



### Solving an alternator problem

Nic Houslip enjoys track days and sprints with his RV8 and V8 Roadster and here relates a tale of how a problem developed with his alternator on the RV8 at a sprint. Nic's article provides useful information on solving the problem for fellow members.

Whilst competing in a Sprint at Curborough last Sunday I noticed after my first run that the **ignition warning light remained on** when the ignition was switched off. At first I thought it was a few errant rays of sunshine but shielding the lamp showed that it really was on. When I started the engine the light did not go out. Before we get into the detail, I should mention that the ignition warning light is actually a "not charging" warning light for the alternator. This light has a rather curious multifunction that it is worth understanding. Yes, it does show when you've switched the ignition on, but its proper function is to warn that the alternator is no longer charging, perhaps because of a fan belt breakage, but hidden behind that is a function little

understood by most people, but very clear to electrical engineers.

Any electrical generating machine uses a combination of copper conductors moving in magnetic fields to generate electricity. To create a magnetic field one needs a current to flow in a coil, usually known as the **field coil** (in dynamo speak) or the **armature** (in alternator speak) The filament of the ignition warning light feeds a tiny current from the ignition switch into the alternator via the warning light terminal to "excite" it and make it start to generate electricity. When it is generating enough to charge the battery the voltage on this terminal rises to match the voltage at the ignition switch and the light goes out.

Now in my case I was interested to know why the light was on, and therefore draining the battery, when the ignition was off. When I returned from having my cup of tea and bacon sandwich, an important prerequisite of all motor sport events, I discovered that the battery voltage was rather low on the voltmeter when I came to start the engine for

my second run. Aha, a clue, there must be current draining into the alternator. As it was time to go on track I did not get a chance to check further.

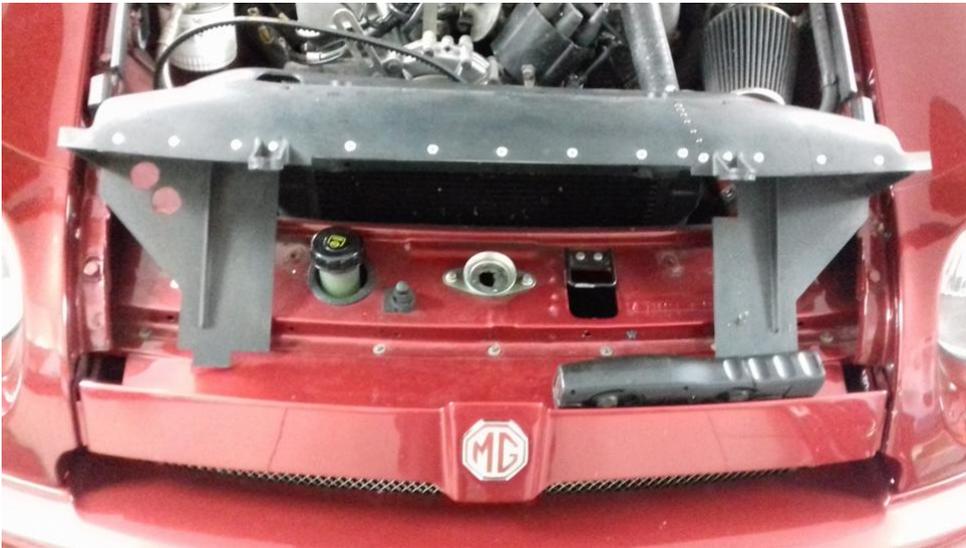
But all was not to be as it should have been, undaunted I gave it some beans and was going really well until I spun out under heavy braking just before I got to the sharp right hander which popped the left rear tyre off the rim. Deciding that discretion was the better part of valour, I had another cup of tea, got the tyre back on and packed up to drive the RV8 home, followed by a friend in a car just in case.

On the way home the alternator started to charge, I could see the voltmeter steadily rising to its normal on charge reading of around 14V. How odd. So having got home early enough to watch the F1 men at Silverstone slipping and sliding all over the track at speeds I can only dream about, and with a nail-biting finish, eventually I got my RV8 wiring diagrams out and after some study decided that **the problem was most likely the failure of a diode in the diode pack** whose function is to change the alternating current that the alternator produces into direct current that the battery likes and needs. This failure probably caused the regulator to fail simultaneously.

So having removed the alternator, a few simple tests with a multimeter confirmed this was the case. A quick web search showed me that there was a firm in Redditch near where I live who said they were able to repair alternators. This was interesting, their website actually says they are able to give you not just a replacement, but repair the original fitment. A little over 3 hours later I picked up my repaired alternator, cleaned and fitted with a brand new outboard end needle roller bearing - the drive end ball bearing was OK to re-use - a new electronic regulator and a new set of diodes. The charge was a reasonable £65.00 plus VAT, making a total of £78.00. Somewhat less than a replacement alternator.

**Changing an alternator** is well within the capability of a competent DIY mechanic. It is detailed in the RV8 workshop manual but if you don't have one here is how.

- **First remove the battery negative lead** or turn off the isolator switch if the car is fitted with one (as mine is) to avoid big sparks under the bonnet.
- **Remove the radiator cowl.** This is large plastic bit that directs air through the radiator rather than around it and which frequently cracks with age. You will note that mine has a line of Frankenstein stitches of stainless steel locking wire on the left side from the driver's seat and also a strip of aluminium pop riveted to



function - it locates the radiator in its correct position using the two large rubber grommets and the two pins on the radiator. If the shroud is not in place, the water pump spindle will rub on the radiator fan housing! If you happen to lose these rubber grommets, or they are perished they are available from your local Land Rover dealer. The RV8 radiator seems to be much like the Land Rover Defender radiator and the rubber grommets are identical!

One last bit of not very useful information. There is a **third terminal marked W**. Do not connect anything to this, it is marked W for winding and is an alternating voltage that was used in some cars particularly diesels to feed to the rev counter. As the alternator rotates, the alternating voltage it produces changes its frequency with the speed it rotates at, so it is possible to derive a reasonable accurate engine speed signal with the correct rev counter.

I must give a credit to the company that repaired my alternator. **Auto Electrics (Redditch) Ltd**, 241 Birmingham Road, Enfield, Redditch, B97 6EH. Their website is at: <http://www.autoelectricsredditch.co.uk/>



Auto Electrics identified my alternator as a Magnetti Marelli A127-65 part which is as listed in the workshop manual. Magnetti Marelli is the Italian company who bought out the Lucas alternator factory some years back. Auto Electrics can repair almost all alternators and keep stocks of most parts so that work can be carried out quickly and economically.

the front edge for strength. I did this about six years ago, but I will eventually change it for a nice carbon fibre replacement from Clive Wheatley.

- **Remove the electrical connections**, noting which goes where, not too difficult as there should only be two and they are different sizes.
- **Now remove the bolt that secures the alternator to the metal strip that allows you to adjust belt tension**, remove the belt and then remove the two other fixings below the alternator that holds it to the cradle. Take care, the alternator is quite heavy and you can pinch your fingers if you let it drop from its mountings.

Please be very careful when removing the nuts bolts and washers, noting where they came from so that you can put them back in their right positions. This is **IMPORTANT**. If you do not put the washers back where they belong the belt pulleys might not be aligned correctly and lots of trouble will ensue that will cost, you a great deal of money to rectify.

Replacing the alternator is just a reverse of the removal, again the workshop manual

is a great help and for only a small investment you get a document containing a wealth of useful knowledge and information about your car. See details of the RV8 Repair Manual [AKM7153ENG](#).

The **parts that were replaced on the alternator** are shown in the picture alongside, the large aluminium ribbed part with three bolts is the regulator. This supplies a small current, proportional to the charge current required, to the armature and according to the battery voltage thus regulating the charge. The diodes are contained inside the body just under the two slots and the needle roller bearing is under the central circular cap.

Once everything is back in place, the belt tension adjusted correctly and the electrical connections made and tight, reconnect the battery and start the engine. The warning light should go out and the battery voltage should increase to around 14 volts indicating correct alternator function.

**Warning**, do not be tempted to start the engine before you refit the radiator shroud. It has an important, but not so obvious



When you get the alternator out it should look like this . . . . . and the location it came from looks like this. The cradle bolts to the RH cylinder head and supports the alternator by two bolts.