Vacuum Circuit Breaker

VS1

Powering Business Worldwide

VS1 Vacuum Circuit Breaker

Product features

- Conform to GB, IEC, DL and JB standards
- KEMA type test Level A certificate
- Ideal contact material and shape, ensuring low current carrying value and stable contact resistance
- Integrated design of main conductive circuit made of compound isolation material and operating mechanism
- Few components and parts, compact and logical structure, assuring more reliable and safer operation
- Switching resistive, inductive and capacitive loads in an ideal way
- Compact design enables the breaker to be installed within almost all switchgears
- More than 100,000 sets of breakers used in operation
- Superior cost performance, ideal choice for engineering programs

VS1 offers versatile applications

Epoxy resin insulation cylinder manufactured with APG process can withstand severe environmental impacts, enabling VS1 breakers to be used in all kinds of situations.

The utilization of special contact material and primary tulip contact ensures VS1 devices applicable for all medium voltage cases.

- Chemical industry
- Substation, transformer substation
- Petroleum industry
- Cement industry
- Pipeline industry
- Automotive industry
- Offshore mining
- Metallurgical industry
- Shipbuilding industry
- Textile and food industries
- Paper industry
- Power plant
- Opencast coal mine

Product application conditions

- Ambient air temperature is not exceeding 40°C, and the average temperature measured within 24 hours is not exceeding 35°C
  The minimum ambient air temperature is -15°C
- Negligible effect by solar radiation
- Altitude is not exceeding 1000m
- Ambient air is not obviously polluted by dust, smoke, corrosive and flammable gases, vapor or salt mist
- Negligible vibration or quake external to the switchgear and controlgrear
- Amplitude of electromagnetism interference sensed in secondary system is not exceeding 1.61kV
- Average daily relative humidity: ≤ 95%; average monthly relative humidity: ≤ 90%
- Average daily vapor pressure: ≤ $2.2*10^{-3}$MPa, Average monthly vapor pressure:≤ $1.8*10^{-3}$MPa
- No water dropping, flammable and explosive hazards in the application places, without chemical corrosive gases and violent vibrations.

VS1 completely meets demands of power users

VS1 series vacuum circuit breaker offers drawout type VS1 and fixed type VS1, based on different operation environments, applied separately for centrally installed switchgears and fixed type switchgears, to satisfy different requirements from users for different application occasions

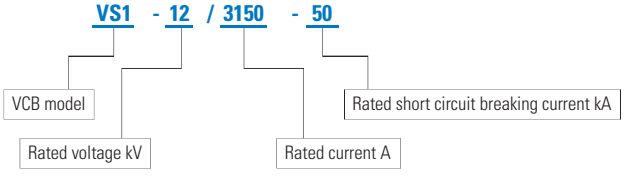
Drawout type VS1 breakers have been widely used in all kinds of centrally installed switchgears. Due to its reliable interlocking and stable performance, it can be applied within most of centrally

installed switchgears. In the places where old generation switchgears are used, Eaton's fixed type VS1 breaker can still achieve mechanical interlocking* function with dedicated mechanical interlocking mechanism to coordinate with the old generation switchgear.

VS1 series vacuum circuit breaker also offers solutions of all rated currents, to fully meet demands of electrical users.

* Customers are required to provide relevant switchgear information for customization.

Product model



Technology creates history

Eaton has over 80years manufacture experience of circuit breakers. Over the past 80years, we are leading global circuit breaker market with the most advanced technology and concept.

In the world advocating environment conservation, the expectation for medium voltage power switching is very high. Along with lower impedance system configuration, the demand for current continuity and breaking capacity is higher; meanwhile the demand for installation in limited spaces and cooling is more stringent. The optimal solution is our medium voltage circuit breakers with advantages of pro-environment, reliably breaking heavy-duty current, without extra cooling or forced air cooling.

VS1 vacuum circuit breaker requires almost no relevant maitenance

Simple structure design of Eaton's VS1 vacuum circuit breaker minimizes fault occurrence, and simplifies daily maintenance.

- First class vacuum interrupters are utilized for the breaker, with reasonable price but superior performance
- Adoption of multi-point compressing contact method, lowering contact resistance and extending breaker's service life and without maintenance
- The insulation tension pole used for the breaker must be subject to force measurement, ensuring contact pressure in closing state, and can be traceable

Optional accessory

Charging handle

Cradle handle

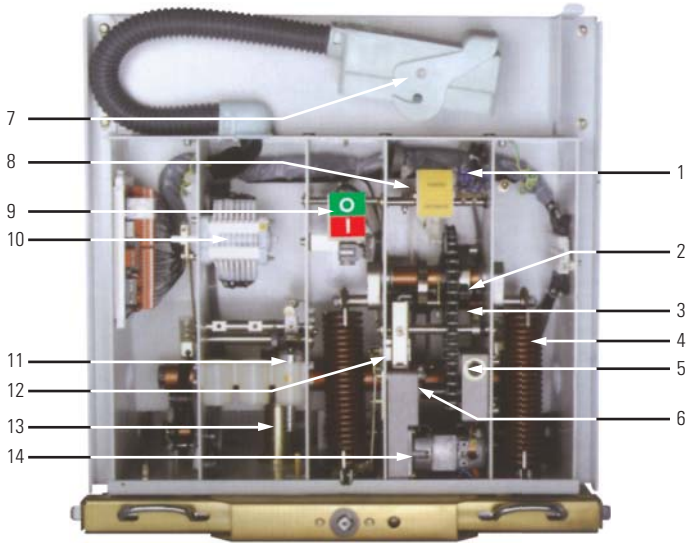
Cradle

Transport trolley

VS1 Vacuum Circuit Breaker

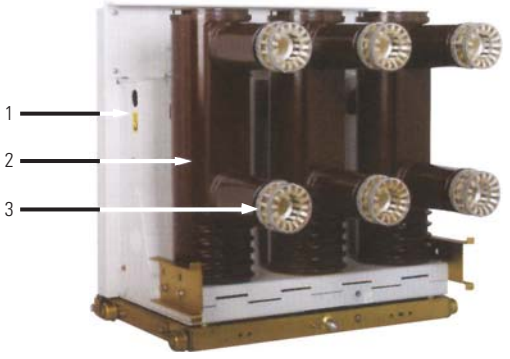
VS1 Construction

Front View



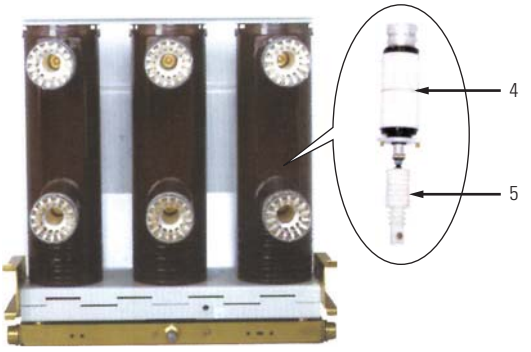
1. Motor cutoff switch
2. Charging shaft
3. Charging holding latch
4. Charging spring
5. Manual charging worm drive gear
6. Motor output shaft
7. Secondary plug
8. Charging indicator
9. Opening/closing indicator
10. Auxiliary switch
11. Opening coil
12. Closing coil
13. Oil dash pot
14. Charging motor

Side View



1. Lifting hole
2. Insulation pole unit
3. Primary disconnect

Rear View



4. Vacuum interrupter
5. Insulation rod

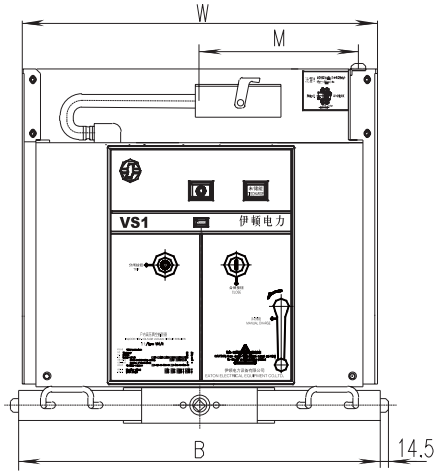
Main specifications and technical parameters (VS1 drawout type/fixed type)

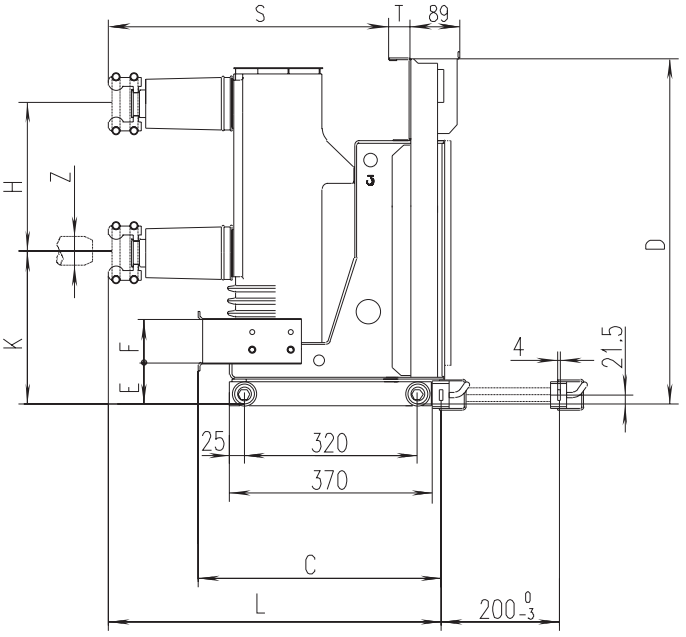
No.	Item	Unit	Parameters
1	Rated voltage	kV	12
2	Rated power frequency withstand voltage (1min)	kV	42/48
3	Rated lightning impulse withstand voltage (peak)	kV	75/85
4	Rated frequency	Hz	50
5	Rated current	A	63/1250/1600/2000/2500/3150/4000*
6	Rated short circuit breaking current	kA	20 25 31.5 40 50
7	Rated short time withstand current	kA	20 25 31.5 40 50
8	Rated short circuit making current (peak)	kA	50 63 80 100 125
9	Rated peak withstand current	kA	50 63 80 100 125
10	Rated short circuit duration	s	4
11	Secondary circuit power frequency withstand voltage (1min)	kV	2
12	Rated single/back-to-back capacitor bank breaking current **	A	630/400(800/400-40kA**)
13	Times of breaking 100% fault-current	Times	50 (30 times at 40kA, 20 times at 50kA)
14	Closing time	ms	35-70
15	Opening time	ms	20-50
16	Mechanical endurance	Times	20000 10000 (50kA)
17	Rated opening/closing operation voltage	V	AC 110/220 DC 110/220
18	Rated voltage of charging motor	V	AC 110/220 DC 110/220
19	Closing bouncing time	ms	≤ 2
20	Opening asynchronism	ms	≤ 2
21	Closing asynchronism	ms	≤ 2
22	Rated operating sequence		O-0.3s-CO-180s-CO O-180s-CO-180s-CO (50kA)

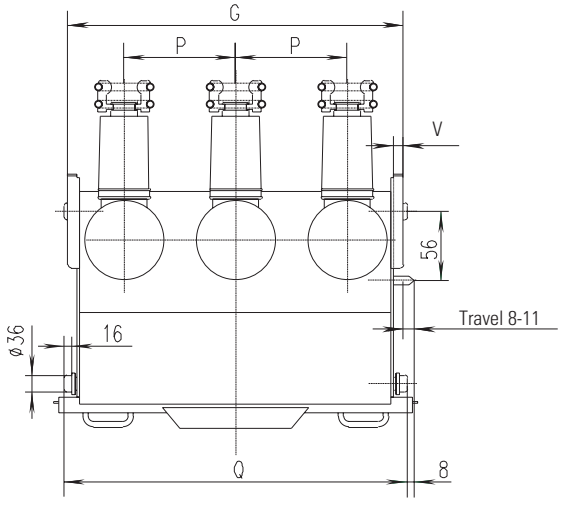
* 4000A needs forced air cooling;
** Data are offered only on request by users

VS1 Vacuum Circuit Breaker

Outline dimensions (VS1 drawout type)



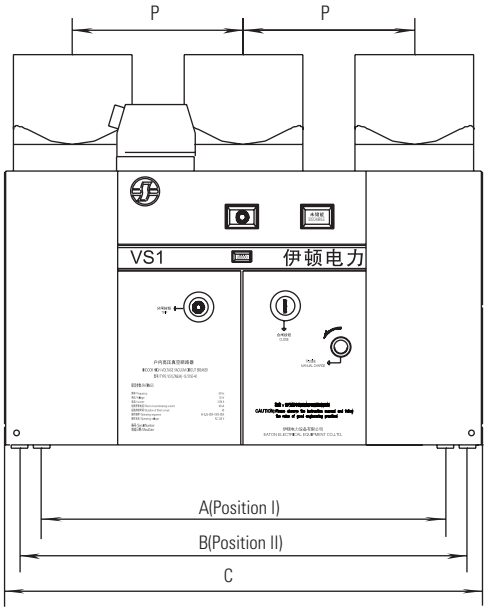


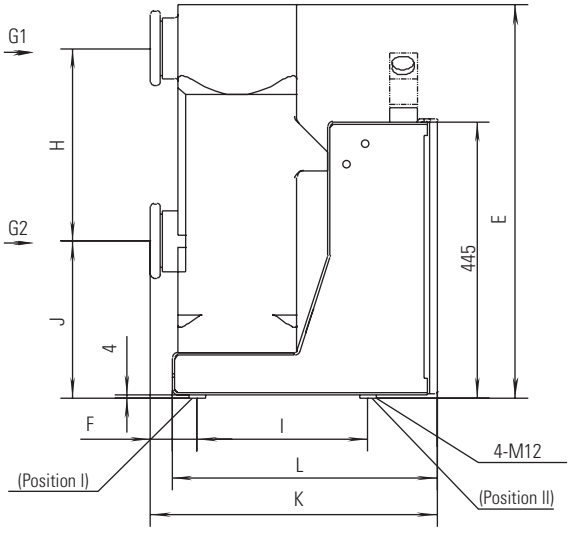


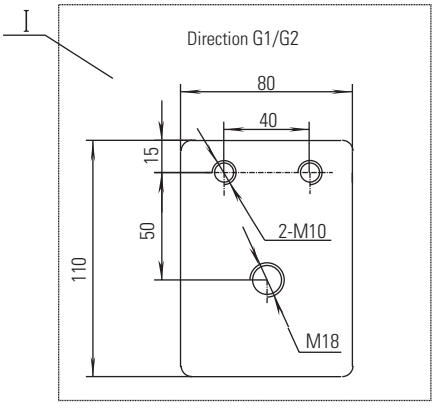
Rated parameter	P	H	K	L	B	C	D	E	F	G	M	Q	S	T	W	Z	V
630A	210	275	280	598	652	433	637	76	78	640	277	650	508	40	638	Ø35	23
20~31.5kA	275	275	280	598	852	433	637	76	78	838	377	850	508	40	838	Ø35	23
1250A	210	275	280	598	652	433	637	76	78	640	277	650	508	40	638	Ø49	23
20~31.5kA	275	275	280	598	852	433	637	76	78	838	377	850	508	40	838	Ø49	23
1250A	210	275	280	598	652	433	637	76	78	640	277	650	508	40	638	Ø49	23
40kA	275	275	280	598	852	433	637	76	78	838	377	850	508	40	838	Ø49	23
1600A	210	275	280	598	652	433	637	76	78	640	277	650	508	40	638	Ø55	23
31.5~40kA	275	310	295	586	852	361	698	77	88	838	377	850	536	0	838	Ø79	34
	275	275	280	598	852	433	637	76	78	838	377	850	508	40	838	Ø55	23
1600A	275	310	295	586	852	361	698	77	88	838	377	850	536	0	838	Ø79	34
50kA																	
2000A	275	310	295	586	852	361	698	77	88	838	377	850	536	0	838	Ø79	34
31.5~50kA																	
2500-3150A	275	310	295	586	852	361	698	77	88	838	377	850	536	0	838	Ø109	34
31.5~50kA																	
3150-4000A	275	310	295	586	852	361	698	77	88	838	377	850	536	0	838	Ø109	34
40~50kA																	

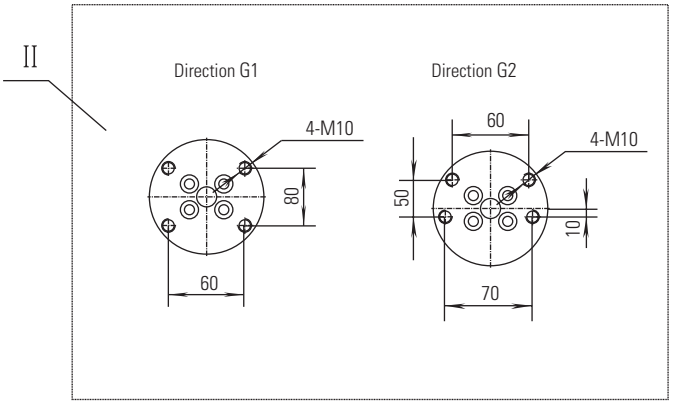
Note: unit (mm)

Outline dimensions (VS1 fixed type)





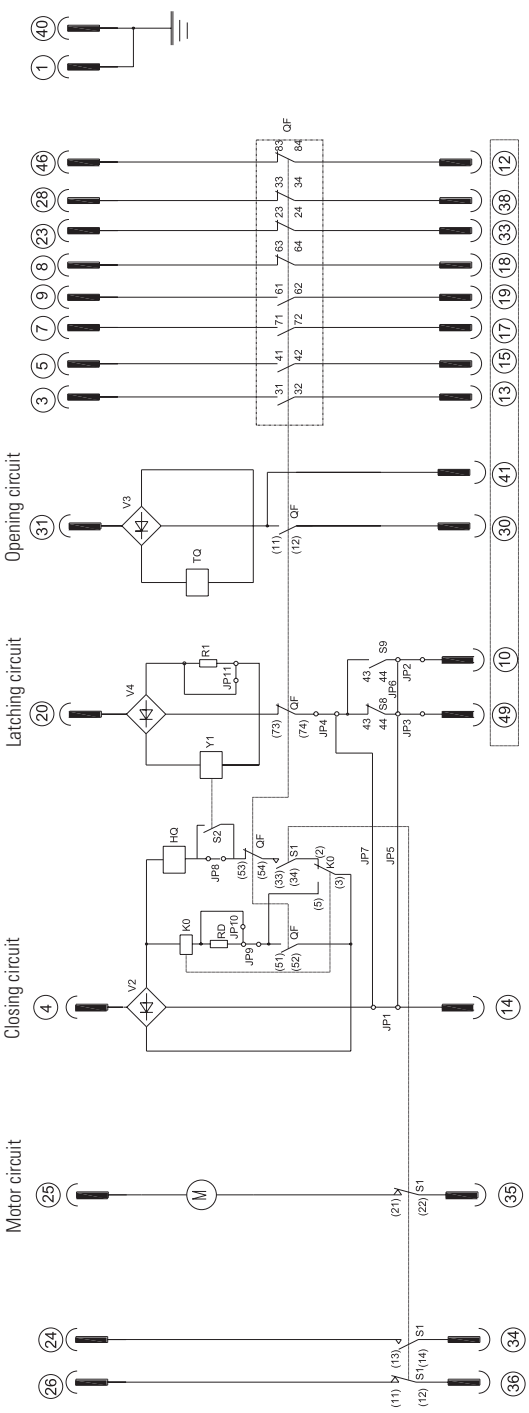




Distribution panel width	Rated current (A)	P	H	A	B	C	E	F	G1/G2	I	J	K	L
800	630~1250	210	275	520	520	588	580	90	I	250	237	455	410
800	1600	210	275	520	520	588	580	65	I	275	237	455	410
1000	630~1600	275	275	720	720	770	580	65	I	275	237	455	430
1000	1600~4000	275	310	650	720	770	632	78	II	275	252	465	430

* When ordering fixed type VS1,it is required to provide relevant technical requirements such as fixed panel type, the functions that mechanical interlock should achieve, assembly position and interface dimension of the circuit breaker and the mechanical interlock. Eaton Electrical Equipment will customize the device as per your request.

Control wiring diagram (VS1 drawout type)



Connection settings of optional parts

Configuration	Jumper status	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

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

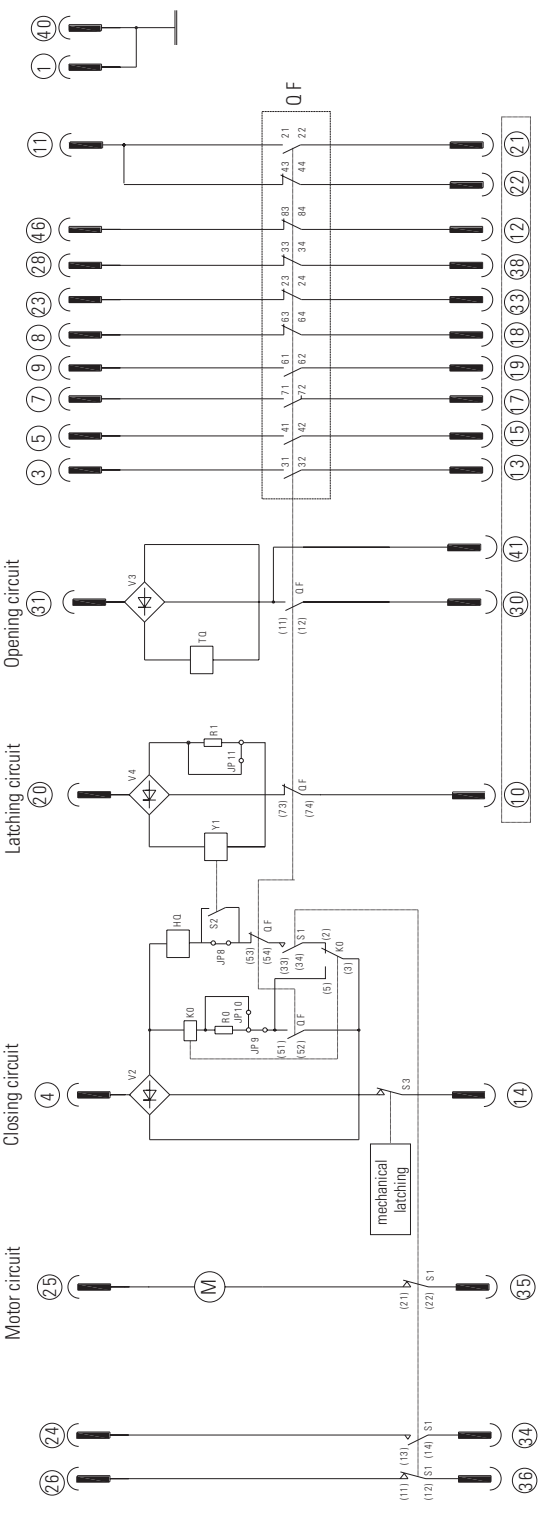
Notes: "/" denotes disconnected;
"√" denotes connected.

S9: Auxiliary switch (to switch when VS1 is in working position)
S8: Auxiliary switch (to switch when VS1 is in testing position)
S2: Auxiliary switch
S1: Auxiliary switch (to switch after closing spring is charged)
QF: Auxiliary switch (to switch during opening/closing operations)
V2-V4: Bridge rectifier (to cancel at DC)
Y1: Latch coil (optional)
K0: anti-pupming relay (optional)
Y7-Y9: Indirect overcurrent release coil (optional)
JP1-JP11: Jumper

HQ: Closing coil
TQ: Opening coil
R0-R1: Resistance
M: Charging motor

Note: When in DC supply operations, the polarity within the dotted box shall be the same
VS1 is in testing position, opening and uncharged state.

Control wiring diagram (VS1 fixed type)



Connection settings of optional parts

Configuration	Jumper status	Jumper JP8	Jumper JP9
With anti-pumping	With latch	/	√
	Without latch	√	√
Without anti-pumping	With latch	/	/
	Without latch	√	/

Operating power supply options

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

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

HQ: Closing coil
TQ: Opening coil
M: Charging motor
S2: Auxiliary switch
S1: Auxiliary switch (to switch after the closing spring is charged)
S3: Auxiliary switch (to switch after mechanical lock is in place, to cancel when no mechanical interlock is supplied
QF: Auxiliary switch (to switch during opening/closing operations)
K0: anti-pumping (optional)
R0-R2: Resistance
Y7-Y9: Indirect overcurrent release coil (optional)
Y1: Latching coil (optional)
V2-V4: Bridge rectifier (to cancel at DC)
JP8-JP11: Jumper

Note: 1. When in DC supply operations, the polarity within the dotted box shall be the same
2. During installation and commissioning of mechanical interlock, make sure that S3 can be reliably switched after the mechanical interlock is in place
3. VS1 is in opening and uncharged state.

Ordering information

Project name: _____

Ordering quantity: _____

Applications

□VS1 draw out type □VS1 fixed type

Primary data

Rated voltage	□12kV	□kV					
Rated current	□630A	□1250A	□1600A	□2000A	□2500A	□3150A	□4000A*
Rated short circuit breaking current	□20kA	□25kA	□31.5kA	□40kA	□50kA		

*4000A needs forced air cooling

Secondary configuration

Power supply of charging motor	□DC 110V	□DC 220V	□AC 110V	□AC 220V
Closing release	□DC 110V	□DC 220V	□AC 110V	□AC 220V
Opening relaease	□DC 110V	□DC 220V	□AC 110V	□AC 220V
Auxiliary switch	5NO+5NC			
Secondary wiring	□58-pin plug/socket	□46-pin plug/socket		

Optional configuration

□Overcurrent release	□2 overcurrent	□3 overcurrent	□A
□Closing latch	□V		
□Position latch	□V		
□anti-pumping relay	□V		
□Undervoltage release	□V		

Options

□Cradle
□Contact arm (including contact finger, and contact arm cylinder)
□shutter-propelling bracket
□Blanking board cover plate
□Transport trolley
□Charging handle
□Cradle handle

Contact information

Company name: _____

Department: _____

Name: _____

Phone: _____

Fax: _____

* For any questions, please contact Eaton Electrical Equipment Co., Ltd.

EATON
Powering Business Worldwide

There's a certain energy at Eaton. It's the power of uniting some of the world's most respected names to build a brand you can trust to meet your every power management need.

Eaton is dedicated to ensuring that reliable, effi cient and safe power is available when it's needed most. Building on over 100 years of experience in electrical power management, the experts at Eaton deliver customized, integrated solutions to solve your most critical challenges. To learn more visit **www.eaton.com/electrical.**

Eaton is a power management company with 2013 sales of $22.0 billion. Eaton provides energy-efficient solutions that help our customers effectively manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. Eaton has approximately 102,000 employees and sells products to customers in more than 175 countries. For more information, visit **www.eaton.com.cn/electrical.**

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