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Apr.2017

HTND3/HSVC-B Series

AC Voltage Stabilizer

User Manual

Please carefully read the user manual before the installation and use of the products,and then keep it properly as backup.

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HTND3/HSJW3 /HSVC-B series
High-Precision Full-Automatic AC Voltage Stabilizer

Overview

HTND3/HSJW3/HSVC-B series high-precision full-automatic AC voltage stabilizer is a new generation of AC voltage stabilizer with LCD display developed by the company, with an innovative and luxury form design and wide voltage stabilization range free of additional distortion, it adopts a CPU capable of data processing and provides complete protection functions, including electronic overload protection, overvoltage protection, short circuit and temperature protection. With intuitive and clear digital display of input/output voltage, it is an ideal AC voltage stabilizer for all users.

Featured with high voltage stabilization precision and low loss, the product is suitable for voltage stabilization in families, schools, investors, institutes, laboratories, radio and television equipment, textile machinery, factories production lines, plant residence, various types of processing equipment.

HTND3/HSJW3/HSVC-B series high-precision full-automatic AC voltage stabilizer is composed of varitran, linear integrated control circuit, voltage and current sampling circuit, CPU processor, servo motor transmission mechanism and other components. In case of mains voltage fluctuations or user load changes, the sampling circuit processes the voltage change signal through the control circuit and then the servo motor drives the relative motion of the varitron's brush arm, that is, adjusts the primary and secondary turns ratio to achieve the purpose of automatic and stable output.

Main Technical Parameters

1. Model implication
Single phase: HTND represents ordinary pointer type, HTND2- represents LED display type and HTND3/HSVC-B represents LCD display type;
Three-phase: HSJW represents ordinary pointer type, HSJW2- represents LED display type and HSJW3- represents LCD display type.

2. Main technical indicators

Phase number / Item	Single phase	Three phase
Input voltage range	Technical indexes of each stabilizer are subject to indications on the stabilizer body.	
Output voltage	220V ±4% 230V ±4%	380V ±4% 400V ±4%
Output overvoltage protection	246±4V 257±4V	425±7V 445±7V
Output undervoltage protection	184±4V 192±4V	-------- --------
Efficiency	>97%	
Frequency	50/60Hz	
Temperature rise	<90K	
Regulation time	<1s(When the input voltage fluctuate by 10%)	

Note 1: The technical parameters of the product are subject to the indicators on the body and generally the conventional products are not provided with "undervoltage protection". If required, the "undervoltage protection" shall be indicated separately.
Note 2: The products above 5k are not provided with 110V output end. If required, 110V output end shall be indicated separately at order with a default value of 110V±4V. When ø110V with load, article 3 should be strictly followed.
Note: 110V output end of the conventional products does not have the protection functions.
Note 3: The products with the input voltage beyond the above range can be specially customized.

3. See the figure for the output capacity curve

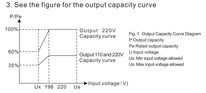

Fig.1 Output Capacity Curve Diagram
P:Output capacity
Pe:Rated output capacity
U:Input voltage
Ux: Min input voltage allowed
Us: Max input voltage allowed

Figure1 Output Capacity Curve

Product Overall Structure

1. The panel appearance of 1kVA~10kVA high-precision full-automatic AC voltage stabilizer is shown in Figure 2.

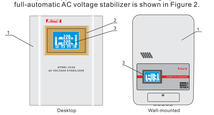

Figure 2: 1kVA~10kVA front panel.
Panel part: 1. Panel; 2. Display frame; 3. Display screen

2. The LCD operation mode display of HTND3/HSVC-B high-precision full-automatic AC voltage stabilizer is shown in Figure 3.

Figure 3: LCD mode display

2.1 LCD operation mode display:
1. Temperature display bar, 2. Input voltage,
3. Output voltage,
4. Load display bar, 5. Output delay display,
6. Output undervoltage display,
7. Output overvoltage display,
8. Protection display

2.2 Symbol meanings

Symbol	Symbol description
8°C	Temperature display bar
	Load display bar
	Delay output
	Output overvoltage
	Output undervoltage
	Output protection

3. The back panel appearance of HTND3﹣1kVA~1.5kVA high-precision full-automatic voltage stabilizer is shown in Figure 4.

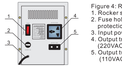

Figure 4: Rear panel part:
1. Rocker switch;
2. Fuse holder (overcurrent protection)
3. Input power line (plug)
4. Output triplex receptacle (220VAC)
5. Output two-pin socket (110VAC)

4. The rear panel appearance of HTND3﹣2kVA high-precision full-automatic voltage stabilizer is shown in Figure 5.

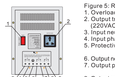

Figure 5: Rear panel part:
1. Overload protection switch
2. Output triplex receptacle (220VAC)
3. Input neutral line (N);
4. Input phase line (L);
5. Protective earthing;
6. Output neutral line (110VAC)
7. Output phase line
8. Output neutral line (220VAC)
9. Output phase line

5. The rear panel appearance of HTND3﹣3kVA~5kVA high-precision full-automatic voltage stabilizer is shown in Figure 6.

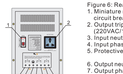

Figure 6: Rear panel part:
1. Miniature moulded case circuit breaker;
2. Output triplex receptacle (220VAC/10A)
3. Input neutral line (N);
4. Input phase line (L);
5. Protective earthing;
6. Output neutral line (110VAC)
7. Output phase line
8. Output neutral line (220VAC)
9. Output phase line

6. The rear panel appearance of HTND3﹣7kVA~10kVA high-precision full-automatic voltage stabilizer is shown in Figure 7.

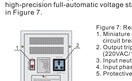

Figure 7: Rear panel part:
1. Miniature moulded case circuit breaker;
2. Output triplex receptacle (220VAC/10A)
3. Input neutral line (N);
4. Input phase line (L);
5. Protective earthing;
6. Output neutral line (110VAC)
7. Output phase line (220VAC)

Electrical Schematic Diagrams

1. The schematic diagram of the detection control part of single-phase 1kVA~30kVA high-precision full-automatic AC voltage stabilizer is shown in Figure 8.

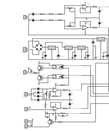

Figure 8: Schematic diagram of detection control part: for reference only, subject to change without notice!

2. The electrical block diagram of single-phase 1kVA~10kVA is shown in Figure 9.

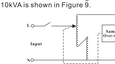

Figure 9: 1kVA~10kVA electrical block diagram

3. The compensated circuit is adopted for single-phase 15KVA~30KVA with the electrical schematic diagram as shown in Figure 10.

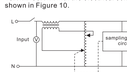

Figure 10: Single-phase 15KVA~30KVA electrical schematic diagram

4. The electrical block diagram of three-phase 1.5kVA~30kVA is shown in Figure 11.

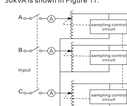

Figure 11: Three-phase electrical schematic diagram

Note 1: Refer to the single-phase electrical schematic diagrams, Figure 8 and Figure 9 for three-phase 1.5kVA, 3kVA, 6kVA, 9kVA, 15kVA, 20kVA and 30kVA electrical schematic diagrams.
Note 2: Refer to Figure 10 for the compensated circuit used for three-phase 45kVA and 60kVA.

Instructions

1. The nominal power of the voltage stabilizer is the maximum apparent power and that of the household appliances is generally active power. For example, the refrigerators, air conditioners and motors as inductive load have a large transient current at startup. It is recommended to select the voltage stabilizer with the power of 3~5 times for the refrigerators and air conditioners. In case of low input voltage, the load shall be reduced, as specifically shown in the output capacity curve (Figure 1).
2. When the output voltage of the voltage stabilizer is 110V, the output capacity shall not be 35% more than the rated capacity to avoid overload damage.
3. Confirm whether the input voltage is within the applicable range of the voltage stabilizer. If so, turn on the rear power switch. Then the display screen enters the self-inspection process and all functions on the display screen shall be displayed, the output delay "" icon flashes for 3s and then disappears. The voltage stabilizer enters the normal working state.
4. Check whether the supply voltage is within the nominal output voltage range of the voltage stabilizer. When the input voltage exceeds the voltage stabilization range of the load, stabilizer or the output voltage is undervoltage less than 184V±4V (undervoltage protection not set for conventional products) due to failure, "" icon flashes for a few seconds and then the protection icon "" flashes and the output power supply is cut off. When the voltage is higher than 246V±4V, "" icon flashes for a few seconds and then the protection icon "" flashes and the output power supply is cut off. When the temperature is higher than the set temperature, all of " " temperature bars are displayed and a few seconds later, the protection icon "" flashes; the output power supply is cut off. When the input, output voltage and temperature are all within the range, the protection function will be automatically released and the output power supply is restored.

5. When the output load exceeds the complete machine predetermined value, all of " " load bars are displayed and a few seconds later, the protection icon "" flashes; the output power supply is cut off. In case of load protection, the load for output shall be reduced and the voltage stabilizer shall be restarted to work normally.
6. If motor running equipment or device with large starting current is connected at the output power supply circuit voltage drop.
7. HTND3-1kVA~1.5kVA voltage stabilizers adopt fuse tube and 2kVA voltage stabilizers adopt circuit protection switch for overcurrent protection; voltage stabilizers above (including) 3kVA adopt HD86 miniature circuit breaker for overcurrent protection. Check whether the fuse tube is intact and whether the circuit switch. Then the display screen enters the self-inspection process and all functions on the display screen shall be displayed, the output delay "" icon flashes for 3s and then disappears. The voltage stabilizer enters the normal working state.
8. To ensure equipment and personal safety, the voltage stabilizers are provided with ground screws or ground terminals, which must be well grounded during installation.
9. Turn on the input power switch after installation to ensure the input and output voltage display is within the normal output voltage range and then turn on the electric switch of the electric equipment to ensure normal operation of the load.
10. The three-phase voltage stabilizers must be accessed to the neutral line, i.e. three-phase four-wire system for normal operation. The neutral line shall not be replaced by a ground wire. The voltage stabilizers can be put into operation only upon normal voltage display after energization.
11. For the three-phase voltage stabilizers with single-phase load, the load power shall be noted and make sure the load power per phase does not exceed 1/3 of the total capacity (i.e. for three-phase 30kVA voltage stabilizers, the load capacity per phase shall not exceed 10kVA) and the three-phase current shall be balanced as far as possible to avoid damage to the voltage stabilizers or impact on the service life of the voltage stabilizers.

12. The residual current circuit breaker, if required in the three-phase four-wire system line, shall be installed at the output end of the voltage stabilizer but not at the input end in order to avoid mishap.

Normal Operation Conditions And Maintenance

1. The normal operation conditions of the voltage stabilizer shall meet the following requirements:
1.1 Altitude
The altitude of the voltage stabilizer installation site shall not exceed 2000m.
1.2 Ambient temperature
Maximum temperature 40℃ ; Minimum temperature - 5℃ (applicable to indoor voltage stabilizers);
1.3 Operation environment
a) Indoor environment free of chemical deposition or dirt;
b) Indoor environment free of hazardous or corrosive media or flammable, explosive gases or dust;
c) Indoor environment free of serious vibration or bumps;
d) The voltage stabilizers shall be placed in the ventilated and dry room without direct sunlight or corrosive gases.
e) The output ends cannot be connected in parallel.
1.4 Relative humidity
The relative humidity shall not exceed 90% (at 25℃).
2. Depending on the operation environment conditions, it is required to periodically disengage the power supply (usually 6 months or one year), remove the dust in the product and keep the contact surface, gears and carbon brush of the ring transformer clean. If the carbon brush is excessively worn, it is required to timely replace the same type of brush and to adjust the pressure;
3. Properly adjust the carbon brush pressure during replace, with the adjustment method as follows:
Loosen the screws of carbon brush mounted on the axis in the motor, press the carbon brush part with hands to make it stretch within 3-5mm and then tighten the screws. If the carbon brush cannot contact with the coil contact surfacewell, it is required to pad fine sandpaper between the

carbon brush and the coil and then naturally rotate the carbon brush part with hands to rub smooth.
4. Installation, wiring and adjustment must be completed by electricians without electricity to avoid electric shock or damage to the voltage stabilizers;

Common Faults And Troubleshooting Methods

Installation, wiring, maintenance and trouble removal must be completed by professional electricians or professionals without electricity to avoid electric shock or damage to the voltage stabilizers!

Table 1 common faults and troubleshooting methods

Fault	Causes	Troubleshooting methods
The voltage stabilizer does not outputthe the voltage	1. Fault in the servo motor inside the voltage stabilizer. 2. The input voltage exceeds the input voltage range of the voltage stabilizer. 3. Mechanical fix spare.	1. Voltage is available at both ends of the motor, but the motor does not rotate. Check the motor and the voltage at both ends of the motor, check whether the mechanism is open and check the output voltage and temperature protection switch is open. 2. If the input voltage of the voltage stabilizer is too low, adjust the output voltage regulator potentiometer on the front panel of the voltage stabilizer to the maximum or select a transformer tower to increase the input voltage. 3. Measure whether the input voltage exceeds the input voltage range of the voltage stabilizer. If so, the power grid voltage and circuit of voltmeter shall be checked for maintenance. 4. Measure the pin resistance at both sides of the motor. Disconnect the motor power supply and the resistance value should be 0Ω. If the resistance is too large or infinitely large, please replace the motor with the same specification.
Display subtitle flashes for input voltage	1. Input of input voltage has exceeded or lower than voltage stabilizer fix range. 2. Check if voltage stabilizer fix range is set correctly and if not, set it correctly.	1. Check the power grid voltage and change the control circuit board or motor. 2. Check the power grid voltage and change the control circuit board or motor. 3. Check if the control circuit board is damaged and replace the control circuit board.
The voltage stabilizer does not output	1. The output end of the voltage stabilizer is open. 2. Fault in voltmeter, voltmeter is fixed on the control circuit board.	1. Check the output end and check whether the wiring is secure and reliable. 2. Check the voltmeter or re-select on, and also replace the fuse tube.
The voltage stabilizer has no voltage output, the voltage is offset.	1) Deflection of voltage regulator potentiometer 2. Inaccurate voltmeter indication	1. Re-adjust the voltage potentiometer 2. Replace the new voltmeter
Arcover transformer of the voltage stabilizer burnout	Excessive load, exceeds the load capacity of the voltage stabilizer	Replace the arcover transformer, then re-adjust the output voltage and reduce the load to avoid to burnout.

Accompanying Documents

1. Product manual;
2. Certificate of inspection;
3. Accompanying spare fuse tube(for1kVA-1.5kV products)

Installation Tips!

Select appropriate external copper wires according to the load power or the rated power of the voltage stabilizer before installation; the external input and output wires shall not be too thin or too long, so as to avoid failure to work normally. The external adaptive wires can be selected according to the following example:
Be calculated by the load capacity of normal copper wires. The safe load capacity of the wire is determined according to the maximum allowable core temperature, cooling conditions and cabling conditions. The safe load capacity of the normal copper wires is 5~8A/mm².
For example: Recommended value of safe carrying capacity of 2.5 mm² BVV copper wire:2.5×8A/ mm² =20A

No.	Single-phase Rated power (kVA)	External copper wire cross-section (mm²)	No.	Three-phase Rated power (kVA)	External copper wire cross-section (mm²)
1	1kVA	≥1.5mm²	11	15kVA	≥6.0mm²
2	1.5kVA	≥1.5mm²	12	9kVA	≥2.5mm²
3	2kVA	≥1.5mm²	13	12kVA	≥4.0mm²
4	3kVA	≥2.5mm²	14	20kVA	≥6.0mm²
5	5kVA	≥4.0mm²	15	30kVA	≥10mm²
6	7kVA	≥6.0mm²	16	45kVA	≥16mm²
7	10kVA	≥10mm²	17	60kVA	≥16mm²
8	15kVA	≥16mm²			
9	20kVA	≥16mm²			
10	30kVA	≥25mm²			

The general load (such as incandescent lamps and refrigerators) is classified into resistive load and inductive load.
Formula used for common resistive load: P=U×I
P= Rated power (W);
U = Rated voltage (V);
I = Rated current (A).
There is a factor relationship between the apparent power and the active power. Taking the power factor as cosφ0.8, the relationship between the two is apparent power 1000VA×0.8= active power 800W.

Warranty Card

User name	
Address	
Tel.	Postal code
Model specification	Date of production
Sales unit	
Sales date	Invoice No.
Warranty unit	Inspector
Warranty address	

Maintenance Record

Repair date	Maintenance content	Inspector