NUMERIC®
1-20 kVA
Voltsafe
Plus

# NUMERIC 1-20 kVA Voltsafe Plus Installation Guide



Contents



NUMERIC®

**NUMERIC 1-20 kVA Voltsafe Plus**


## Product Information

### Specifications

| | |
|---|---|
| **Capacity (kVA)** | 1, 2, 3, 5, 7.5, 10, 15, 20 |
| **Operation** | Automatic |
| **Cooling** | Natural / Forced air |

## Product Usage Instructions

**Installation**
Follow these steps to install the VoltSafe Plus servo stabilizer:

1. Ensure installation is done in accordance with local electrical codes.
2. Connect the unit to the mains power supply following the installation procedure provided.

**Operation**
Here are the basic operations of the VoltSafe Plus:

- Use the front panel operations and LED indications to monitor input and output parameters.
- Ensure to connect only neutral to phase during operation.

### Frequently Asked Questions (FAQ)

- **Q: Can I install the stabilizer in a location with flammable materials?**
  A: To prevent any potential hazards, do not install the stabilizer in compartments containing batteries or flammable materials.
- **Q: How do I know if the stabilizer is operating within safe parameters?**
  A: Use the LED indications on the front panel to monitor the stabilizer's status. Normal and high indicators are

provided for input and output sides.

**PREFACE**
Congratulations, we are delighted to welcome you to our family of customers. Thank you for choosing Numeric as your reliable power solution partner; you now have access to our widest network of 250+ service centers in the country. Since 1984, Numeric has been enabling its clients to optimize their businesses with top-notch power solutions that promise seamless and clean power with controlled environmental footprints. We look forward to your continued patronage in the years to come! This manual provides general information regarding installation and operation of VOLTSAFE PLUS.

**Disclaimer**

- The contents of this manual are bound to change without prior notice.
- We have exercised reasonable care to give you an error-free manual. Numeric disclaims liability for any inaccuracies or omissions that may have occurred. If you find information in this manual that is incorrect, misleading, or incomplete, we would appreciate your comments and suggestions.
- Before you begin the installation of the servo voltage stabilizer, please read this manual thoroughly. The warranty of this product is null and void, if the product is abused/misused.

## Introduction

Numeric VOLTSAFE PLUS is a servo-controlled voltage stabilizer with advanced microprocessor-based technology to stabilize line of AC power system. This stabilizer is an electronic equipment which gives a constant output voltage from fluctuating input AC voltage and varying load conditions. VOLTSAFE PLUS produces a constant output voltage with ±2% accuracy of the set voltage.

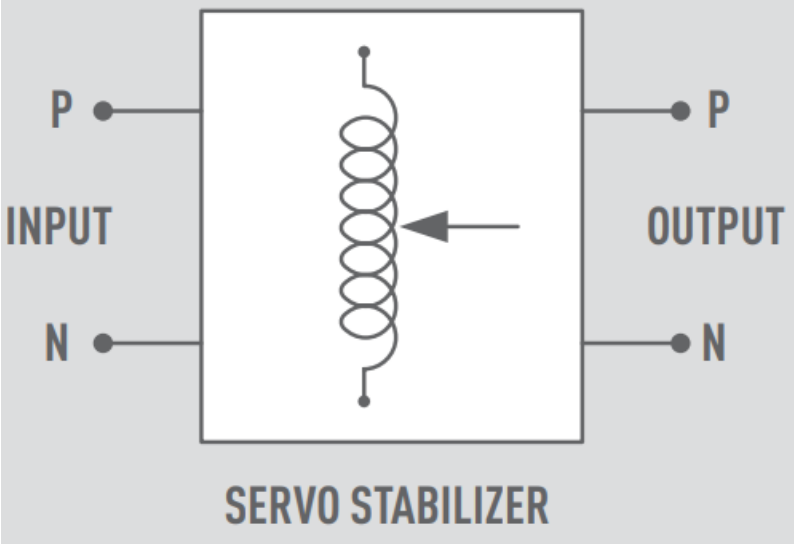
**Features**

- Seven segment digital display
- Advanced MCU-based technology
- High efficiency and reliability
- Generator compatible
- In-built SMPS technology
- No waveform distortion
- Overload cut-off
- Power loss less than 4%
- Continuous duty cycle
- Provides audible buzzer warning for faulty / trip conditions
- Visual LED indication for trip indications & mains ON
- Extended life
- High MTBF with low maintenance

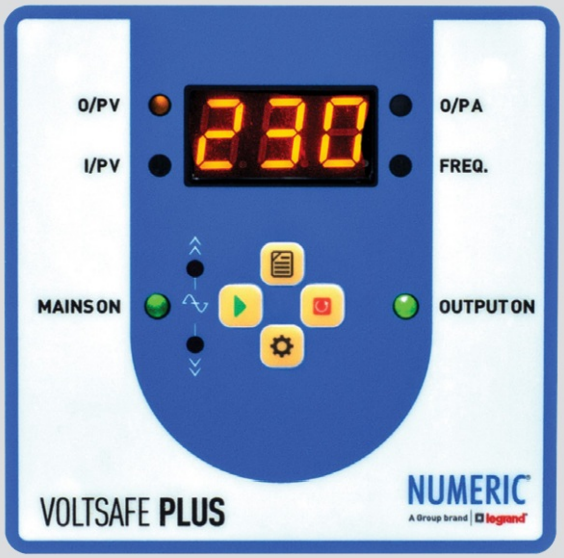
**Principle of operation**
VOLTSAFE PLUS uses a closed-loop feedback system to monitor the input and output voltages and to correct the varying input voltage. The constant output voltage is achieved by using a variable autotransformer (variac) with AC synchronous motor and an electronic circuit. Microcontroller-based electronic circuit senses the voltage, current and frequency and compares it with a reference. In case of any deviation in input, it generates a signal which energizes the motor to vary the voltage and correct the output voltage within the said tolerance. The stabilized

voltage is supplied for the AC loads only.

**Block diagram**
VOLTSAFE PLUS – Servo 1 Phase – 1 Phase : Servo Stabilizer block diagram.




**Front panel operations & LED indication**




| Digital meter selection indication | |
|---|---|
| I/P V | Display meter selection indication for input volts |
| O/P V | Display meter selection indication for output volts |
| FREQ | Display meter selection indication for output frequency |
| O/P A | Display meter selection indication for output load current |

| Menu switch | | | |
|---|---|---|---|
| Input volts | Output volts | Output load current | Output frequency |

| LED indication Input side | | |
|---|---|---|
| I/P Normal | I/P High | I/P Low |

| LED indication Output side | | | |
|---|---|---|---|
| O/P Normal | O/P High | O/P Low | Overload |

| Switches | | | |
|---|---|---|---|
| Start | Menu | Set | Stop |

**Dos and Don’ts – Operations**

- **Dos**

  - For all single phase servo stabilizers, it is
  - recommended to only connect the neutral and any one phase only.
  - Ensure that there is no loose connection.
- **Don’ts**

  - Input line & Output line should not be interchanged in single phase connection.
  - At the site, do no connect phase to phase at input side of the servo, under any circumstance. Only neutral to phase is to be connected.

## Important safety instructions

### General safety precautions

- Do not expose the stabilizer to rain, snow, spray, bilge or dust.
- To reduce the risk of hazard, do not cover or obstruct the ventilation openings.
- Do not install the stabilizer in a zero-clearance compartment which may result in overheating.
- To avoid the risk of fire and electronic shock, make sure that the existing wiring is in good condition and the wire is not under-sized.
- Do not operate the stabilizer with damaged wiring.
- This equipment contains electronic components which can produce arcs or sparks. To prevent fire or explosion, do not install it in compartments containing batteries or flammable materials or at locations that require ignition protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks or joints, fittings, or other connections between components of the fuel system.

### IMPORTANT SAFETY WARNING

- As dangerous voltages are present within the servo-controlled voltage stabilizer, only Numeric technicians are permitted to open it. Failure to observe this could result in the risk of an electric shock and invalidation of any implied warranty.
- As servo stabilizer has got moving parts like variac arm and motor, please keep it in a dust-free environment.

## Installation

### Installation procedure

- Unpack the unit carefully without damage since the packaging of the equipment has a carton along with a foam-packed enclosure, depending on the case. It is recommended to move the packed equipment till the installation area and unpack it later.

- The unit must be placed at an adequate distance from the wall and proper ventilation needs to be ensured for continuous operation. The unit should be installed in a dust-free environment and at a place where no heat waves are generated.
- If the servo unit has a 3-pin power input cable, connect it to a 3-pin [E, N & P] Indian plug or a 16A Indian socket to the 1-pole main breaker switch, in accordance with local electrical codes and standards.
- In other models, where the servo has a connector or terminal board, connect the marked input and output respectively from the terminal board.
  **Note:** Do not interchange the single phase Input – L & N.
- Switch ON Main MCB
  **Note:** Input & Output MCB is an optional accessory as per the customer's requirement for Air-cooled – single-phase servo stabilizers.
- Before connecting the load, check the output voltage in the display meter provided in the front panel.
  It should be within the desired set voltage of ± 2%. Verify the output voltage displayed on the digital meter in the front panel. Ensure the servo stabilizer is working properly.
- Switch OFF Main MCB before connecting the load.
- Connect the single-phase output to one end of the output-rated electrical cable from the load, in accordance with local electrical codes and standards. Connect the other end of the electrical cable to the output Indian UNI socket or terminal block marked 'OUTPUT'.

**AC safety grounding**
Earth wire should be connected with the chassis earth point terminal of the unit.

**WARNING!** Make sure all the AC connections are tight (torque of 9-10ft-lbs 11.7–13 Nm). Loose connections could result in overheating and a potential hazard.

## Specifications

| **Capacity (kVA)** | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 |
|---|---|---|---|---|---|---|---|---|
| **GENERAL** | | | | | | | | |
| Operation | Automatic | | | | | | | |
| Cooling | Natural / Forced air | | | | | | | |
| Ingress protection | IP 20 | | | | | | | |
| Insulation resistance | > 5M at 500 VDC as per IS9815 | | | | | | | |
| Dielectric test | 2kV RMS for 1 minute | | | | | | | |
| Ambient temperature | 0 to 45 °C | | | | | | | |
| Application | Indoor use / Floor mounting | | | | | | | |
| Acoustic noise level | < 50 dB at 1 meter distance | | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Colour | RAL 9005 | | | | | |
| Standards | Conforms to IS 9815 | | | | | |
| IP/OP-Cable entry | Front side / Rear side | | | | | |
| Door lock | Front side | | | | | |
| Generator compatibility | Compatible | | | | | |
| **INPUT** | | | | | | |
| Voltage range | Normal – (170 V~270 V +1% AC); Wide – (140~280 V + 1% AC) | | | | | |
| Frequency range | 47 ~ 53 ± 0.5% Hz | | | | | |
| Correction speed | 27 V/sec (Ph-N) | | | | | |
| **OUTPUT** | | | | | | |
| Voltage | 230 VAC + 2% | | | | | |
| Waveform | True reproduction of input; no waveform distortion introduced by stabilizer | | | | | |
| Efficiency | > 97% | | | | | |
| Power factor | Immune to load PF | | | | | |
| Protection | Neutral failure | | | | | |
| | Frequency cut off | | | | | |
| | Surge arrester | | | | | |
| | Input: Low-High & Output: Low-High | | | | | |
| | Overload (Electronic trip) / Short circuit (MCB/MCCB) | | | | | |
| | Carbon brush failure | | | | | |
| **PHYSICAL** | | | | | | |
| Dimensions (WxDxH) mm (±5mm) | 238x320x300 | 285x585x325 | 395x540x735 | 460x605x855 | | |
| Weight (kgs) | 13-16 | 36-60 | 70 – 80 | 60-100 | 100-110 | 130-150 |
| | TRUE RMS measurement | | | | | |
| | | | | | | |

| | |
|---|---|
| LED digital display | Input voltage |
| | Output voltage |
| | Output frequency |
| | Load current |
| Front panel indications | Mains ON, Output ON, Trip indications: Input low, Input high, Output low, Output high, Overload |

**BYPASS Switch – Optional**
**Note:** Product specifications are subject to change purely on company's discretion without any prior notice.

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## Documents / Resources

| | |
|---|---|
|   | NUMERIC 1-20 kVA Voltsafe Plus [pdf] Installation Guide<br>1-20 kVA Voltsafe Plus, 1-20 kVA, Voltsafe Plus, Plus |

## References

- User Manual