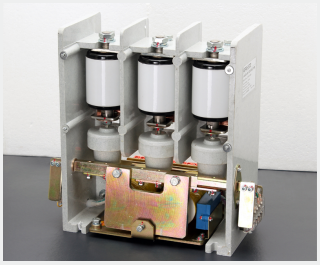

## EVC5 Series AC high voltage vacuum contactor

### General

EVC5-7.2,12/160,250,400,630 series vacuum contactor is used in an AC. 50-60 Hz electric power system, with rated working voltage is 7.2Kv and 12kV, and rated current of 160A, 250A, 400A 630A, for direct or romote on-off control and circuit-breaking control of the of the main load. It is especially suitable for the frequently operated electric control applications such as electric motors, transformer, etc. This series adopts integrated framework, before-and-after layout between the main circuit and controlling circuit, adopts electric-maintaining structure or machinery-maintaining structure, and vacuum interrupter with ceramic shell(the vacuum contactor with rated voltage of 7.2kV also brings vacuum interrupter with glass shell).

### Normal working conditions

■ Ambient temperature: Maximum ambient air temperature not exceeds +40℃; averaged air temperature within 24 hours not exceeds +35℃; Minimum ambient temperature to be not lower than -15℃. If the ambient temperature exceeds +40℃, the contactor should be used with lower capacity and need to be proved. The highest temperature of the contactor should not exceed +105℃.
■ Altitude above sea level: altitude above sea level of the installation place not exceeds 1,000 m.
■ Relative humidity: relative humidity of the atmospheric air not exceeds 50% when the ambient air temperature is +40℃; higher relative humidity is allowed when the air temperature is lower, daily averaged relative humidity not exceeds 95%; maximum monthly averaged relative humidity is 90% when the averaged air temperature is +20℃ in most humid months. Having taken into account the condensation dew on the surface of the product due to the temperature variation.
■ Installation conditions: inclination angle of the installed plane with the vertical plane not exceeds 5°.
■ Contamination class: class III

### Type and specification of the product

| E | VC | 5 | - | 12 | D/D | 400 | - | 4.0 | □ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | | 4 | 5 | 6 7 | | 8 | 9 |

1. GREEGOO
2. Vacuum Contactor
3. Design sequence no.
4. Rated working voltage (kV)
5. D: electric maintaining type; J: mechanical maintaining type
6. Electro-magnetic operating mechanism
7. Rated working current (A)
8. Max. limit breaking current (kA)
9. No. of enclosure material of vacuum switch tube. B: glass (can be not signed) T: ceramic

### Structure & working principle

>> Structure and working principle

The high voltage main circuit and low voltage control circuit are arranged in upper and lower sections. This arrangement mode looks apparently, safe, reliable and convenient for installing and maintaining. The contactor is mainly composed of vacuum arc-extinguishing chamber, insulating frame, insulator, open/close operating mechanism, electro-magnet and bottom plate; while for the mechanical holding type, the mechanical interlock mechanism should be assembled relatively. The moving current-conducting rod of three-phase vacuum arc-extinguishing chamber is connected with the connecting lever by means of three insulators; the connecting lever and the moving armature is fixed/secured on the square axle. For the electric holding type, attracting and releasing of the armature by the electro-magnetic coil drives the making and breaking process of the moving contacts in the vacuum switch tube. For the mechanical holding type, attracting of the moving armature by the electro-magnetic coil drives the making process of the moving contacts, and the mechanical locking mechanism keeps with the state of closing; the breaking coil forces the mechanical locking mechanism to release and the moving armature drives the moving contacts to open by the function of opening coil. As making/breaking process of the contacts is carried out in the vacuum space, therefore, it has excellent switching characteristics, with long lifetime, both safe and reliable. Its control circuits provide the rectifying equipment and the changeover of picking up and holding of the electro-magnetic coil. It also provides the auxiliary switch of 3a+3b for the user.

>> Vacuum arc-extinguishing chamber

Inside the vacuum arc-extinguishing chamber of the glass or ceramic enclosure is installed one pair of contacts, made of wear-resistant and low current-cutting off material (see Fig.1), which can satisfy both the breaking performance and reducing the over-voltage caused due to the cutoff current, and raise the lifetime of the arc-extinguishing chamber. Bellow inside the arc-extinguishing chamber has the function of separating the atmospheric air and making the moving contacts to be able to make axial motion, thus cannot rotate the moving conducting rod; otherwise the bellow will be damaged due to the twist of the rod.

WARNING: Vacuum arc-extinguishing chamber is the functional actuating component of the contactor. Do not impact it by the external force; otherwise the complete contactor will be damaged/wasted.

## Rated technical data

Rated data see table 1 (Table 1 rated data)

| Name | | | Unit | Data |
|---|---|---|---|---|
| Main circuit | Rated working voltage (Ue) | | kV | 7.2, 12 |
| | Rated working current (Ie) | | A | 160, 250,400,630 |
| | Rated thermal current (Ith) | | A | 160, 250,400,630 |
| | Rated making capacity (I) | | A | 10Ie |
| | Rated breaking capacity (Ic) | | A | 8Ie |
| | Limit breaking capacity | | A | 10Ie |
| | Rated breaking current of single capacitor bank (C2) | | A | 400 |
| | Rated short time withstand current and duration | | A/s | 10Ie/4 |
| Control circuit | Rated voltage (Us)1 | | V | AC. or DC.110/220 |
| | Rated power (Ps) | Electric holding | VA | ≯1000/100(attracting/holding) |
| | | Mechanical holding | | ≯900/600(closing/opening) |
| Auxiliary circuit | | type | | 3a+3b |
| | | Rated value | | 380V/AC.5A or DC.1A |
| Rated operating frequency | | Long time or mechanical holding type | Time/h | 300 |
| | | Short time | | 600 |
| Mechanical life2 | | | 10000 time | 100 |
| Electric life | | | 10000 time | 25(AC-3); 10(AC-4) |

Remarks: 1 rated control voltage can be made according to the requirement of the user's;
2 for mechanical holding type, the interlock mechanism should be replaced every 300000 times.

Technical requirements for the contactor see table 2 (Table 2 technical requirements)

| Technical requirements | | | unit | Data | |
|---|---|---|---|---|---|
| | | | | 7.2kV | 12kV |
| Power frequency withstandvoltage | Main circuit | Phase to phase, phase to ground | kV | 32 | 42 |
| | | Vacuum breaks | kV | 32 | 42 |
| | Secondary circuit to ground | | kV | 2 | |
| Mechanical characteristics | stroke | | mm | 4.5±0.5 | 6.5±0.5 |
| | Over-travel | | mm | 1.5±0.5 | 1.5±0.5 |
| | Closing time | | ms | ≤200 | |
| | Stationary opening time | | ms | ≤160(electric holding) | |
| | | | ms | ≤60(mechanical holding) | |
| | Three-phase synchronism | | ms | ≤3 | |
| | Closing jump | | ms | ≤10 | |
| Main circuit resistance | | | μΩ | Ie≤2000 | 400<Ie |
| | | | μΩ | ≤200 | ≤150 |
| Main contact working pressure | | | N | ≥60 | ≥80 |

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## Installation, operation, adjustment and maintenance

>> Installation

■ The contactor should be installed as per the normal working position, of which the inclination angle not exceeds 5°.
■ Correctly make electric wiring; pay attention to that the control power supply voltage to be in compliance with the control voltage of the contactor.

>> Replacement & adjustment of vacuum switch tube

1. Replacement of arc-extinguishing chamber
■ Loosen the adjusting screw of the insulator and arc-extinguishing chamber, remove the insulator;
■ Remove the soft connection, loosen the lock nut on stationary end and the stationary conducting board.
■ Assemble the arc-extinguishing chamber with the opposite procedures as disassembling it.

Notice: Do not make moving conducting rod to be relatively rotated with the arc-extinguishing chamber when disassembling/assembling the insulator and the soft connections; otherwise the bellows inside the arc-extinguishing chamber will be damaged.

2. Adjustment of the stroke
■ Please see the technical parameters of each model of the contactor for the stroke of main contact of the vacuum arc-extinguishing chamber; and see Fig.1 for the measuring method. Measure the distance between the soft connection and end face of the enclosure to be h when it is under closed state, and then make the contactor to be under released state, and measure the distance between the soft connection and the end face of the enclosure to be H. The difference of H-h is the stroke. The total travel and stroke has been adjusted when the contactor leaves the factory. It does not necessary to be adjusted under normal condition.
■ Please refer to figure 1 in case the stroke needs to be adjusted. Loosening the lock nut and turning the insulator can make it. Make sure that the adjustment of stroke for different phases must be done synchronously. Tighten the lock nut after adjustment.

Notice: be careful about the twist of the bellows when tighten the nut.

3. Adjustment of synchronism
Use special measuring instrument to carry out the adjustment of synchronism as per the method stated in 2

>> Upon completion of the adjustment, perform the moving operation test under the following voltage range, the contactor should be capable of reliable work.
1. For electric holding series:
■ Make closing/opening operation for several times under 85% rated control voltage;
■ Make closing/opening operation for several times under 110% rated control voltage;
■ The highest releasing voltage of the contactor should be between 70%~10% of rated control voltage.

2. For mechanical holding series:
■ Make closing operation for several times under 85% rated control voltage;
■ Make closing operation for several times under 110% rated control voltage;
■ Make the contactor to be reliably released for several times under 65%~120% rated control voltage; it cannot open for three times under 30% rated control voltage.

>> We suggest using the surge voltage absorber, such as R-C resistance capacitor protection or varistor protection, when the contactor is to be used for controlling the inductive loads such as the electric motor etc.

>> New arc-extinguishing chamber should be capable of withstanding the specified withstand test under power frequency. Periodically perform the withstand voltage test during the using process. The withstand voltage should not be less than half of the rated test value.

>> During operating process, keep the contactor in clean; periodically adjust its stroke, and check its structural elements for loosened connections.

## Transportation & Storage

■ During the transportation process the contactor should not be converted, turned over, strongly vibrated/ shocked and collided.
■ During the transportation and storage process of the contactor, it cannot suffer the invasion of rain and snow. It should be stored in the warehouse without the.invasion of rain and snow, with circulating air, and relative humidity of air not exceeding 85%, and air temperature not higher than +40℃ and not lower than -25℃.

## Unpack & inspection

- Inspect the package for its completeness, and check it for damage.
- Check the contactor if comply with the purchase order, and check the spare parts and attached document if comply with the packing list.
- Make corresponding inspection to the contactor.

## Documents going with the contactor

- Product quality certificate;
- Operating instruction;
- Test record;
- Packing list.

## Notice when placing the order

Please state the following when placing the order:

- Title, model/specification of the product;
- Rated voltage, rated current and rated control voltage;
- Quantity of product and spare parts;
- Other special requirement..

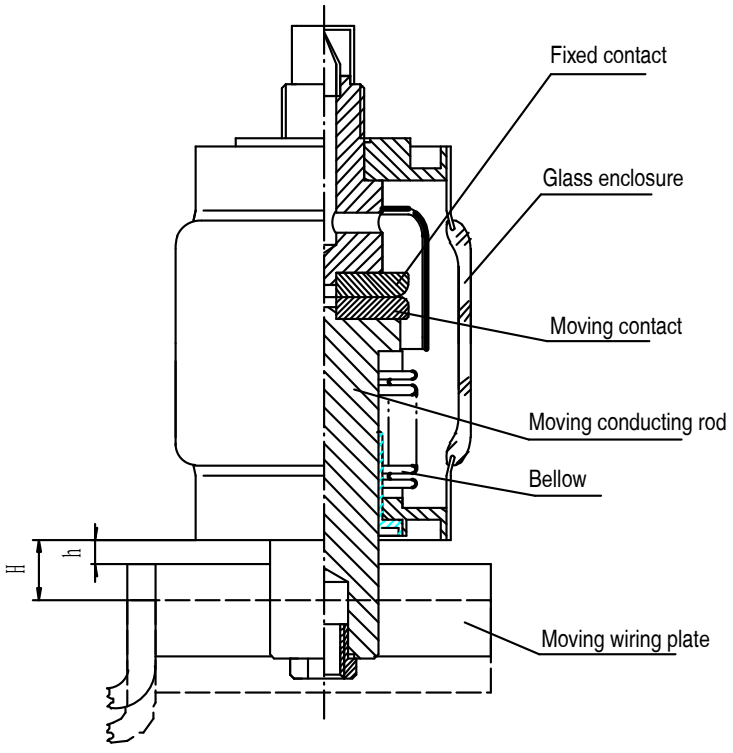
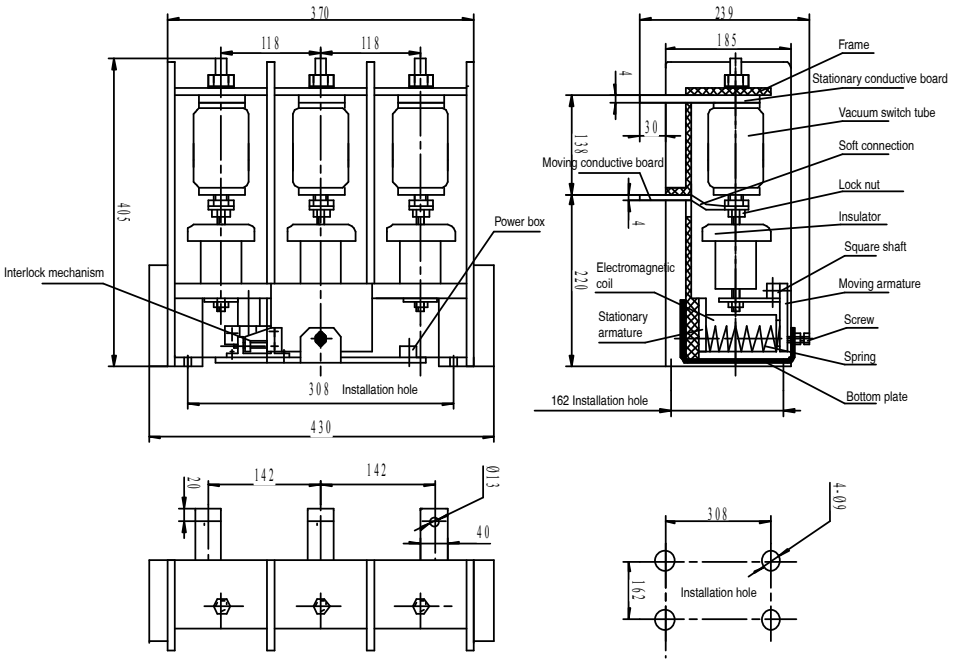
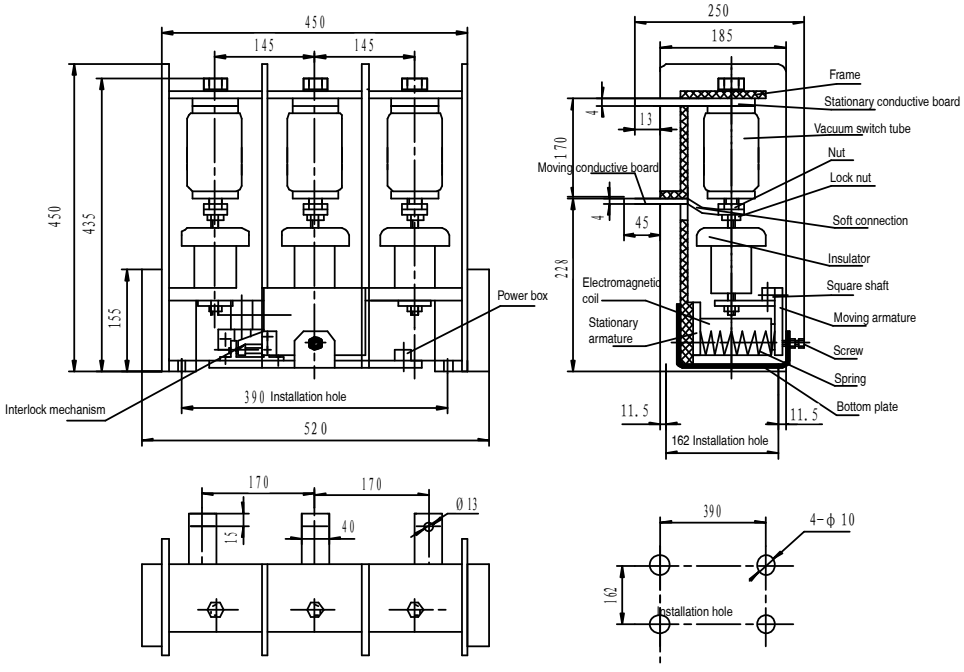



Figure 2



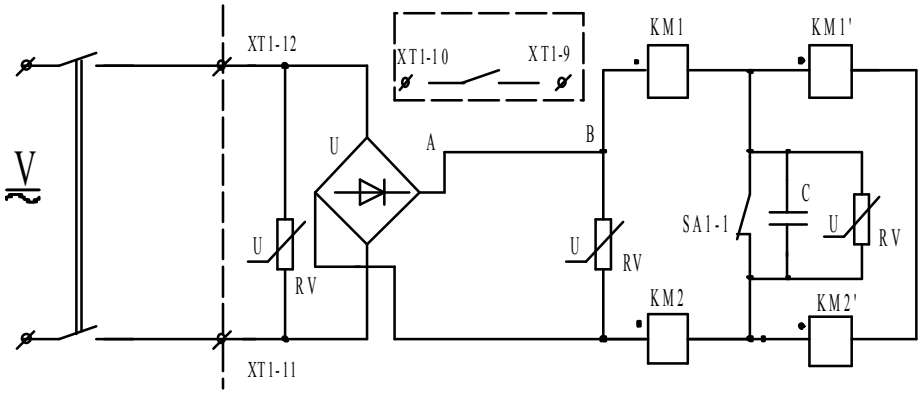

EVC5-7.2kV series AC high voltage vacuum contact or outline dimension

Remarks: There is no interlock mechanism in electric holding type




EVC5-12kV series AC high voltage vacuum contact or outline dimension

Remarks: There is no interlock mechanism in electric holding type

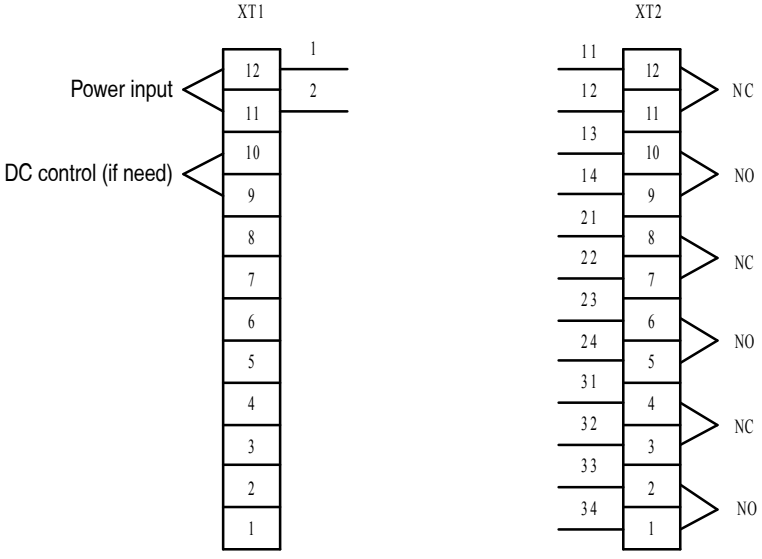



KM +KM ': making coil , KM: starting winding; KM' : holding winding; SA1-1:auxiliary switch;
U: rectifier bridge; RV: varist or resistance; C: protection capacitor; XT: wiring terminal

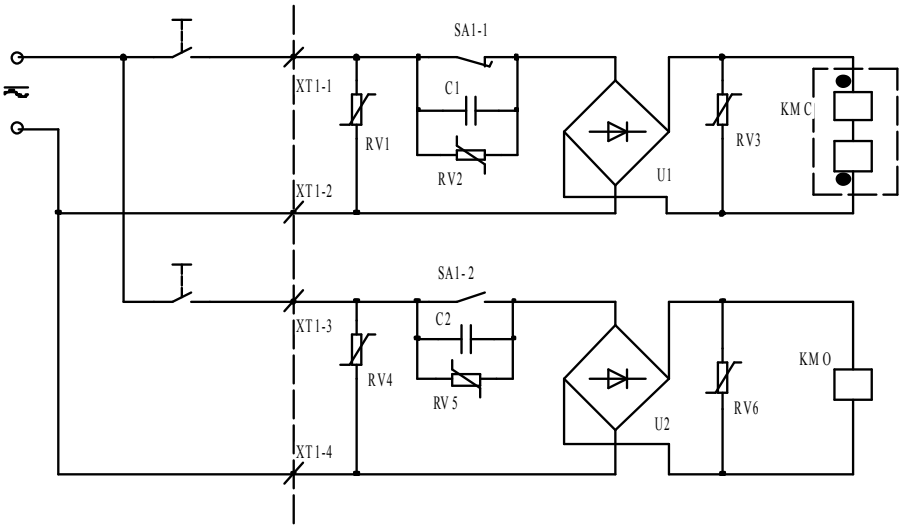
(If the user need to controlby DC, please state it out that the change the point A, B to the wiring in the dotted line.)

EVC5 series electric holding type vacuum contactor scheme

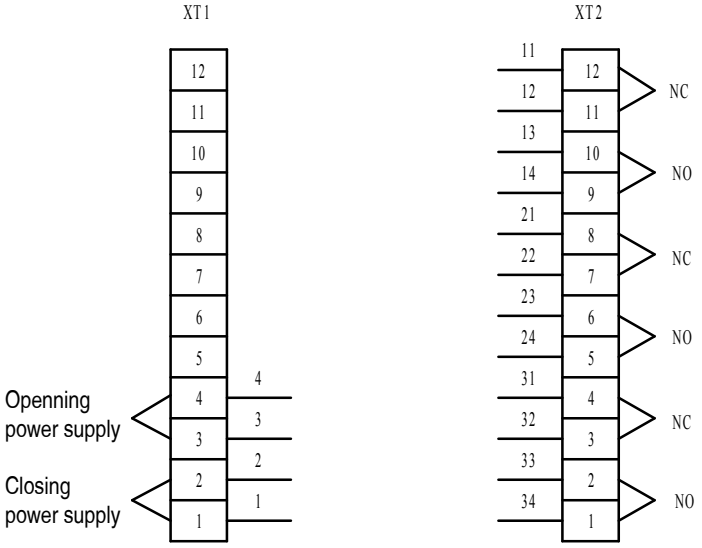
The inter wiring of vacuum contactor is at the right side of the dotted line while the indicating wiring is at the left side. The detailed pattern carried out by user .




EVC5 series electric holding type vacuum contact or wiring terminal scheme




EVC5 series mechanical holding type vacuum contact or scheme
The inter wiring of vacuum contactor is at the right side of the dotted line while the indicating wiring is at the left side. The detailed pattern carried out by user .
RV1-6: varist or resistance; C1,C2: arc suppression resistance; SA1-1, SA1-2: auxiliary switch
U1, U2: rectifier bridge; KMC: closing coil bank; KMO: opening coil




EVC5 series mechanical holding type vacuum contactor wiring terminal scheme