DECLARATION

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Wechat Contact

AISIKAI-2023VCBSG-V1.0

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ASKV5

HIGH VOLTAGE VACUUM CIRCUIT BREAKER

OPERATION MANUAL



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AiSIKAI®

COMPANY PROFILE

Since established in 2007, AISIKAI has been committed to the manufacture, research, development and marketing of the high-quality high and low voltage electric switches. Our product lines cover level Ⅰ,Ⅱ,Ⅲ power distribution fields. We are awarded as the National High Tech Enterprise, Double-Soft Certified Enterprise (i.e., software product certified and software enterprise certified), Little Giant Science and Technology Enterprise of Jiangsu Province, and Contract-keeping and Trustworthy Enterprise. We have invention patents, utility model patents and appearance patents. All of AISIKAI products have China Compulsory Certification (CCC) and China Quality Certification (CQC). From 2014, we have been recognized as Yangzhou City Engineering Technology Center and National Adopting International Standard Enterprise.

AISIKAI products have CE certification and IEC CB certification. We have passed the ISO9001 Quality Management System and ISO14001 Environment Management System, ISO45001 Occupational Health Management System, and SGS Global Qualified Supplier Authentication.

QUALITY, SERVICE, REPUTATION, INNOVATION is AISIKAI's unchanging company principle. We're always eager to make progress to offer reliable products and impeccable services. With your support and trust, AISIKAI will thrive and work towards a brighter future.

OVERVIEW

ASKV5 series indoor high voltage vacuum circuit breaker (abbreviated as VCB) is the next generation vacuum circuit breaker independently developed and manufactured by our company which is competitive in the industry. VCB is used for AC 50Hz and rated voltage 12kV, 24KV, 40.5KV indoor device, suitable for a variety of different loads and frequent operation sites. VCB has an independently developed new type spring operating mechanism with simple mechanism and reliable operation.

VACUUM CIRCUIT BREAKER SELECTION TABLE

ASK V 5 – I – 12kV / 1600A / 31·5kA

① ② ③ ④ ⑤ ⑥ ⑦

①	Company name	AISIKAI ELECTRIC
②	Product code	High voltage vacuum circuit breaker
③	Design serial	5
④	Structure code	No code: VS1; I: VBI
⑤	Rated voltage	12kV/24kV
⑥	Rated current	630、1250、1600、2000、2500、3150、4000A
⑦	Rated short-time withstand current	20kA/25kA/31.5kA/40kA

APPLICATIONS

VCB are widely used in power plants, power grids, metallurgy, petrochemical, urban infrastructure such as airports, buildings, subway and other projects. In the power distribution system, VCB can be applied to control and protect cables, overhead lines, transformers, engines, generators and capacitor sets.

STANDARDS

The technical parameters of VCB fully comply with GB1984, GB/T11022 and Chinese electric power industry standard DL403, and also meet the provisions of IEC62271-100, IEC56 standard specification and other major industrialized countries' relevant standards.

OPERATION SAFETY

VCB have perfect mechanical and electrical interlocking devices. VCB have high operation reliability and long service life. When working with the matched cabinets, VCB can complete the safe power distribution function, ensuring the safety of operators and equipment.

CLASSIFICATION

Installation method	Handcart sleeve coupling type, handcart solid-sealed type, fixed sleeve coupling type, fixed solid-sealed type
Operation method	Electric; Manual(for inspection and maintenance)
Spring mechanism	VS1 double springs mechanism; VBI single spring mechanism
Inlet and outlet wiring method	Upper inlet and lower outlet; lower inlet and upper outlet

SLEEVE COUPLING TYPE STRUCTURE OVERVIEW

The vacuum arc extinguish chamber of the ASKV5 series sleeve coupling type indoor high voltage AC vacuum circuit breaker's main circuit is positioned in the enclosed insulating cylinder. The insulating cylinder is made of epoxy resin with reliable mechanical and electrical performance. The cylinder is moulded adopting the advanced automatic pressure gelation (APG) process. The cylinder functions not only a support, and also as insulation between phase and phase, between phase and ground.

The design of the insulating cylinder fully takes into account the requirements of the national standard and the harsh working conditions. It can not only prevent the vacuum arc extinguish chamber from being affected by the external environment, but also prevent dust and foreign matter from entering the main circuit. It also ensures that even in humid, hot and heavily polluted environments, it presents a high resistance state to the voltage effect.

SOLID-SEALED TYPE STRUCTU REOVERVIEW

The main electrical circuit is in the form of solid-sealed polar poles using solid insulation method. This is a special embedding technology to achieve solid insulation of the main electrical circuit by casting the vacuum arc extinguisher and conductive parts with ultra-low resistance value in epoxy resin. The operating mechanism is a new type of spring operating mechanism.

The primary main circuit of circuit breaker uses solid-sealed polar poles with solid insulation technology. The solid-sealed polar poles. The vacuum arc extinguisher and other parts of the primary conductive circuit are sealed directly in a special epoxy resin material using advanced automatic pressure gelation (APG) process to form a main electrical circuit module. Double skirt design is used at the mounting end of the solid-sealed polar pole. The polar pole has the characteristics of large creepage ratio distance, high mechanical strength, high precision of parts, small number of parts, without secondary adjustment and small lap surface. The electric field distribution of the poles is uniform, avoiding the damage to the organic insulation caused by the local electric field concentration. What's more, this structure design can simplify the assembly process of primary main circuit, completely avoid the problem of loosening the primary main circuit connection bolts due to vibration in operation, ensure the high reliability of the primary main circuit connection, and make it possible to realize the maintenance-free primary main circuit of the circuit breaker.

NORMAL OPERATIONAL CONDITIONS AND INSTALLATION METHODS

Category	Requirement
Altitude	Lower than 1000 meters.
Operational temperature	Between -5℃ and +40℃.
Operational humidity	The relative humidity at +40℃ shall not exceed 50%. Higher relative humidity is allowed at lower temperature. The average maximum relative humidity is 90% in the most humid month and this month has the average minimum temperature of +25℃. The condensation that occurs on the surface of the product due to temperature changes should also be taken into consideration.
Installation conditions	Use environment should be without strong vibration and shock. The magnetic field near the installation site should not exceed 5 times the geomagnetic field in any direction.
Installation method	Install horizontally.
Wiring method	Upper inlet and lower outlet. Wiring reversely is acceptable.

MAIN TECHNICAL PARAMETERS

Item		Unit	Technical parameters							
Rated voltage		kV	12					24		
Rated insulation level	Rated short-time power frequency withstand voltage(1min)	kV	42					65		
	Rated lightning impulse withstand voltage (peak)	kV	75					125		
Rated frequency		Hz	50					50		
Rated current		A	630 1250	630 1250	1250 1600 2000 2500 3150 4000	1250 1600 2000 2500 3150 4000	3150 4000	630 1250	630 1250	1250 1600 2000 2500 3150
Rated short-circuit breaking current		kA	20	25	31.5	40	50	20	25	31.5
Rated short-time withstand current		kA	20	25	31.5	40	50	20	25	31.5
Rated peak withstand current		kA	50	63	80	100	125	50	63	80
Rated short-circuit closing current (peak)		kA	50	63	80	100	125	50	63	80
4s thermal stable current		kA	20	25	31.5	40	50	20	25	31.5
Rated dynamic stable current		kA	50	63	80	100	125	50	63	80
Rated capacitor set closing surge current		kA	12.5 (frequency not higher than 1000Hz)							
Rated single/back-to-back capacitor set breaking current		A	630 / 400							
Rated short-circuit duration		S	4							
Secondary circuit power frequency withstand voltage		V	2000							
Rated operational voltage	Closing coil	V	AC 110 / 220 DC 110 / 220					AC 110 / 220 DC 110 / 220		
	Opening coil	V	AC 110 / 220 DC 110 / 220							
	Energy storage motor	V	AC 110 / 220 DC 110 / 220							
Opening time (rated voltage)		ms	20~50					⩽45		
Closing time (rated voltage)		ms	30~70					⩽60		
The allowable wear cumulative thickness of moving and fixed contacts		mm	3							
Energy storage Time		s	⩽15					⩽15		
Contact opening distance		mm	11±1					13±1		
Overtravel		mm	3~4					4±1		
Contact closing bounce Time		ms	⩽ 2							
Three phase opening/closing non-synchronous characteristic		ms	⩽ 2							
Average opening speed [1]		m/s	0.9~1.3					1.1~1.7		
Average closing speed [2]		m/s	0.4~0.8		0.5~0.9 (side-mounted)			0.6~1.1		
Contact opening rebound amplitude		mm	⩽ 2		⩽3(side-mounted)			⩽ 3		
Main conductive circuit resistance		μΩ	⩽55 (630A)		⩽45(630A side mounted)			Rated current	handcart type	fixed type
			⩽45 (1250A)		⩽40(1250A side mounted)			630~1250A	⩽60	⩽50
			⩽35 (1600A~2000A)					1600~2000A	⩽35	⩽30
			⩽25 (2500A以上)					2500A以上	⩽25	⩽20

1.The average opening speed refers to the average speed of the breaker contact just after opening 6mm.

2.12kV circuit breaker: the average closing speed refers to the average speed of the breaker contact before closing 8mm
24kV circuit breaker : the average closing speed refers to the average speed of the circuit breaker contacts full opening distance.

3.When the rated short-circuit breaking current＜40kA，θ =0.3s，When the rated short-circuit breaking current is ≥40kA, θ =180s.

Contact closing contact pressure	N	2000±200(20KA)	
		2400±200(25KA)	
		3100±200(31.5KA)	
		4750±200(40KA)	
Rated operation order [3]		O-0.3s-CO-180s-CO / O-180s-CO-180s-CO	
Mechanical service life	times	30000 (31.5kA and below)	20000
		20000 (40kA and above)	

1.The average opening speed refers to the average speed of the breaker contact just after opening 6mm.

2.12kV circuit breaker: the average closing speed refers to the average speed of the breaker contact before closing 8mm
24kV circuit breaker : the average closing speed refers to the average speed of the circuit breaker contacts full opening distance.

3.When the rated short-circuit breaking current＜40kA，θ =0.3s，When the rated short-circuit breaking current is ≥40kA, θ =180s.

Energy Storage Motor Technical Parameters(Sleeve Coupling Type)

Model	Rated voltage	Rated input power(W)		Normal operation voltage range	Energy storage time at rated voltage(S)
		12kV	24kV		
ZYJ55-1	DC110V	75,100	70 ,100	85%~110%rated voltage	≤15
	DC220V				

Energy Storage Motor Technical Parameters(Solid-sealed Type)

Model	Rated voltage	Rated input power(W)		Normal operation voltage range	Energy storage time at rated voltage(S)
		12kV	24kV		
ZYJ55-1	DC110V	70 ,100		——	≤15
	DC220V				

Technical Parameters of Closing and Opening Electromagnets and Related Electrical Components

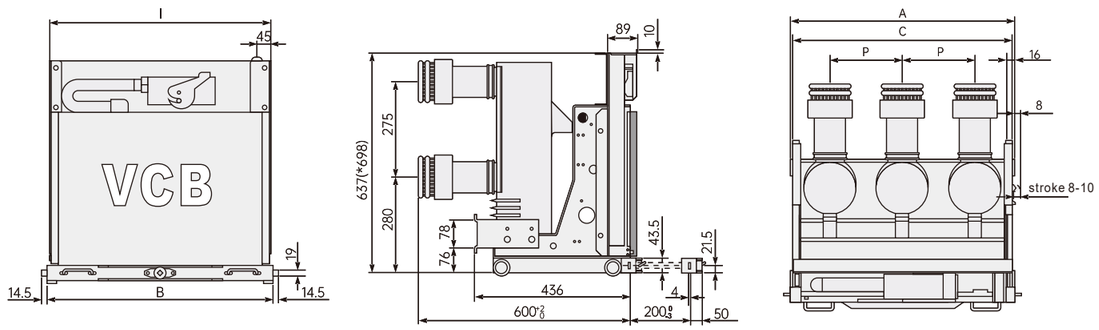
Item \ category	Closing electromagnet		Opening electromagnet		Locking electromagnet		Anti-tripping relay	
Rated operational voltage(V)	DC220V	DC110V	DC220V	DC110V	DC220V	DC110V	DC220V	DC110V
Rated operational current(A)	1.1	2.2	1.1	2.2	25mA		9.1mA	
Rated power(W)	242	242	242	242	2.7		1.0	
Normal operational voltage range	85%~110% rated voltage		65%~120% rated voltage; If at voltage lower than 30% of rated voltage, the switch cannot open.		——		——	

Secondary Control Circuit Solution Portfolio

Control voltage	Locking solution	Anti-tripping solution	Under-voltage tripping solution	Over-current tripping solution		
AC220V	With electrical locking	With anti-tripping relay	With under-voltage tripper	With over-current tripper	Number of over-current trippers	Action current value
DC220V					2 units/3 units	3.5/5
AC110V	Without electrical locking	without anti-tripping relay	Without under-voltage tripper	Without over-current tripper		
DC110V						

OUTLINE AND INSTALLATION DIMENSIONS-HANDCART SLEEVE COUPLING

12kV Low Current Handcart Vacuum Circuit Breaker Outline Dimensions(630A~1600A)



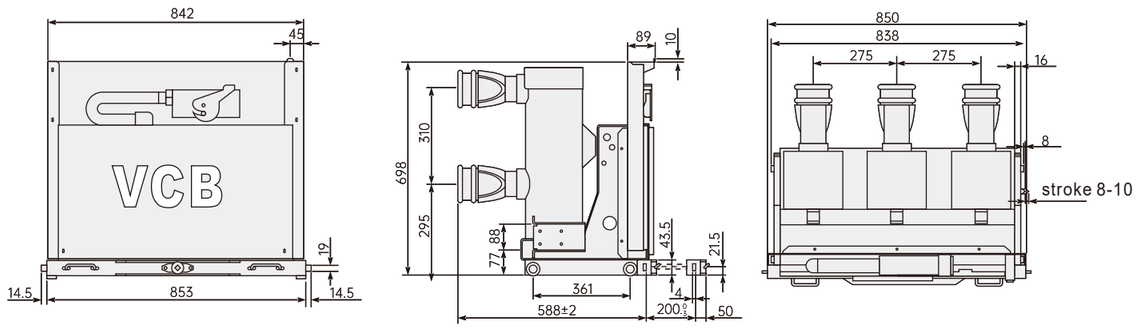
Rated current(A)	Rated short-circuit breaking current(KA)	P(mm)	A(mm)	B(mm)	C(mm)	I(mm)	Supporting cabinet width(mm)
630~1250	20~40	150	502	503	492	492	650
630~1600		210	650	653	640	638	800
		275	850	853	838	842	1000

	Rated current(A)	Star-shaped contact	Static contact size(mm)
Moving and static contact fit size	630	CT-24	Ø44
	1250	CT-30	Ø50
	1600	CT-36	Ø55

1.Main circuit adopts sleeve coupling type

2.In the diagram (*698) is an optional solution for the height of the sealing plates with phase spacing 275

12kV High Current Handcart Vacuum Circuit Breaker Outline Dimensions(1600A~4000A)

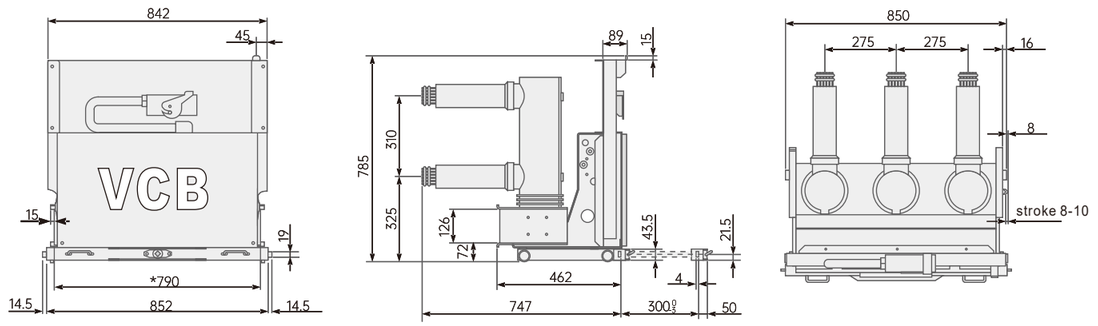


Rated current(A)	Rated short-circuit breaking current(kA)	Supporting cabinet width(mm)
630~4000	25~40	1000

Main circuit adopts sleeve type

	Rated current(A)	Star-shaped contact	Static contact size(mm)
Moving and static contact fit size	1600~4000	CT-48	Ø79
	2500~3150	CT-64	Ø109
	4000	CT-82	

24kV Handcart Vacuum Circuit Breaker Outline Dimensions(630A~1600A)

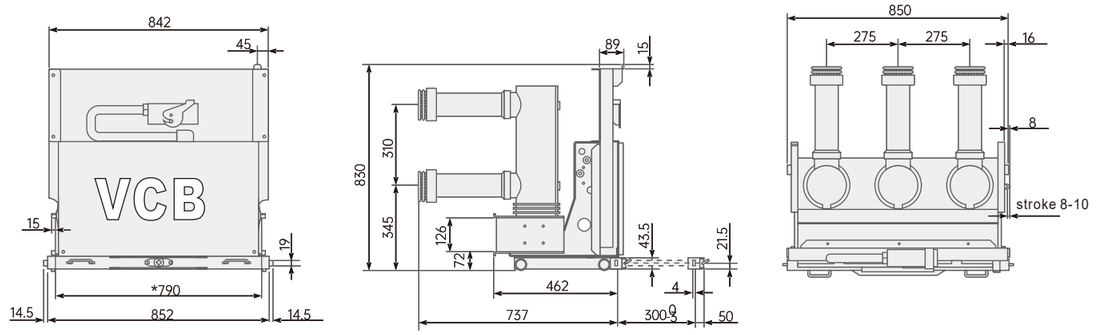


Rated current(A)	Rated short-circuit breaking current(KA)	Supporting cabinet width(mm)
630	40 and below	1000
1250		
1600		

Main circuit adopts sleeve type

	Rated current(A)	Star-shaped contact	Static contact size(mm)
Moving and static contact fit size	630	CT-20	Ø35
	1250	CT-30	Ø49
	1600	CT-36	Ø55

24kV Handcart Vacuum Circuit Breaker Outline Dimensions(1600A~3150A)



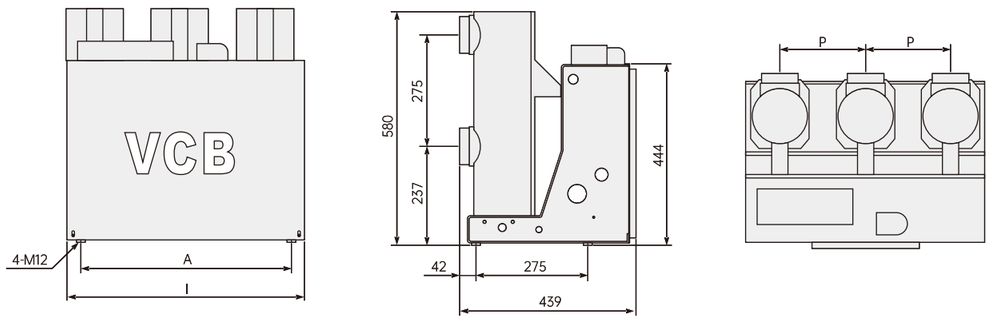
Rated current(A)	Rated short-circuit breaking current(KA)	Supporting cabinet width(mm)
1600/2000/2500	40 and below	1000
2500/3150		

Main circuit adopts sleeve type

	Rated current(A)	Star-shaped contact	Static contact size(mm)
Moving and static contact fit size	1600/2000/2500	CT-20	Ø35
	2500/3150	CT-30	Ø49

OUTLINE AND INSTALLATION DIMENSIONS-FIXED SLEEVE COUPLING

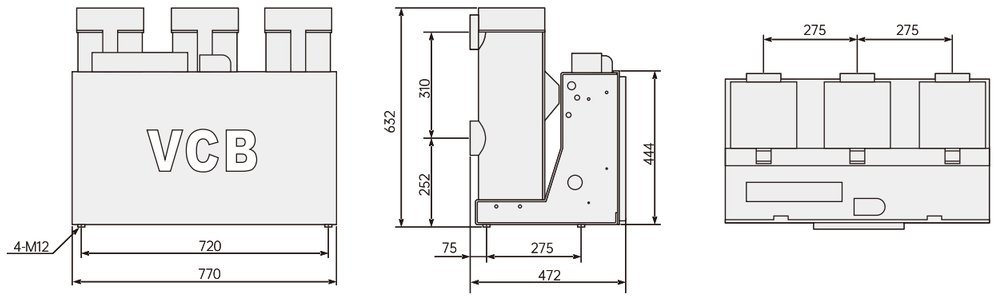
12kV Low Current Fixed Vacuum Circuit Breaker Outline Dimensions(630A~1600A)



Rated current(A)	Rated short-circuit breaking current(kA)	P(mm)	I(mm)	A(mm)	Supporting cabinet width(mm)
630~1600	20~40	210	588	520	800
		275	770	720	1000

Main circuit adopts sleeve type.

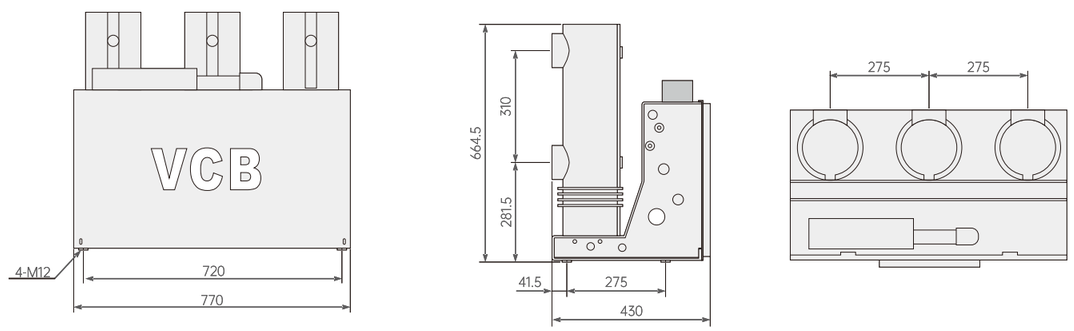
12kV high current handcart vacuum circuit breaker dimensions(1600A~4000A)



Rated current(A)	Rated short-circuit breaking current(kA)
1600~4000	25~40

Main circuit adopts sleeve type

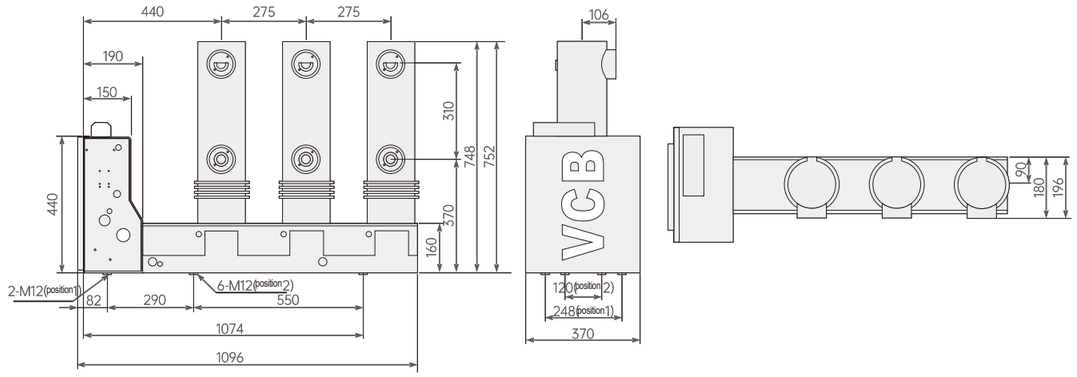
24kV Fixed Vacuum Circuit Breaker Outline Dimensions(630A~1600A)



Rated current(A)	Rated short-circuit breaking current(KA)	Supporting cabinet width(mm)
630/1250/1600	40 and below	1000

Main circuit adopts sleeve type.

24kV Side-mounted Vacuum Circuit Breaker(Sleeve Coupling) Dimensions(630A~1250A)

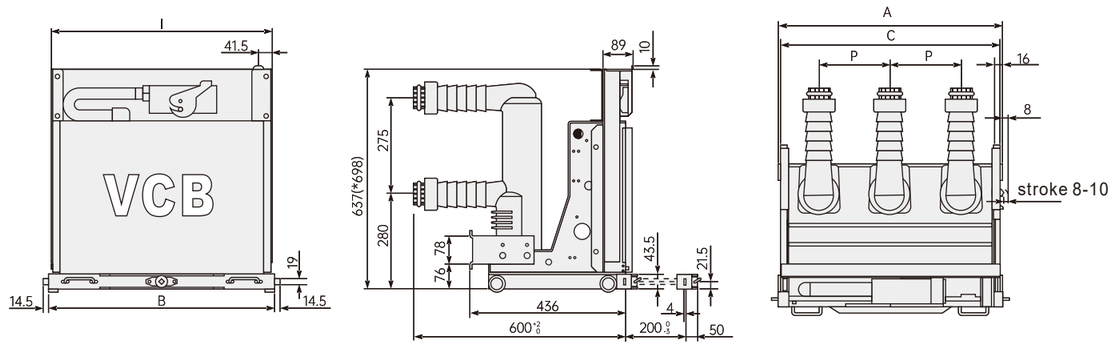


Rated current(A)	Rated short-circuit breaking current(KA)	Supporting cabinet width(mm)
630~1250	20~40	370

Main circuit adopts sleeve type.

OUTLINE AND INSTALLATION DIMENSION DRAWING

12kV Low Current Handcart Vacuum Circuit Breaker Outline Dimensions(630A~1600A)



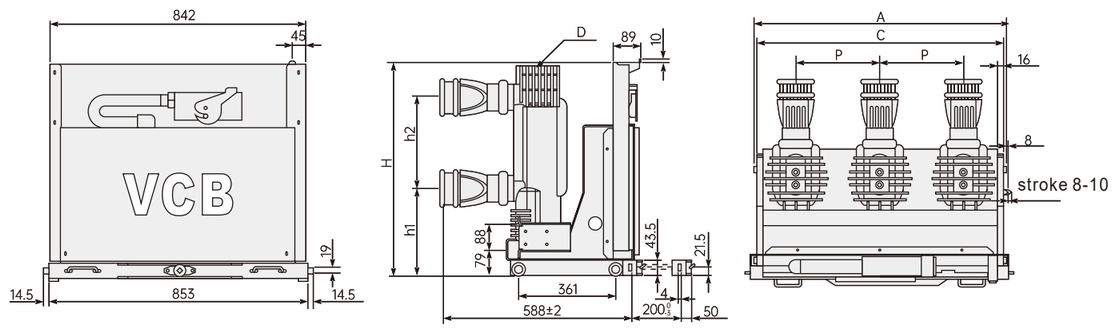
Rated current(A)	Rated short-circuit breaking current(kA)	P(mm)	A(mm)	B(mm)	C(mm)	I(mm)	Supporting cabinet width(mm)
630~1600	20~40	210	650	653	640	635	800
		275	850	853	838	842	1000

	Rated current(A)	Star-shaped contact	Static contact size(mm)
Moving and static contact fit size	630	CT-24	Ø35
	1250	CT-30	Ø49
	1600	CT-36	Ø55

1.Main circuit adopts solid-sealed type

2.In the diagram (*698) is an optional solution for the height of the sealing plates with phase spacing 275

12kV High Current Handcart Vacuum Circuit Breaker Outline Dimensions(1600A~4000A)



Rated current(A)	Rated short-circuit breaking current(kA)	P(mm)	A(mm)	B(mm)	C(mm)	H(mm)	I(mm)	h1/h2(mm)		Supporting cabinet width(mm)
1600~2000	25~40	275	850	853	838	698	842	295/310	280/310	1000
2500~4000		275	850	853	838	735	842			
*4000	31.5~40									

	Rated current(A)	Star-shaped contact	Static contact size(mm)
Moving and static contact fit size	1600~2000	CT-48	Ø79
	2500~3150	CT-64	Ø109
	4000	CT-82	

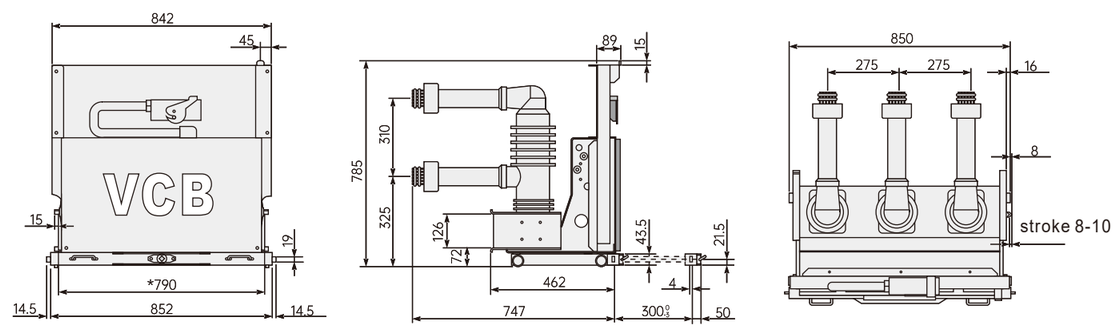
1.Main circuit with solid-sealed pole;

2.When the rated current is 2500A and above, the circuit breaker must have a cooling cover D;

3.Rated current up to 4000A when use forced cold air;

4.* This specification is a special type. Please contact our technician before ordering.

24kV Handcart Vacuum Circuit Breaker Outline Dimensions(630A-1250A)

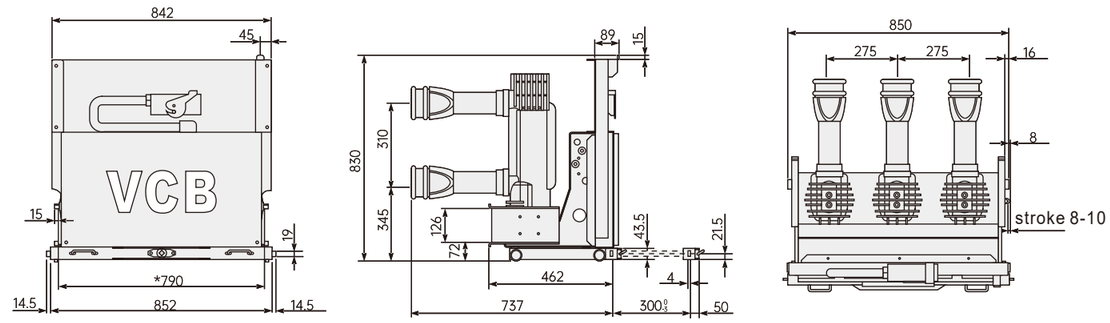


Rated current(A)	Rated short-circuit breaking current(KA)	Supporting cabinet width(mm)
630	31.5and below	1000
1250		

	Star-shaped contact	Static contact size(mm)
Moving and static contact fit size	CT-24	Ø35
	CT-30	Ø49

Main circuit with solid-sealed pole.

24kV Handcart Vacuum Circuit Breaker Outline Dimensions(1600A-3150A)



Rated current(A)	Rated short-circuit breaking current(KA)	Supporting cabinet width(mm)
1600	31.5and below	1000
1600/2000/2500min		
2500max/3150		

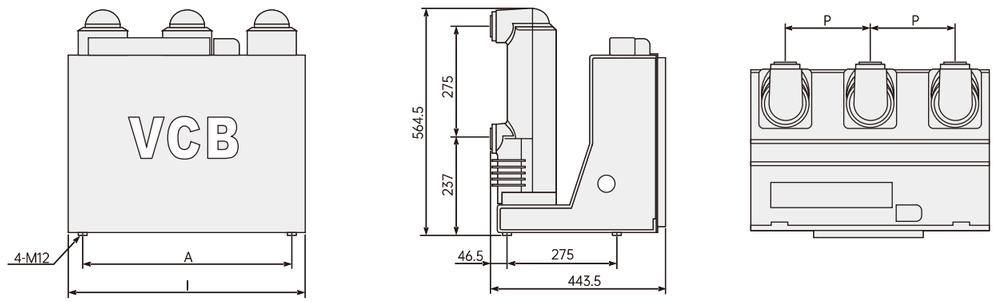
	Star-shaped contact	Static contact size(mm)
Moving and static contact fit size	CT-36	Ø55
	CT-48	Ø79
	CT-64	Ø109

1.Main circuit with solid-sealed pole;

2.*min/max:represent the size of pole.

OUTLINE AND INSTALLATION DIMENSIONS-FIXED SOLID SEALED

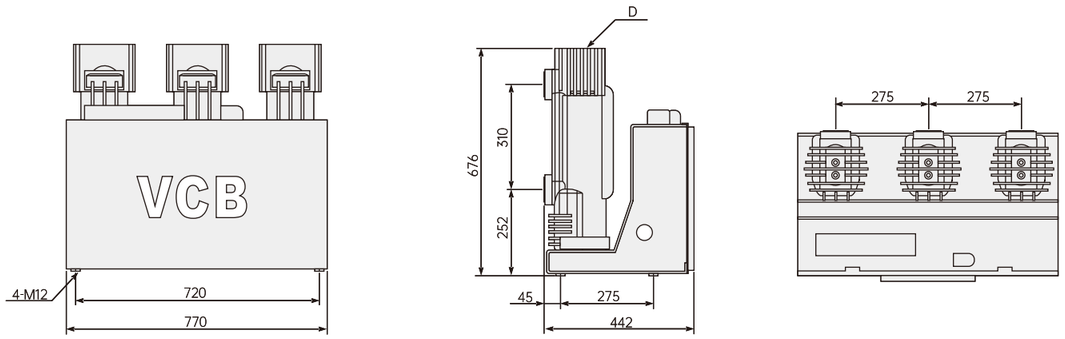
12kV Low Current Fixed Vacuum Circuit Breaker Outline Dimensions(630A~1600A)



Rated current(A)	Rated short-circuit breaking current(kA)	P(mm)	I(mm)	A(mm)	Supporting cabinet width(mm)
630~1600	20~40	210	588	520	800
		275	770	720	1000

Main circuit with solid-sealed pole.

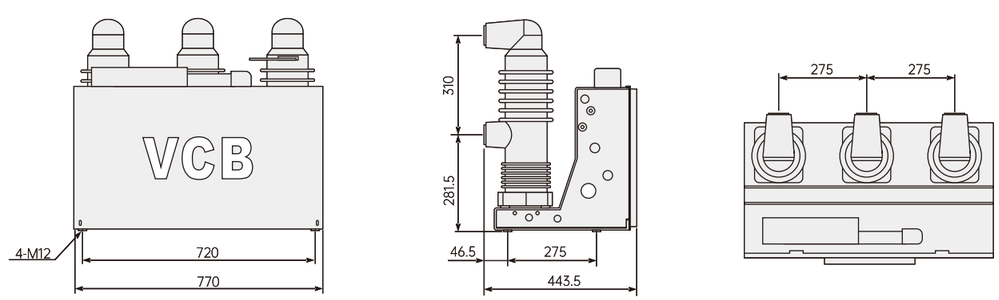
12kV High Current Fixed Vacuum Circuit Breaker Outline Dimensions(1600A~4000A)



Rated current(A)	Rated short-circuit breaking current(kA)
1600~4000	20~40
*4000	31.5~40

1.Main circuit with solid-sealed pole;
2.When the rated current is 2500A and above, the circuit breaker must have a cooling cover D;
3.Rated current up to 4000A when use forced cold air;
4.* This specification is a special type. Please contact our technician before ordering.

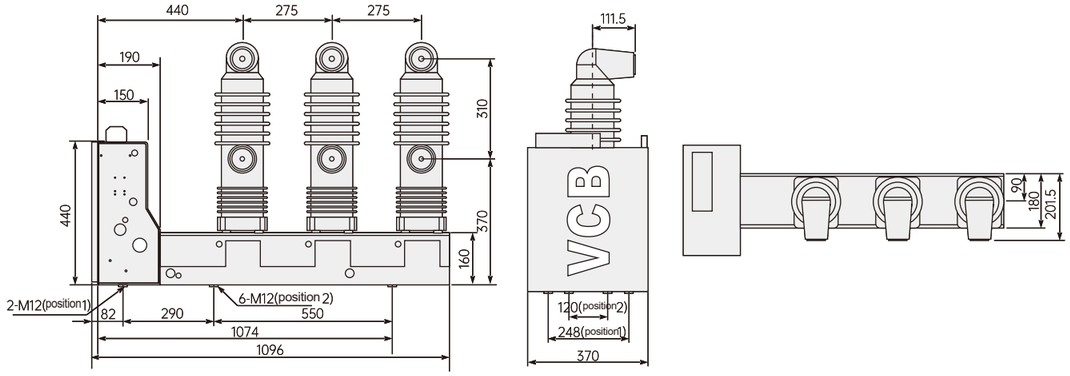
24kV Fixed Vacuum Circuit Breaker Outline Dimensions(630A~1250A)



Rated current(A)	Rated short-circuit breaking current(KA)	Supporting cabinet width(mm)
1600~2500	31and below	1000

Main circuit with solid-sealed pole.

24kV Side-mounted Vacuum Circuit Breaker(Solid-sealed) Outline Dimensions(630A~1250A)

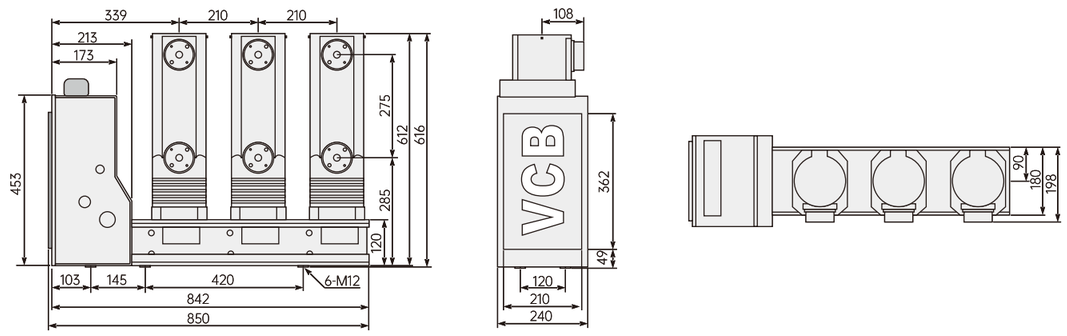


Rated current(A)	Rated short-circuit breaking current(KA)	Supporting cabinet width(mm)
630~1250	20~31.5	370

Main circuit with solid-sealed pole.

OUTLINE AND INSTALLATION DIMENSIONS

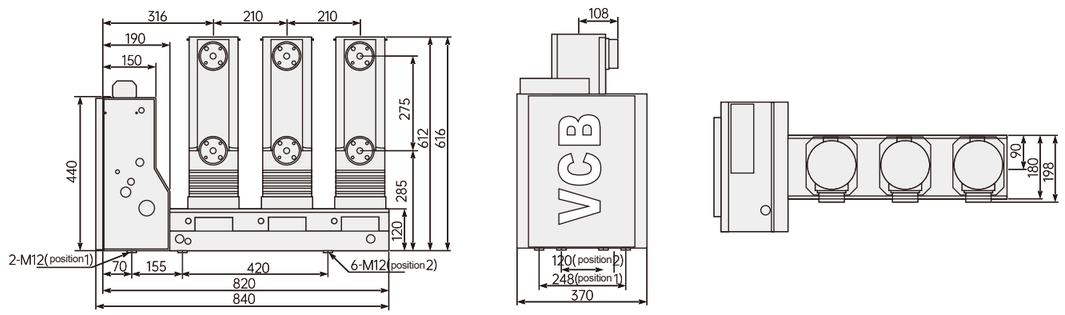
12kV (A) side mounted vacuum circuit breaker (fixed type) dimensions(630A~1600A)



Rated current(A)	Rated short-circuit breaking current(kA)	Supporting cabinet width(mm)
630~1600	20~40	240

Main circuit adopts sleeve type

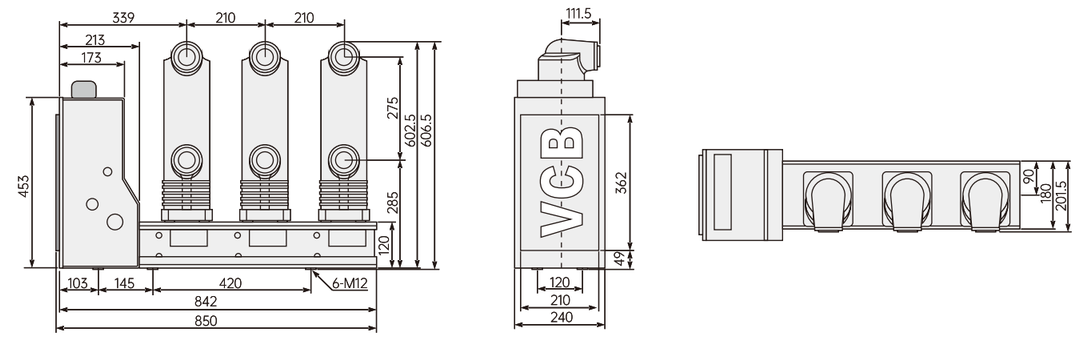
12kV (B) side mounted vacuum circuit breaker (fixed type) dimensions(630A~1250A)



Rated current(A)	Rated short-circuit breaking current(kA)	Supporting cabinet width(mm)
630~1250	20~40	370

Main circuit adopts sleeve type

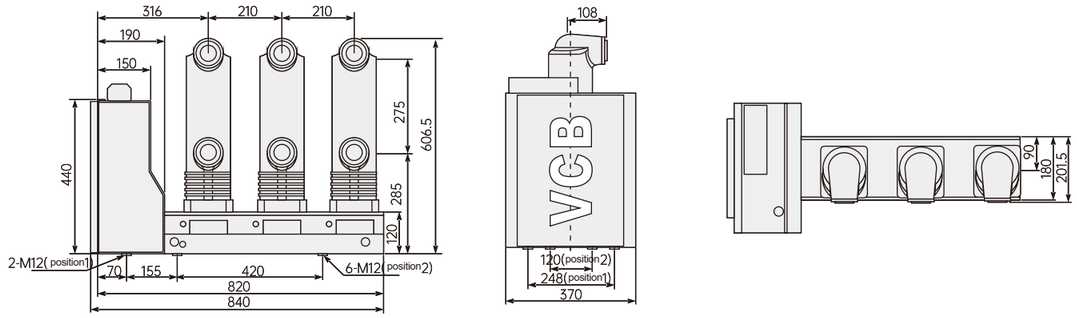
12kV Side-mounted Vacuum Circuit Breaker(Fixed) Outline Dimensions(Type C)(630A~1600A)



Rated current(A)	Rated short-circuit breaking current(kA)	Supporting cabinet width(mm)
630~1600	20~40	240

Main circuit adopts sleeve type

12kV Side-mounted Vacuum Circuit Breaker(Fixed) Outline Dimensions(Type D)(630A-1600A)

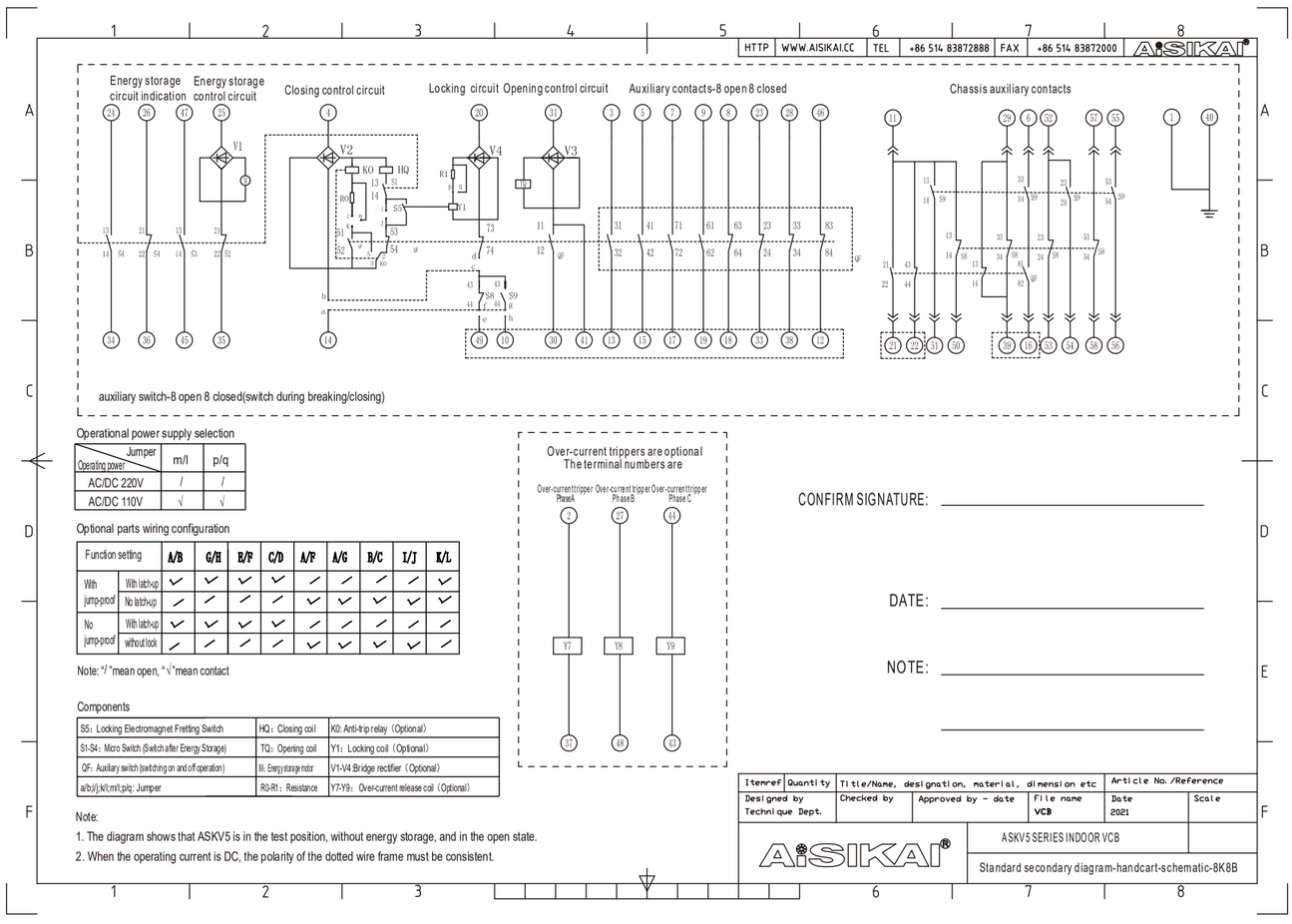


Rated current(A)	Rated short-circuit breaking current(kA)	Supporting cabinet width(mm)
630~1600	20~40	370

Main circuit adopts sleeve type

ELECTRICAL SCHEMATIC DIAGRAM

Handcart vacuum circuit breaker electrical schematic diagram-8 open 8 closed



Operational power supply selection

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

Optional parts wiring configuration

Function setting		A/B	G/H	B/F	C/D	A/F	A/G	B/C	I/J	K/L
With jump-proof	With latch-up	✓	✓	✓	✓	／	／	／	／	✓
	No latch-up	／	／	／	／	✓	✓	✓	✓	✓
No jump-proof	With latch-up	✓	✓	✓	✓	／	／	／	／	／
	without lock	／	／	／	／	✓	✓	✓	✓	／

Note: "/ "mean open, " √"mean contact

Components

SS: Locking Electromagnet Fretting Switch	HQ: Closing coil	KD: Anti-trip relay (Optional)
S1-S4: Micro Switch (Switch after Energy Storage)	TQ: Opening coil	Y1: Locking coil (Optional)
QF: Auxiliary switch (switching on and off operation)	M: Energy storage motor	V1-V4:Bridge rectifier (Optional)
a/b/j/k/l,m/l,p/q: Jumper	R0-R1: Resistance	Y7-Y9: Over-current release coil (Optional)

Note:
1. The diagram shows that ASKV5 is in the test position, without energy storage, and in the open state.
2. When the operating current is DC, the polarity of the dotted wire frame must be consistent.

Over-current trippers are optional
The terminal numbers are

Over-current tripper Phase A: 2, Y7, 37
Over-current tripper Phase B: 27, Y8, 48
Over-current tripper Phase C: 18, Y9, 43

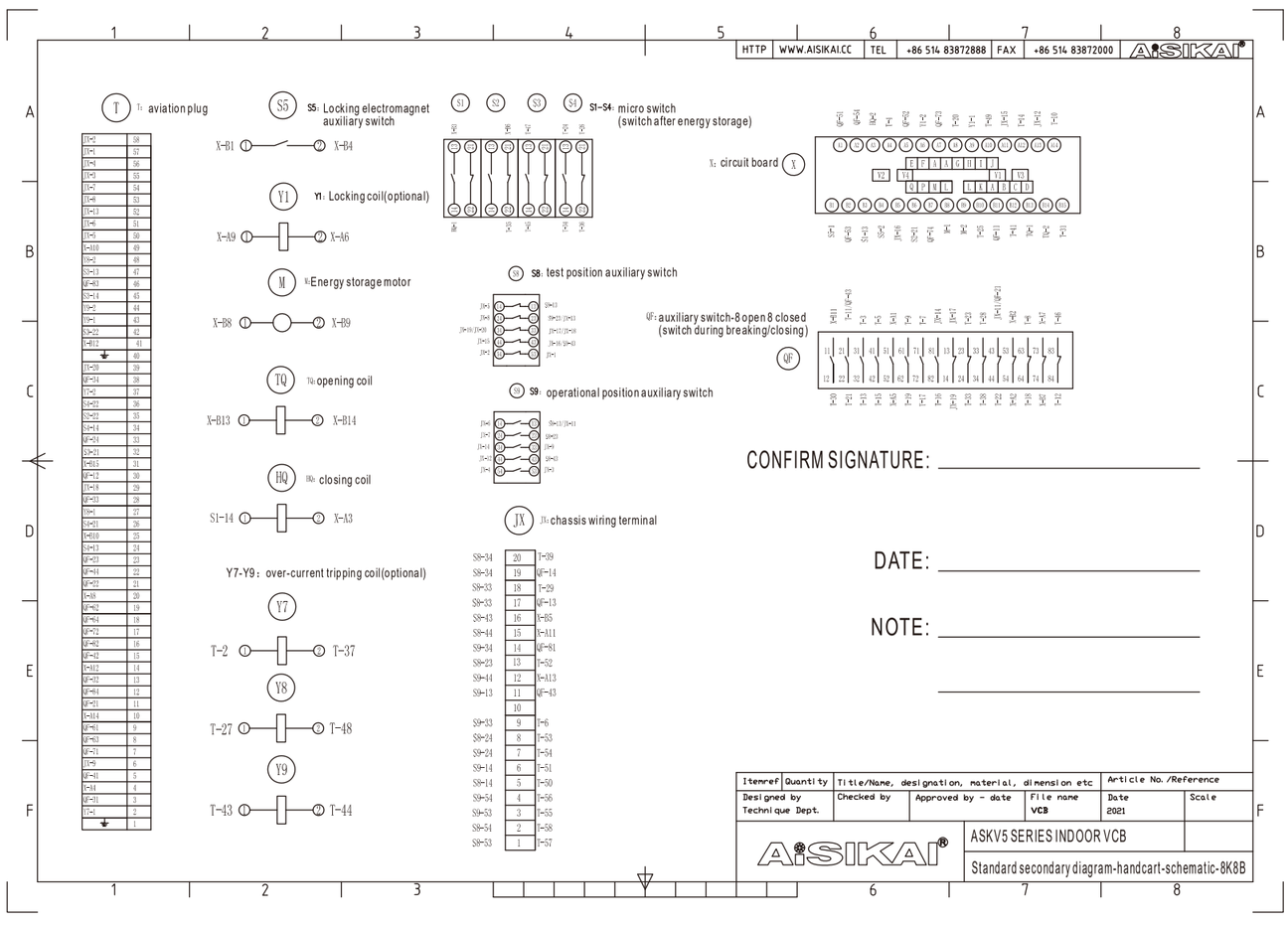
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Itemref	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference
Designed by Technique Dept.	Checked by	Approved by - date	File name VCB	Date 2021	Scale
AISIKAI®	ASKV5 SERIES INDOOR VCB				
	Standard secondary diagram-handcart-schematic-8K8B				

Handcart vacuum circuit breaker secondary wiring diagram-8 open 8 closed



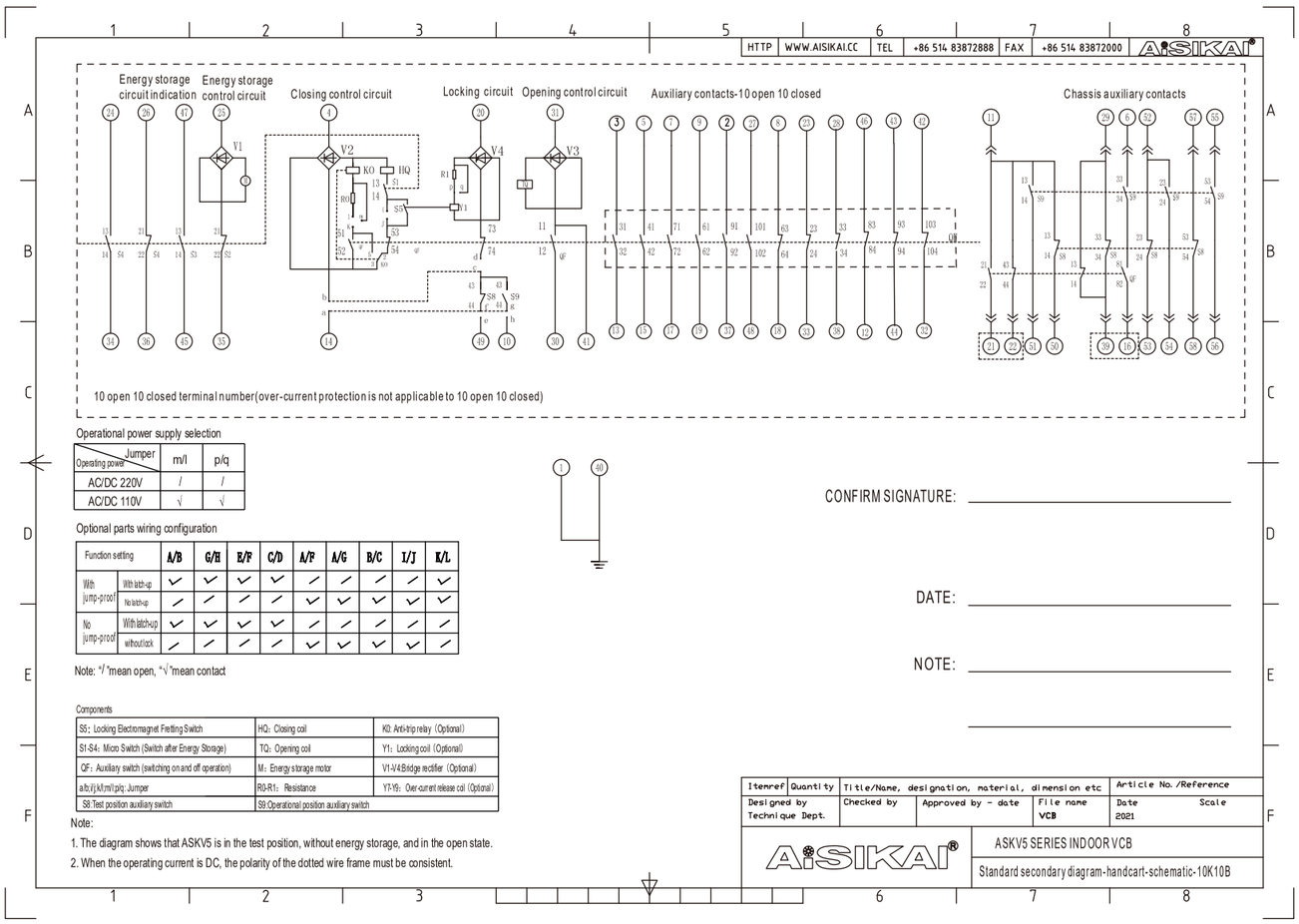
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Designed by Technique Dept.	Checked by	Approved by - date	File name VCB	Date 2021	Scale
AISIKAI®	ASKV5 SERIES INDOOR VCB				
	Standard secondary diagram-handcart-schematic-8K8B				

Handcart vacuum circuit breaker electrical schematic diagram- 10 open 10 closed



Operational power supply selection

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

Optional parts wiring configuration

Function setting		A/B	G/H	E/F	C/D	A/F	A/G	B/C	I/J	K/L
With jump-proof	With latch-up	✓	✓	✓	✓	/	/	/	/	✓
	No latch-up	/	/	/	/	✓	✓	✓	✓	✓
No jump-proof	With latch-up	✓	✓	✓	✓	/	/	/	/	/
	without latch	/	/	/	/	✓	✓	✓	✓	/

Note: "/" mean open, "√" mean contact

Components

S5: Locking Electromagnet Fleting Switch	HQ: Closing coil	K0: Anti-trip relay (Optional)
S1-S4: Micro Switch (Switch after Energy Storage)	TQ: Opening coil	Y1: Locking coil (Optional)
QF: Auxiliary switch (switching on and off operation)	M: Energy storage motor	V1-V4:Bridge rectifier (Optional)
a/b/j/jl/kf,m1/p/q: Jumper	R0-R1: Resistance	Y7-Y9: Over-current release coil (Optional)
S8:Test position auxiliary switch	S9:Operational position auxiliary switch	

Note:
1. The diagram shows that ASKV5 is in the test position, without energy storage, and in the open state.
2. When the operating current is DC, the polarity of the dotted wire frame must be consistent.

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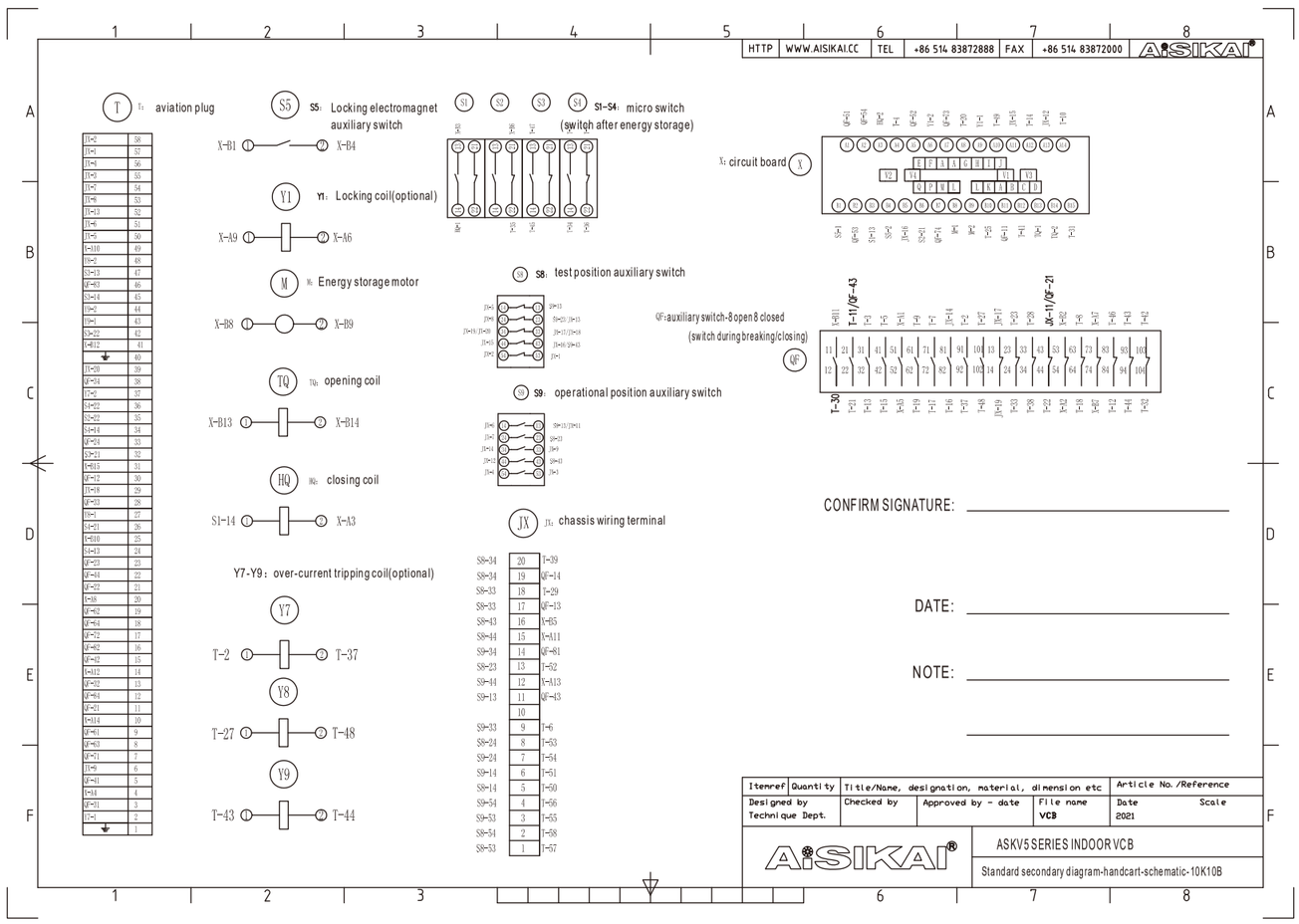
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Itemref	Quantity	Title/Name, designation, material, dimension etc		Article No./Reference
Designed by Technique Dept.	Checked by	Approved by - date	File name VCB	Date 2021 Scale

AISIKAI® ASKV5 SERIES INDOOR VCB

Standard secondary diagram-handcart-schematic-10K10B

Handcart vacuum circuit breaker secondary wiring diagram- 10 open 10 closed



CONFIRM SIGNATURE: _____

DATE: _____

NOTE: _____

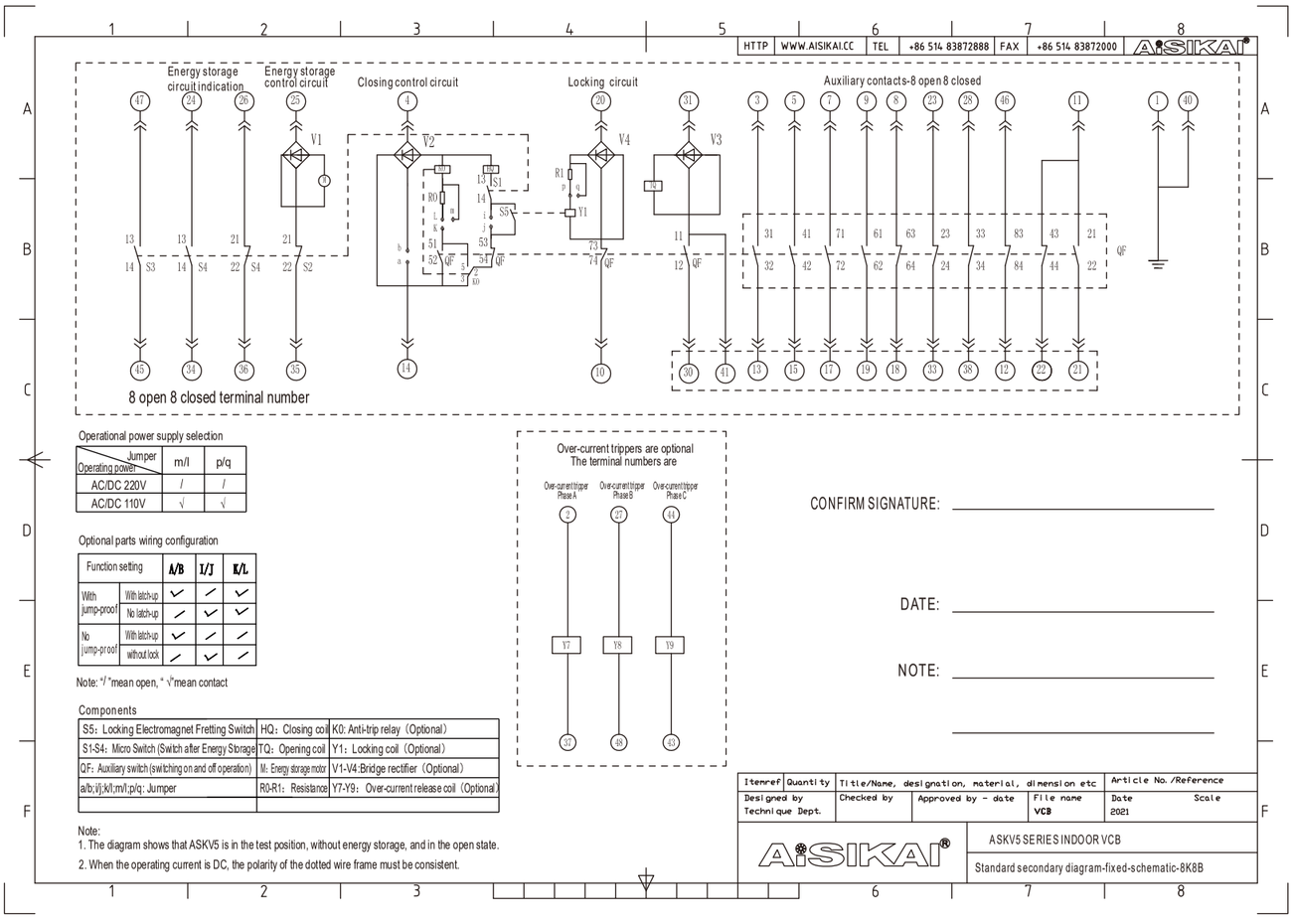
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Designed by Technique Dept.	Checked by	Approved by - date	File name VCB	Date 2021 Scale

AISIKAI® ASKV5 SERIES INDOOR VCB

Standard secondary diagram-handcart-schematic-10K10B

ELECTRICAL SCHEMATIC DIAGRAM

Fixed vacuum circuit breaker electrical schematic diagram- 8 open 8 closed



Operational power supply selection

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

Optional parts wiring configuration

Function setting		A/B	I/J	K/L
With jump-proof	With latch-up	√	/	√
	No latch-up	/	√	√
No jump-proof	With latch-up	√	/	/
	without lock	/	√	/

Note: "/ "mean open, " √"mean contact

Components

S5：Locking Electromagnet Fretting Switch	HQ：Closing coil	K0: Anti-trip relay（Optional）
S1-S4：Micro Switch (Switch after Energy Storage)	TQ：Opening coil	Y1：Locking coil（Optional）
QF：Auxiliary switch (switching on and off operation)	M：Energy storage motor	V1-V4:Bridge rectifier（Optional）
a/b;ij;kl;m/l;p/q: Jumper	R0-R1：Resistance	Y7-Y9：Over-current release coil（Optional）

Note:
1. The diagram shows that ASKV5 is in the test position, without energy storage, and in the open state.
2. When the operating current is DC, the polarity of the dotted wire frame must be consistent.

Over-current trippers are optional
The terminal numbers are

CONFIRM SIGNATURE: _____

DATE: _____

NOTE: _____

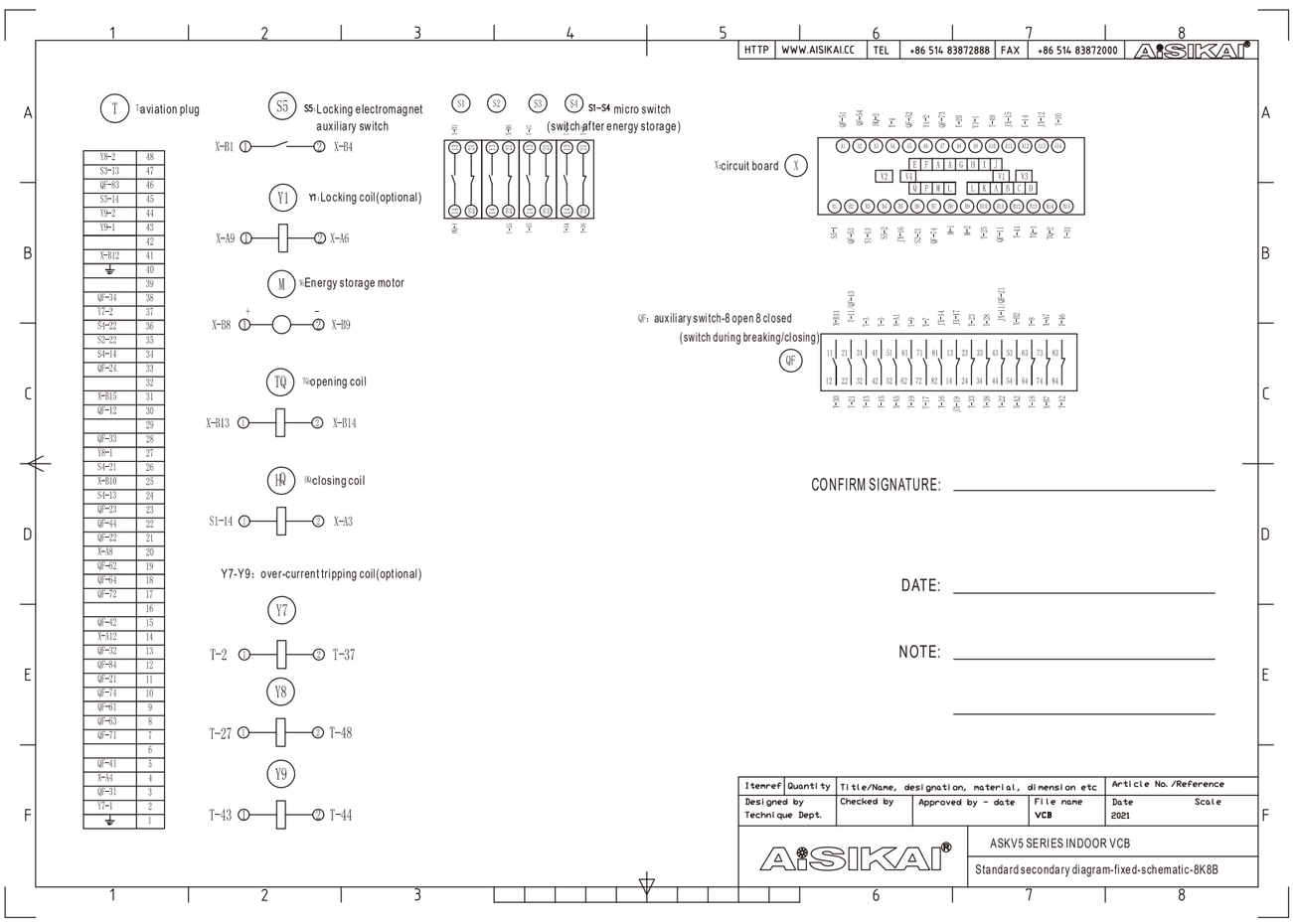
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Designed by Technique Dept.		Checked by	Approved by - date	File name VCB	Date 2021 / Scale

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ASKV5 SERIES INDOOR VCB

Standard secondary diagram-fixed-schematic-8K8B

Fixed vacuum circuit breaker second wiring diagram-8 open 8 closed



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NOTE: _____

Itemref	Quantity	Title/Name, designation, material, dimension etc			Article No. /Reference
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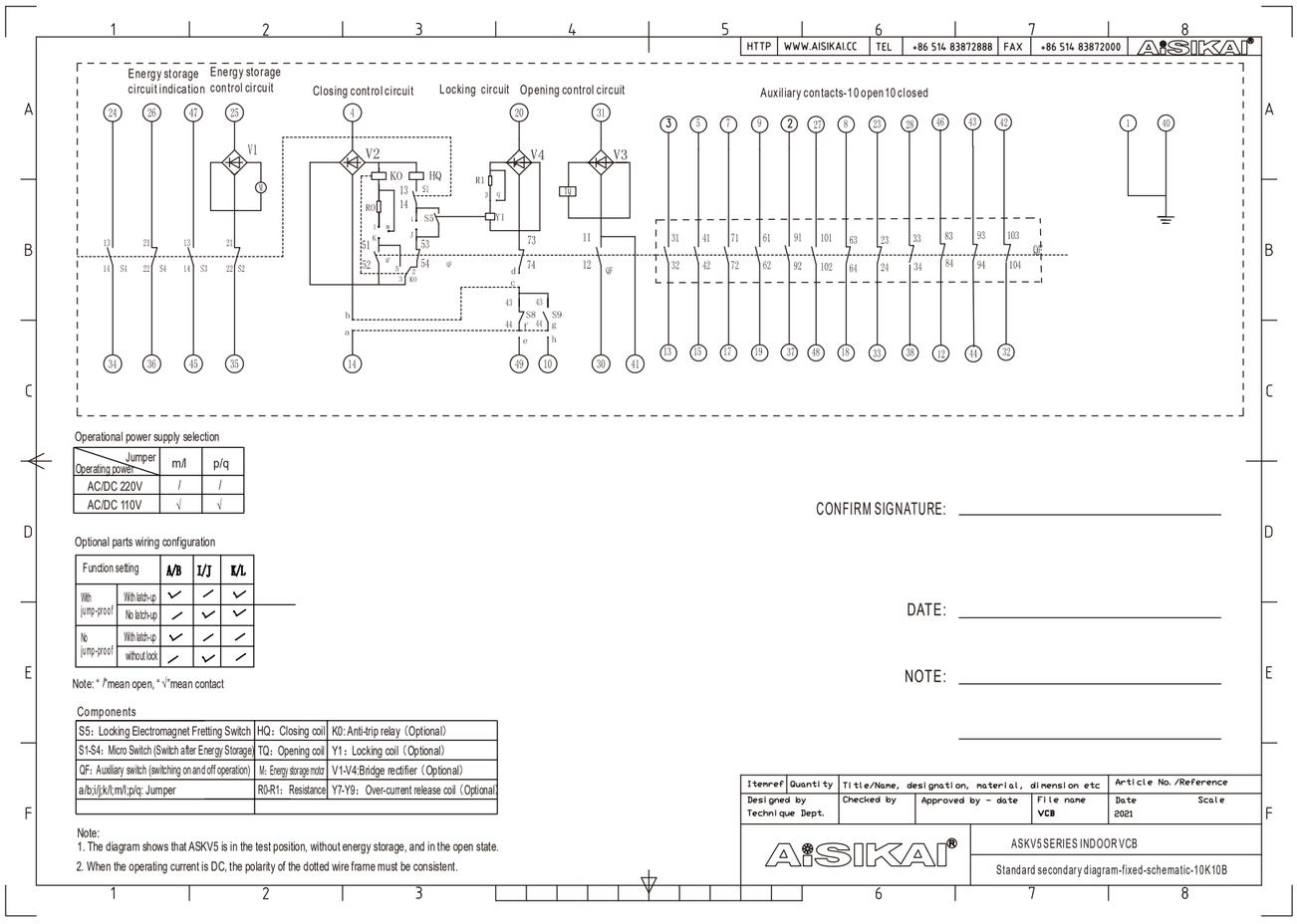
AISIKAI®

ASKV5 SERIES INDOOR VCB

Standard secondary diagram-fixed-schematic-8K8B

ELECTRICAL SCHEMATIC DIAGRAM

Fixed vacuum circuit breaker electrical schematic diagram- 10 open 10 closed



Operational power supply selection

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

Optional parts wiring configuration

Function setting		A/B	I/J	K/L
With jump-proof	With latch-up	√	/	√
	No latch-up	/	√	√
No jump-proof	With latch-up	√	/	/
	without lock	/	√	/

Note: " /"mean open, " √"mean contact

Components

S5：Locking Electromagnet Fretting Switch	HQ：Closing coil	K0: Anti-trip relay（Optional）
S1-S4：Micro Switch (Switch after Energy Storage)	TQ：Opening coil	Y1：Locking coil（Optional）
QF：Auxiliary switch (switching on and off operation)	M：Energy storage moto	V1-V4:Bridge rectifier（Optional）
a/b;i/j;k/l;m/l;p/q: Jumper	R0-R1：Resistance	Y7-Y9：Over-current release coil（Optional）

Note:
1. The diagram shows that ASKV5 is in the test position, without energy storage, and in the open state.
2. When the operating current is DC, the polarity of the dotted wire frame must be consistent.

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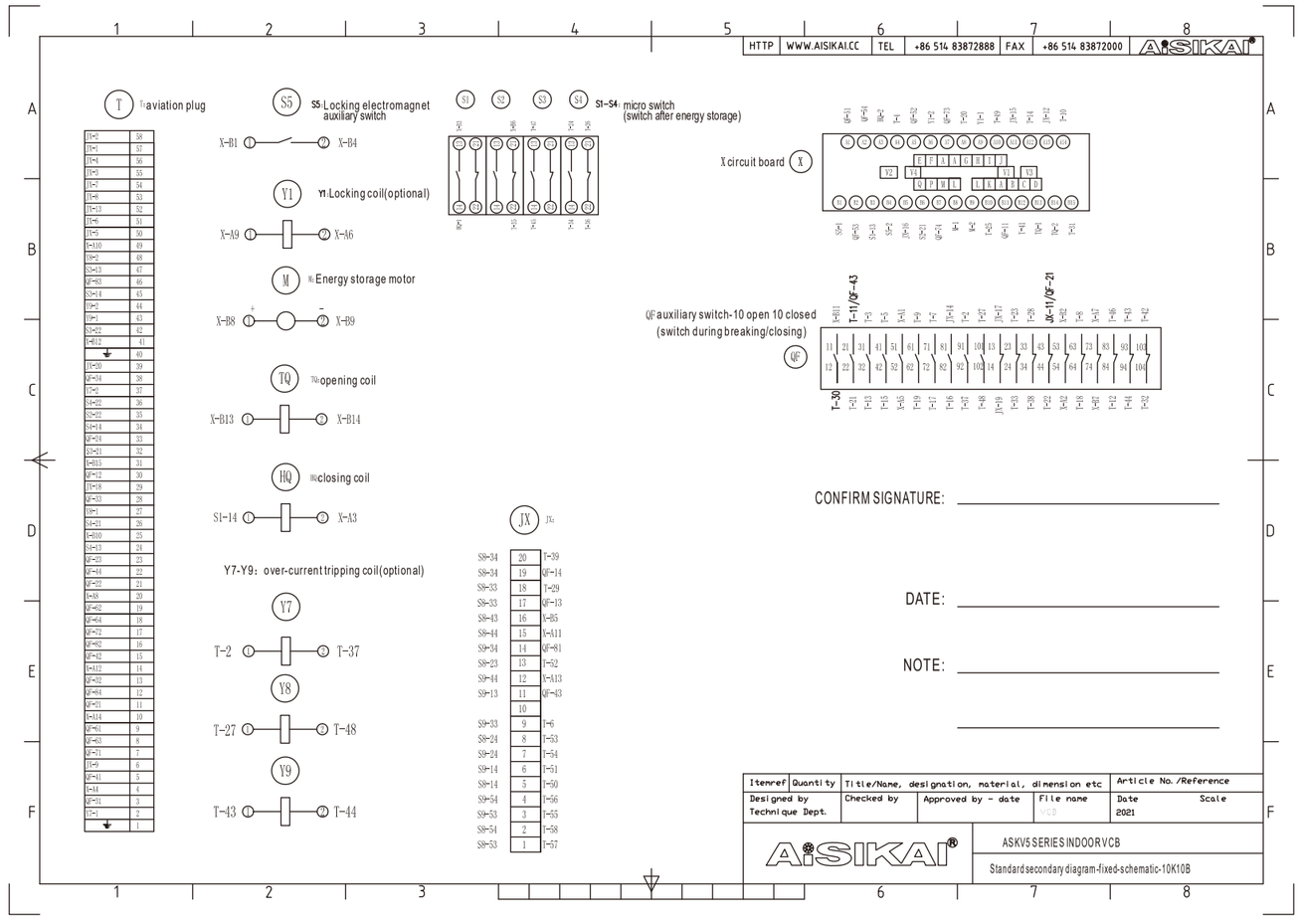
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Designed by Technique Dept.	Checked by	Approved by - date	File name VCB	Date 2021 / Scale

AISIKAI® ASKV5 SERIES INDOOR VCB

Standard secondary diagram-fixed-schematic-10K10B



CONFIRM SIGNATURE: _____

DATE: _____

NOTE: _____

Itemref	Quantity	Title/Name, designation, material, dimension etc		Article No. /Reference
Designed by Technique Dept.	Checked by	Approved by - date	File name	Date 2021 / Scale

AISIKAI® ASKV5 SERIES INDOOR VCB

Standard secondary diagram-fixed-schematic-10K10B

PRODUCT STRUCTURE AND FEATURES

OVERALL STRUCTURE

The overall structure of the circuit breaker adopts design arranging the operating structure in front and the arc extinguishing chamber in behind. The main circuit part is a three-phase floor-standing structure. The vacuum arc extinguishing chamber is installed longitudinally in a tubular insulating cylinder. The insulating cylinder is made of epoxy resin formed by automatic pressure gelation (APG) process, thus it is particularly resistant to creeping. This structure design greatly reduces the accumulation of dust on the surface of the arc extinguishing chamber. It not only prevents the vacuum arc extinguishing from being damaged by external factors, but also ensures a high resistance state to voltage effects even in hot, humid and heavily polluted environments.

OPERATING MECHANISM

The operating mechanism of VCB is an energy storage spring operating mechanism in planar layout, with manual energy storage and electric energy storage function. The mechanism box of the circuit breaker is also used as the frame of the operating mechanism. The operating mechanism is placed in the mechanism box in front of the arc extinguishing chamber. The mechanism box is divided into five assembly spaces by four intermediate spacers, which are equipped with the energy storage part, transmission part, tripping part and buffering part of the operating mechanism. The front and rear are equipped with closing and opening buttons, manual energy storage operation hole, spring energy storage status indication plate, and close and open indication plate. In this way, the arc extinguishing chamber in front and the mechanism in rear form a whole, making the two more compatible, reducing the unnecessary intermediate transmission process, reducing energy consumption and noise, so that the operation performance is more reliable.

VACUUM ARC EXTINGUISHING CHAMBER

The circuit breaker is equipped with middle-sealed ceramic or glass vacuum arc extinguishing chamber, copper-chromium contact material and cup-shaped longitudinal magnetic field contact structure. The contacts have small electrical wear rate, long electrical life, high level of voltage resistance, stable dielectric insulation strength, fast recovery after arc extinguishing, low interception level, and high breaking capacity.

WORKING PRINCIPLE

ENERGY STORAGE

The energy required to close the circuit breaker is provided by the closing spring energy storage. Energy storage can be performed by an external power driven motor or manually using the storage handle.

Energy storage: the energy storage motor 15 fixed on the frame is energized to output torque, and the sprocket wheel 14 is driven to rotate through the single-phase bearing 13 of the motor output shaft 16; or insert the energy storage handle into the manual energy storage hole and crank clockwise to drive the sprocket 14 through the worm gear and worm (10, 11). Then through the chain 9 drive sprocket 3 rotate. When sprocket 3 rotates, baffle pin 1 pushes the slider 2 on wheel 5 so that energy storage shaft 21 follows the rotation, and through the crank arm 19 on the two sides, stretching the closing spring for energy storage. When reaching the energy storage position, the frame's position limit rod pressed down slider 2, so that the energy storage shaft and sprocket drive system disconnect. Energy storage holding detent 7 is pushed against the roller 6 to maintain the energy storage position. At the same time, the toggle plate 23 on the energy storage shaft drives energy storage indication plate to flip, showing the mark "energy storage". The stroke switch is switched. The power supply of energy storage motor is cut off. The circuit breaker is in the ready state for closing.

CLOSE OPERATION

After the mechanism energy storage, if the closing signal is received, the closing electromagnet 17 moves or the close button is pressed, the energy storage holding shaft 8 rotates, driving the detent 7 to release the roller 6 and lift the energy storage holding, the closing spring 18 releases energy, the energy storage shaft 21 and the cam 22 on the shaft rotate clockwise, through the transmission crank arm 36, the transmission shaft 37 drives the insulation lever 34 to drive the moving contact upward into the closing position, and compress the contact spring 33 to maintain the contact pressure required.

After the close action is completed, the closing detent 40 and the half shaft 42 maintain the closing position, at the same time, the energy storage indication plate, energy storage stroke switch reset, the motor power supply circuit is turned on, the indication plate shows "close" mark. If the external power supply is also turned on, then VCB enters the energy storage state again. Note: When the circuit breaker is in the closed state or the optional locking device is not connected to the external power supply or in the process of pushing in handcart type circuit breaker , the close operation cannot be performed.

OPEN OPERATION

After the close action is completed, once the opening signal is received or the open button is pressed, the opening tripper electromagnet or the over-current tripper electromagnet operates so that the closing hold detent 40 is released from the restraint of the opening half shaft 42. The energy stored by the contact spring 33 and the opening spring 35 makes the fixed and moving contacts in the arc extinguishing chamber 29 separate to achieve the open operation. In the latter part of the opening process, the hydraulic buffer absorbs the remaining energy and limits the opening position. The indication plate shows "close" mark. At the same time, the counter 43 is pulled and counts. The drive linkage pulls the main auxiliary switch to switch.

Note: In order to prevent accidents, all the operations on the operating mechanism(e.g., adding add lubricant) should be carried out in the energy non-stored state. The repair of circuit breakers should be carried out by professionally trained personnel or manufacturer's service personnel in order to make the correct adjustments.

CIRCUIT BREAKER INTERNAL STRUCTURE DIAGRAM

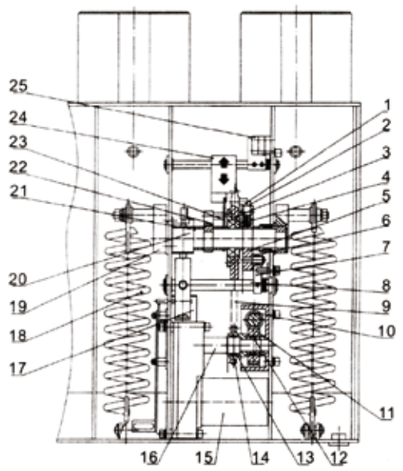


Figure 3

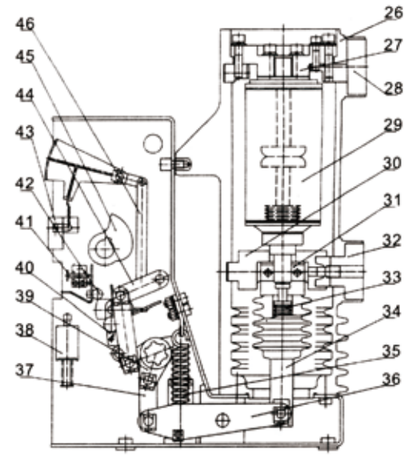


Figure 4

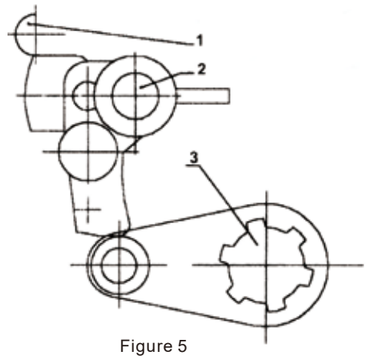


Figure 5

1.Bafflepin
2.Slider
3.Sprocket
4.Single-rowcentripetalballbearing
5.Wheel
6.Roller
7.Detent
8.Closingshaft
9.Chain
10.Worm
11.Wormgear
12.One-waybearing
13.One-waybearing
14.Sprocket
15.Energystoragemotor
16.Motoroutputshaft
17.Closingelectromagnetic
18.Closingspring
19.Crankarm
20.Lockingelectromagnetic
21.Energystorageshaft
22.Cam
23.Toggleplate
24.Energystorageindicationplate
25.Energystoragein-placestrokeswitch

26.Insulationcylinder
27.Upperbracket
28.Upperoutletsocket
29.Vacuumarcextinguishingchamber
30.Lowerbracket
31.Conductiveclamp
32.Loweroutletsocket
33.Diskspring
34.Insulationlever
35.Openingspring
36.Transmissioncrankarm
37.Transmissionlinkplate
38.Openingelectromagnetic
39.Spindletransmissioncrankarm
40.Closingholdingdetent
41.Manualopeningejector
42.Halfshaft
43.Counter
44.Linkplate
45.Cam
46.Open/Closeindicationplatelinkplate

1.Openinghalfshaft
2.Openingtrippingpart
3.Spindle

ANTI-MISOPERATION INTERLOCKING

The circuit breaker can provide perfect anti-misoperation functions, see Figure 6 and 7

- After the closing operation is completed, the closing interlocking bend plate 2 moves downward to clasp the closing bend plate 3 on the closing holding shaft. The circuit breaker cannot be closed again before it is opened.
- After the closing operation is completed, if the closing electric signal is not removed in time, the internal anti-tripping control circuit will cut off the closing circuit to prevent repeated re-closing.
- When the handcart type circuit breaker is not in the test position or working position, the pin 5 on the closing tripper 3 is clasped by the interlocking bend plate 4. The circuit breaker cannot be closed, preventing the circuit breaker from entering the load area in the closed state.
- After closing the handcart type circuit breaker in the working position or test position, the roller presses the drive mechanism locking plate. The handcart cannot move, preventing the circuit breaker from exiting from or entering the load area in the closed state.
- If using electrical closing locking, it prevents the manual closing operation if the secondary control power is not turned on.

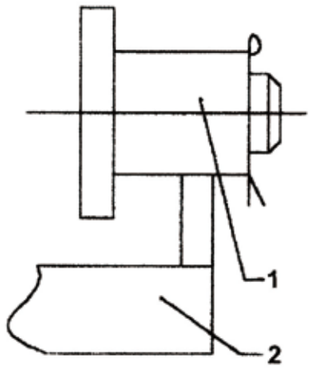


Figure 6

1.Pin shaft
2.Drive mechanism interlocking bend plate

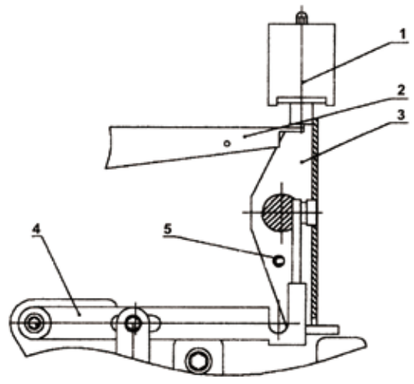


Figure 7

1.Closing electromagnetic
2.Closing interlocking plate
3.Closing tripping plate
4.Interlocking bend plate
5. Pin

CONFIGURATION

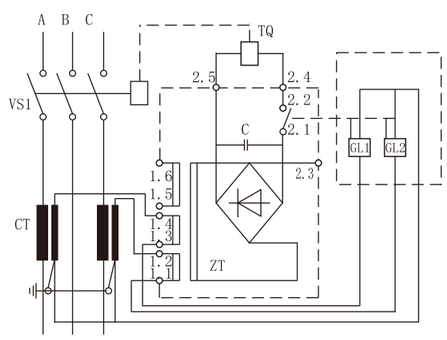
SECONDARY CONTROL VOLTAGE

DC220V/AC220V/DC110V/AC110V

SECONDARY CONTROL OPTIONAL COMPONENTS CONFIGURATION:

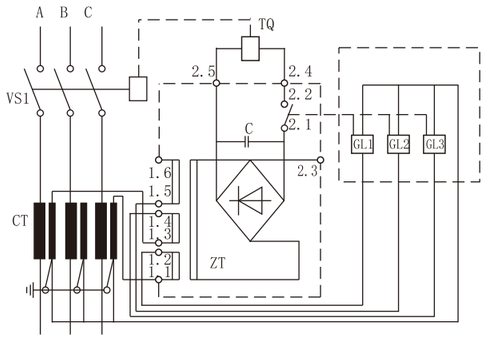
- Anti-tripping-device: after the closing operation is completed, if the closing electric signal is not removed in time, the internal anti-tripping control circuit will cut off the closing circuit to prevent repeated re-closing. If the integrated protection instrument and anti-tripping device are used on the cabinet, it is necessary to confirm the necessity of the anti-tripping device.
- Locking device: prevent closing when the secondary control power is not turned on or below the technical requirement.
- Over-current device: in case of overload or short-circuit in the primary circuit, the over-current coil is energized through the over-current relay, making the circuit breaker trip. The over-current devices are generally added to phase A and phase C; adding devices to all the 3 phases is also feasible. When the secondary output capacity of the current transformer is sufficient, select the indirect over-current tripper solution(3.5A and 5A); when the capacity is not sufficient for the over-current tripping electromagnetic, select the intermediate transformer solution (the intermediate transformer terminals 2.4 and 2.5 are connected to the over-current tripping electromagnetic on the circuit breaker).

Phase A, Phase B over-current tripper (2/3 trippers) intermediate transformer external wiring diagram



2 trippers

TQ:over-current tripping electromagnetic
GL1-2:over-current relay
Z1:intermediate transformer
C:capacitor
Ct:current transformer(primary element)



3 trippers

TQ:over-current tripping electromagnetic
GL1-3:over-current relay
Z1:intermediate transformer
C:capacitor
Ct:current transformer(primary element)

GROUNDING DEVICE

According to the circuit breaker cabinet width, there are 2 solutions: 800 width grounding solution and 1000 width grounding solution. See the diagrams below for details.

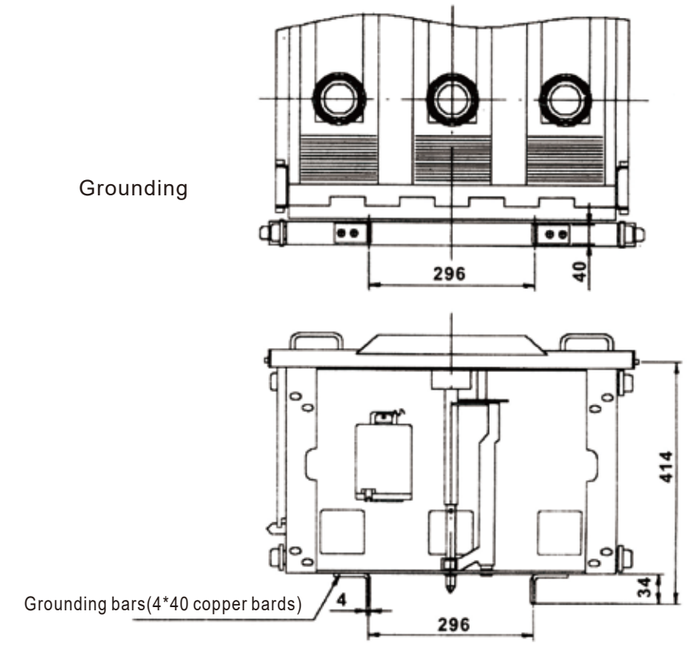


Diagram 11 VCB(800) grounding device installation dimensions diagram

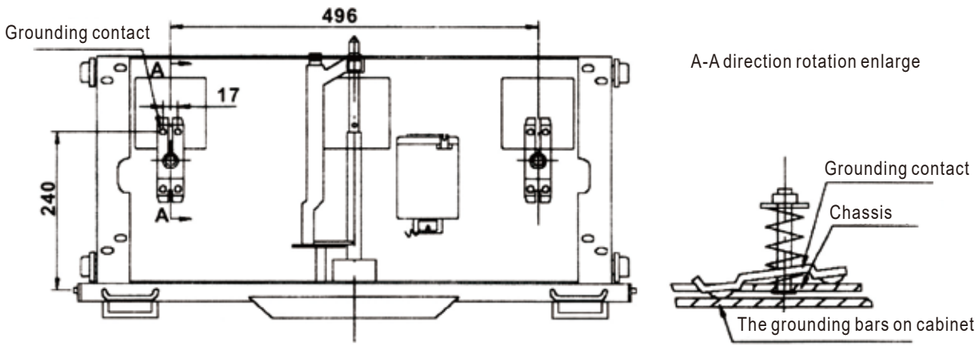


Diagram 12 VCB(1000) grounding device installation dimensions diagram

INSTALLATION, COMMISSIONING

UNPACKING

When the circuit breaker is lifted from the packing box, the hook should be hung at the clearly marked lifting position on the circuit breaker. When moving the circuit breaker, the upper and lower outlet arms should not be subjected to force, and the circuit breaker should not be subjected to large shock vibration. Note: before the formal into-cabinet operation, please lift the device as required.

EXAMINE BEFORE INSTALLATION

The circuit breaker has undergone strict factory inspection before leaving the factory. All parameters are in accordance with technical requirements. The following preparatory work must be done before the primary circuit is energized.

- Check whether the product nameplate and certificate of conformity are consistent with the order form, and whether the packing list is consistent with the actual product.
- Check whether the circuit breaker is damaged. If it is damaged, please stop using.
- Remove surface dust and dirt, especially the insulation surface. Check the vacuum degree of the vacuum arc extinguishing chamber by using the power frequency withstand voltage method(the circuit breaker is open, apply 42KV/1min of power frequency between the breaks).
- Manually operate the circuit breaker to store energy, close and break according to the regulations. Observe whether the energy storage status indication and the open/close position indication are normal(Note: circuit breakers equipped with locking devices must be energized in the secondary circuit before it can be operated manually).
- Electrically operate the circuit breaker to store energy, close and break according to the regulations. Observe whether the energy storage status indication and the open/close position indication are normal. The handcart type circuit breaker is operated as follows:
  Insert the drive handle into the drive hole. Clockwise cranking is driving in; counterclockwise cranking is driving out. The total drive-in stroke is about 200 mm.
  In the open state, it should smoothly get into the operating position or test position. Please turn the handle circle at medium speed, when you hear the "Ta" sound, it is in place(do not use too much force and damage the drive mechanism); the corresponding position indication circuit is switched on at the same time.

MAINTENANCE

- In normal use, the body of the circuit breaker should be properly inspected periodically. Clean the dirty and damp parts of the equipment surface. Wipe the insulating surface with a dry cloth, then wipe off other dirt with a silk cloth stained with cleaning agent(note that the cleaning agent used should be applicable to plastic or synthetic plastic materials). Check the vacuum degree of the vacuum arc extinguishing chamber by using the power frequency withstand voltage method. In the process of withstanding voltage, it is normal to have a faint glow outside the chamber. If a continuous breakdown of the chamber is found, the vacuum arc extinguishing chamber should be replaced.
- When the circuit breaker is placed for a long time, it may cause blockage in the moving part of the circuit breaker. The circuit breaker should be operated energy storage, breaking and closing at least five times a year.
- It is strictly forbidden to hit the vacuum arc extinguishing chamber with hard objects during installation and use.
- Users should not arbitrarily replace and use electrical components that are inconsistent with the specifications of the original type.
- Operators should have a preliminary understanding of the structure, performance, installation, commissioning, maintenance, inspection and repair of circuit breakers and mechanisms. Operators should record the problems in operation, and notify the manufacturer if necessary.
- In frequent operation site, attention should be paid to strictly controlling the number of operations and breaking within the range specified by technical specifications. Do not use it beyond its service life.

Possible occurrence during operation

No	Occurrence	Cause
1	Can not close	Already in close position
		Handcart VCB does not safely get into operating position or test position
		The closing locking device is used and the auxiliary power is not on or does not meet the technical requirements
		Secondary circuit is not accurate
2	Can not drive in or drive out	VCB is in close position
		Drive handle is not inserted safely into the drive-in hole
		Drive mechanism has not completely reached the test position. Indication tongue plate can not be unlocked with the cabinet
		Cabinet grounding interlocking is not unlocked

Please contact the manufacturer if you still have problems after checking the above factors.
Please remove the insulating cylinder cover as required for rated current 1600A and above during formal operation.

TRANSPORTATION AND STORAGE

TRANSPORTATION

In transportation, the whole set of circuit breaker must be packed and fixed in a closed case.

STORAGE

The circuit breaker should be stored in a dry, ventilated, moisture-proof and anti-harmful gas erosion room. For long-term storage, should add lubricant in the transmission part, and check whether the environment meets the requirements. The storage period of the vacuum arc extinguishing chamber is 20 years.

DOCUMENTS ALONG WITH PRODUCT

1.Product certificate of conformity and factory test report
2.Installation and use manual
3.Packing list

ORDERING NOTICE

Users should specify when ordering:

a.The model and quantity of circuit breakers
b.The rated voltage, rated current and rated short-circuit breaking current of circuit breakers
c.The rated operational voltage of energy storage motors and opening/closing coils
d.The quantity and tripping current of the over-current tripping coils
e.The name and quantity of the spared parts
f.Please contact the manufacturer if you have any questions or special requirements.
Please refer to the order specifications for specific order requirements.

ORDERING TECHNICAL SPECIFICATIONS

Customer name		Project name	
Model		Quantity	
Mechanical structure	VB1 ☐ VS1 ☐	Rated voltage	12KV ☐ 24KV ☐
Rated current	630A ☐ 1250A ☐ 1600A ☐ 2000A ☐ 2500A ☐ 3150A ☐ 4000A ☐		
Breaking current	20KA ☐ 25KA ☐ 31.5KA ☐ 40KA ☐		
Installation method	Handcart ☐ Fixed ☐ Side-mounted (left outlet line) ☐ Side-mounted (right outlet line) ☐		
Vacuum arc extinguishing chamber	Normal insulating cylinder ☐ Solid-sealed polar pole ☐ Factory requirement		
Mating cabinet type	550 (distance 150mm)☐ 650 (distance 150mm)☐ 800 (distance 150mm)☐ 1000 (distance 150mm)☐		
Installation dimensions diagram	provided by customer ☐ both sides confirm ☐		
Secondary schematic diagram	provided by customer ☐ both sides confirm ☐		
Operational voltage	AC220V ☐ AC110V ☐ DC220V ☐ DC110V ☐ Non-standard voltage( ) V ☐		
Auxiliary contacts	8 open 8 closed is default ☐ Optional: 10 open 10 closed ☐ Special customized ☐		
Closing anti-tripping/ locking	Without closing anti-tripping, without closing locking(default) ☐ Optional:closing anti-tripping ☐ closing locking ☐		
Over-current tripping device	Without over-current tripper(default) ☐ Optional: Y7 Y8 ☐ Tripping current ☐		
Under-voltage tripping device	Without under-voltage tripper(default) ☐ Optional: DC 220V ☐ DC 110V ☐		
Handcart grounding method	Bottom friction grounding (standard) ☐ Grounding on both sides of the rail ☐		
Program lock:（optional for handcart type）	Two locks and one key ☐ Three locks two keys ☐ Four locks two keys ☐ Special program lock ☐		
	Mounting position: chassis ☐ Switch left side sealing plate ☐		
Chassis locking:（optional for handcart type）	Optional: DC220V ☐ DC110V ☐		
Emergency interlocking device: (optional for fixed type)	Emergency breaking interlock ☐ Emergency breaking and closing interlock ☐ Extension length: standard is 45mm ☐		
	Special length: Middle ☐ Left extension ☐ Right extension ☐ Note: The left and right is judged from the front of the circuit breaker (face to panel)		
Spindle interlocking device (optional for fixed type)	Left extension ☐ Right extension ☐ Spindle extension length: standard is 45mm ☐ Special length :		
	Note: The left and right is judged from the front of the circuit breaker (face to panel)		
Use environment	Altitude: ≤1000m ☐ Temperature -25 ℃ ~+40 ℃ ☐ Special requirement:		
	Packaging and transportation requirements:		

Other technical requirements:

Note:The price of the circuit breaker already includes standard configuration (details in the above table). Other optional parts are charged additionally.

Customer confirmation signature		telephone number		Required delivery date	