

SERVO VOLTAGE STABILIZER

OPERATION INSTRUCTION MANUAL



HPCS Global Power Systems Pvt. Ltd.

284, HIND NAGAR, KANPUR ROAD, LUCKNOW (U.P.) - 226012

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SAFETY NOTES

Read the following information carefully before using the Servo Voltage Stabilizer.

Caution! : Disregard of the following safety notes may endanger your life or health, as well as, the functioning of the equipment.

1. Before installation ensure that the site is free from direct sunlight (or any heat source), water, and should have a solid platform.
2. Location of installation should be well ventilated.
3. Any type of repair and maintenance to the system if required, should only be done by a qualified technician. Unauthorized opening/repairing may endanger the life of the repairer, as well as it may damage the system.
4. Never use inflammable fluids for cleaning rather than only use vacuum cleaners or blowers to blow out the dust outside or inside the system. Moist cloth can also be used to clean the surface the system from the outside.
5. Never apply extra load on the system. Maximum load carrying capacity can be checked on the serial number plate at the back panel of the system.
6. Ensuring safety of cables is must. Cables must be away from the reach of the children.
7. Always connect earthing to the system before switching it on.
8. Ensure that no fluids are spilled inside the system.
9. Before carrying out any kind of servicing and / or maintenance, ensure that input has been disconnected and no current and voltage is flowing inside the system.
10. This system has been designed for commercial / industrial use only and is not recommended for use of life supporting machines.

OVERVIEW

Servo Voltage Stabilizers are employed where highly accurate voltage is required. It receive a fluctuated AC voltage of high or low amplitude and provide a constant level of voltage to the output. These are the most recommended systems to save energy and ensure longer life to the electrical devices.

Protects against the variations in electric power which is quite common in power supply systems which can cause a lot of damage to even highly advanced electrical components.

FEATURES

- Eliminates voltage fluctuations.
- Provides correct voltage to the accuracy of $\pm 1\%$.
- Voltage control is step-less.
- The protection features of servo-stabilizers cut-off the very high supply voltage and protects and thus reduces failure rate of electrical devices.
- The overload / short circuit feature prevents damage to the stabilizer.
- Keeps the overall power factor between 0.8 and 1 thereby reducing the risk of penalty in electricity bills.
- Functions as Energy saving device.

TYPICAL APPLICATIONS:

- Hospitals
- Xerox and Computer centers
- Hotels, Restaurants and Bars
- Lifts and Tube wells
- Cold Storages and Central AC Plants
- Residence, Offices and Printing press
- Shopping mall and Petrol pumps
- Flour, Cement and Ethanol Industry
- Rubber and Plastic moulding
- Telecom equipments
- CNC Machines

OPERATION

Normal Operation: Mains Power available, Stabilizer MCB On

- The secondary winding of a double wound buck/boost control transformer is connected in series to the supply line going to the load. Its primary winding is fed with a voltage from a variable auto-transformer which is connected across the input supply. The voltage is induced in the secondary winding gets added to or is subtracted from the mains voltage depending upon its phase with respect to the line voltage. The induced voltage will either be in phase or out of phase by 180° with the supply voltage.
- Buck or Boost is obtained depending on which side of the auto transformer the wiper contact is placed relative to the fixed tap. While the range of correction possible depends on the magnitude of the adding or subtracting voltage injected between the supply and the load by the auto-transformer. The injected voltage is maximum when the wiper contact is at the two extreme position of its excursion. In the automatic servo voltage regulators the wiper arm is coupled to a servo-motor and its positioning is affected by a controlling unit which samples the output voltage and compares it with the reference voltage. If it deviated from the required value, the control unit energizes the motor to rotate the variable transformer wiper until the correct voltage is restored. This method of stabilization sampling from the output automatically compensates for any changes in the load current. The servo action is exceptionally fast and the de-acceleration controlled so as to result in minimum overshoot.



DISPLAY AND CONTROLS

The integrated controller for voltage stabilizer controls the output voltages, trips under faulty conditions. LCD panel in the controller displays and scrolls the Input Voltage, Output Voltage and Load Current in each phase. The fault parameters and on/off delays are user settable to configure the controller for different input ranges and easy adaptability for difficult site conditions.





User Interface

The Left-most 3 LEDs are used to identify which parameter type is being displayed by the device. The device can display *Output Voltage*, *Ampere* and *Input Voltage* and these are indicated by their respective LEDs in the same order (*O/P V* for *Output Voltage*, *AMP.* For *Ampere* and *I/P V* for *Input Voltage*). When any of these LEDs are blinking, it indicates automatic scroll mode is active. In this mode, the device scrolls through these parameters while briefly halting on each for a period of 5 seconds.

The user can also manually scroll between different parameters by pressing the  keys. If the corresponding LED is not blinking, it indicates the view is fixed upon the highlighted parameter and manual scroll is disabled.

How to Enable / Disable auto Scroll

Scrolling can be disabled by press holding the  for 2 seconds. Auto Scroll mode can be enabled by press holding the  key for 2 seconds. Blinking parameter LEDs indicate Auto Scroll mode is enabled.

How to Program the device- the Control Panel

Press hold the ● key for 3 seconds and the Control panel will open. The Control panel is a menu-driven window where device setting can be programmed. Use the ↓ key to navigate to the desirable setting which has to be programmed. Use the ● key to select the setting. Once selected, the parameters current value is displayed with its right most digit (least significant digit) blinking. This blinking digit represents the cursor and its value can be incremented by using the ↑ key. The cursor can be moved to next digit by pressing the ↓ key. Once the desired value is set, press the ● key to save the results. In case an invalid value is entered, the device will display an Error message starting “Err” and will reset the parameter value to a valid value. In case the device witnesses no activity for a period of 30 seconds, the control panel is automatically exited.

Following are the items present inside the control panel (in the same order):

VOL	Output Voltage Control: the voltage level that the device should maintain. Value can range from 100V to 350V. (Defaults is 230volts)
GAP	It refers to the allowed +/- variations in the set output Voltage control which can be safely ignored by the device so as to prevent continuous operation (i.e. the tolerance). The allowed range is 1V-9V. (Default is 3 Volts)
TD	Time Delay: this is the time interval for which the fluctuating Voltage must remain outside the zone of VOL +/- GAP, so that a suitable raise/ lower action can be triggered. The allowed range is 0.1 sec to 9.9 sec (Defaults is 3.0 seconds)
OV	Over Voltage: value of the voltage above the output control voltage range (VOL +/- GAP) at which the over voltage trip relay (Pins: 16, 17, 18) is triggered. Highest possible value for OV is 320V. (Defaults is 250 volts)
UV	Under Voltage: value of voltage below the output control voltage range (VOL +/- GAP) at which the under voltage relay (Pins: 13, 14, 15) is triggered. Lowest possible value for UV is 120V. (Defaults is 210 volts)
TTD	Trip Time Delay: This is the time interval for which the fluctuating voltage (or Current) needs to be above OV/UV/OC (see below) limit for tripping action to be triggered. (Default is 0.0)
CT	Current Transformer: CT value needs to be fed into the device as per operating environment. It is used to calculate the CT ratio. If this ratio is less than 100, the value of Current (indicated by second LED on the left) is shown in one decimal point (no decimal point is used otherwise). Secondary value for CT ratio is fixed at 05
OC	OVER Current: value of current above which the device triggers an over current trip on current Trip Relay (Pins: 13, 14, 15). It can have the maximum value equal to the CT value. (Default value is 155 amperes)

INSTALLATION & COMMISSIONING:

Verification:

- Check the Stabilizer for any transit damage. If damage is detected, please inform our service centre.
- Please ensure that material supplied is in conformance to the order and any deviation should be communicated to our Sales & Service Centre without delay.

Selection of Installation Site:

- Ensure at least 200mm clearance from the rear panel of the stabilizer with the wall.
- Ensure free air flow and ventilation for the stabilizer.
- Installation site should be cool and dry. There must not be any type of damping, as it may affect the working of stabilizer.
- Ambient temperature ranges between 0 to 50°C.

- Do not cover back panel (cooling air outlet), rear and side clearance of 100 mm must be required from side walls.
- Ensure that the load bearing capacity of the floor is adequate to bear stabilizer load (along with oil in case of oil cooled servo stabilizer).

Installation and Functional Testing of the Stabilizer:

- Before making any connection ensure that AUTO/MANUAL switch is in Auto position and MCB should be in off condition provided at the front panel of the stabilizer
- Ensure the connections according to the phase (RYB), Neutral (N) and Earth (E) marked at the input terminals provided at the rear of the stabilizer.
- Now connect the input supply to the stabilizer.
- Now switch on the MCB.
- The stabilizer provides output after a delay of approximately 10 sec. when the input is within specified range.
- Now check specified output voltage through the controller provided at the front panel.
- Now put AUTO/MAUAL to manual position and increase or decrease slightly from the output voltage, with the help of INCREASE/DECREASE . Press switch provided on the front panel.
- Now put back AUTO/MANUAL switch to AUTO position, output voltage should restore to pre-adjusted voltage.
- Now switch off the mains supply and connect load to output terminals provided at the rear of the stabilizer.
- Incase of overload MCB will get tripped. Switch off some of the connected load and again switch on, the MCB.
- Ensure proper and tight connections through suitable and recommended gauge of wires for I/P and O/P load.

Maintenance & Servicing:

Normally this servo stabilizer does not require any maintenance by the user but in the dusty environment (in case of air cooled servo stabilizer), it need to cleaned with the blower time to time.

Trouble shooting chart:

Problem	Indications	Possible Causes	Remedies
Under Voltage and Over Voltage	UV / OV LED Indicator in the controller will glow	Controlled O/P or I/P voltage goes beyond the range specified.	Wait for the voltage to come in the range of specified limit
Overload	OL Indicator in the controller will glow	Excess load connected to the Stabilizer O/P	Reduce the load
No Display	Control Unit digits will disappear	Either extra high voltage, i.e more than 300V (single phase), or controller got failed	Either wait till voltage to come in the range of specified limit or please contact our service centre
No Output	Input is normal but no output	Either Controller cut off unit or relay operating transformer (i.e. 24V-750mA) may got failed. Some times failure of Line Contactor coil also create such problem.	Please contact our service centre.



WARRANTY CARD

Sr. No. -

Item -

Model -

Name of the Purchaser -

Address -

Date of Purchase -

Warranty Expire Date -

Dealer's Name -

The Manufacturing Company warrants to the original purchaser provided the product is still in possession of and used by original purchaser, from the date of shipment from the company. The Warranty stands on all parts (except LED's, Switches & external body) for a period as mentioned in Warranty Expire Date.

Consumer shall have no coverage or benefit under this warranty in the event of any of the following conditions are applicable.

- The product has been subjected to abnormal use or conditions, improper storage, exposure to excessive moisture or dampness, exposure to excessive temperature, unauthorized modification, unauthorized repair (including but not limited to the use of unauthorized spare parts in repairs), abuse, accident, act of God, spill of food or liquid, improper installation and breakage or damage.
- The consumer has not notified the defect of the product to the company during the warranty period.
- The product Serial No. code or the accessory code has been removed, defaced or altered.
- The seals are broken or show evidence of tampering.

This warranty is offsite in nature, the consumer will have to take the product to the company or it's authorized service centre for repair and will have to take it back at his / her own expenses.

No other express warranty is applicable to this product. The duration of any implied warranties, including the implied warranty of marketability or fitness for particular purpose or use is limited to the duration of express warranty herein. The company shall not be liable for the loss of use of the product inconvenience, loss or any other consequent damage arising out of the use or inability of use, of this product or for the breach of any express or implied warranty including the implied warranty of market ability or merchantability or fitness applicable to this product.

All disputes are subject to Lucknow jurisdiction only.