


VS 1-12 Series Indoor High Voltage Vacuum Circuit Breaker

OPERATION INSTRUCTION

Standard: IEC 62271-100

CNC

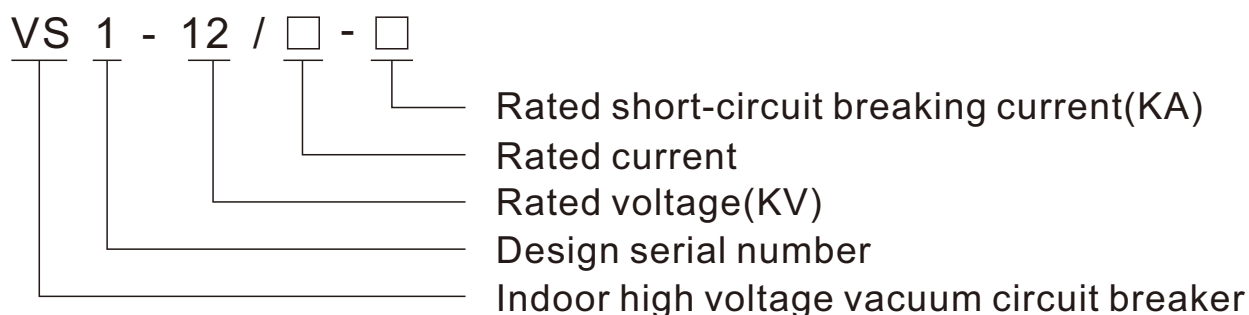
Deliver
Power For Better Life

 Before installing and using this product, please read this manual carefully and pay more attention to safety.

1. General description

VS1-12 indoor high voltage vacuum circuit breaker (circuit breaker for short) is AC 50Hz, rated voltage of 12KV indoor switchgear, control and protection unit for industrial and mining enterprises, power plants, and for frequent operation place under rated working current and many times breaking short-circuit current place.

2. Product model and the meaning



3. The use environment conditions:

- ◆ Altitude: not exceed 2000m;
- ◆ Ambient temperature: not higher than +40°C, not less than -15°C(allowed to delivery and storage at -30°C);
- ◆ Relative humidity: daily average of not more than 95%, month average of not more than 90%;
- ◆ No fire, explosion hazard, serious filthy, chemical corrosion, as well as places of intense vibration.

4. Rated parameters

- ◆ The main technical parameters of circuit breaker (see table 1)
- ◆ The mechanism character parameters of circuit breaker (see table 2)

Table 1 The main technical parameters of circuit breaker

| No. | Item | Unit | Data | | | |
|-----|---|-------|--------------|------|------|------|
| 1 | Rated voltage | KA | 12 | | | |
| 2 | Rated frequency | Hz | 50 | | | |
| 3 | Rated lightning impact withstand voltage (Peak) | KV | 75 | | | |
| 4 | Rated short time power frequency withstand voltage(1 min) | KV | 42 | | | |
| 5 | Rated short-circuit breaking current | KA | 20 | 25 | 31.5 | 40 |
| 6 | Rated current | A | 630 | 630 | 1250 | 2000 |
| | | | 1250 | 1250 | 1600 | 2500 |
| | | | | | 2000 | 3150 |
| | | | | | 2500 | 4000 |
| 7 | Rated short time withstand voltage (rms) | KA | 20 | 25 | 31.5 | 40 |
| 8 | Rated peak withstand current (rms) | KA | 50 | 63 | 80 | 100 |
| 9 | Rated short-circuit making current (Peak) | KA | 50 | 63 | 80 | 100 |
| 10 | Rated short-circuit current duration | S | 4 | | | |
| 11 | Mechanical life | Times | 10000 | | | |
| 12 | Secondary loop power frequency withstand voltage (1 min) | V | 2000 | | | |
| 13 | Rated operation order | | O-t-CO-t1-CO | | | |

Note: 20KA,25KA,31.5KA t=0.3s, t1=180s, 40KA t=180s, t1=180s

Table 2 The mechanism character parameters of circuit breaker

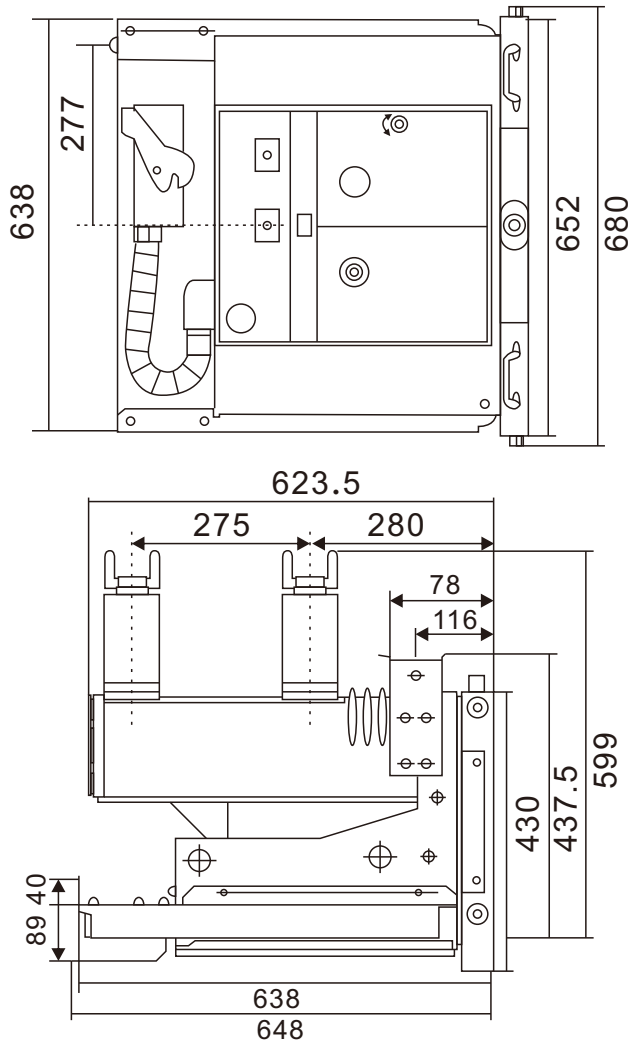
| No. | Item | Unit | Data |
|-----|---|------------|---------------|
| 1 | Switching distance of the contact | mm | 11±1,9±1 |
| 2 | Contact journey | mm | 3.5±0.5 |
| 3 | Contact close bouncing time | ms | ≤2(40KA≤3) |
| 4 | Three phase open, close asynchrony | ms | ≤2 |
| 5 | Average speed of breaking | m/s | 0.9~1.3 |
| 6 | Average speed of closing | m/s | 0.5~0.8 |
| 7 | Breaking time(rated voltage) | ms | ≤50 |
| 8 | Closing time(rated voltage) | ms | ≤100 |
| 9 | Rated closing, breaking operation voltage | V | AC100 |
| | | | AC/DC110 200 |
| 10 | Storage motor rated voltage | V | AC/DC110 200 |
| 11 | Storage motor rated power | W | 70(40KA 100W) |
| 12 | Storage time | s | 10 |
| 13 | Allowance abrasion cumulated thickness of the moving and stationary contact | mm | 3 |
| 14 | Main conduct circuit resistance | 630A | ≤50μΩ |
| | | 1250A | ≤45μΩ |
| | | 1600-2000A | ≤40μΩ |
| | | 2500-4000A | ≤35μΩ |
| 15 | Closing contact touching press | 20KA | 2000±200N |
| | | 25KA | 2400±200N |
| | | 31.5KA | 3100±200N |
| | | 40KA | 4750±250N |

Note: 20KA,25KA,31.5KA t=0.3s, t1=180s, 40KA t=180s, t1=180s

5. Structure and working principle

- ◆ Circuit breaker outlook and install dimension see figure 1 to figure 6

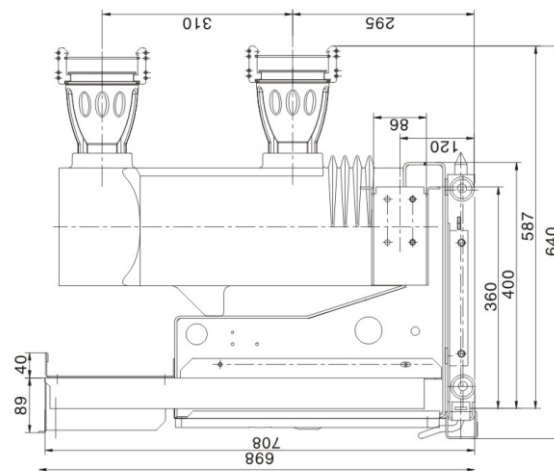
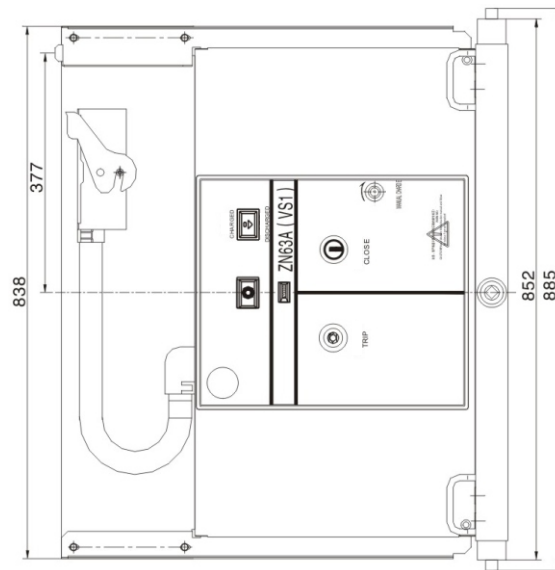
Drawout type VS1 out dimension (figure 1)



The mesh dimension of moving contact and static contact is not less than 15mm, primary phase distance is 210 ± 1.5 mm.

| | | | |
|--|--------------|--------------|-----------|
| Rated current(A) | 630 | 1250 | 1600 |
| Rated short-circuit breaking current(KA) | 20, 25, 31.5 | 25, 31.5, 40 | 31.5, 40 |
| Matching static contact dimension(mm) | $\Phi 35$ | $\Phi 49$ | $\Phi 55$ |

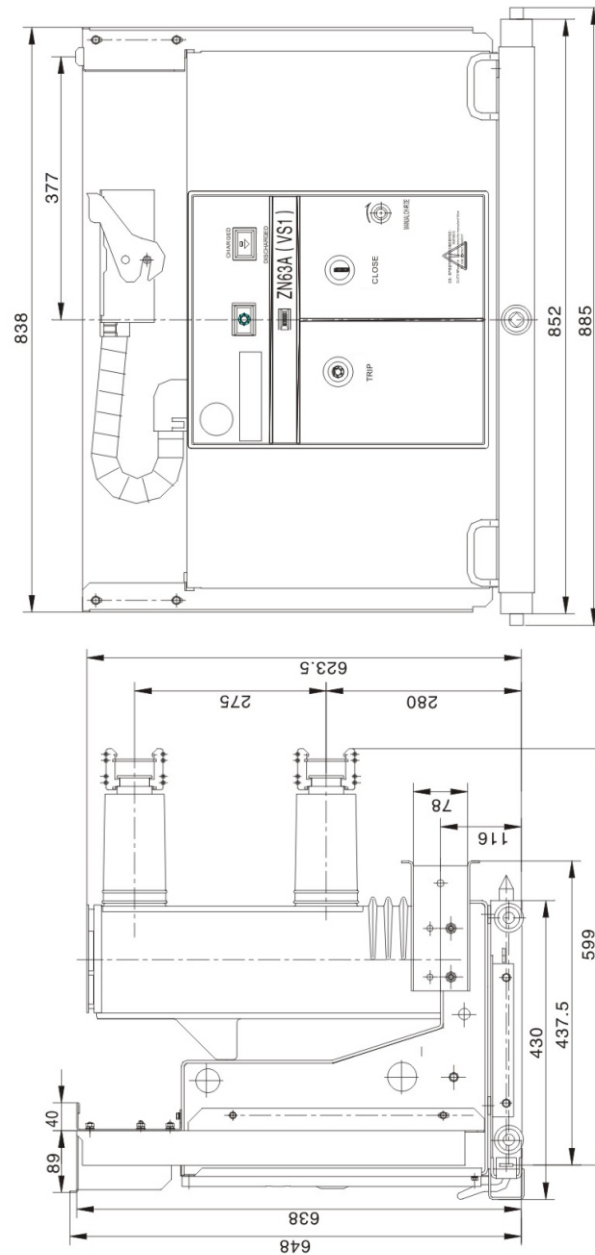
Drawout type VS1 out dimension (figure 2)



The mesh dimension of moving contact and static contact is not less than 15mm, primary phase distance is 275 ± 1.5 mm.

| | | | | | |
|--|--------------------|-----------|------------|----------|--------|
| Rated current(A) | 1600 | 2000 | 2500 | 3150 | 4000 |
| Rated short-circuit breaking current(KA) | 40 | 31.5, 40 | 31.5, 40 | 31.5, 40 | 40, 50 |
| Matching static contact dimension(mm) | $\Phi 55, \Phi 79$ | $\Phi 79$ | $\Phi 109$ | | |

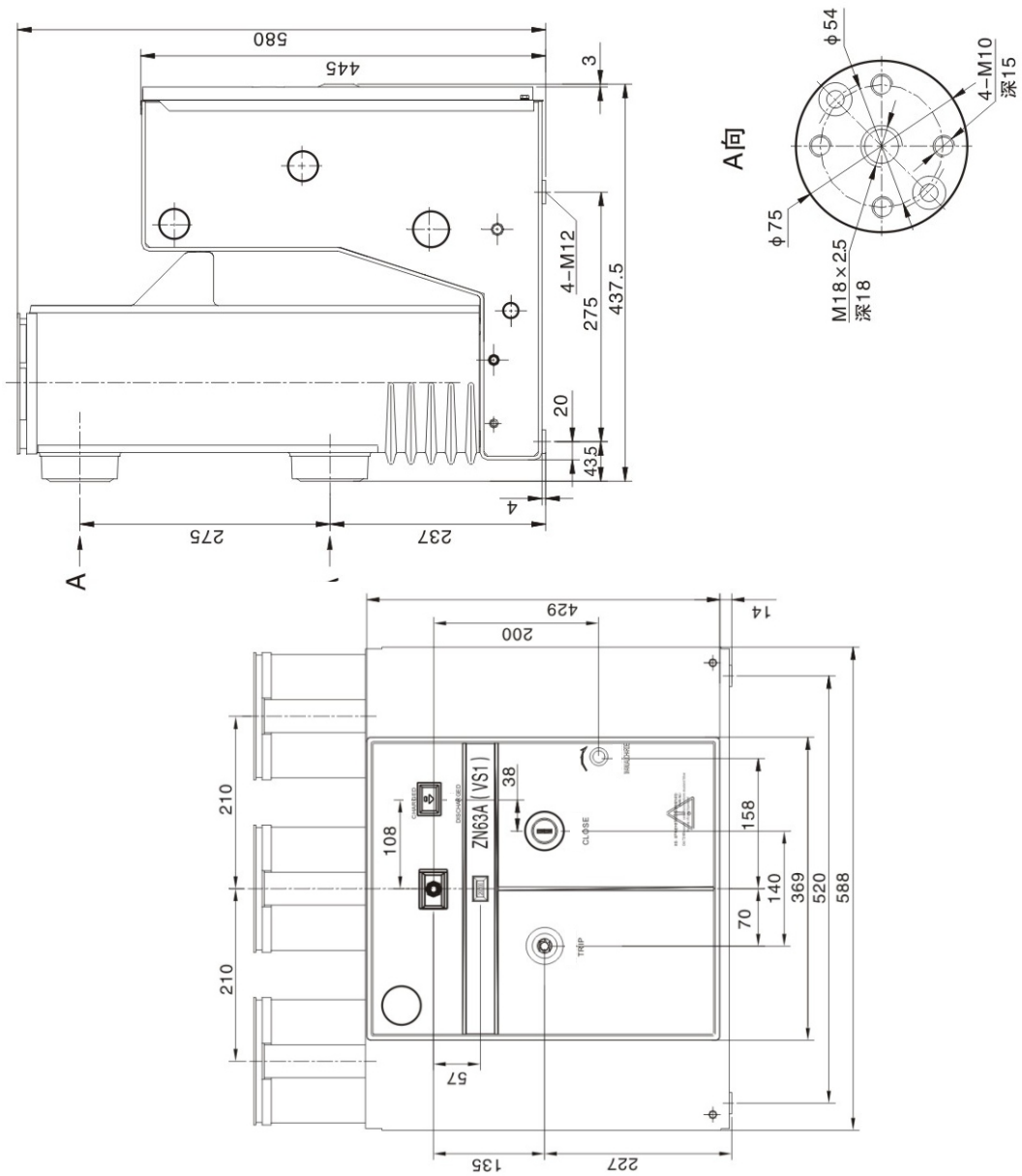
Drawout type VS1 out dimension (figure 3)



The mesh dimension of moving contact and static contact is not less than 15mm, primary phase distance is 275 ± 1.5 mm.

| | | | |
|--|--------------|--------------|-----------|
| Rated current(A) | 630 | 1250 | 1600 |
| Rated short-circuit breaking current(KA) | 20, 25, 31.5 | 25, 31.5, 40 | 31.5, 40 |
| Matching static contact dimension(mm) | $\Phi 35$ | $\Phi 49$ | $\Phi 55$ |

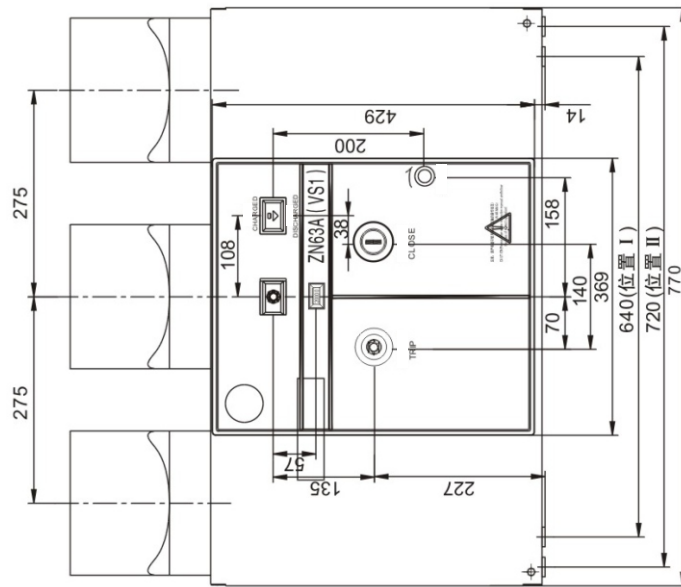
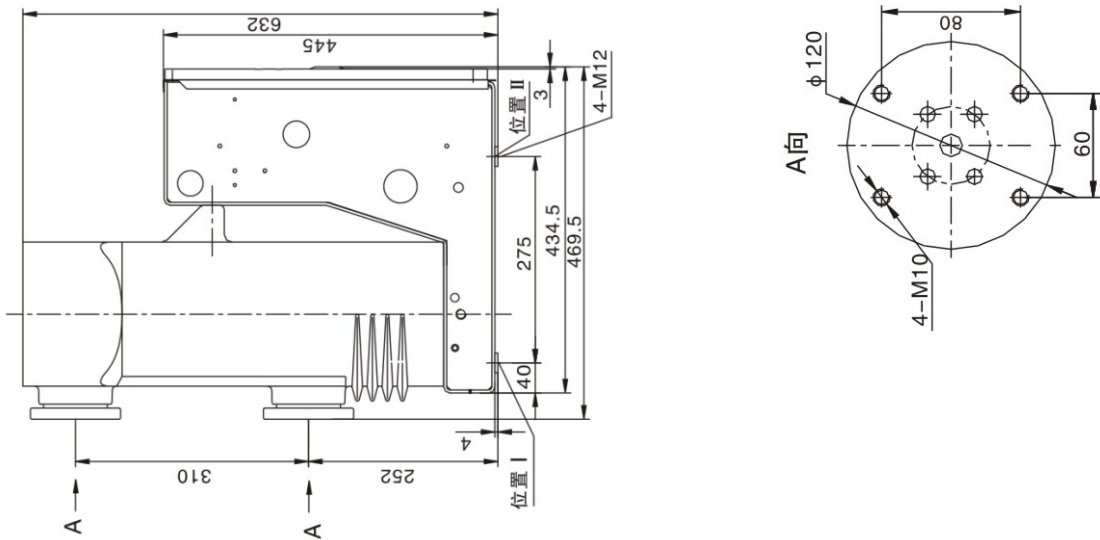
Fixed type VS1 out dimension (figure 4)



The primary phase distance is 210 ± 1.5 mm.

| | | | |
|--|--------------|--------------|----------|
| Rated current(A) | 630 | 1250 | 1600 |
| Rated short-circuit breaking current(KA) | 20, 25, 31.5 | 25, 31.5, 40 | 31.5, 40 |

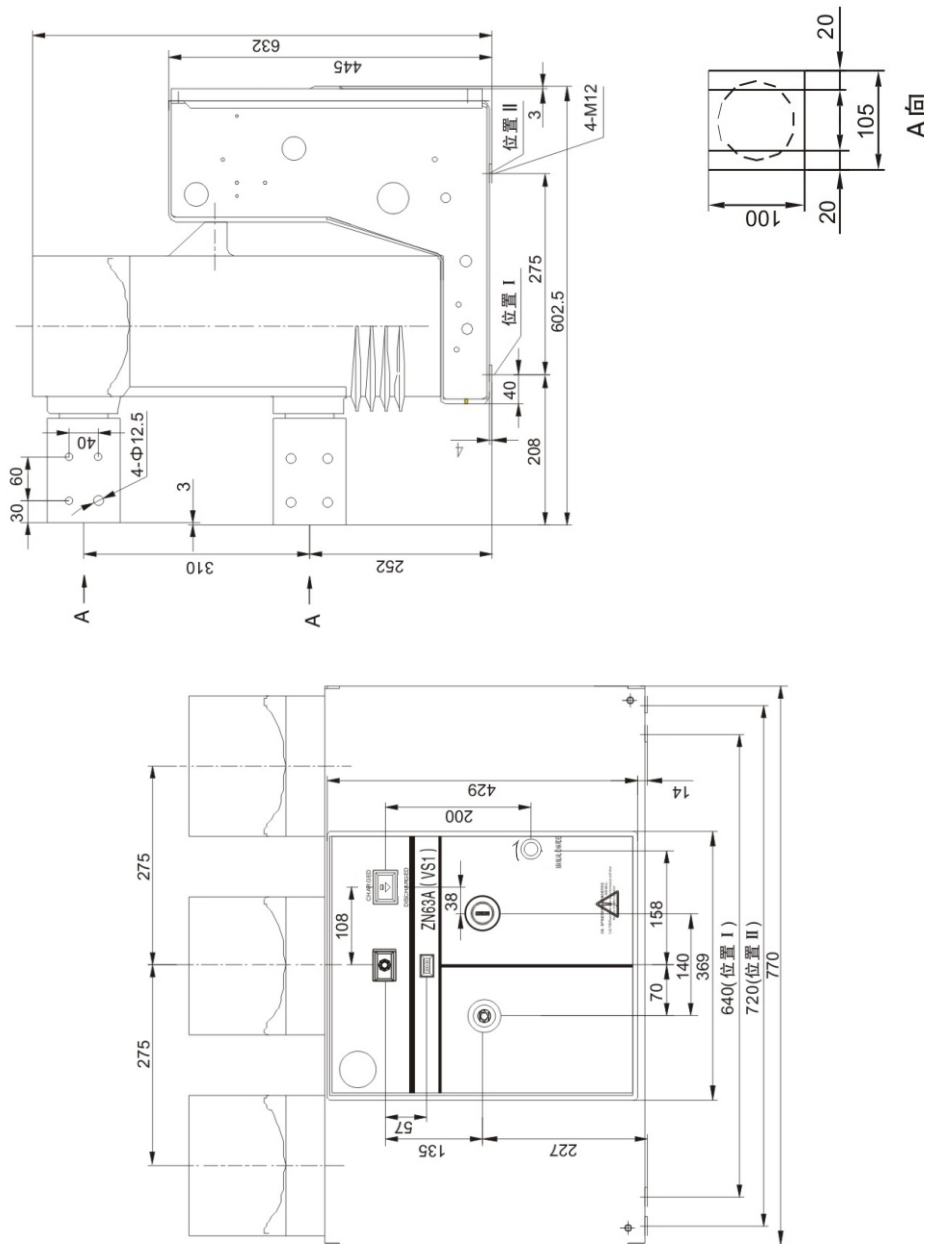
Fixed type VS1 out dimension (figure 5)



The primary phase distance is 275 ± 1.5 mm.

| | | | | |
|--|----------|------|------|------|
| Rated current(A) | 1600 | 2000 | 2500 | 3150 |
| Rared short-circuit breaking current(KA) | 31.5, 40 | | | |

Fixed type VS1 out dimension (figure 6)



The primary phase distance is 275 ± 1.5 mm.

| | |
|--|--------|
| Rated current(A) | 4000 |
| Rared short-circuit breaking current(KA) | 40, 50 |

5.2 Structural characteristics

5.2.1 The general structure of the circuit breaker is operating mechanism and the circuit breaker body integrated designed, with composite insulation structure, no pollution, no danger of explosion, with high insulation level.

5.2.2 The circuit breaker with characteristics of long life, simple maintenance, low noise, etc.

5.2.3 Adopting vacuum as the media of arc extinguish and insulation, longitudinal magnetic field control the vacuum electric arc, so the circuit breaker has the strong and stable current interrupting capability.

5.2.4 The circuit breaker with function of reliable mechanical interlocking and anti-jump. Besides, the common circuit breaker mating with over current release at phase A, B, C, with over current protective function.

5.3 Working principle see figure 6, figure 7, figure 8.

5.3.1 Energy storage action

The energy motor 34 output torque through one-way bearing 32, passed by chain, make the bumper pin move, rotate the energy storage shaft 17, drive the hanging spring crank arm of energy storage shaft moving, so that elongate the closing spring 16, realize energy storage. After the closing storage finished, the energy storage keeping pawl 25 keep the position, dialing plate 18 make the micro switch acting meantime, cut off the power supply of energy storage motor, finish the whole energy storage action remote.

5.3.2 Closing action

After the mechanism energy stored, if receive the closing signal, moving steel core of closing electromagnet 29 suck and move forward, make the energy storage keeping pawl 25 rotate through closing shaft 26, so that release the constraint of energy keeping pawl to energy shaft 17, closing spring 16 release the energy, make the closing cam 15 rotate clockwise direction, to finish the closing operating.

5.2.3 Breaking operation

Once the closing circuit breaker receive the breaking signal, the breaking half shaft 35 rotate clockwise direction under the tripping power, the constraint of half shaft to breaking tripping part 36 released, breaking tripping part rotate clockwise direction under the contact pressure spring and disc spring. The moving conduct pole of vacuum interrupter 3 move downward under the two four-bar linkage and insulating tension pole 9, so to finish the breaking operation.

5.3.4 Circuit breaker mechanism inside wiring princible see figure 9.

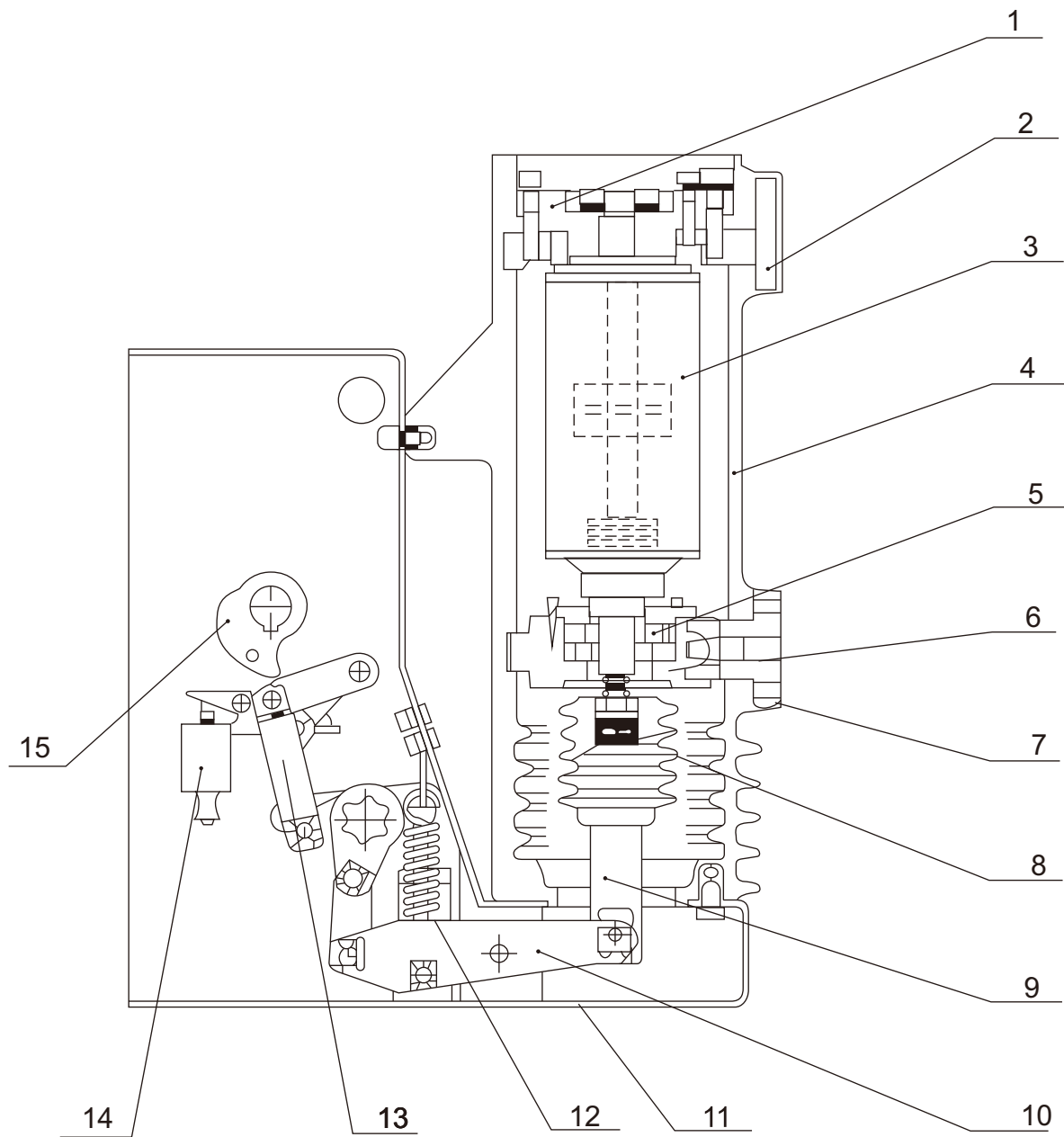


Figure 6

- | | |
|-----------------------|------------------------------|
| 1. upper bracket | 9. insulating tension pole |
| 2. upper outlet base | 10. four-bar linkage |
| 3. vacuum interrupter | 11. circuit breaker house |
| 4. insulating house | 12. breaking spring |
| 5. conductive blade | 13. four-bar linkage |
| 6. lower bracket | 14. breaking electromagnetic |
| 7. lower outlet base | 15. closing cam |
| 8. disc spring | |

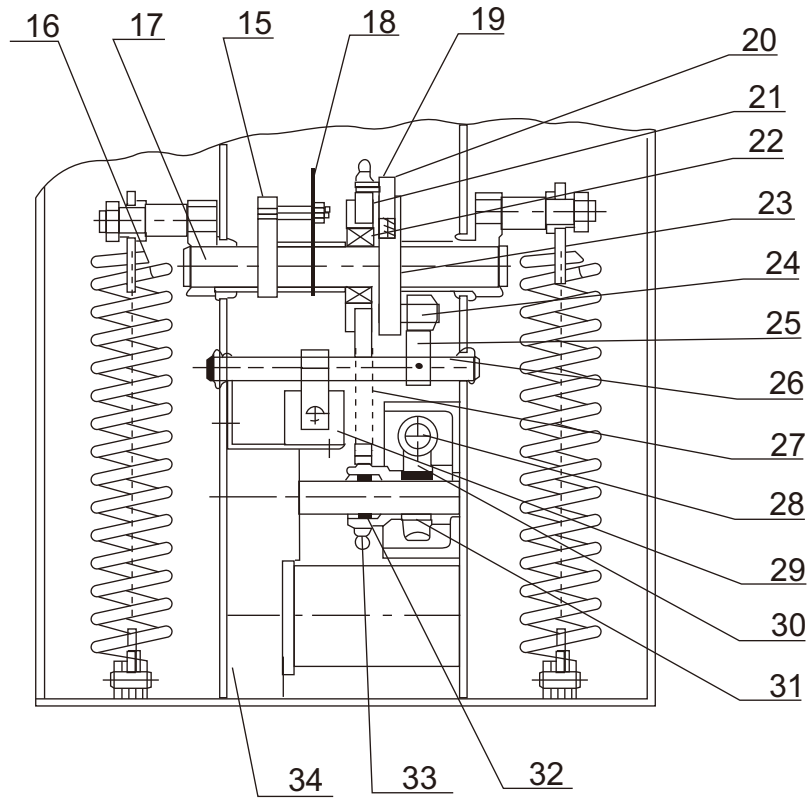


Figure 7

- | | | |
|------------------------------------|------------------------------------|---------------------------|
| 16. closing spring | 18. dialing plate | 24. bumper pin |
| 17. energy storage shaft | 19. bumper pin | 25. pawl |
| 19. bumper pin | 20. slider | 26. closing shaft |
| 20. slider | 21. chain wheel | 27. chain |
| 21. chain wheel | 22. single row radial ball bearing | 28. worm |
| 22. single row radial ball bearing | 23. wheel | 29. closing electromagnet |
| 23. wheel | | 30. worm gear |
| | | 31. one-way bearing |
| | | 32. one-way bearing |
| | | 33. chain wheel |
| | | 34. energy storage motor |

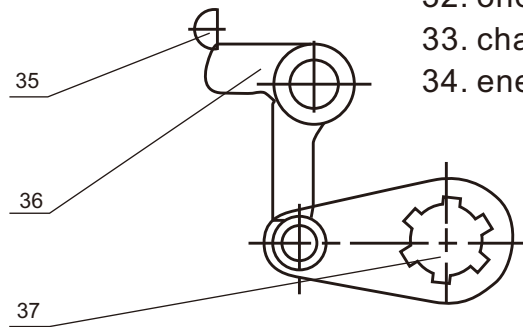


Figure 8

- | | | |
|-------------------------|----------------------------|----------------|
| 35. breaking half shaft | 36. breaking tripping part | 37. main shaft |
|-------------------------|----------------------------|----------------|

6. Installation and run and maintenance

6.1 The circuit breaker can be installed as fixed unit or handcart unit.

6.2 It is needed to check the rated voltage or current of every operating elements to see if it is consistent with the actual, and test the energy storage and closing and breaking parts to see if every parameter is right or not before it running.

6.3 It should use the method of power frequency withstand voltage (42KV 1 min) to test the vacuum degree of the vacuum arc extinguish room regularly during the using process. If the arc extinguish room has sustained breakdown phenomenon, the circuit breaker can not use any longer.

6.4 Regularly maintenance is needed for the normal operation circuit breaker, clean the dust and dirt on insulator surface, and filling amount of lubricating oil at the mechanism inside friction parts.

6.5 The operating people should be familiar with the constructure, performance, and the knowledge of installation, using, maintenance of the circuit breaker. Record the problems appear during running, and contact with the manufacturer if needed.

7. Delivery, test and storage

7.1 The circuit breaker is packed with sealing box and fixed when delivery from factory, it is not allowed to rotate, lean or collide during transportation or loading process. The vibration proof measures is needed.

7.2 When receive the circuit breaker, the user should check if the package is damaged or not first, then open the package to check if there is any breakage on the circuit breaker, check if the nameplate, qualify certificate, manual is right, and also be sure if the accessory and documents is included. Test the power frequency withstand and circuit resistance according to the technical data finally.

7.3 The circuit breaker should be storaged in the dry, ventilate, dampproof, anti erosion of harmful gases indoor environment. Check if the environment meet the requirement or not regularly. Storage time is 15-20 years.

8. Random file and accessories

8.1 Product qualify certificate

8.2 Installation, using manual

8.3 Factory test record

8.4 Packing list

8.5 Random accessories

9. Notice for ordering

9.1 Below information is needed when place the order.

9.1.1 Type, name and quantity of circuit breaker

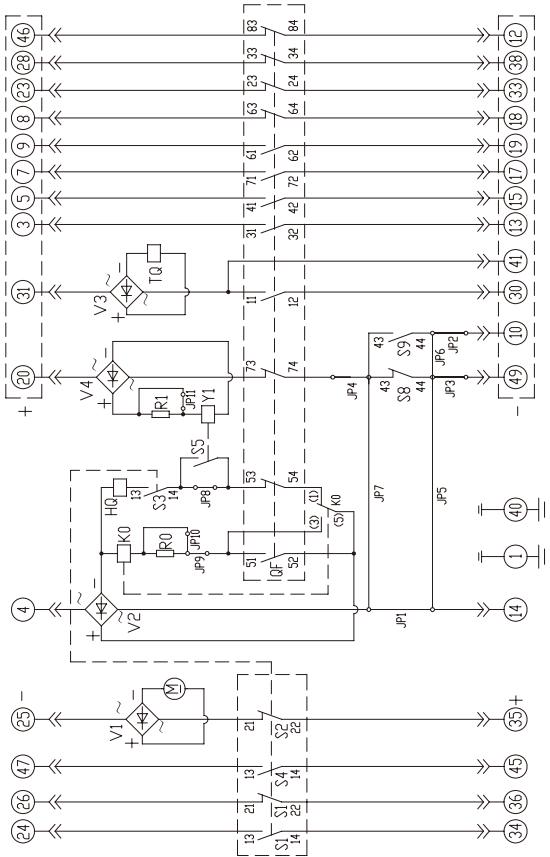
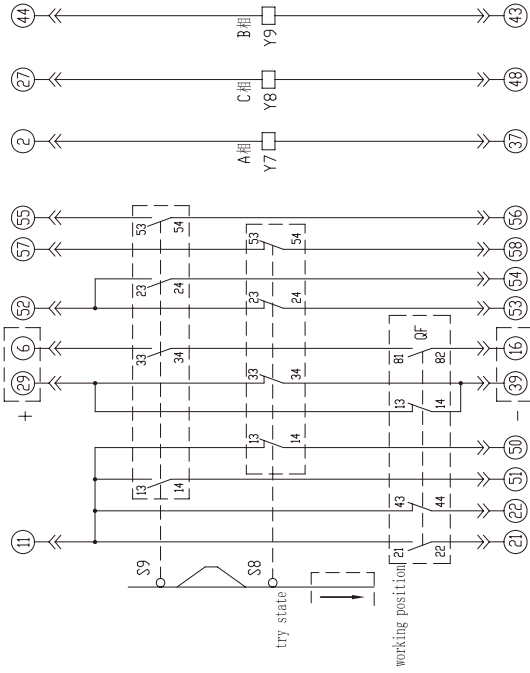
9.1.2 Rated current and rated short-circuit breaking current of circuit breaker

9.1.3 Rated operating voltage type and value

9.2 If there is any other special requirement, please point out when place the order.

10. Guaranty

This product is insured by the People' s Insurance Company of China, date from the factory within 5 years, if any quality problem of products manufacturing, the company is responsible for free repair.



Optional wiring deployment : a-b h-g e-f c-d a-f a-g b-c i-j l-k

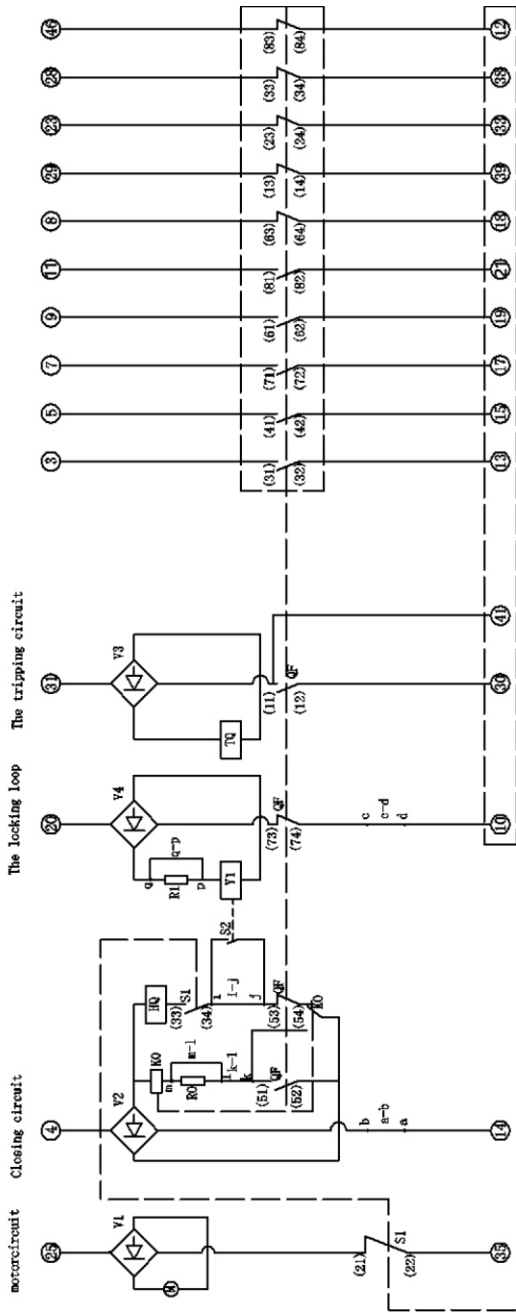
| wire jumper configure | JP1 | JP2 | JP3 | JP4 | JP5 | JP6 | JP7 | JP8 | JP9 |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| With locking | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| No lock | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| With locking | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| antibounced | √ | √ | √ | √ | √ | √ | √ | √ | √ |

The operation power of choice: l-m q-p

| wire jumper operation four strands | JP10 | JP11 |
|------------------------------------|------|------|
| AC/DC220V | √ | √ |
| AC/DC110V | √ | √ |

annotation: “ / ” disconnect, “ √ ” connect

| | | | |
|----|----------|---------------------------------|----|
| 15 | T (1-58) | Aviation plug | 1 |
| 14 | Y7-Y9 | Overcurrent tripping coi | 3 |
| 13 | K0 | Internal anti jump relay | 1 |
| 12 | V1-V4 | rectifying element | 4 |
| 11 | Y1 | Electromagnet coil | 1 |
| 10 | M | Energy Storage Motor | 1 |
| 9 | R0-R1 | electric resistance | 2 |
| 8 | HQ | Closing tripping coi | 1 |
| 7 | T0 | A brake separating tripping coi | 1 |
| 6 | S9 | auxiliary switch | 1 |
| 5 | S8 | auxiliary switch | 1 |
| 4 | JP1-JP11 | wire jumper | 11 |
| 3 | S5 | inches switch | 1 |
| 2 | SI-S4 | overtravel-limit switch | 4 |
| 1 | QF | auxiliary switch | 1 |



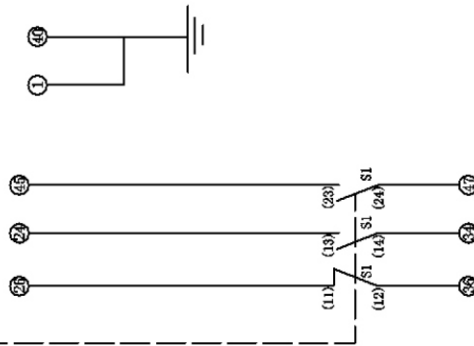
The operation of selection of power supply:

| | | |
|-------------|-----|-----|
| wire jumper | p-q | m-l |
| configure | / | / |
| AC/DC220V | / | / |
| AC/DC110V | / | / |

Optional connection settings :

annotate: That disconnect
 Represents a connection

| | | | | | |
|----------------|--------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| condition | wire jumper | a-b | c-d | i-j | k-l |
| configure | / | / | / | / | / |
| With anti jump | With locking | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| No jump | Nonlocking | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| | With locking | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Nonlocking | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |



| | | | |
|----|----------------------|----|---------------|
| S1 | auxiliary switch | HQ | closing coil |
| S2 | auxiliary switch | TQ | tripcoil |
| QF | auxiliary switch | Y1 | blocking coil |
| M | storage energy motor | | |

| | | |
|------------------------|--|----------------------|
| YS1-12 circuit breaker | | figure number: C-004 |
| schematic diagram | | |

CNC

ELECTRIC

CERTIFICATE

Product Model: VS1-12

Standard : IEC62271-100

Inspector: CNC004

Production date: Printed on the product or package

This product is qualified after delivery inspection

CNC

CNC ELECTRIC

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