

NORTHERN 650W 2 Stroke Genny

By G8MNY

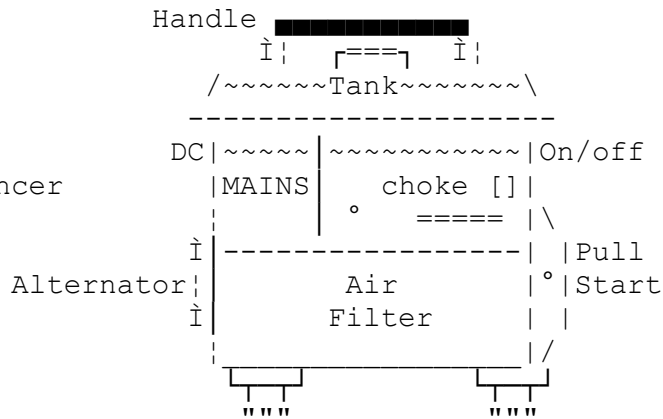
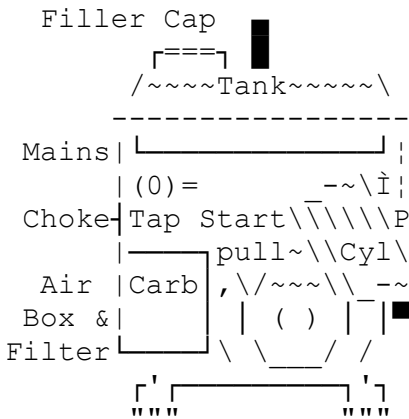
(Updated Sep 15)

(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

I bought this very clean & hardly used non working 63cc one at a junk sale, & "it worked OK last year" I was told! It seems identical to the Wolf, Pro User & KINGAVON versions.

On looking into the non-running, there was no intake "suck". This is a 2 stroke with an angled engine & the carburettor ported into the crank case with a reed valve, rather than an upright engine with bottom edge of piston valve intake.

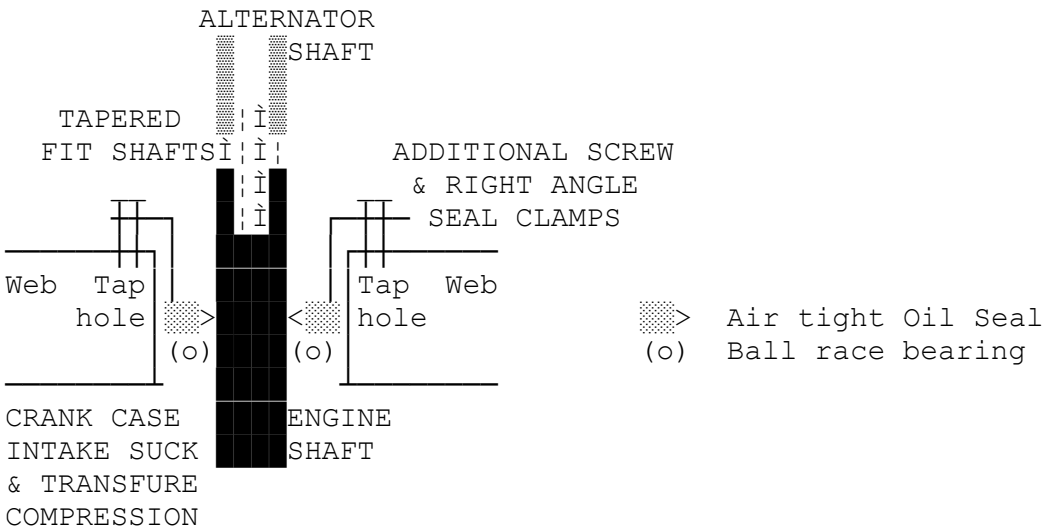
Oil Measuring



ENGINE FAULT

Checking the ignition, there was a weak spark OK, & there was compression, so I tried putting petrol/ether spray into the crankcase through the reed intake valve, but the engine still did not fire. So I put took the silencer off (needed painting anyway) & put spray through the exhaust port, this did give a bang on turning over, so the ignition & timing was OK.

The fault was eventually found to be a popped out crankshaft bearing air seal rubber, between the engine & the alternator. This may have happened if there had been a back fire in the crankcase, or just a lot of compression. There was non of the usual spring circlip in a groove to hold it in place in this design!



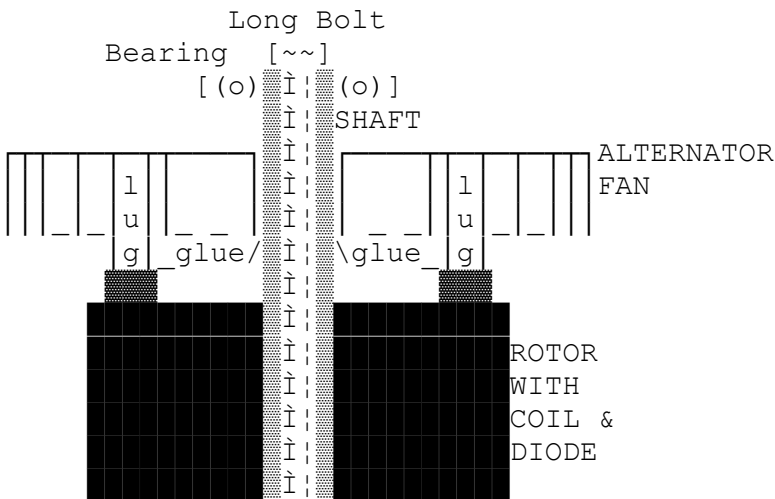
To get to the fault, I needed to split the alternator off the engine (3 outer bolts) & remove silencer & gently levering off the end casing. A long bolt through the alternator shaft holds it on to the tapered crankshaft, this was the first problem & a smart tap the socket set freed this OK. Then on the lose bolt a sharp tap with a hammer to free the crankshaft off lternator rotor.

Now was the problem of fixing the hardly worn air seal back in place so it would not spin. Initially I used instant gasket sealant, but eventually I added 2 right angle metal pieces, held in by drilled & tapped screws in the available cast lugs around the bearing, these lock the seal in place.

But this failed a year later with the captured seal managing to get half way out. I managed to find a new tight fitting seal & a circlip to hold it in place just in cast it statetd rotate as the old one did.

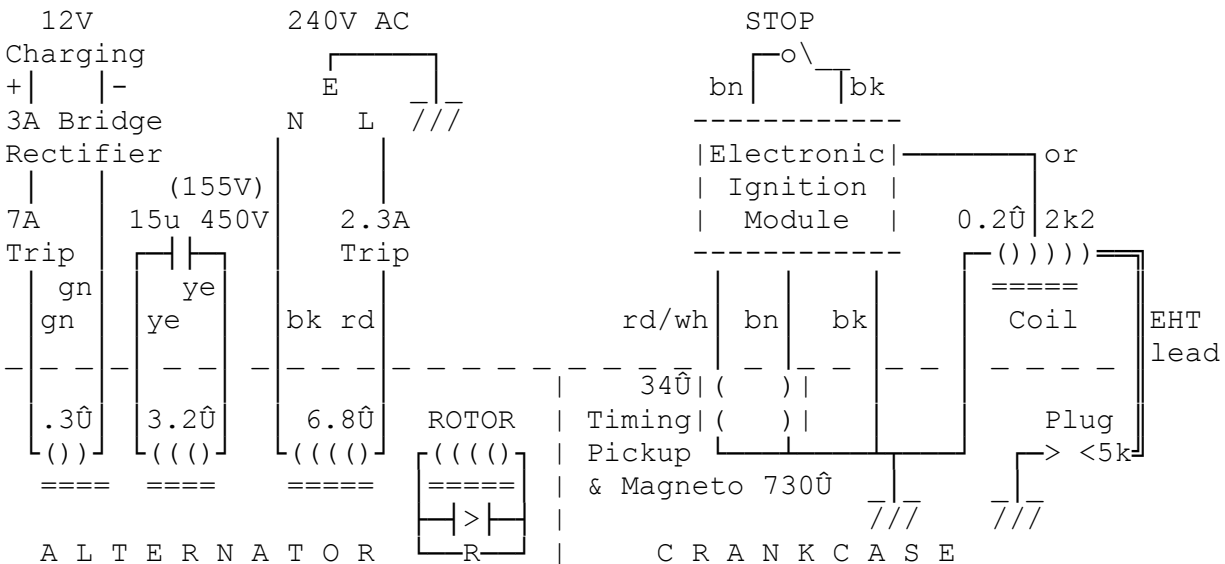
ALTERNATOR FAN

Also I noticed the Alternator Fan was loose, this removes about 100W of heat, & blows it over the exhaust, but it was able to free wheel! I used 2 part glue (resin & hardener) to fixed that OK, & re-fixed the 2 locating lugs etc.



CIRCUIT

Not having the handbook etc. I have reverse engineered the diagram...

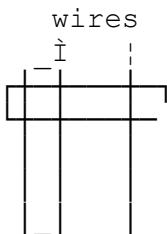


ALTERNATOR EXCITATION

This is a brushless alternator with the excitation of the rotor magnetically charged up each half cycle from circulating 90° out of phase currents from the exciting 15uF capacitor. The rotor winding has a diode across (& back emf R) it to maintain the current, half a cycle after the kick. Excitation only starts at high enough RPM (2000RPM) to overcome the diode voltage drop loss, with the weak residual magnetic rotor field. This system is more reliable than the brush type, but it does produce a kink in the load winding waveform & there is no opportunity for voltage control other than engine RPM.

CHARGING

As I did not have the special DC plug & lead, I made a plug (- |) from 2 brass strips, poked these into socket & through cardboard, to form the plug's mould base, & fitted a cardboard tube. Made the lot into a good mould, & with the petrol tank removed up end the generator to get the socket level, spay oil / grease into the socket holes & refit the plug strips & mould.



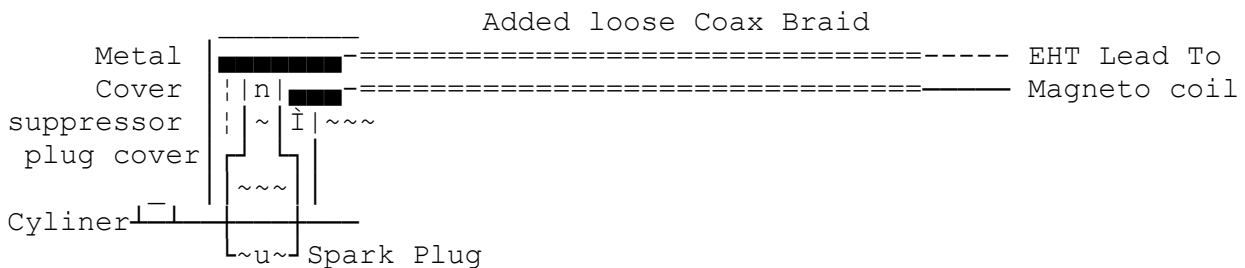
Mix up resin & hardener with some fiber glass to add strength for the plug base. pour in & tamp down. When set remove the new plug, cut off the cardboard mould, Grind & file off the resin lump into the wanted shape, Solder on the new lead to the brass strips noting +/- & tape the lot up in rubber amalgamating tape, this finishes the plug.

Although there is a 7A trip (12A to activate!) before the bridge, the rectifier is only made from 4x 3A diodes in the connector box with no heat sink. To improve on this, I cleaned off all the copper track paint & flowed a thick layer of solder all over it to act as a heat spreader. I also doubled up on the diodes putting 4 more on the copper side of the PCB. Note the current trip does not prevent blowing the diodes on wrong battery polarity! So a 13A fuse in the charging lead will help that!

In practice though on a good battery the charging current is only 3-4A, but enough to boost a flat car battery (@ 10A ?) in a few mins so you can crank the car over.

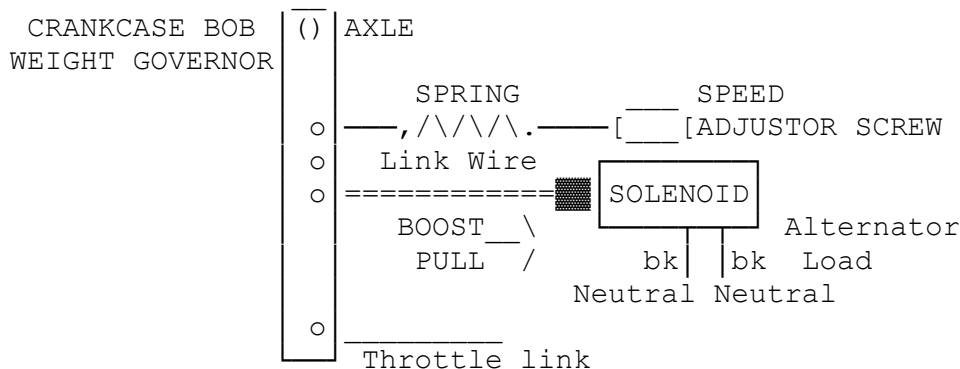
OTHER MODIFICATIONS

1/ To improve the VHF/UHF ignition noise, I have added a loose coax braid over the lead earthed at the plug screened cap.



2/ To improve the voltage regulation, I applied my current solenoid feed forward modification. This was easily done, by adding a small solenoid (e.g. from an old VCR) rewound with a few turns of suitably insulated & thick enamelled copper wire, that takes the 230V 4A full load current (neutral). Mounted with a single screw firmly on the engine webbing, by the speed setting adjuster. (Tap/Make hole in webbing) The solenoid piston is linked

up to aid the speed setting spring as the load comes on. The length of the thick link wire is critical so that the piston only just goes fully home at full throttle, & if less compensation is needed the wire can be bent slightly to adjust the effect (Mount the petrol tank elsewhere for testing).



N.B. Solenoid pull is proportional to:-
 1/ the Mains load current squared,
 2/ the number of turns,
 3/ the location of the movable iron piston slug,

With this modification a good 230V @ 750W peak is available under resistive lamp load tests from this small generator.

CONCLUSION

Although 2 stokes are not the best engine for efficiency etc. & fuel oil mix is needed, their simplicity & reliability if maintained (clean carburettor & muffler) it does give a simple lightweight power source. The noise of this one changes from poor putting misfires on no load, to a steady 50Hz hum on higher loads.

N.B. if the engine is difficult to start, "ether spray" in the air inlet does help!

So a lot of work was needed, but now I have good genny in the end for /P work.

See my TECH buls "Regulating 12V Generator Output", "Cheaper Generators" & "Petrol Generators for /P SSB"

Y Don't U send an interesting bul?

73 de John G8MNY @ GB7CIP