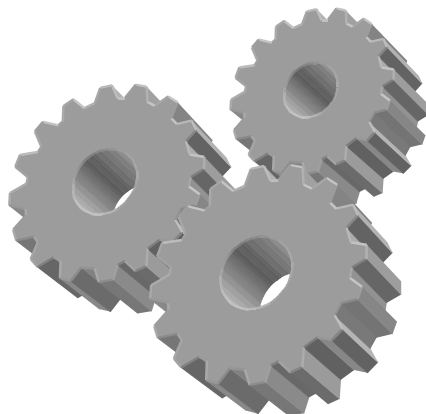


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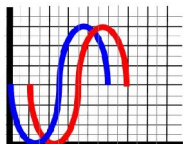


REGMASTER

REGULATION MASTER

Generator Automatic Voltage Regulator (AVR)

Installation / User Manual



Congratulations!!!

All **Regmaster** products are designed and developed using advanced technology to bring you durable products with most advanced features.

To ensure you get the best value for your money, **Regmaster** manufactures products to international safety and quality standards.

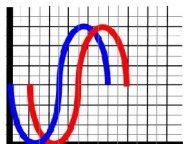
To get the best performance and service from this product, remember to carefully read and adhere to the instructions.

INSTRUCTIONS

Reg 6 is a general purpose or universal automatic voltage regulator (AVR) designed for power generating sets of **10KVA up to 2,500KVA** ratings. It can be installed in all generators with **brushless** excitation alternators. It is a perfect replacement for Leroy Somer, ECC, Ansaldo, Newage Series 3, 4 and 6, Mitsubishi Electric, Pirelli, Caterpillar, and Contrology AVRs. **See wiring diagrams and installation steps.**

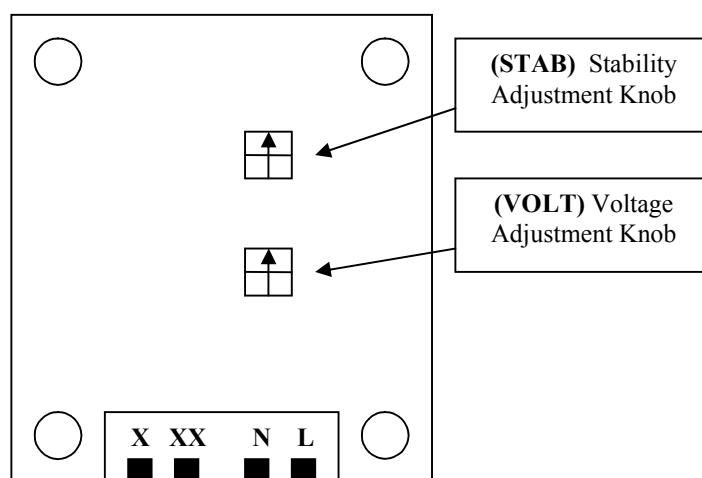
(A) SAFETY MEASURES

- (a) Reg 6 is easy to install and maintain. However, **INSTALLATION MUST BE CARRIED OUT BY QUALIFIED PERSONS.**
- (b) Reg 6 is protected with one fuse. For fuse replacement, strictly adhere to the fuse rating as written beside the fuse.
- (c) Always install reg 6 in an environment that is
 - Ventilated.
 - Not exposed to direct sunlight or heat source.
 - Away from water, moisture, or oil.
 - Away from flammable substances.
 - Secure and have no risk of falling.
 - **FREE FROM MUCH VIBRATION.** As much as possible, do not install it in the generator housing if the generator vibrates too much.
- (d) Avoid direct contact of the circuit board with any metal part of the generator. Reg 6 has a mounting prop installed on it which isolates the circuit board. Do not remove it during installation.



- (e) Avoid overloading the generating set, as overloading can damage any AVR.
- (f) Avoid erratic engine speed adjustment as this can damage any AVR.

(B) WIRING DIAGRAM AND INSTALLATION STEPS.



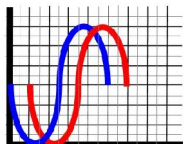
**N - Neutral,
L - Live,
X - Positive Exciter,
XX - Negative Exciter.**

INSTALLATION TOOLS.

- (i) Functional Digital or Analog Multimeter.
- (ii) Frequency meter or Tachometer for measuring engine speed.
- (iii) Precision screw drivers for voltage and stability adjustment.
- (iv) A generator technician should own a complete toolbox.

INSTALLATION STEPS

- (i) Make sure that the generator set is intact. That is to say that the set starts and runs smoothly and the speed governor is working fine.
- (ii) Use a digital multimeter (digital meters are more precise and accurate than analog meters) set at 200 Ω resistance to measure the resistance of the exciter coil (X and XX winding terminals). **IF THE COIL RESISTANCE READING IS LESS**



REGMASTER AVR

THAN 3 Ω , DO NOT CONNECT REG 6 OR ANY AVR TO IT. An exciter winding resistance less than 3 Ω indicates that the exciter winding is shorting or weak. It will damage an AVR connected to it due to excess current. The exciter coil should be replaced or taken for rewinding.

- (iii) With the generator off,
 - (a) Connect N of Reg 6 to Neutral terminal.
 - (b) Connect L of Reg 6 to Live terminal.
 - (c) Connect X of Reg 6 to positive + of exciter terminal.
 - (d) Connect XX of Reg 6 to negative - of exciter terminal.

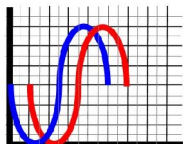
FOR GENERATORS ORIGINALLY USING CENTRE TAPPED OR HALF WINDING TAPPINGS, SUCH AS NEWAGE SERIES 6 OF STANFORD ALTERNATORS, CONNECT N AND L OF REG 6 TO THE LI AND L2 TERMINALS CONNECTED TO PIN NUMBER 7 AND 8 OF NEWAGE SERIAL 6 (SX 460).

- (iv) **TURN THE VOLTS AND STAB TUNING KNOBS TO FULL OFF (ANTICLOCKWISE) POSITION USING PRECISION SCREWDRIVERS.**
- (v) **PROPERLY AND PATIENTLY GO THROUGH THE INSTALLATION STEPS (i) TO (iv) ABOVE TO CONFIRM THAT CONNECTIONS ARE PROPERLY MADE. FAULTY OR WRONG CONNECTIONS CAN CAUSE DAMAGE TO THE AVR OR GENERATOR.**
- (vi) Start the generator. The red bulb in Reg 6 lights to indicate that power is present in the AVR and generator. Once normal speed is reached, slowly adjust the VOLT knob of Reg 6 and watch the voltage on the generator panel voltmeter and your multimeter set at 700 volts. Gradually continue to adjust generator terminal voltage using the VOLT knob until the desired voltage, 220-240 volts (Phase to Neutral) or 380-415 volts (Phase to Phase) is reached.

Make sure you use a multimeter during this adjustment because the generator panel meter can deceive you with a wrong reading if it is faulty.

If power flickers or is unstable, slightly reduce the voltage and gradually increase the stability using the STAB knob until power becomes stable. Then adjust and set the voltage.

BATTERY EXCITATION OR FLASHING



After installing Reg 6, if the AVR does not build up voltage, it could be that the generator field winding has lost the residual magnetism required to produce the necessary initial voltage for the AVR to build up and regulate voltage. This problem can be solved by using battery excitation. There are two ways to do it.

Battery excitation with AVR disconnected

Completely disconnect REG 6 from the generator and connect a 12 or 24 volts battery (depending on the battery the generator uses) to the exciter terminals. Connect X of generator exciter to the positive + of the battery and the XX of generator exciter to the negative – of the battery.

Start the generator and make sure that the generator terminal voltage has built up from the battery.

With the battery still connected (VERY IMPORTANT), stop the generator.

Then disconnect the battery from the exciter and connect Reg 6 using the installation steps (i) to (iv) described earlier in this manual.

The AVR should now build up and work. **IF NOT TRY THE NEXT PATTERN.**

Battery excitation with AVR connected

THIS PATTERN OF EXCITATION IS SENSITIVE AND CAN DAMAGE THE AVR IF NOT CAREFULLY DONE.

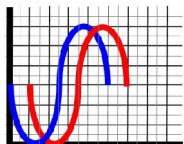
Connect Reg 6 to the generator using the installation steps (i) to (iv) described earlier in this manual.

Make sure that the VOLT and STAB adjustment knobs are fully off (full anticlockwise).

Start the generator. Run cables (wires) to the positive + and negative – of the battery. Use a red cable for + and a black cable for –.

Hold the + (red) cable on your left hand and the – (black) cable on your right hand.

With the generator running, place and hold the + (red) cable on your left hand to contact X terminal of Reg 6.



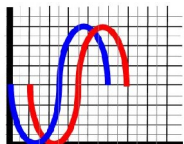
Momentarily (Touch and quickly remove) the – (black) cable on your right hand to contact XX terminal of Reg 6.

The AVR will build up and work. Adjust voltage and stability if necessary.

IF A MISTAKE IS MADE BY INTERCHANGING CABLES CONNECTED TO X AND XX DURING THE EXCITATION, THE AVR MAY BE DAMAGED EVEN THOUGH THE EXCITATION IS DONE QUICKLY.

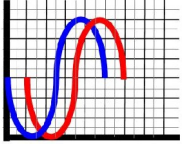
GENERATOR REPAIRS AND TROUBLESHOOTING GUIDE

FAULT	POSSIBLE CAUSES	REMEDY
Remarkable voltage drop when generator is loaded. Alternator coils are overheating. Output voltage fluctuates	Generator is overloaded AVR is faulty Generator governor is not working properly Alternator coils are faulty Partial contact at AVR terminals or AVR is faulty and supplying excess current to the exciter.	Check and confirm AVR Run set without load and see if coils still heat. Confirm if speed governor is okay Confirm that cables at AVR terminals are firmly connected.
Generator voltage is too high.	AVR is faulty Generator is over speeding	Repair or replace AVR Confirm generator speed governor performance
Battery is not charging	Generator charging circuit or alternator is faulty	Check battery charging alternator and circuit



<p>Generator unable to carry some inductive loads such as compressors, borehole pumps and heavy welding machines.</p>	<p>Inductive load is not properly installed and pose overload to generator.</p> <p>Initial starting current of inductive load is high compared to the KVA rating of the generator.</p> <p>Generator may be running lower than rated speed.</p> <p>AVR may be faulty or does not fit the generator alternator.</p>	<p>Check electrical and mechanical installation of inductive load.</p> <p>Install a generator with a higher KVA rating to match the initial starting and running current of inductive load.</p> <p>Use tachometer and frequency meter to confirm that the generator is running on normal speed and the output voltage frequency is okay.</p>
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FAULT	POSSIBLE CAUSES	REMEDY
<p>No power output in generator</p>	<p>Connecting cables to AVR terminals are detached.</p> <p>The generator circuit breaker tripped off.</p> <p>Flying diodes in generator alternator are faulty.</p> <p>The AVR is faulty.</p> <p>The alternator coils are faulty.</p>	<p>Check and confirm AVR connections.</p> <p>Use battery to excite the generator. If there is still no output voltage, check the flying diodes, exciter and field coils of the alternator. If battery excitation produces an output, AVR is faulty or is not properly connected. Check connections again or repair / replace the AVR.</p>

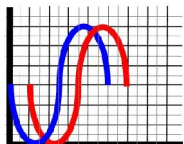


<p>Power output frequency of generator is low (below 50 Hz).</p>	<p>Generator engine speed is low (below 1500 RPM). Frequency of generator output can only be changed or altered by varying the engine speed.</p>	<p>Increase speed of generator engine until the desired 50 Hz frequency is reached. Some sensitive equipment such as split system air conditioners, color photograph printers and processing machines, photocopiers, UPS equipment, computers, and modern instruments are frequency sensitive. If the voltage is full and frequency is low, such equipment may not function. Increase the generator speed to increase the frequency of the output. If frequency is to be 50 Hz at full load, ensure that the no load frequency is up to 51 or 52 Hz, so that at full load it could come to 50 Hz.</p>
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WARRANTY

Reg 6 AVRs undergo rigorous and uncompromising tests before they are introduced into the market.

We hereby warrant to the original retail purchaser, subject to the conditions set forth below, that should Reg 6 prove defective by reason of improper workmanship or materials within ninety days from the date of purchase **Regmaster** will replace or repair (at her option) the Reg 6 AVR without charge for parts or labour for a \$10 handling charge. Any such replacement or repair will carry a thirty days limited warranty from the date of replacement or repair.



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REGMASTER AVR

This warranty is subject to the following conditions:-

- (i) The Reg 6 AVR **MUST NOT** have been previously internally altered, repaired or serviced by anyone other than Regmaster or any of her authorized agents; and the AVR **MUST NOT** have been subject to accident, abuse, misuse or have been operated or installed in a manner contrary to the accompanying instructions. If the AVR unit is connected contrary to instruction to an exciter winding of less than 3 Ω resistance value, any damage to the AVR is not covered by this warranty. This cause of damage will be detected when the faulty Reg 6 is tested.
- (ii) The report **MUST** be made within thirty days after the defect becomes noticeable.

For further information and inquiries on the use, installation, maintenance and repairs of Reg 6 please call the numbers or use email address below for technical assistance.

NIGERIA: - Summit Systems Ltd

Contact Persons:

Njoku Chinedu - 07036642418

Technical Support Department - 08068382749

Email: - info@summitsystemsLtd.com
uzngoka@yahoo.co.uk