

Indoor vacuum circuit breaker

---similar to ABB VD4/P type
---Replace size of VD4/P



6Kv to 24kV
Product brochure
2009/4

ZHEJIANG FARADY POWERTECH CO., LTD.

ISO9001&ISO14001 certificated enterprise

COMMITTED TO BE BETTER POWER

++++General

VB4P medium-voltage indoor vacuum circuit breaker is applicable for three-phase AC power system of rated voltage up to 12~24kV and frequency 50/60Hz, widely used in many fields such as power plant, transformer substation, petrol chemical industry, metallurgy, manufacturing industry, airport, residential area, etc., to control and protect the electric equipment, especially, It is used for the occasion that needs infrequent operation at rated current or multi-breaking short circuit current, may be mounted in the indoor air insulating switchgear like type KYN28 or AMS, ABB type ZS1 series, etc. This circuit breaker is standards as GB1984-2003 AC high voltage circuit breaker, JB3855 3.6-40.5Kv indoor AC High voltage circuit breaker, DL/T403 Specification of 12-40.5Kv indoor High voltage vacuum circuit breaker for order as well as IEC60694.

This circuit breaker is made with mature APG technology. The application of VB4P terminal buffer guarantees the indoor terminal is ever more reliable in any operation environment. VB4P can fully meet the requirement of GB, DL, IEC, DIN, VDE as well as standards of other advanced industrial countries.

++++Service environment

- a) Air temperature: Maximum temperature: +40°C; Minimum temperature: -25°C
- b) Humidity: Monthly average humidity 95%; Daily average humidity 90% .
- c) Altitude above sea level: Maximum installation altitude: 2500m
- d) Ambient air not apparently polluted by corrosive and flammable gas, vapor etc.
- e) No frequent violent shake

++++Service environment

No	Item	Unit	Parameter	
1	Rated voltage	kV	12/17.5	24
2	Rated frequency	Hz	50/60	
3	Rated current	A	630,4000A	
4	1min Power frequency withstand voltage	kV	48	65
5	Lightning impulse withstand voltage	kV	75/95	125/150
6	Rated short circuit breaking current (peak)	kA	50/63/80/100	
7	Rated active load and close circuit breaking current	A	63	50
8	Rated short breaking current	kA	31.5	
9	Rated short circuit making current (peak)	kA	50/63/80/100	
10	Rated cable(line) charging breaking current	A	50 and 10	
11	Rated capacitor bank switching current	A	400	
12	Rated withstand current (peak)	kA	50/63/80/100	
13	Short time withstand current (4s)	kA	20,.....40	
14	Mechanism life	times	10000	

Note: For short circuit breaking current & rated current is optional by clients.

++++Advanced techniques and capabilities

The circuit-breaker VB4P-12(24) is the newest equipment in the voltage class of 12kV up to 24kV manufactured by Zhejiang Farady Electric Co., Ltd. It is universal used in power distributing and transforming systems of power stations, power generators, and secondary substations of mines, industries and infrastructures.

The circuit-breaker VB4P-12(24) has complete type specifications:
the rated voltage is 12kV, the rated current is up to 4000A and the rated short circuit breaking current is up to 50kA.

The circuit-breaker VB4P-12(24) is equipped with modularized spring operating mechanism which has characteristic of more convenient maintenance, rapider replacing of parts and more reliable performance.

The circuit-breaker VB4P-12(24) adopts embedded poles that the vacuum interrupter with low resistance and the primary main electrical circuit are cast in insulating cylinders by epoxy resin.
This structure makes the breaker have more reliable insulation.

The embedded poles of circuit-breaker VB4P-12(24) have the technique of ventilation and convection. Besides, the vacuum interrupter is with low resistance. All of these reduce the power consumption and the temperature rising due to the longtime running of circuit-breaker.

The circuit-breaker VB4P-12(24) has perfect performance when it is breaking short-circuit current or being operated frequently.

Beside that it also has the functions of automatic reclosing and reliable operating.

The driving mechanisms of circuit-breaker VB4P-12(24) are designed by professionals in CooperNature and with characteristic of reliable closing performance, low impact force and longer lifetime. The mechanical lifetime can be up to 30000 cycles.

All of the mechanism surface of circuit-breaker VB4P-12(24) is disposed with special process and lubricative technique. Not only the rust-resistance capability is improved but also the operating performance is ensured. The circuit-breaker is also applicable to humid and hot regions.

The circuit-breaker VB4P-12(24) has been through the whole type test in accordance with the standards of GB and IEC.

++++Innovative product design



Single closing spring device



Self- lubricative Bearing without Oil



Conductors with Silvered Surface

Damper with perfect performance

Thanks to the refined damper with perfect performance and the new cam gear with curvilinear design, the contacts rebounding value during the breaker opening is reduced more and the breaker can be opened reliably. Besides, the bellows in vacuum interrupter are avoided to be broken down due to contacts over bounding and also the mechanical lifetime of operating mechanism is ensured.

Special design of repair without many tools

During the design for VB4P circuit-breaker, the installation and repair must be taken into account. So for the disassembly of parts or accessories, users need no special tools and the repair becomes more convenient. Besides, all of the secondary controlling components are in front of the operating mechanism, which also make maintenance and repair convenient.

Modularized operating mechanism

Modularized operating mechanism is another feature of VB4P. It can be divided into closing module, opening module, main axis module and secondary wiring module, which make the mechanism have characteristic of standard manufacture method, short producing period, convenient maintenance and rapid replacing. These modules are standard and applicable to all VB4P so the costs of facilities management and maintenance are reduced.

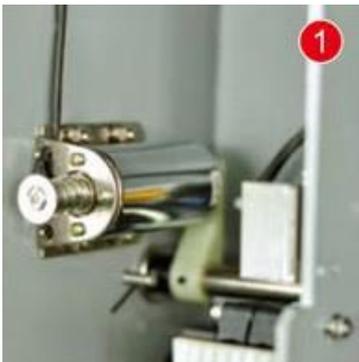
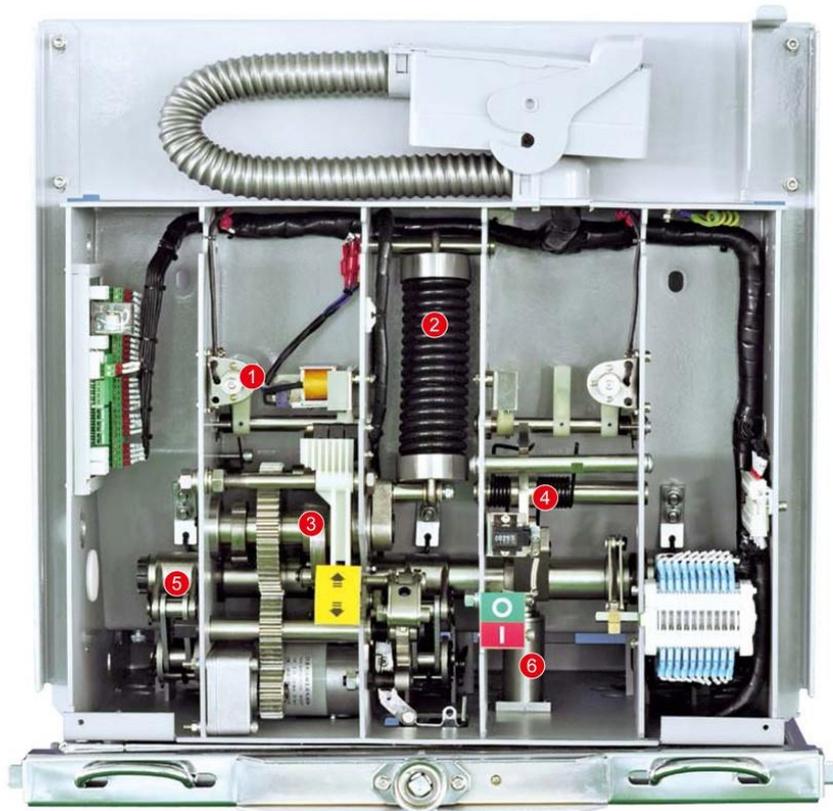
Self- lubricative bearing without oil

Self-lubricative bearing without oil used for VB4P circuit-breaker is very applicable to over-load and low-speed conditions and avoids the lost-lubricative phenomena due to oil-lubricative bearing out of work for a long time. The free-maintenance can be realized accordingly.

Conductors with silvered surface

All the conductors of VB4P circuit-breaker are disposed by silvered process so that it do not only reduce the contacting resistance but also improve the electricity-conducting capacity of conductors. Thanks to the reduced resistance the heat from circuit-breaker running can be decreased and the breaker's lifetime is also lengthened.

++++Mechanism introduction



1 Electrical control

The modular control circuit board adopts the connection plug with the self-fastening function, which can ensure the reliability of the electrical connection. It also has the function of trip-proof and monitoring.

Tripping and closing coils adopt fully sealed structure to reach strong humidity resistance. The metal shell can ensure the good electromagnetic shielding.

Magnetic blow-out micro-switch is adopted to ensure the accurate signal indication

Closing system

Special steel tension spring can ensure the persistence and steady of the mechanical property.

Self-lubrication bearing is adopted to ensure the mechanical life can reach more than 50000 times.

The cam shape is optimized through rigorous engineering to ensure the excellent output performance.





Closing system

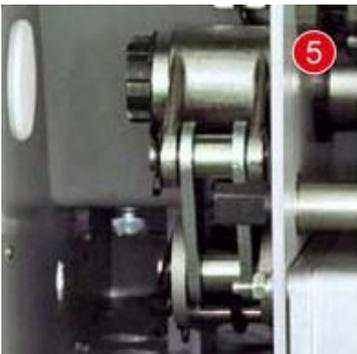
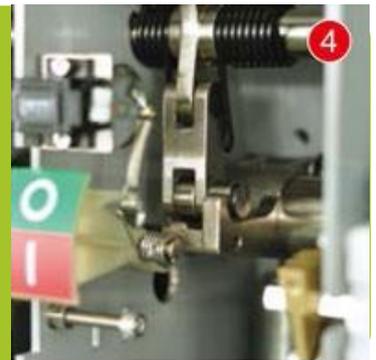
High quality motor can ensure that the continuous operating life is up to 100,000 hours or more.

The gear transmission structure can avoid the risk of fracture.

Holding structure

The integral design of closing holding and separating brake release can ensure that the structure is simple and reliable, which can stop the fault of opening and closing.

The latch is casted with high performance steel and matched with accurate heat treatment process to ensure its long life.



Surface treatment

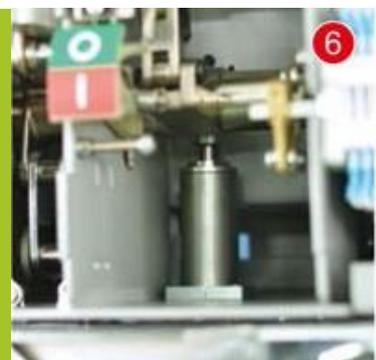
More than 90% of the component adopt the electro less nickel-phosphorus plating process and the standard items are taken stainless steel to enhance the corrosion resistance, the salt spray test exceed 500 hours.

Breaking brake buffer

Special cushioning mechanism design can buff the impact of the opening operation effectively.

Accurate damping control can ensure the perfect performance of the opening operation.

The aircraft hydraulic oils have excellent low-temperature viscosity which can ensure the reliable operation of the circuit breaker.



++++Embedded pole design

High Reliability

Compared with the traditional assembled pole, the number of parts, conductor connection surface connecting fasteners used for the Embedded Pole can be reduced by a big margin so as to simplify the assembly procedure of the main circuit, lower the circuit resistance and enhance the reliability of the main circuit connection.

Stable Insulating Property

After the vacuum interrupter is embedded in the solid epoxy resin material, the external environment of the pole can make the lowest effect on the vacuum interrupter. With the external insulating capacity, the pole can not be affected by dust, humidity, small animals, condensation and pollutions. It can completely meet the creepage distance requirement of the II-grade polluted region specified in the GB/DL Standard.

Firm Structure

Provide the sufficient protection for the vacuum interrupter so that it can not suffer the accidental mechanical collision in the process of assembling or transportation.

Miniaturization

Adopt the epoxy resin as the insulation medium to reduce the phase distance and decrease the volume of the vacuum circuit breaker & its matching switch cabinet.

Free Maintenance

As the whole pole is poured into the integral component, the vacuum interrupter can get the sufficient protection. The free maintenance of the vacuum interrupter can provide the condition for the free maintenance of the circuit breaker.

More Environmental Protection

The circuit breaker with the Embedded Pole can substitute for the SF6 gas as the external insulation to some extent, with more environmental protection.



++++Vacuum Interrupter with Excellent Performance

As the core component of VB4/P Vacuum Circuit Breaker, the vacuum interrupter is the new-type vacuum interrupter with the following features:

• Unique R-shaped Contact Terminal Design

At present, the majority of vacuum interrupters made by the china manufacturers can adopt the cup-shaped axial magnetic structure.

VB4/P vacuum circuit breaker can use the R-shaped contact terminal which adopts the unique axial magnetic structure in the world, with independent intellectual property rights. Through the electromagnetic field optimization design, the vacuum interrupter using the R-shaped contact terminal can have the following features.



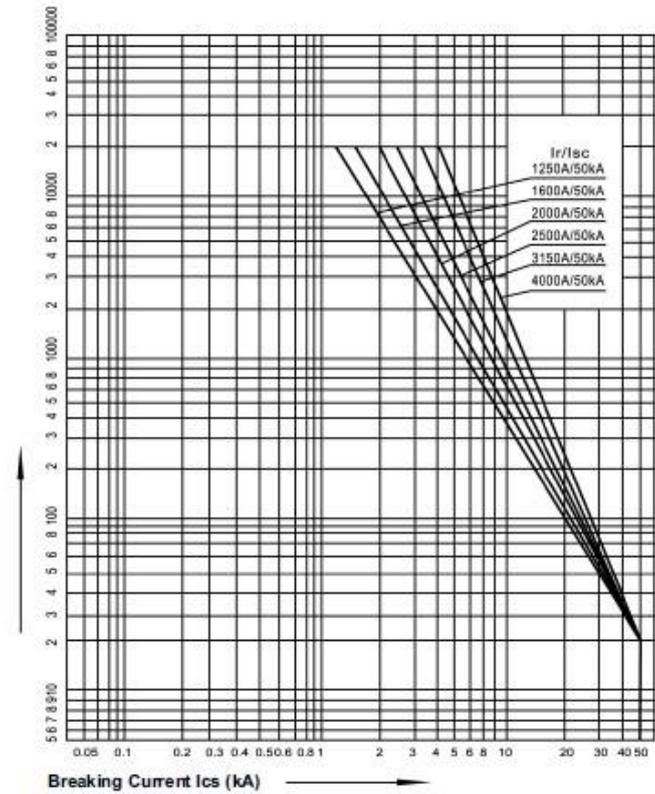
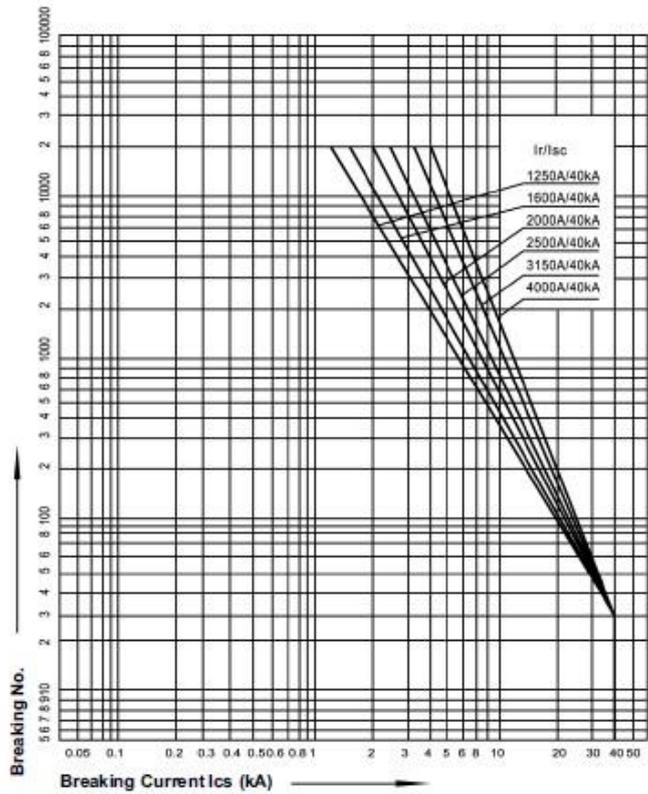
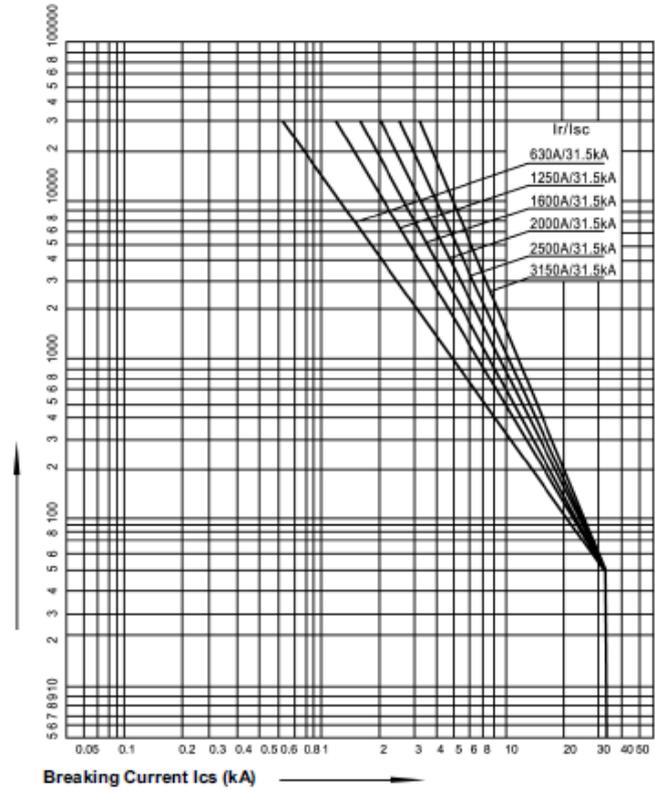
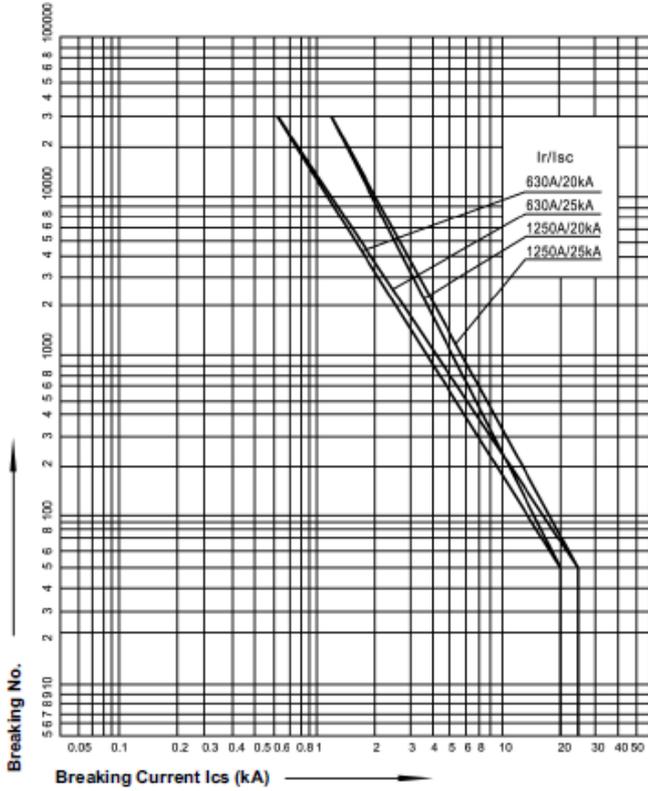
1. When breaking the short-circuit current the strong axial magnetic field is formed. The product can have good heat welding with a strong capacity to break the short-circuit current. With low re-arc rate & high reliability, the product can meet the breaking requirements of 100% rated short-circuit current.
2. The R-shaped contact terminal can be made by adopting the integration form, with high structure strength in the process of closing & breaking brake the product cannot be deformed, with stable short-circuit breaking performance.
3. The R-shaped contact terminal has no striking are groove with perfect appearance. All blend into one. The product has the high withstand voltage.
4. Small circuit resistance: under the rated contact terminal pressure, when $I_n=1,250A$, $R=9\pm 1pQ$; when $I_n=3.150A$, $R=7\pm 1pQ$.
5. With high & reliable capacitive loading and inductive loading breaking capacity.
6. With high & reliable ground fault current breaking capacity.
7. Under the normal conditions, with low X-ray radiation quantity, the product can meet the requirement of the environment protection.

• Complete One-Time Sea-Exhaust Technology

• High & Stable Quality Ceramic Metallization Technology

• Stainless Steel Direct Rivet Weld Technology

+++Breaking current of vacuum interrupter

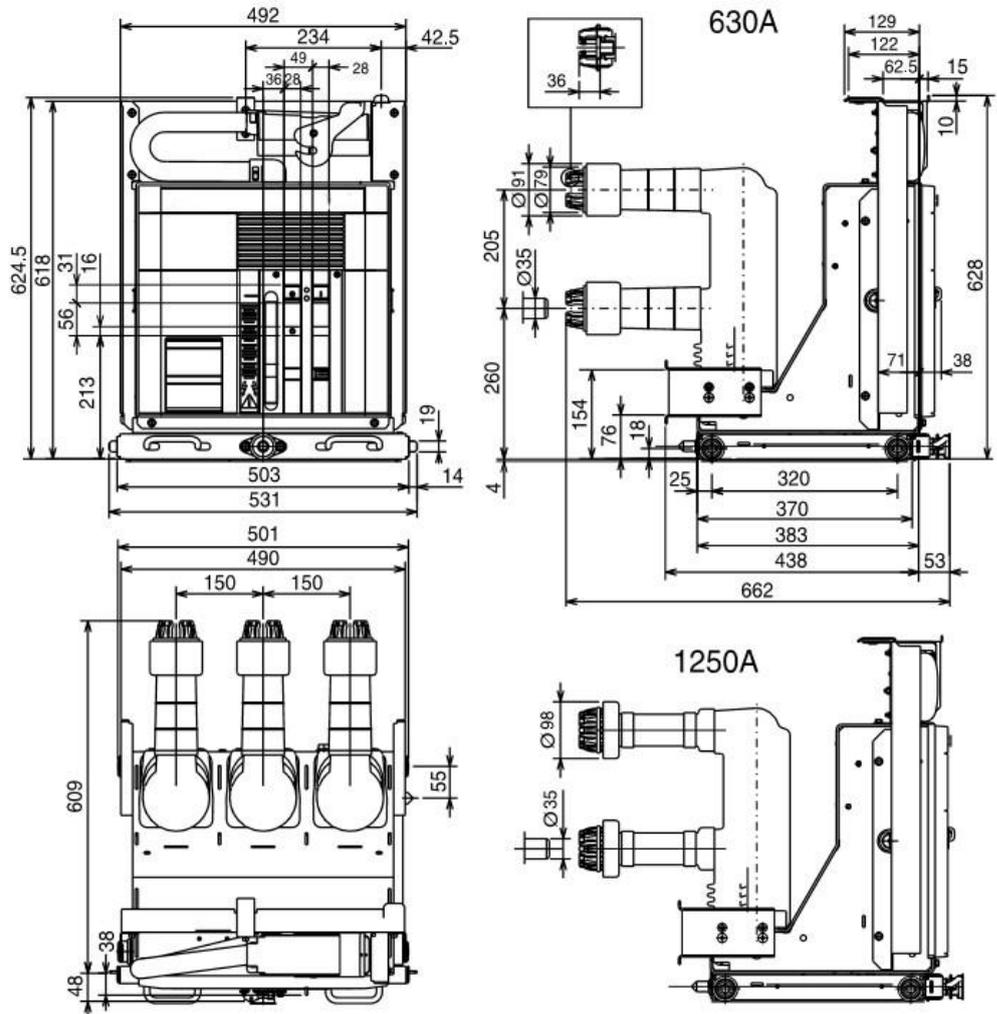


+++Installation size

Withdrawable circuit-breakers overall size(suitable for KYN28/ZS1 also)

VB4/P		
TN	VB4/P-12	
Ur	12	kV
Ur	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA

VB4/P		
TN	VB4/P-17.5	
Ur	17.5	kV
Ur	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



+++Ordering Instructions

1. Below terms should be marked while ordering:

Model of operating mechanism (opening closing coil voltage, trip coil voltage).

Provide the rated voltage specification if motorization operating is required.

For rated voltage and current and breaking current is optional. Pls give data.

• Copyright 2014 Farady Powertech

Zhejiang Farady Powertech Co.,Ltd

TEL:0086-577-61512688

Fax:0086-577-61510628

Http://www.farady.com.cn

Email:info@farady.cn

Add:N.O,278,Wei 7 Rd,Yueqing Economic development Zone,Yueqing,Zhejiang,P.R.China, 325606