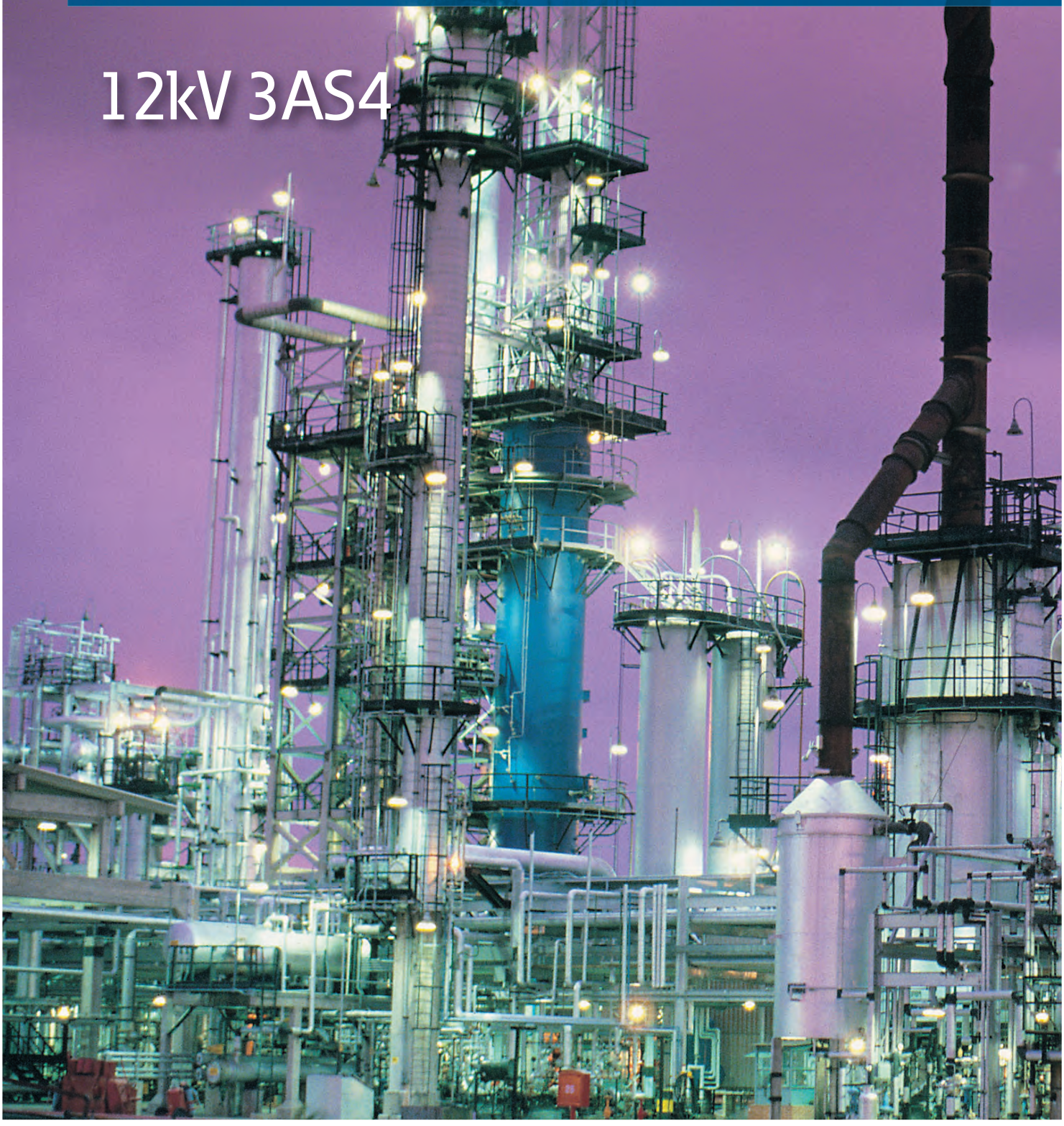
Highly Reliable Indoor Encapsulated Pole Vacuum Circuit Breaker

12kV 3AS4



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12kV Highly Reliable Indoor Encapsulated Pole Vacuum Circuit Breaker

3AS4 vacuum circuit breaker series

3AS4 vacuum circuit breaker is a new generation indoor VCB with integrated encapsulated pole units developed by Eaton Electrical Equipment, its installation base is neary 100,000 units in China Market, with the rated current from 630A to 4000A, and rated short circuit breaking current of 25kA to 40kA.

3AS4 is a 12kV 3-phase indoor vacuum circuit breaker, used as 50 or 60 Hz protection and control unit for grid equipment and power equipment of industry and mining enterprises. APG encapsulated process is utilized for primary parts, to protect the vacuum interrupter and other main circuit parts against impacts caused by collision, dust and condensation, suitable for occasions requiring frequent operations of rated operating current or multiple switching of short circuit current, and also applicable for occasions with harsh environmental conditions.

Standards

12kV highly reliable indoor encapsulated pole vacuum circuit breaker is based on the following standards:

GB 1984-2003	High voltage AC circuit breaker
JB 3855-1996	3.6~40.5kV indoor AC high voltage vacuum circuit breaker
DL/T 403-2000	12~40.5kV high voltage vacuum circuit breaker ordering technical conditions

Application conditions

Environment temperature
Maximum temperature: +40ºC
Minimum temperature: -15ºC

Environment humidity
Daily average relative humidity:≤ 95%
Monthly average relative humidity: ≤ 90%
Daily average vapor pressure: ≤ $2.2*10^{-3}$Mpa
Monthly average vapor pressure: ≤ $1.8*10^{-3}$Mpa

Altitude: ≤ 1000m

Seismic intensity: ≤ 8 degree

Pollution: the ambient air is not obviously polluted by dust, smoke, corrosive and/or flammable gases, vapor or salt mist.

Technical features

3AS4 series 12kV vacuum circuit breaker utilizes the proven APG process to have the vacuum interrupter and main conductive circuit encapsulated into the insulation cylinder, completely eliminating the issue of lowering withstand voltage level of the insulation parts due to environmental impact, and making the vacuum interrupter perfect choice for harsh environment.

3AS4 series vacuum circuit breaker offers powerful switching capacity and high reliability, more satisfying actual operation requirements, and making primary parts maintenance free.

3AS4 series vacuum circuit breaker utilizes mature spring operating mechanism, providing stable and reliable performance, long service life, ease of operation and excellent corrosion protection. In this way, less maintenance is required within its life cycle.

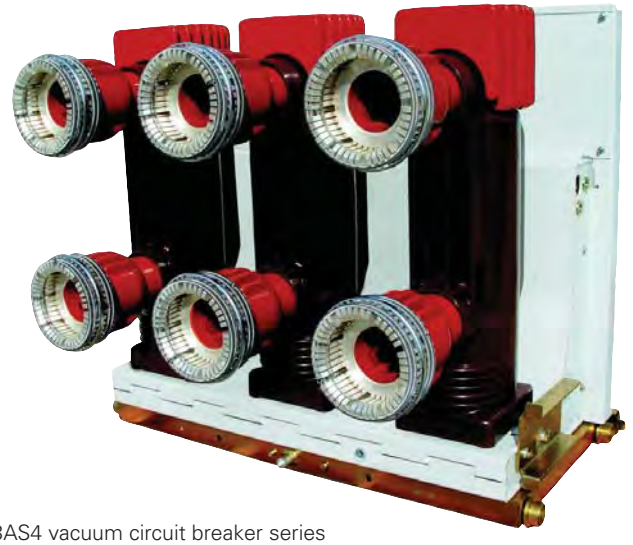
Class E2 electrical endurance and class M2 mechanical endurance as per GB 1984-2003, & class C2 breaking capacitive current , have completed the type tests.

Outline dimension and distribution panel interlocking methods are the same with those of VS1 and VD4 of the same specification, offering high universality, and significantly lowering design cost.

Product assembly utilizes tooling method to ensure dimension consistency. All products have been subject to the pre-engineeringtest for standard panels, ensuring product interchangeability and universality.

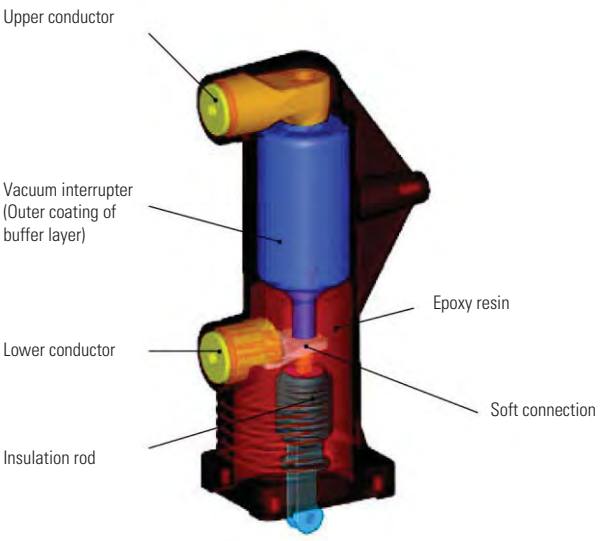
All products have been subject to hundreds of mechanical operation running-in tests before delivery, ensuring the product performance in the most stable phase.

Advanced imported testing equipment is utilized, to record no-load mechanical characteristics of each product, and to ensure product reliability.



3AS4 vacuum circuit breaker series

Product representation



3D perspective drawing of the encapsulated pole unit of 3AS4 1250A/31.5kV VCB

3AS4

Eaton electrical mechanism:

It is built on the safety running by nearly 300-thousand units, mature, stable, and highly reliable.

There are several options available for users:

- Drawout type;
- Fixed type: optional mechanical interlocking;
- Phase spacing: 210mm and 275mm
- Distribution panel width: 800mm and 1000mm
- Expanded function schemes…

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Technical data

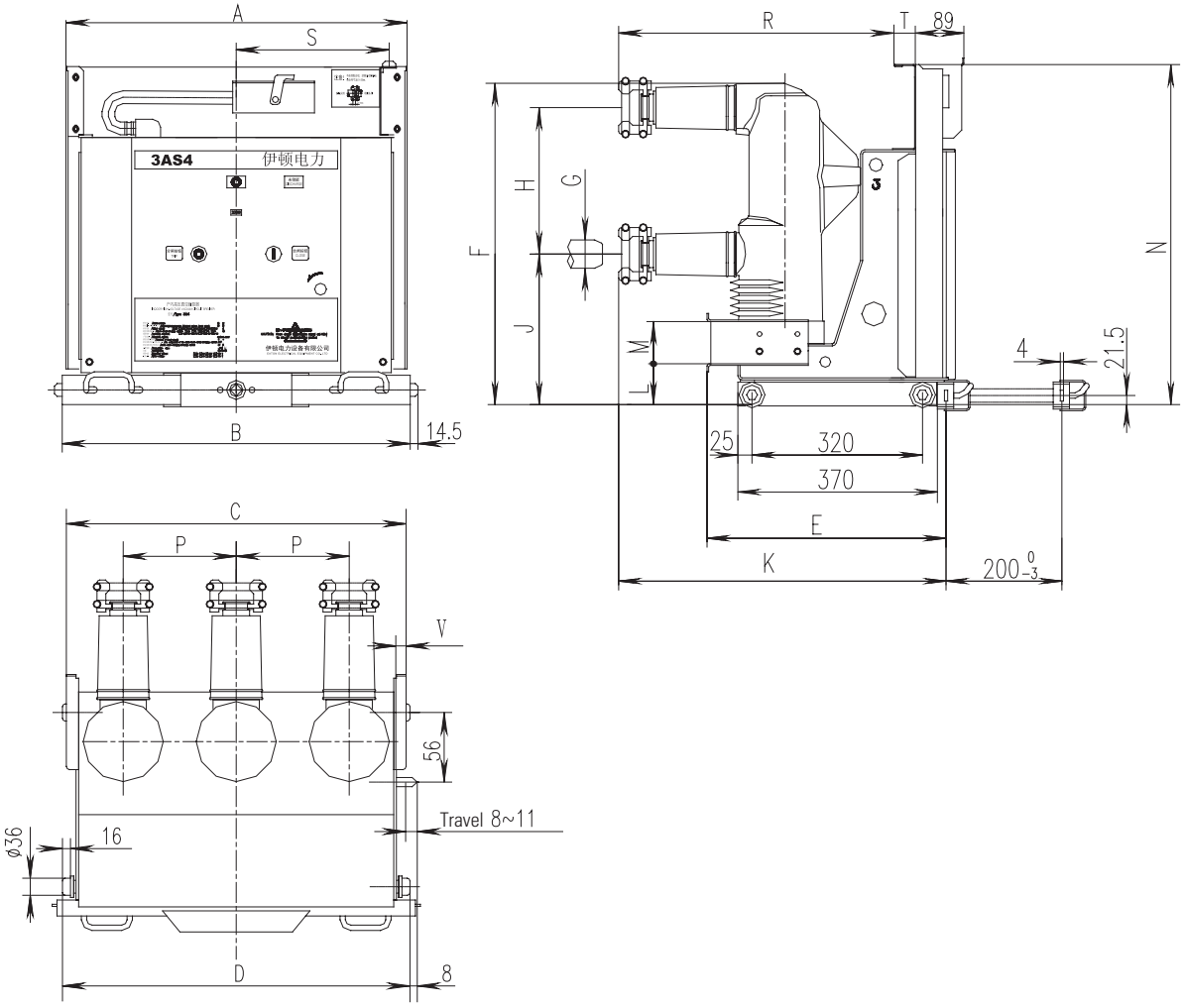
Main specifications and technical data

No.	Item	Unit	3AS4 parameters					
1	Rated voltage	kV	12					
2	Rated power frequency withstand voltage (1 min)	kV	42					
3	Rated lightning impulse withstand voltage (peak)	kV	75					
4	Rated frequency	Hz	50					
5	Rated current	A	630	1250	630	1250	1250	1600
					1600	2000	2000	2500
					2500	3150	3150	4000*
6	Rated short circuit breaking current	kA	25		31.5		40	
7	Rated short time withstand current	kA	25		31.5		40	
8	Rated short circuit duration	s	4					
9	Rated peak withstand current	kA	63		80		100	
10	Rated short circuit making current (peak)	kA	63		80		100	
11	Rated single/back to back capacitor bank breaking current**	A	630/400					
12	Secondary circuit power frequency withstand voltage (1 min)	V	2000					
13	Opening time	ms	20~50					
14	Closing time	ms	35~70					
15	Mechanical endurance	Times	30000 (20000 times at 40kA)					
16	Electrical endurance	Times	E2 (30 times at 40kA)					
17	Allowable accumulated wearing thickness of moving/fixed contact	mm	3					
18	Rated opening/closing operating voltage	V	AC110 AC220 DC110 DC220					
19	Rated voltage of charging motor	V	AC110 AC220 DC110 DC220					
20	Contact stroke	mm	9.0±1					
21	Overtravel	mm	3.5±1					
22	Contact closing bouncing time	ms	≤ 2					
23	Asynchronism of 3-phase opening and closing	ms	≤ 2					
24	Average opening speed	ms	Contact just opening~6mm				0.9~1.2	
25	Average closing speed	ms	6mm~contact just closing				0.5~0.8	
26	Main conductive circuit resistance	μΩ	≤ 55 (630A)				≤ 30 (2000~2500A)	
			≤ 45 (1250A)				≤ 25 (above 3150A)	
			≤ 35 (1600A)					
27	Rated operating sequence		O-0.3s-CO-180s-CO					

* 4000A needs forced air cooling

**Data are offered only on customer request

Outline dimensions of drawout type 3AS4 (1)



Distribution panel width (mm)	Rated current (A)	Rated short circuit breaking current (kA)	P	H	A	B	C	D	E	F	G	J	K	L	M	N	R	S	T	V
800	630	25~31.5	210	275	638	652	640	650	433	602	Φ35	280	598	76	78	637	508	277	40	23
800	1250	25~31.5	210	275	638	652	640	650	433	602	Φ49	280	598	76	78	637	508	277	40	23
800	1600	31.5	210	275	638	652	640	650	433	602	Φ55	280	598	76	78	637	508	277	40	23
800	1250	40	210	310	638	652	640	650	361	656	Φ49	295	586	77	88	698	536	277	0	34
800	1600	40	210	310	638	652	640	650	361	656	Φ55	295	586	77	88	698	536	277	0	34
1000	1250	40	275	310	838	852	838	850	361	656	Φ49	295	586	77	88	698	536	377	0	34
1000	1600	31.5~40	275	310	838	852	838	850	361	656	Φ55	295	586	77	88	698	536	377	0	34
1000	2000	31.5~40	275	310	838	852	838	850	361	656	Φ79	295	586	77	88	698	536	377	0	34

Note: dimension unit (mm)

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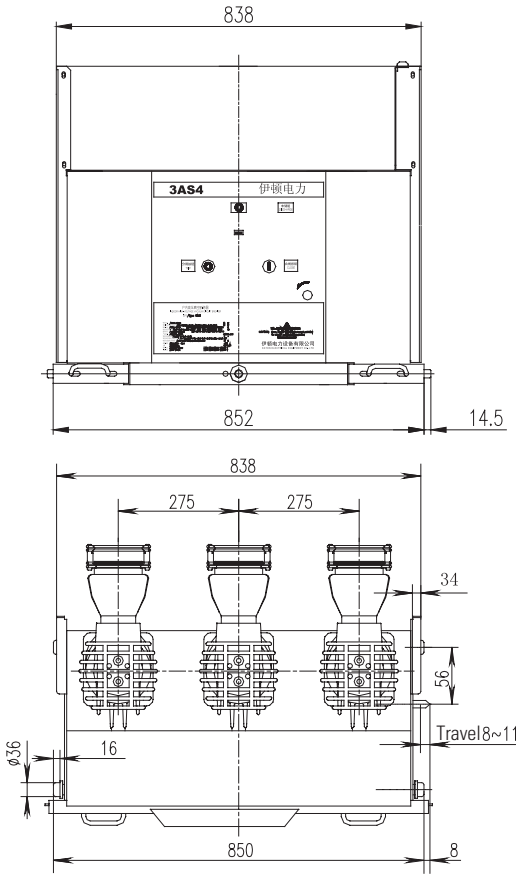
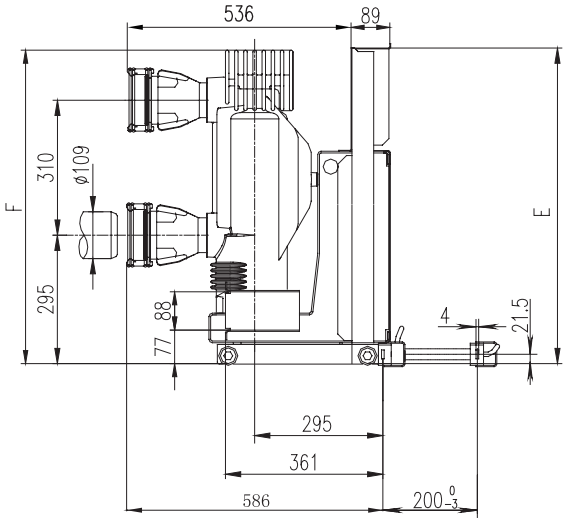
Outline dimensions

Outline dimensions of drawout type 3AS4 (2)



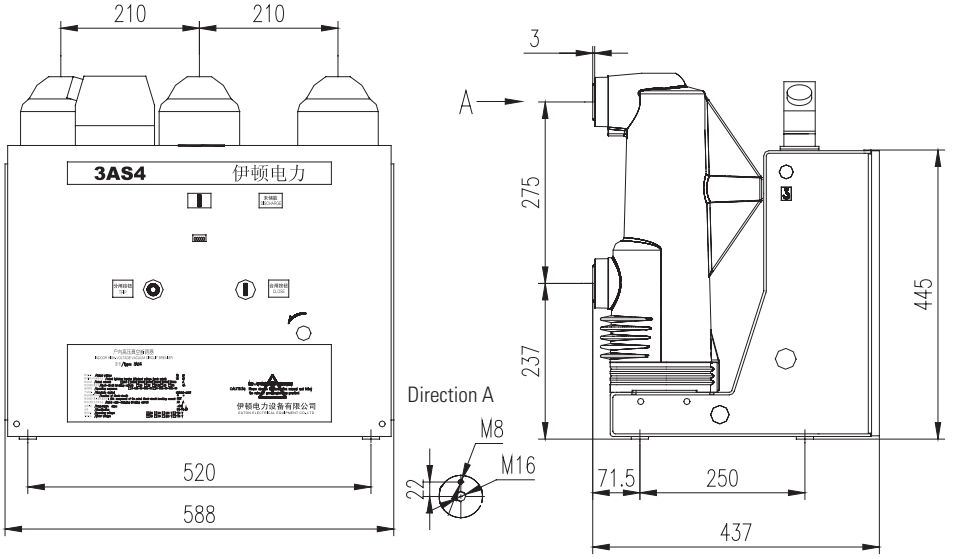


Distribution panel width (mm)	Rated current (A)	Rated short circuit breaking current (kA)	E	F
1000	4000	31.5~40	725	722
1000	3150	31.5~40	725	722
1000	2500	31.5~40	698	680

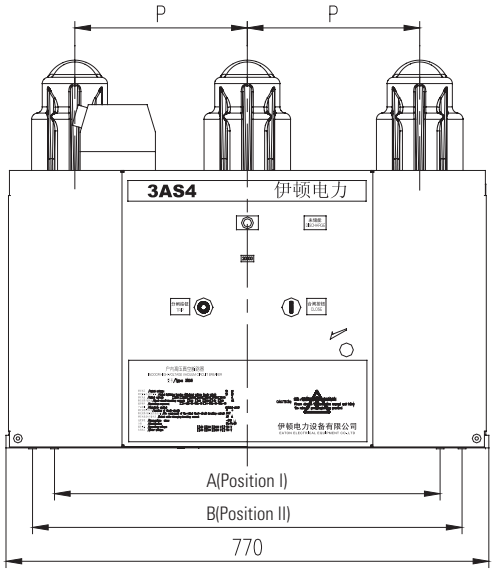
Note: 4000A requires forced air cooling.

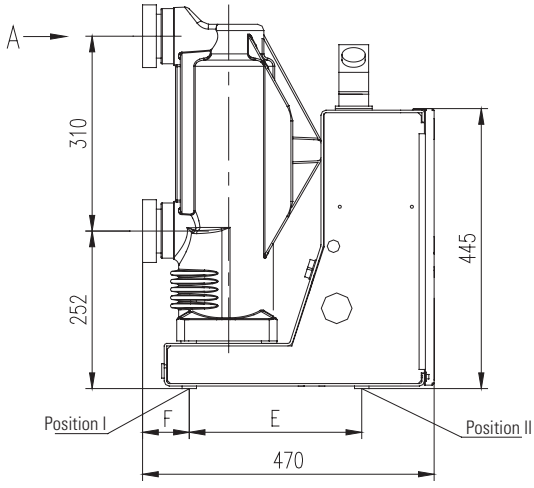
Outline dimensions of fixed type 3AS4

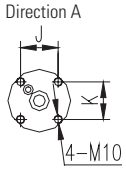
(1) Outline drawing of 3AS4 630-1250A/25-31.5kA 1600/31.5 fixed type VCB



(2) Outline drawing of 3AS4 1250A/40kA 1600~2000A/31.5-40kA fixed type VCB

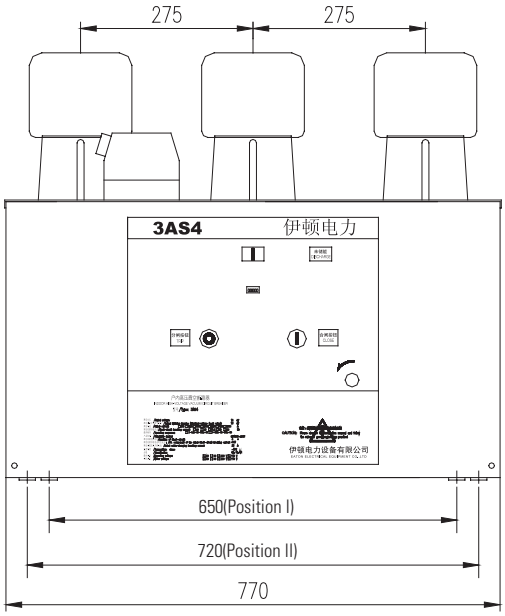


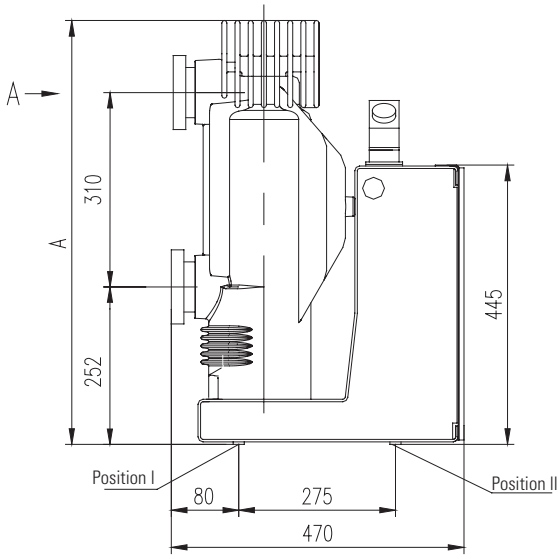




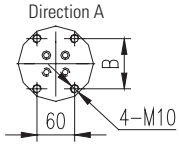
Distribution panel width (mm)	Rated current (A)	P	A	B	C	E	F	J	K
800	1250/40,1600	210	520	520	588	250	105	50	70
1000	1250/40, 1600~2000	275	650	720	770	275	80	60	60

(3) Outline drawing of 3AS4 2500~4000A/31.5~40kA fixed type VCB





Distribution panel width (mm)	Rated current (A)	A	B
1000	2500	645	60
1000	3150~4000	676	80



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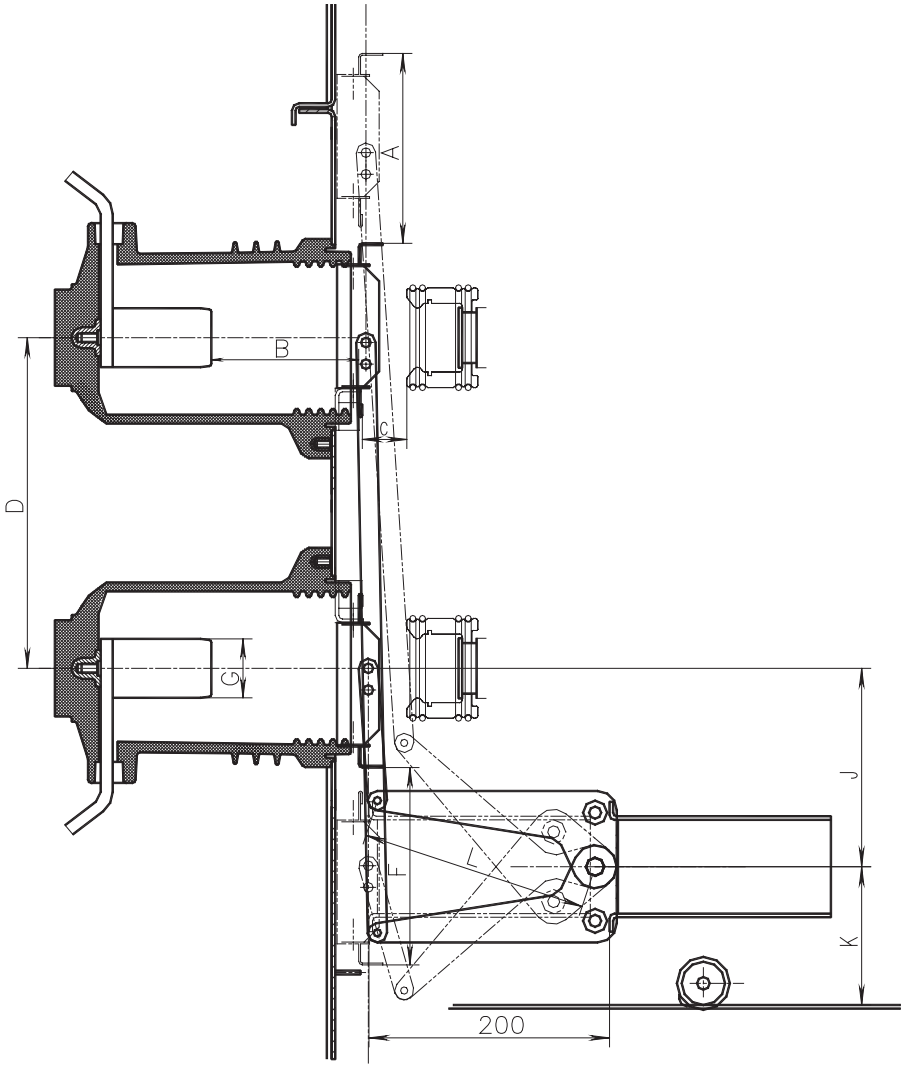
Outline dimensions

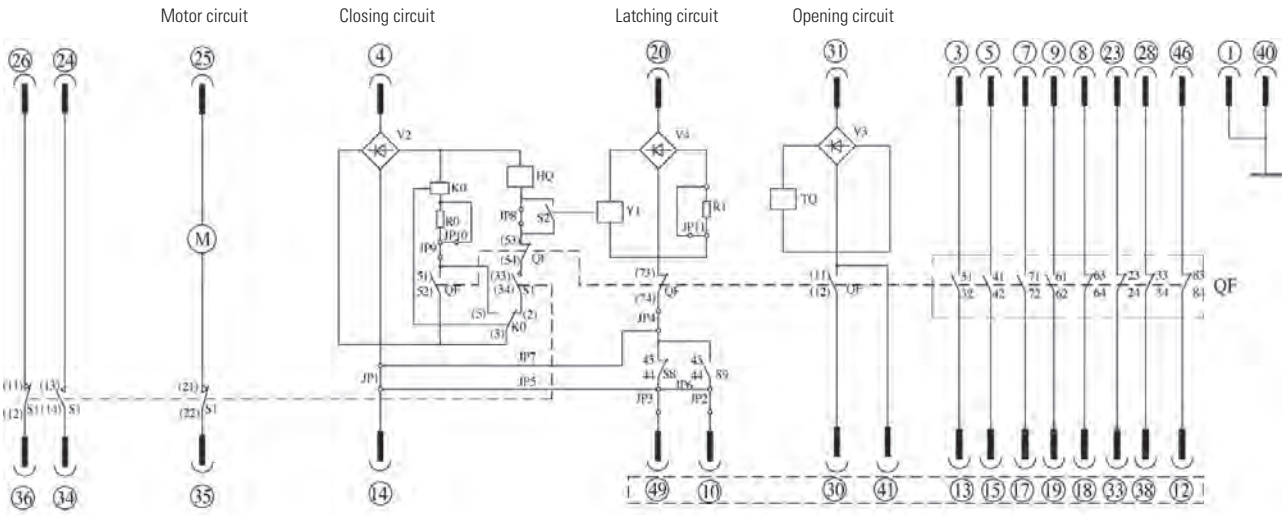
Recommended dimension for drawout type 3AS4 circuit breaker in coordination with panels

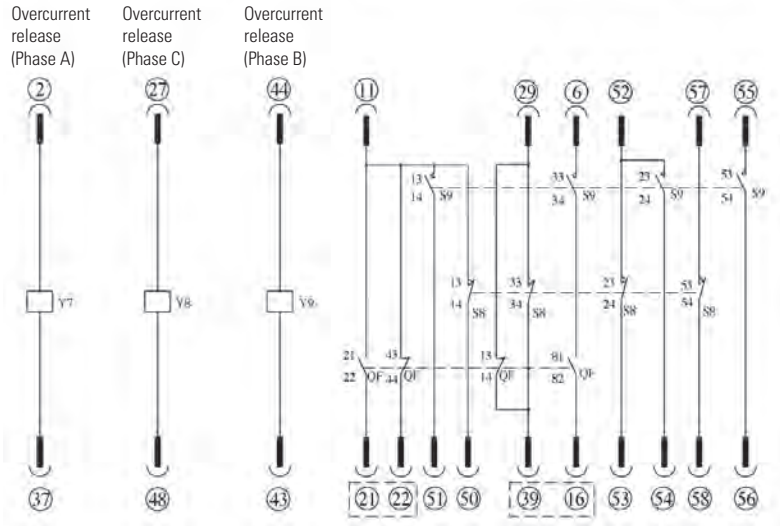
Sketch diagram:



Distribution panel width (mm)	Rated current (A)	Rated short circuit breaking current (kA)	P	H	A	B	C	D	F	G	J	K	L
800	630	25-31.5	210	275	158	116	37	275	164	Φ35	165	115	189
800	1250	25-31.5	210	275	158	116	37	275	164	Φ49	165	115	189
800	1600	31.5	210	275	158	116	37	275	164	Φ55	165	115	189
800	1250	40	210	310	244	106	43	310	214	Φ49	175	120	254
800	1600	40	210	310	244	106	43	310	214	Φ55	175	120	254
1000	1250	40	275	310	244	106	43	310	214	Φ49	175	120	254
1000	1600	40	275	310	244	106	43	310	214	Φ55	175	120	254
1000	2000	31.5-40	275	310	244	106	43	310	214	Φ79	175	120	254
1000	2500~4000	31.5~40	275	310	244	106	43	310	214	Φ109	175	120	254

Internal wiring schematic diagram of 3AS4 (drawout type)





Connection setting of optional parts

Configuration	Jumper								
	JP1	JP2	JP3	JP4	JP5	JP6	JP7	JP8	JP9
With anti-pumping									
With latch	√	√	√	√	/	/	/	/	√
Without latch	/	/	/	/	√	√	√	√	√
Without anti-pumping									
With latch	√	√	√	√	/	/	/	/	/
Without latch	/	/	/	/	√	√	√	√	/

Operating power supply options

Configuration	Jumper	
	JP10	JP11
Operating power supply		
AC/DC 220V	/	/
AC/DC 110V	√	√

Notes: "/" denotes disconnected; "√" denotes connected.

Note: 1) The diagram shows the circuit breaker is in test position, opening, discharged states
2) When in DC operation power supply, the polarities in the dashed box should be consistent.
S9: Auxiliary switch (switching when the circuit breaker is in working position)
S8: Auxiliary switch (switching when the circuit breaker is in test position)
S2: Auxiliary switch
S1: Auxiliary switch (switching after the closing spring is charged)
QF: Auxiliary switch (switching during opening and closing operation)
V2~V4: Bridge rectifier (can be canceled at DC)
Y1: Latch coil (optional)
K0: anti-pumping relay (optional)
Y7~Y9: Indirect overcurrent release releases (optional)
JP1~JP11: Jumper
HQ: Closing release
TQ: Opening release
R0~R1: Resistance
M: Charging motor

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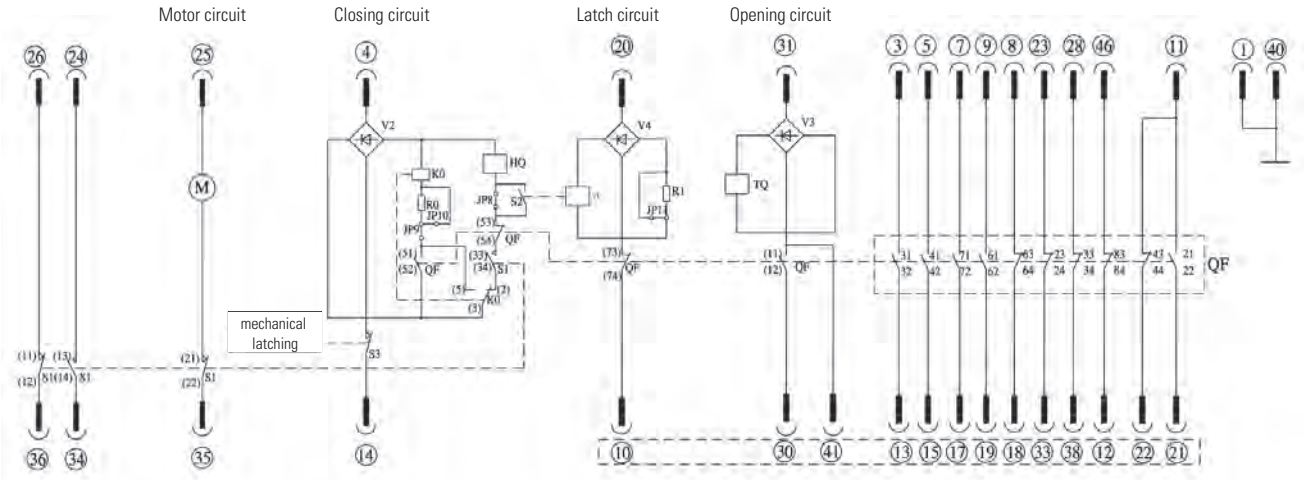
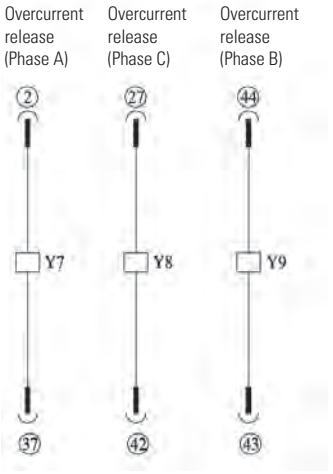
Secondary schematic diagram

Internal wiring schematic diagram of 3AS4 (fixed type)





Connection setting of optional parts

configuration	Jumper JP8	JP9
With anti pumping		
With latch	/	√
Without latch	√	√
Without anti pumping		
With latch	/	/
Without latch	√	/

Operating power supply options

configuration	Jumper JP10	JP11
Operating power supply		
AC/DC 220V	/	/
AC/DC 110V	√	√

Notes: "/" denotes disconnected; "√" denotes connected.

Note: 1) The diagram shows the circuit breaker is in opening, discharged states

2) When in DC operation power supply, the polarities in the dashed box should be consistent.

S3: Auxiliary switch (switching after the mechanical interlock is in place, cancelled when no mechanical interlock is provided)

S2: Auxiliary switch

S1: Auxiliary switch (switching after the closing spring is charged)

QF: Auxiliary switch (switching during opening and closing operation)

V2~V4: Bridge rectifier (can be canceled at DC)

Y1: Latching relase (optional)

K0: anti-pumping relay (optional)

Y7~Y9: Indirect overcurrent release (optional)

JP1~JP11: Jumper

HQ: Closing release

TQ: Opening release

R0~R1: Resistance

M: Charging motor

1. Product model: 3AS4

Panel width (mm)	Phase spacing (mm)	Pole spacing (mm)	Rated current (A)	Rated short circuit breaking current (kA)	Quantity (set)	Remark
800	210	275				
800	210	310				
1000	275	275				
1000	275	310				

Note: forced air cooling is required at 4000A

2. Models

□ **Drawout type** □ **Fixed type**

For fixed type breakers, specify other requirements, such as whether interlocks are to be supplied: _____

3. Configuration

Standard configuration: wirings as per standard wiring diagram, including anti-pumping release (K0), without latch (Y1+Y2), without overcurrent release (Y7, Y8, Y9), without undervoltage device, without grounding device

Operating voltage	Configuration
AC 220	Standard configuration
AC 110	
DC 220	Non-standard configuration
DC 110	

For non-standard options, fill in the following table:

Latch device	Overcurrent device		Ground device	Undervoltage device
No	No		No	No
	2 overcurrent	A		
Yes	3 overcurrent	A	Yes	Yes
	Intermediate transformer			

Note: fill in the above table when ordering, or specify item by item: phase spacing, pole spacing, models and specifications, operating voltage and configuration options.

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Printed in China
3AS4-EN(2015-12)