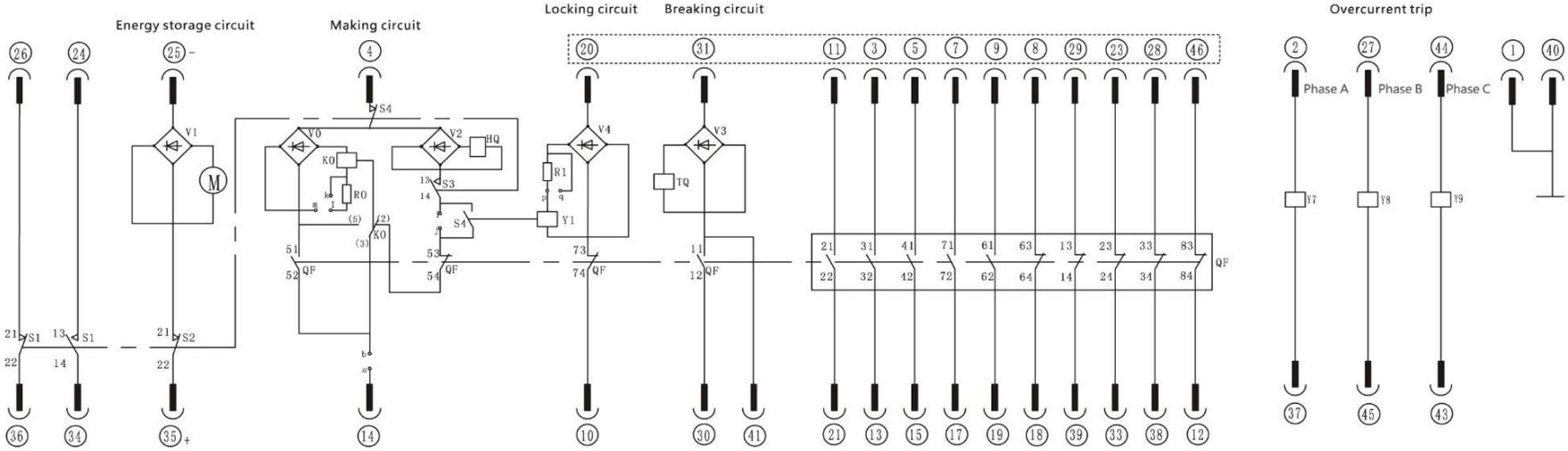
Jumper selection for operating power supply

Operating power supply	Jumper	
	p-q	k-l
AC/DC 220V	/	/
AC/DC 110V	✓	✓

Note: "/" means disconnection; and "✓" means connection.

- S9 : Auxiliary switch (working position)
- S8 : Auxiliary switch (testing position)
- Y4 : Locking electromagnet auxiliary switch
- S1-S3 : Energy-storage micro switch
- QF : Auxiliary switch
- HQ : Closing coil
- TQ : Opening coil
- R0-R1 : Resistor
- V1-V5 : Bridge rectifier
- a-m : Jumper terminal
- Y7-Y9 : Indirect overcurrent tripper (optional)
- Y1 : Locking coil (optional)
- K0 : Anti-tripping relay
- M : Motor

Electric circuit diagram of handcard type VS1-Series



Note:

- 1.As shown in the figure, the circuit breaker is in a state of no energy storage and breaking.
- 2When the operating power supply is of direct current, the polarity in the dashed box should be consistent, and the motor should be wired following the polarity requirements shown in the figure.

- HQ : Closing coil
- TQ : Opening coil
- R0-R1 : Resistor
- V1-V5 : Bridge rectifier
- S1-S3 : Energy-storage micro switch
- QF : Auxiliary switch
- a-m : Jumper terminal
- Y7-Y9 : Indirect overcurrent tripper (optional)
- Y1 : Locking coil (optional)
- K0 : Anti-tripping relay
- M : Motor
- S4 : Locking electromagnet auxiliary switch

Wiring setting of options

Jumper state Configuration	Jumper	Jumper		
		b-a	i-j	l-m
With anti-pumping	With locking	√	/	√
	Without locking	√	√	√
Without anti-pumping	With locking	√	/	/
	Without locking	√	√	/

Jumper selection for operating power supply

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

Note: "/" means disconnection; and "√" means connection.

Electric circuit diagram of fixed type VS1-Series

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