MMM Generator Conversion

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The following description and drawings cover the modifications I made to the original Rotax/Lucas generator in my MG type PA in order to improve its output and reliability.

The outer diameter of the original generator was 107 mm which was standard for most MMM cars. A Bosch generator from an early air cooled Volkswagen was obtained for the rebuild since it has close to the same outer diameter and it has rotor shaft inputs from both ends. This generator had an output of 14V, 30 Amps when used in the Volkswagen however since I have totally enclosed the generator and the ventilation is reduced the current output is somewhat less but much better than the original generator in my MG. There is also a 6V Volkswagen (Bosch) generator which I have modified in a similar manner for an M type MG.

The basic problem is to lower the overall height of the Bosch generator so that it will fit into the MG engine. There is also a problem fitting the bevel gear at the bottom of the generator since the Bosch input shaft is 15 mm and the gear requires a 5/8 inch (15.875 mm) diameter shaft.

After the modifications it is important that the carbon brushes remain in their original axial position on the commutator and the edges of the rotor and stator laminations are in axial alignment. Also since this is not a 3-brush generator, you must use either a Volkswagen regulator or, as in my case, reconnect the field windings and use an early Lucas regulator for 2-brush operation.

The Bosch generator I used has the number 223 stamped on the casing. That may be the model number.

Preparation

Before you begin the conversion it is advisable to check to Volkswagen generator for earth faults, check the condition of the commutator and make sure it generates volts. It can be easily run in a lathe and should come up to voltage under self magnetisation if there is enough residual magnetism left in the generator. I had one generator, which was faulty from the start.

The Top End

The Bosch cover and brush holders are used. The Bosch ball bearing is replaced with a narrower bearing and a sleeve is machined (see sketch 4.TOP BEARING) to fit the new bearing into the space taken up by the old bearing. Also the commutator end of the rotor shaft has to be machined (shortened) to take the new assembly (see sketch 1. ROTOR) and a new keyway cut. I increased the shaft diameter in the top fork to 15 mm as against the original 12.7 mm to increase the strength of the drive to the camshaft. I could do this as I have a homemade fork without oil grooves. The top of the Bosch cover was machined on the outside so that a 1 mm cover plate closes the top of the generator. This plate is held in place by the long screws holding the generator together. Also the very end of the cover should be machined back as far as possible to give clearance to the arms of the fork at the same time leaving enough metal to hold the bearing axially.
The idea is to lower the top fork as much as possible.

The Bottom End

Here the original MG end cover and bearing were used. The 15 mm diameter at the end of the Bosch rotor was machined back to about 16 mm from the rotor laminations. I suggest dimensions are checked as this dimension sets the location of the lower bearing and the overall length of the generator. Next a sleeve was machined with the outer dimension shown in sketch 2. LOWER BEARING. It was pressed onto the rotor shaft. I previously put some Loctite onto the shaft for good measure. After the sleeve was on the rotor shaft, the final outer dimensions were machined and a small taper pin fitted into a reamed hole through sleeve and shaft. A new keyway was cut. This key should enter well into the parent rotor shaft so that both the rotor shaft and the sleeve transmit the drive torque. The end of the shaft wad tapped to take the original MG bolt holding the bevel gear.

When machining the shaft and sleeve for the bottom end, the measurements must to be checked so that the overall height of the generator from top of the fork to the mating face with the engine will fit into my engine. In my case this dimension was 193 mm. At the same time, there must be clearance between the rotor windings and the bottom cover.

The Stator

With both end covers fitted, the length of the stator casing can be measured. I had to machine off 7.5 mm from the end of the stator casing. The field windings should be removed before machining and this requires an impact screwdriver on the screws holding the field poles. They can be difficult to remove.

The Field Connections

If you want to use a Lucas regulator then the fields have to be reconnected as shown in sketch 5. FIELD WINDING CONNECTIONS.

Final Assembly

I used the long Bosch screws, which pass through the stator and hold the generator together. The tops of these screws also hold the 1 mm cover plate on the top of the generator. You can rotate the stator on the bottom cover to get the terminals into a suitable position before drilling and tapping holes in the bottom cover. The best is if the terminals point to the front as it then easier to get at the brushes if you have to change them. I have the drive for my supercharger there so I have the terminals on the side above the distributor and I made the band covering the brushes in two halves to get it off easier.

Disclaimer

This description and sketches show the modifications I made to my MMM generator, the results of which have been a great success however, despite my care, some errors may have crept in and hence I disclaim eventual damages from any errors.

Appendix

Sketches “MMM GENERATOR REBUILD” pages 1 to 4.

MMM GENERATOR REBUILD

Valid for generators with OD 107 mm.

1. ROTOR

2005-05-25

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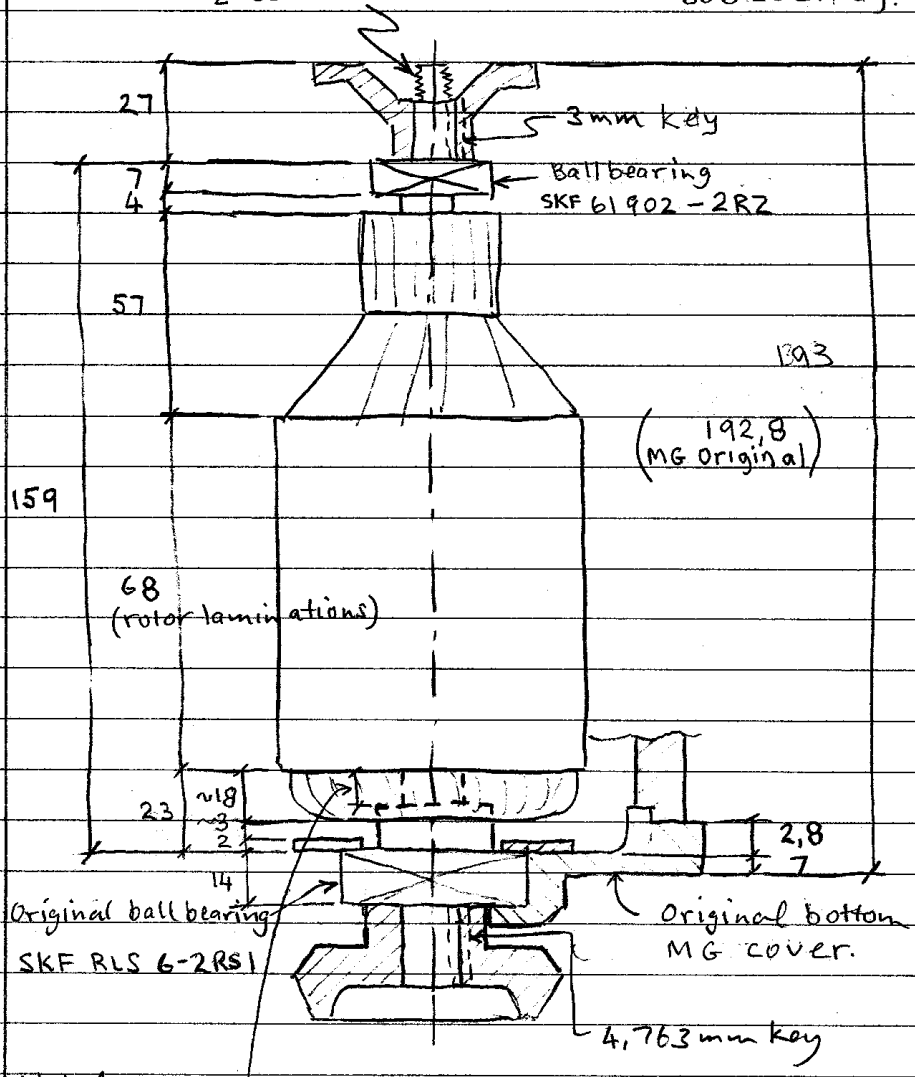


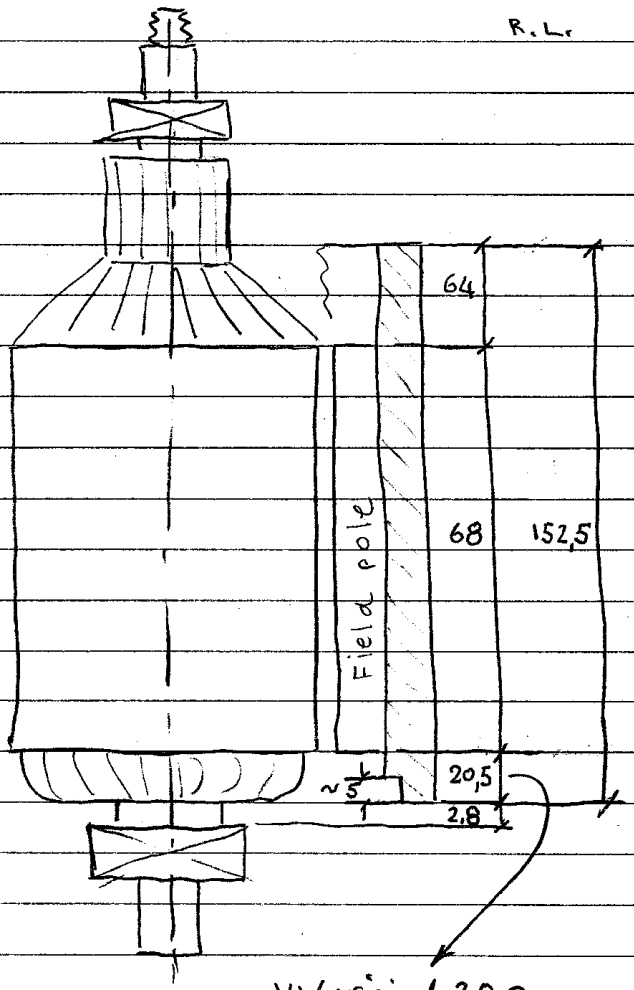
Note 1

Original shaft machined to ϕ15 back to within about 16 mm from rotor laminations

2005-05-25

R.L.

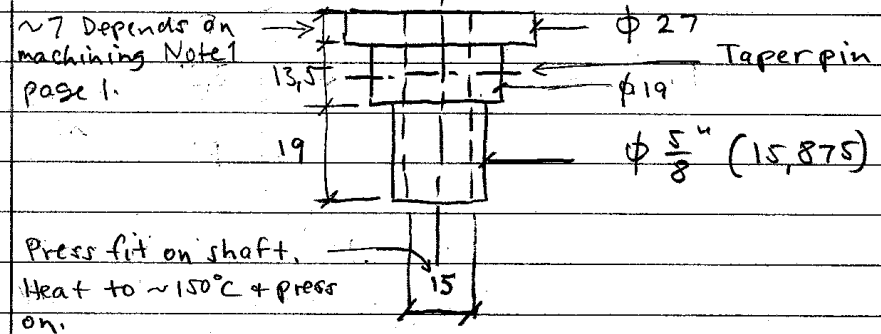
2. STATOR



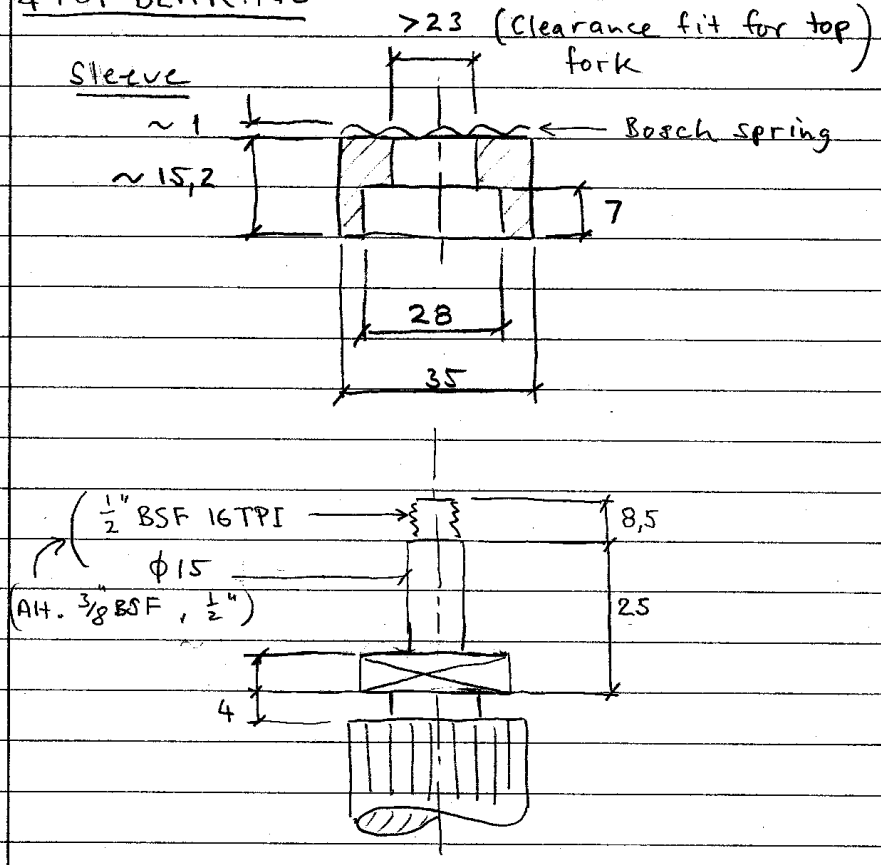
2005-05-25 RL.

3. LOWER BEARING

Sleeve Press fit & glued with Loctite 638 or 641
Finally locked with taper pin.

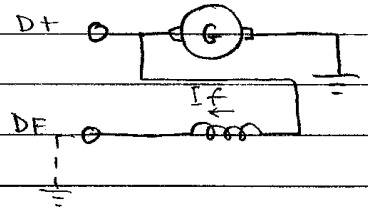


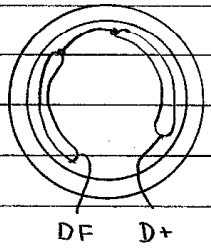
4 TOP BEARING



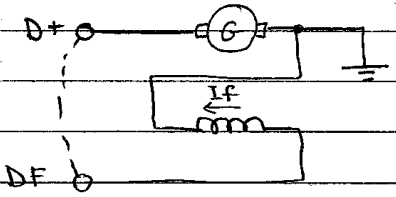
5. FIELD WINDING CONNECTIONS 2005-05-25 R.L.

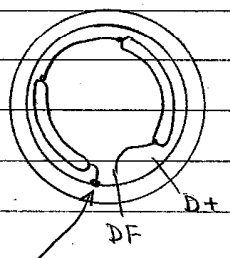
Original Bosch Connection





Lucas Connection





New earthing screw (M5) in stator.