



USER MANUAL

**STATIC VOLTAGE
REGULATOR**

(SVR)

Important Notice

Thank you for purchasing Inform SVR.

This document provides instructions about safety, installation and handling of the Regulator. It is necessary to read the manual completely before working on this equipment.



Read the manual completely before working on this equipment!



Keep this manual near Regulator for easy consultation!

Symbols



This symbol points out the instructions which are especially important.



This symbol points out the risk of electric shock if the following instruction is not obeyed.



This symbol points out the instructions, which may be resulted with the injury of the operator or damage of the equipment if not obeyed.

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1 Safety



Please read carefully the security recommendations below!

It is important to read these warnings for your safety, as well as for the security of your machine!

- ✓ This unit ensures all safety stipulations about technical information institutions including electronic office machines. In any hesitation have recourse to authorized technical service.
- ✓ In order to pay avoid any kind of stroke or dash, carry the machine only in proper package.
- ✓ Mist can be occurred when the regulator is brought to indoors from a colder surrounding. The machine should be completely dry before operating. Thus; there will be need two hours waiting period.
- ✓ Before installing and operating the machine, take the warnings about surrounding conditions under “Technical Properties” section into account.
- ✓ Make earth connection of the machine.
- ✓ In order to leave from the mains completely, you should have to switch power switch to its middle position and switch the input fuse to its “0” position.
- ✓ Arrange the cables in such an order so that nobody step on them and cause an accident. Pay attention to “installing and commissioning” section while making the connections of the unit.
- ✓ In weather conditions including thunderbolt and lightning, do not put in or out the communication interface unit’s cables.
- ✓ Avoid dropping foreign materials (chain, thumbtack, nail etc.) inside of the unit.
- ✓ In urgent situations (like a damage in front panel and mains connections or foreign materials inside the machine) turn off the machine, put the plug out and call the authorized technical service.
- ✓ The regulator can only be repaired by authorized technical staff. Opening the machine or any effort to repair by someone who is not authorized can pose excessive troubles.
- ✓ Read carefully the “upkeep” section while you are cleaning the machine.
- ✓ Pay attention to leave at least 15 centimeters of space behind the machine for airflow.
- ✓ You can find the other details and information about SVR in “points to pay attention in SVR usage” section.

2 System Description

Static Voltage Regulator (SVR) which is connected between mains and consumer's machine removes the negative effects of the mains' fluctuation to the consumer's machine.

Unexpected occasions may happen in the mains electricity at different locations and periods. Instant Voltage fluctuations, problems caused by the poor electric distribution system, periodically activated unbalanced loads, may cause decrease in the quality of the absorbed energy from mains. Thus it is important to use a voltage regulator between the mains and the loads in order to protect the loads. SVR is one of these regulators which stabilizes the mains energy.

SVR is composed of a transformer, semiconductor switch power unit which triggers this transformer, and microprocessor block which acts as an control and user interface. SVR operation is based on coil selecting principle, which means supplying the consumer machine with auto transformer coils inside of it. It ensure machines (like motors, rectifier, and air conditioner) to operate properly and safely with selecting coil if a fluctuation and a deviation occurs in mains.

If an overload (more than the 150% of nominal power) occurs, consumer machines (loads) are directly supplied with Bypass from the mains. After the normal conditions restate, machines again begin to be supplied with SVR.

There is no moving mechanical part inside the SVR. This ensures less maintenance and repair need on the unit which operates at difficult conditions and maintains a trouble free operation.

You will find whole information for installation and usage of SVR in this booklet.

3 Installation

3rd1 Inspection

 Inspect the Regulator upon receipt. Although the product is packed properly, a damage might have happened during transportation. If you notice any damage on the packing, please contact to transporter company to issue a report for damage claim and also take a picture of the product with packing and without packing.

 Before commissioning the product, control if the right product is being received.

Depending on the model and power of the unit, there can be legs or wheels on the bottom of the regulator. Lift the units which have legs until the installation area. The products with wheels can be easily carried to the installation place.

3rd2 Transportation

The Regulator must remain in a vertical position throughout the transportation.

Make sure that the floor can support the weight of the system.



If the product is needed to be delivered again, then it should be packed properly. Therefore it is advised to keep the original packing.

3rd3 Storage

The product can be stored at a location which does not receive direct sunlight, away from the heaters in a dry environment where the temperature is between $-30\text{ }^{\circ}\text{C}$ to $+75\text{ }^{\circ}\text{C}$.

The relative humidity of the environment should be between %20 to %95 (non-condensing) .

3rd4 Placement

This product meets the safety requirements for devices to be operated in restricted access locations according to safety standards, which states that the owner should guarantee the following:

- ▶ Access to the equipment can only be gained by service persons or by users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken,
- ▶ Access is through the use of a tool or lock and key, or other means of security and is controlled by the authority responsible for the location.

Recommended operating temperature is $-10^{\circ}\text{C} \dots +40^{\circ}\text{C}$, humidity is 20% to 90% and altitude is up to 1000m. Air conditioning may be required to provide these values.

Other requisites are:

- ▶ The equipment shall not be exposed to direct sunlight.
- ▶ Do not expose regulator to rain or liquids in general. Do not introduce any solid objects.
- ▶ Avoid dusty environments or areas where dust of conductive or corrosive materials are present.
- ▶ Leave at least 20 cm free space in front of the air outlets of the regulator for proper ventilation.

3rd5 Connections



Connections shall be done by authorized technical staff only.



When the regulator is brought from a cold place to a warmer place, humidity of the air may condensate in it. In this case, wait for two hours before beginning with the installation.

Static Voltage Regulators are manufactured in different dimensional cases depending on their powers and model types. In concern to this, the connection terminal types also differ with respect to power ratings. But there is one constant principle about the usage of terminals. When you stay in front of the SVR, looking towards to the product, the terminals on the left side belong to input and the terminals on the right side belong to output.

The connection terminal types can be defined in two category. Picture-1 shows the terminal type of the low power units. Picture-s shows the terminal type of the higher rating regulators. Basicly the order of the terminals from left to right is input / neutral / output terminals respectively.

☞ At each regulator, the terminal definitions are indicated with labels.



Picture.1



Picture2

☞ Control and check that the input/output connections are done properly as per information stated on the labels present near the terminals. Wrong connections may harm the regulator.

☞ Connect the input power cord of the SVR to a well grounded mains.

3 Switching On & Off

Please follow up the below instructions while putting the device into operation.

Bring the "bypass - 0 - regulator " switch to "0" position, all other fuses and switches to "off" position then switch on the mains energy switch on the distribution panel.

Bring the input fuses of the regulator to "on" position, and bring the mechanical switch to "bypass" position. At this situation the mains energy is applied to loads.

Within 5sec after switching on the input fuse, the front panel LEDs will start lighting and the SVR power and firmware version shall be observed on the display panel respectively.

After some time later, "Vin" LED will lit and the mains voltage (input) shall be observed.

At the same time, "Vout" output voltage LED lamp will start blinking also.

After 5 seconds, the green color "ON" LED and after 1sec "REGULATOR" LED lamps shall lit and the output voltage is formed. Also the output voltage value is observed on the display panel. At this moment, "Vin" LED lamp is switched off and "Vout" LED lamp starts lighting.

(Note: If "Vout" LED lamp is blinking, then this is a significance that the regulator will start up automatically becoming "ON" position in 3sec.

By pressing "MODE" button, the following parameters can be observed ;

Input Voltage, Output Voltage, Output Current (must be 0), Temperature and Mains Frequency.

If you can observe them w/o any problem and the output voltage is there then bring the bypass switch to 0 position and switch on the input fuse.

After all the lights disappear on the front panel, and the energy at the output is disconnected then bring the bypass switch to "regulator" position.

In 5sec time you will observe that the front panel LEDs will lit again and you will see the regulator power and firmware version on the display for 3sec time periods.

During this, if the mains voltage is within the limits (if bypass inhibit LED is not lighting), regulator supplies the load through bypass.

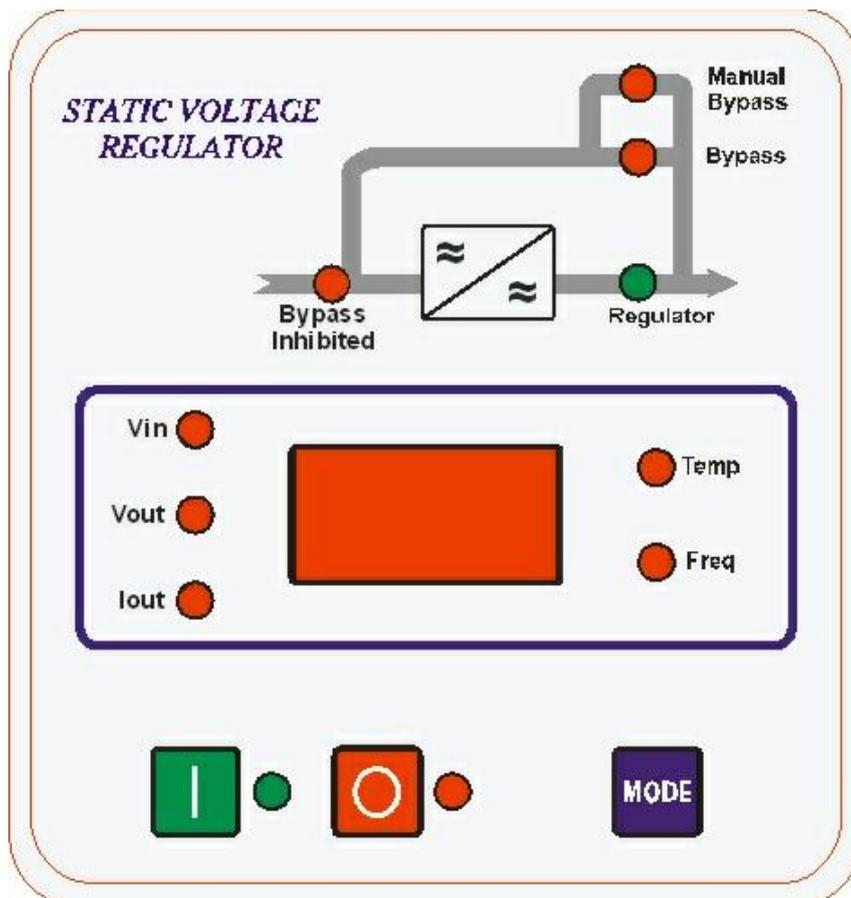
Meanwhile if any button is not pressed, then Vout LED blinks and auto start proceeds.

Respectively "ON" LED and "Regulator" LED lit and regulator take over the load. Now the connected devices are supplied through SVR.

4.1 Control and Monitoring

5.2.1 Front Panel

There is a 3digit display on the front panel of SVR. From this display, the following parameters can be observed ;Input Voltage(V_{in}), Output Voltage(V_{out}), output current(I_{out}), Internal Temperature(Temp) and mains frequency (Freq).



The LED indicators around the display show the displayed parameter at that moment. For example when the input voltage is displayed, V_{in} LED lights, Input and Output Voltages' RMS values are displayed in AC Volt, Output Current's RMS value as AC Amper, Temperature value as °C and frequency value as Hertz.

In case of an overload situation, I_{out} LED blinks continuously independent from the parameter displayed on the screen at that moment. Meanwhile the LED of the parameter that is instantly displayed continues to lit. Similarly when the V_{out} blinks continuously, It means that the regulator is at OFF position at that moment but will make auto start in 5sec time and maintain the ON position.

The LED Indicators on the block diagram above the display provides status information about SVR. The definitions of these LEDs are as follows;

- Bypass Inhibited : indicates that mains voltage is not convenient to be transmitted to the output. In case of an overload condition, the output can not be supplied through bypass and the load shall be deenergized.

- Regulator : the output is supplied through regulator.

- Bypass : the output is supplied through bypass line.

- Manual Bypass : this LED lits only when the output is transferred the bypass line by using manual bypass switch. When this LED lits, all the other electronical devices in the regulator do not operate therefore all other LEDs do not lit.

- "ON" , "OFF" , & "MODE" Buttons : these buttons are used to switch on or off the regulator and to display the different parameters respectively on the screen. If the regulator is not working and ON button is pressed then "ON" LED on the right side of the button lits and "OFF" LED stops litting. If ON button is pressed while the regulator is operating then nothing happens, the regulator continues its normal operation.

The OFF button is used to switch off the regulator during normal operation condition. If bypass inhibit LED is not litting and OFF button is pressed then the regulator comes to OFF position and the load is supplied through bypass line without any interruption. At this mode, the ups does not pass to ON mode unless ON button is pressed or the regulator is restarted.

If the regulator is left at OFF mode and the bypass voltage goes beyond the limits, then the regulator disconnects the output and the load becomes deenergized.

When the load is supplied through regulator and the bypass inhibit LED is ON, in order to switch off the regulator, it is enough to press the OFF button for 2 sec time. In this situation, the connected loads becomes totally deenergized. At this condition, pressing the OFF button for short duration does not affect the normal operation. With this way it is prevented to deenergize the output from wrong or by mistake touches.

The last Button on the front panel is MODE button. By pressing this button, the user can observe the following parameters respectively ; "Vin", "Vout", "Iout", "Temp" and "Freq" .

6 Alarm Messages

Static Voltage Regulator uses the front panel display and the LED indicators in order to provide the status information about the regulator to the consumer. The abnormal conditions are displayed with alarm codes on the display panel. The definitions of these alarm codes are listed below ;

Er1 : When the input voltage drops below the minimum limit then on the display, "InPut Error" message flows and afterwards Er1 alarm code appears. This status information disappears when another button is pressed or the normal operating limits are resumed. If the input voltage value is recovered to normal values then on the screen, V_{in} is displayed. If the user presses a button then the parameter that was displayed before the message appeared is continued to be displayed.

Er2 : When the input voltage exceeds the maximum limit then on the display, "InPut Error" message flows and afterwards Er2 alarm code appears. This status information disappears when another button is pressed or the normal operating limits are resumed. If the input voltage value is recovered to normal values then on the screen, V_{in} is displayed. If the user presses a button then the parameter that was displayed before the message appeared is continued to be displayed.

Er3 : During the normal operation of the regulator, if the output voltage drops below the allowed minimum limit for some reason then the regulator goes the OFF position and on the display ER3 alarm message is observed. At this case if the mains voltage value is within the bypass operation limits, then the output is supplied through bypass line. Otherwise the output is deenergized. Meanwhile "Vout" LED starts to blink and auto-start initializes. In 5seconds regulator is brought to ON position again. If the input voltage value is not within the bypass limits, then when the regulator is switched off by pressing the OFF button, the ER3 message is displayed on the screen and the output is deenergized. At this case auto-start does not work out.

Er4 : During the normal operation of the regulator, if the output voltage exceeds the allowed maximum limit for some reason then the regulator goes the OFF position and on the display ER4 alarm message is observed. At this case if the mains voltage value is within the bypass operation limits, then the output is supplied through bypass line. Otherwise the output is deenergized. At this case auto-start does not work out.

Er5 : During the normal operation of the regulator, if it is overloaded and at that moment the voltage value is not within the bypass operation limits, then the regulator is switched off and the output is deenergized. At the same time, "OutPut CLoSEd" message flows on the screen and afterwards Er5 alarm message is observed. This alarm message stays on the display until any button is pressed. After checking and controlling the loads on the output, by pressing the OFF button for 1sec, the regulator is switched off and then by pressing the ON button, it is started up again.

Er6 : During the bypass operation mode, if the regulator is overloaded, then the regulator deenergize the output and switch off itself for protection. At this time Er6 message is displayed on the screen. This alarm message stays on the display until any button is pressed. After checking and controlling the loads on the output, by pressing the ON button, it is started up again.

Er7 : If the input frequency is beyond the set limits, then the regulators provides Er7 message on the display. But this situation does not affect the operation of the regulator. It continues to operate.

7 Trouble Shooting

If any abnormal condition is absorbed on the SVR, please perform the following controls on the product before calling the authorized technical staff:

- Is there energy in the input of the regulator ?
- Please check all fuses to see if there is any blown one ?

Following these controls, if it is needed to call the service then ;

- provide the full information of the product present on the identity label (model, type... etc)
- full description of the problem

please check the below trouble shooting chart if there is any similar case with the one you are having ;

PROBLEM	POSSIBLE CAUSES	NEEDS TO BE DONE
The Indicators on the front panel do not lit.	No input voltage	Call an authorized electrician to check the input connections.
	Input fuse is switched off	Switch on the fuse
	The over internal temperature thermic is blown	The FAN is out of order. After a while, the regulator shall start up again. But the FAN is faulty, therefore the regulator will switch off itself again, therefore call the authorized service personnel.
	Electronic board failure	Call the authorized service personnel
Er1 or Er2 alarm messages appear on the screen	Input Voltage is out of operation range.	Wait until the input voltage returns back to allowed limits.
Although "ON" lamp is litting, but there is no energy at the output.	Regulator has switched off its output due to overload.	Initially switch off the regulator by pressing OFF button then switch it on again with ON button.
The regulator is at OFF position and bypass Inhibit LED is not litting but there is no energy at the output.	At the time when the regulator is brought to OFF mode, if the mains voltage is not available for bypass operation, it does not go to bypass and even the situation recovers, there will not be bypass operation.	Bring the "Bypass-0-Regulator" switch to "0" position and then to "regulator" position again. If the mains is available and within the operating limits, then the output shall be supplied through regulator again.
"Iout" Lamp is blinking continuously	If it is regulator mode then there is overload	Reduce the load otherwise in max. 10min. the output will be transferred to bypass
	If it is bypass mode then there is a load at the output about %85 more than the nominal value.	It stays at bypass mode, the regulator mode is regained when the load% is reduced to nominal values.

8 Important Notices about the Operation of the Regulator

Static voltage regulators are used for protecting sensitive machines from the harmful effects of the bad and insecure electricity mains and ensuring them to work properly. A consumer, who has such poor-qualified mains conditions, can create himself well-qualified artificial electricity mains for his home or office machines.

Professional electricity mains in a building is established by selecting proper conductor quality and thickness and applying necessary grounding and distribution principles. A consumer who wants to establish an artificial regular electricity mains inside office or home should pay attention to some serious points while assembling the connections between regulator and his machine. Contrary, the safety of the consumer and the security of the regulator are not under guarantee.

The points about human health safe and are mention in “**Safety Warnings**” section. In this section these points will be reemphasized and information about connections between SVR and consumer machine will be explained.

- It can be hazardous to use cables with improper cross-sections between SVR and the main.
- SVR’s **earth connection** must be done properly just as written on the label on the front panel. This grounding would do earth connections of all machines, which are supplied with SVR. Bad earth connection or not to earth poses an electric shock danger for the consumers. At the same time possible damage danger in electronic circuits is very high.
- In computer systems, which are connected to the modem with RS232, system can be effected or the hardware can get damage by the loud noise of the communication (phone) cable of the modem. **Since SVR does not have any noise source power line it can not protect the system.** In this case; you should select your modem in such a type that can ensure 6000V of isolation and the authorities should take the precaution for loud noise.