

Regulating 12V Generator Output

By G8MNY

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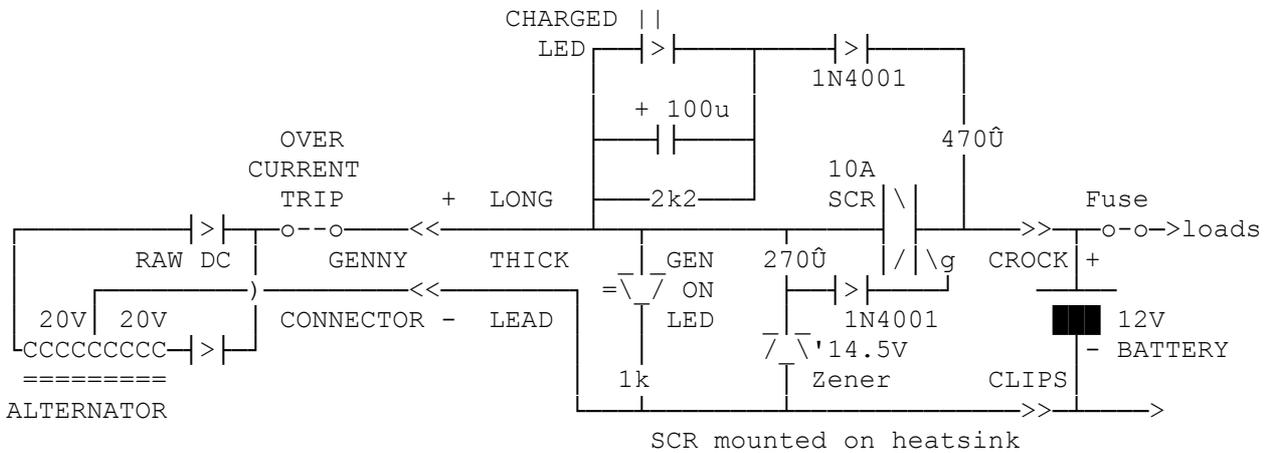
(8 bit ASCII Graphics use code page 437 or 850)

Small generators often provide unregulated charging outputs. These can easily over charge your /P battery, with damaging excessive battery voltage, that can also damage low power lamps & other kit.

Here is s simple & efficient charge limiting SCR regulator that can be put in the lead at the battery end.

FEATURES

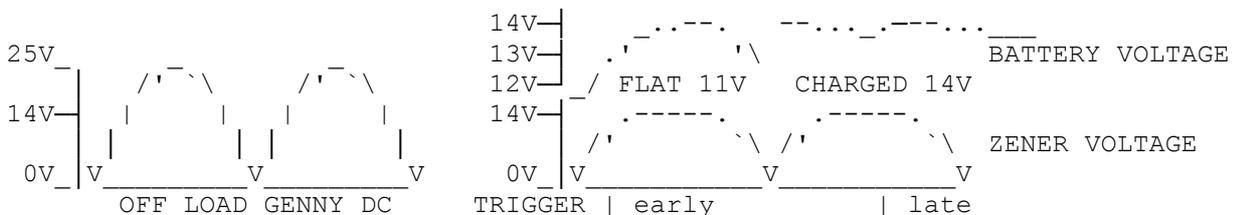
- 1/ Charge output gradually shut of at 14V (dependent on Zener voltage).
- 2/ Low loss (1V) as it is an SCR & not a linear regulator.
- 3/ Generator connected LED, this lights when DC appears from the generator.
- 4/ Charged LED, gradually lights up as the battery takes less genny output.
- 5/ Battery lead isolation, no battery DC to short out @ the generator lead end.
- 6/ No battery drain, the circuit takes no current from the battery.



HOW IT WORKS

The raw DC peaking well over 20V off load, lights the GEN ON LED via the 1k to -ve. The 20V also provides up to 14.5V onto the zener. This puts 14V onto the gate of the SCR via a blocking diode. If the battery voltage is much less than this the SCR will be triggered & puts nearly all of that 1/2 cycle of DC from the generator into the battery. When that half cycle of current stops the SCR is ready for the next voltage comparison & triggering for the subsequent half cycles etc.

As the battery charges the voltage rises & the SCR is triggered later & later, in fact a crude form of phase firing naturally occurs, as the battery voltage falls from the last current burst as the zener voltage rises..



This does what you need for charging, it turns the current down as the voltage comes up & stops excessive gassing. Eventually just the odd trigger occurs keeping the voltage @ 14V.

If the charge current is small (small genny e.g. 8A max), & the battery a big one with low internal resistance, then the hum across the battery may be small enough not to cause hum problems at all with kit like a 22 Amp 100W SSB rig.

#### ACOUSTIC NOISE & LEAD LENGTH

Using the low voltage output means thick short leads! This does not help the noise isolation problem. If you are closing doors on this lead, do make sure it is not crashed! If you are using long leads due to noise, then make sure that are VERY THICK. e.g. A 30A cooker lead with the 3rd earth wire bonded to -ve up to say 10m long for an 8A charge lead, if the losses are not to be too great.

#### DC CHARGING WITH AC LOADS

Some generators warn you not to use both DC & AC outputs at the same time. This may not be due to loading, or regulation problems, but due to safety! This is because the DC output winding is often part of the 230V AC load winding, & that can put DC onto the AC output or bypass some of the safety trip features, as well as MAKING THE 230V NON FLOATING & therefore more hazardous!

If you intend to use both at once do at least use a ELCB/RDC mains trip plug!

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73 de John G8MNY @ GB7CIP