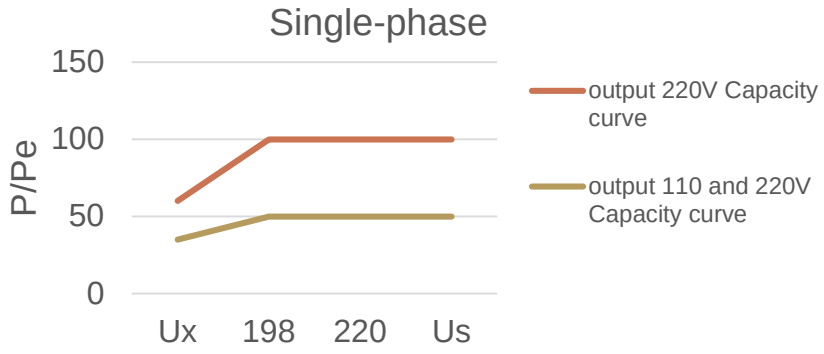
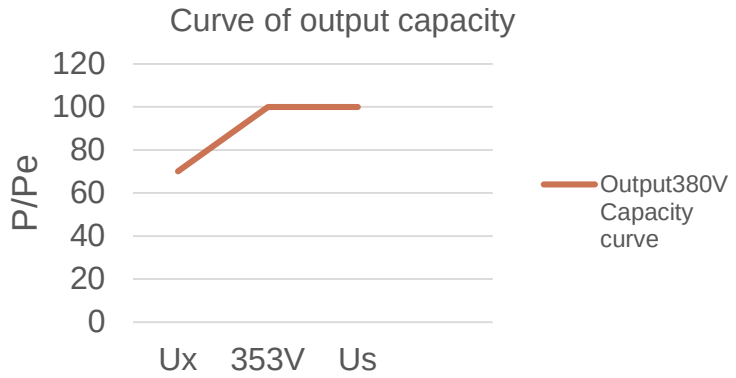
# Voltage Stabilizers Troubleshooting Offer Marketing

# Output Power Curve




- Three-phase




**P:** Output capacity

***Pe*:** Rated output capacity

**U:** Input voltage

***Ux* :** Lower limit of the permitted input voltage range

***Us*:** Upper limit of the permitted input voltage range

# Selection Guide – Single phase & Three phase

- Single-phase

Input > 200V

Resistive load: stabilizer capacity=1*rated load capacity;

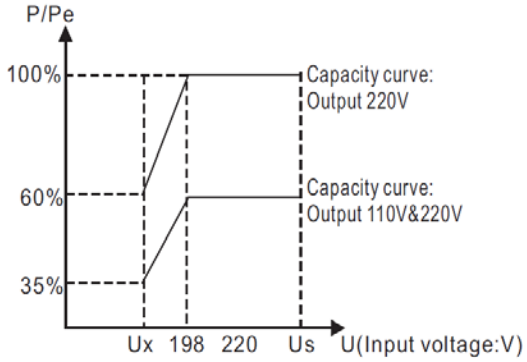
Inductive & Capacitive load: stabilizer capacity=3*rated load capacity

Input < 200V

Resistive load: stabilizer capacity=2*rated load capacity;

Inductive & Capacitive load: stabilizer capacity=6*rated load capacity

2. Output Capacity Curve




- Three-phase

Input > 350V

Resistive load: stabilizer capacity=1*rated load capacity;

Inductive & Capacitive load: stabilizer capacity=3*rated load capacity

Input < 350V

Resistive load: stabilizer capacity=2*rated load capacity;

Inductive & Capacitive load: stabilizer capacity=6*rated load capacity

Where
Fig. 1: output capacity curve:
P: output capacity:
Pe: rated output capacity.
U: input voltago;
Ux: lower limit value of input voltage allowed:
Us: upper limit value of input voltage allowed.

# Protection Features

## ◆ Protection thresholds for all models

| Product Series | Output Undervoltage Threshold (V) | | | | Output Overvoltage Threshold (V) | | | | Temperature Protection Threshold (℃) - sensor in carbon brush | Default (Yes or No?) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | O/220V | O/230V | O/380V | O/400V | O/220V | O/230V | O/380V | O/400V | | Output Undervoltage | Output Overvoltage | Temperature Protection |
| **HTND** | 184±4V | 194±4V | - | - | 246±4V | 256±4V | - | - | 50℃ | No | Yes | No |
| **HTND2** | 184±4V | 194±4V | - | - | 246±4V | 256±4V | - | - | 50℃ | No | Yes | No |
| **HTND3** | 184±4V | 194±4V | - | - | 246±4V | 256±4V | - | - | 50℃ | No | Yes | Yes |
| **HSVC** | 184±4V | 194±4V | - | - | 246±4V | 256±4V | - | - | 50℃ | No | Yes | Yes |
| **HAVRL** | 184±4V | 194±4V | - | - | 246±4V | 256±4V | - | - | 50℃ | No | Yes | Yes |
| **HAVRB** | 184±4V | 194±4V | - | - | 246±4V | 256±4V | - | - | 50℃ | No | Yes | Yes |
| **HSJW** | - | - | 320±7V | 340±7V | - | - | 425±7V | 445±7V | 50℃ | No | Yes | No |
| **HSBW** | - | - | 320±7V | 340±7V | - | - | 425±7V | 445±7V | 50℃ | Yes | Yes | No (**Yes** when capacity **≥250KVA**) |

# Selection Guide - Cable Selection

single-phase

| Model | Cable Size ($mm^2$) | |
|---|---|---|
| | Copper | Aluminum |
| Single-phase 0.5kVA | 0.5 | 0.75 |
| Single-phase 1kVA | 0.75 | 1 |
| Single-phase 1.5kVA | 1 | 1.5 |
| Single-phase 2kVA | 1.5 | 2.5 |
| Single-phase 3kVA | 2.5 | 4 |
| Single-phase 5kVA | 4 | 6 |
| Single-phase 7kVA | 6 | 10 |
| Single-phase 8kVA | 6 | 10 |
| Single-phase 10kVA | 10 | 16 |
| Single-phase 15kVA | 16 | 25 |
| Single-phase 20kVA | 16 | 25 |
| Single-phase 30kVA | 25 | 35 |

# Selection Guide - Cable Selection

## Three-phase

| Model | Cable Size (mm²) | |
|---|---|---|
| | Copper | Alumimun |
| Three-phase 1.5kVA | 0.5 | 0.75 |
| Three-phase 3kVA | 0.75 | 1 |
| Three-phase 4.5kVA | 1 | 1.5 |
| Three-phase 6kVA | 1.5 | 2.5 |
| Three-phase 9kVA | 2.5 | 4 |
| Three-phase 10kVA | 4 | 6 |
| Three-phase 15kVA | 6 | 10 |
| Three-phase 20kVA | 6 | 10 |
| Three-phase 30kVA | 10 | 16 |
| Three-phase 45kVA | 16 | 25 |
| Three-phase 50kVA | 16 | 25 |
| Three-phase 60kVA | 25 | 35 |
| Three-phase 80kVA | 25 | 35 |
| Three-phase 100kVA | 35 | 50 |
| Three-phase 120kVA | 35 | 50 |
| Three-phase 150kVA | 50 | 70 |

| Model | Cable Size (mm²) | |
|---|---|---|
| | Copper | Alumimun |
| Three-phase 180kVA | 50 | 70 |
| Three-phase 200kVA | 70 | 95 |
| Three-phase 225kVA | 70 | 95 |
| Three-phase 250kVA | 70 | 95 |
| Three-phase 300kVA | 95 | 2×70 |
| Three-phase 400kVA | 2×70 | 2×95 |
| Three-phase 500kVA | 2×95 | 4×70 |
| Three-phase 600kVA | 3×70 | 3×95 |
| Three-phase 800kVA | 3×95 | 4×95 |
| Three-phase 1000kVA | 4×95 | 5×95 |
| Three-phase 1300kVA | 5×95 | 7×95 |
| Three-phase 1600kVA | 6×95 | 8×95 |
| Three-phase 2000kVA | 8×95 | 10×95 |
| Three-phase 2500kVA | 10×95 | 13×95 |

# Notifications for Voltage Stabilizers

- IP degree

  Our stabilizers are targeted to be installed indoors with IP20.
  If customers want to install outdoors, then IP degree should be considered additionally.

**E.g. outdoor installation IP45 required**

- Maintenance

Periodic maintenance is recommended, especially following parts:

- Carbon brush
- Coil

It is required to disconnect power supply (usually every 6 months or 1 year) to check stabilizers, cleaning dust on products and keep the surfaces of internal components clean. Limit switches, motors and surfaces of coils should be especially cared if power fluctuations happen frequently.

# Possible faults

Turn-to-turn short circuit

Screws loosen

Carbon brush broke off

Deformed enclosure

Voltmeter pointer jammed

*More actions should be taken during pre-sale!*

# Steps for pre-sale check

step1

**Pre-sale appearance inspection**

Package, model, quantity, accessories, rust and other damages on product, etc.

step2

**Pre-sale power-on test**

Regulator is taken to test whether the output of the stabilizer can be stabilized by adjusting input voltage slowly 4 to 5 times

- No sparks
- No abnormal sound
- No interrupted voltage
- Sound of mechanical operation and carbon brush friction should be consistent.
- Output voltage should be regulated smoothly

step3

**Pre-sale short-time operation test**

After previous test, adjust input to 200V for short-time operation test, and the recommended period of time is 5 minutes; during the operation process, smell the ventilation hole on the stabilizer: no high temperature and burning smell are allowed.

**Once happened**, power should be turned off for repairing

# Structure Features

- **HSBW series**


"**Auto**" or "**Manual**" selection switch for controlling adjustment of the input voltage.

Currently it's in "Manual" status: **"BOOST"** or **"STEP-DOWN"** input voltage **manually**

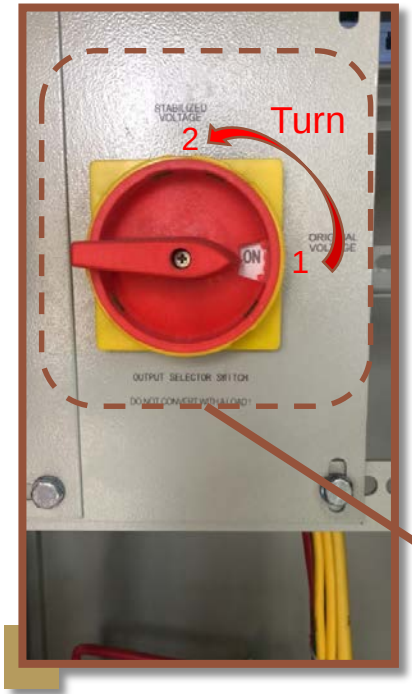
Q&A:

If output voltage for any phase displays abnormal value, please check this **switch status for the first step**!

# Structure Features

## ◆ HSBW series

### ➢ By-pass function




By-pass (default feature when **HSBW ≤ 250KVA**)

1. Position 1: original voltage
   - Grid is connected to loads directly
2. Position 2: stabilized voltage
   - Grid power will go through the stabilizer

### ➢ Cooling function

Fan: for cooling system
Default feature **when HSBW ≥ 300KVA**

# Electrical sparks occurred on the surface of Stabilizer coil

**Malfunction Phenomenon:** Stabilizer coil surface had the dark foreign items, motor swing back and forth, output voltage unstable, then occurred the protection, no output voltage, as figure 1 showed;

**Reason of Malfunction:** due to the use wear of carbon brush, the contact pressure between the carbon brush and coil surface was decreased or the foreign items like dust adhered on the coil surface, then the contact would be not well, occurred the electrical sparks;

**Solution:** cut off the power supply, sand the coil surface foreign items with sandpaper, adjust the contact pressure between the carbon brush and coil surface.

**Notice!!!**
**During the whole operation process, the power supply shall be cut off.**

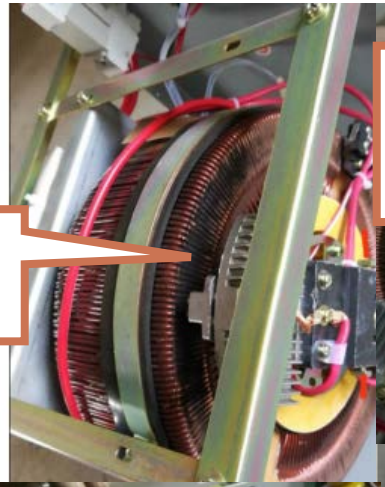


Figure 1：coil surface status

Figure 2：Use sandpaper to sand the coil surface foreign items

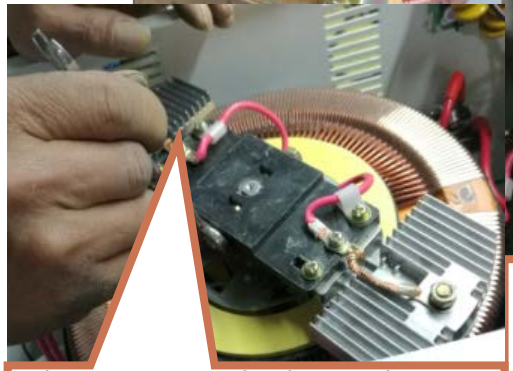
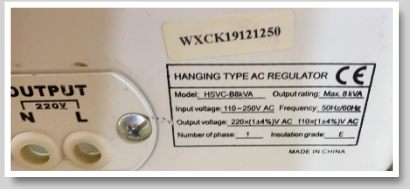


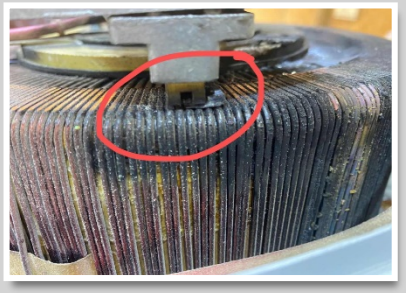
Figure 4: Use tool to loosen the fixing screw of carbon brush component, then move the component down about 2mm and press, retighten the screw, then recover the power supply to use.

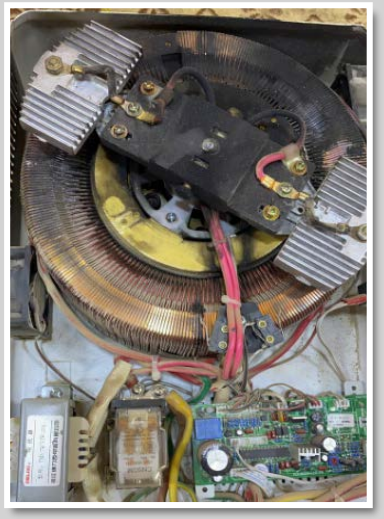
Figure 3: put the opposite of sandpaper on the surface of coil, use hand to lift the carbon brush, then release to press the sandpaper, carbon brush pull the sandpaper back and forth or swing the carbon brush back and forth about 5-6 times, let it contact with coil fully.

# Coil burnt due to low input voltage

- Situation of frequent **low input voltage**





**Phenomenon:**
- Carbon brush stuck and burnt
- Limit switch looks doesn't work

**Reason:**
- Stabilizer was working at low input voltage for a long time, causing that carbon brush was located at one position for a long time
- The temperature rise of the contact area on the coil was too high, damaging the contact area
- When input voltage changed, electric spark occurred between carbon brush and coil, which made carbon brush be stuck and then the coil was burnt

**Recommendations:**
**Option 1**: Select a wider input range model
**Option 2**: Select a relay type instead (it can avoid the risk of carbon brush and coil being burnt)

# HSJW-6~60KVA Contactor issue

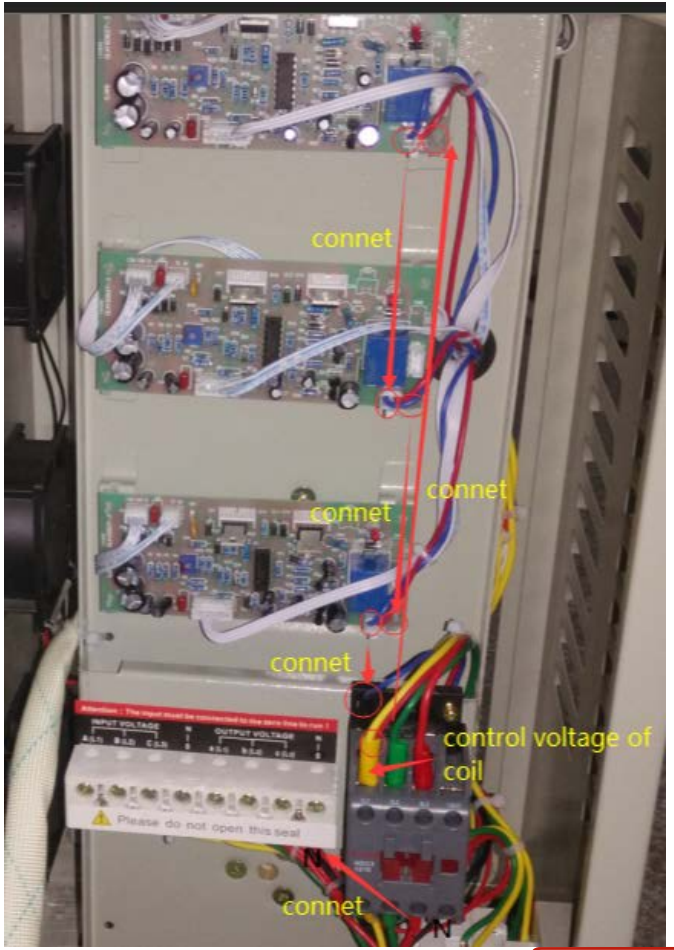
- **6~15KVA:**

  Key point in circuit principle:
  Control voltage of the HDC3 coil is provided by the output of stabilizer.

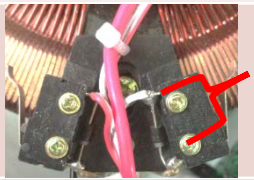
  If the coil is not actuated, there might be two reasons:
  (1) One of any three PCBs is broken;
  (2) Input voltage is low which leads to low output voltage

- **20~60KVA:**

  Working principle is the same and the reasons to cause the contactor damage are also the same: only difference is the placing position difference for contactor and PCBs.



# Product Testing and Troubleshooting

| Faults | Causes | Solutions |
|---|---|---|
| Unstable voltage | Input voltage exceeds the voltage regulation range | Measure the voltage of power grid to check whether it has exceeded the service range. If exceeded, adjust the voltage of power grid or modify the circuit, or place an special order with ultrahigh or ultralow range. |
| | Open-circuit in limit switch | Disconnect the input power supply of products. Use a multi-meter to measure the resistance at the two sides of limit switch. The actual resistance shall be approximate to 0 ohm. If the resistance measured is of certain value or infinitely great, replace the limit switch with a new one. |
| | The structure of limit switch |  0Ω |

# Product Testing and Troubleshooting

| Faults | Causes | Solutions |
|---|---|---|
| Unstable voltage | Servo motor failed | (1) If there is 12V DC voltage at the two sides of motor, but the motor doesn't work, a new limit switch shall be replaced;<br>(2) If there is no 12V DC voltage at the two sides of motor, check whether the limit switch is open-circuit or circuit board is damaged. |
| | Four different types of motors |  |
| | Circuit board damaged. | If the sampling voltage of circuit board is normal, adjust the 'voltage regulation' potentiometer on the circuit board. If the fault still exists, replace the circuit board with a new one of the same model. |
| | Circuit Board example: | Voltage Regulation Potentiometer<br>CPU chip<br>  |

# Product Testing and Troubleshooting

| Faults | Causes | Solutions |
|---|---|---|
| No output voltage | 1. Open-circuit in power supply circuit.<br>2. Switch trip or fuse burnout.<br>3. Unqualified input voltage. | 1. Switch on the power supply circuit and check whether connecting terminal has been reliably connected.<br>2. Load is short circuit or replace with a new fuse in order to reduce the load capacity.<br>3. Voltage exceeds the voltage regulation range and it is under protection state. |
| Output voltage offset | 1. The voltage regulation potentiometer of circuit board is shifted.<br>2. Voltmeter reads inaccurate. | 1. Adjust the voltage regulation potentiometer on the circuit board;<br>2. Replace a new voltmeter or get it repaired. |

# Product Testing and Troubleshooting – Relay type

| Faults | Causes | Solutions |
|---|---|---|
| Display doesn't work after power on | 1.Fuse burnout；<br>2. Power supply cable and plug are damaged and disconnected;<br>3.Power supply switch is broken;<br>4.Display is damaged；<br>5.Windings or terminals are broken;<br>6.Circuit board is damaged. | 1.Check whether the output circuit and appliances from ends are short circuit in order to eliminate the possibility of short circuit;<br>2.Replace a new power supply cable and plug;<br>3.Replace a new switch;<br>4.Replace a new display;<br>5.Measure the plug CN1 whether it has 13VAC voltage; if there is no voltage, coil shall be broken;<br>6. If plug CN1 has 13VAC, the power circuit on the circuit board or CPU shall be broken. |
| No output voltage | 1. Overvoltage, temperature rise and overload;<br>2.CPU control board is broken;<br>3. Relay J8 is damaged. | 1.If input voltage exceeds 260V, power switch shall be open until the power grid recovers to normal state; if the load current is too large, part of appliances shall be disconnected in order to reduce the load capacity;<br>2.Replace a new CPU or a new circuit board;<br>3. Replace s new relay. |
| Output voltage exceeds the range | 1. Input voltage exceeds the stabilization range;<br>2.Circuit board is broken;<br>3.Relay is broken. | 1.Check the power grid circuit;<br>2.Replace a new circuit board;<br>3.Measure the power supply of relay coil and contact performance according to logical configuration, and replace corresponding broken relays |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