

If your alternator is not charging anymore, it could be the auxiliary services belt (called as well timing belt, or drive belt), could be the belt tensioner, or the alternator itself.

If you have driven 180.000 kms, especially off road with lot of mud, it is probably time to replace at least the brushes.

In my case were just the brushes, but once I removed the alternator, I thought it is worth to disassemble the whole alternator, clean it inside, and check the bearings and the seals.

In Melbourne I have been quoted 330\$ do recondition the alternator (if dropped at the shop). Considering that 90% of the time the problem is the regulator/brushes/rectifier, to replace them it is just a matter of 30 minutes (if you don't have bad luck and the whole alternator is f...d), and the guy would have changed only the brushes....for 330\$?!!!!! F..k you!!!!

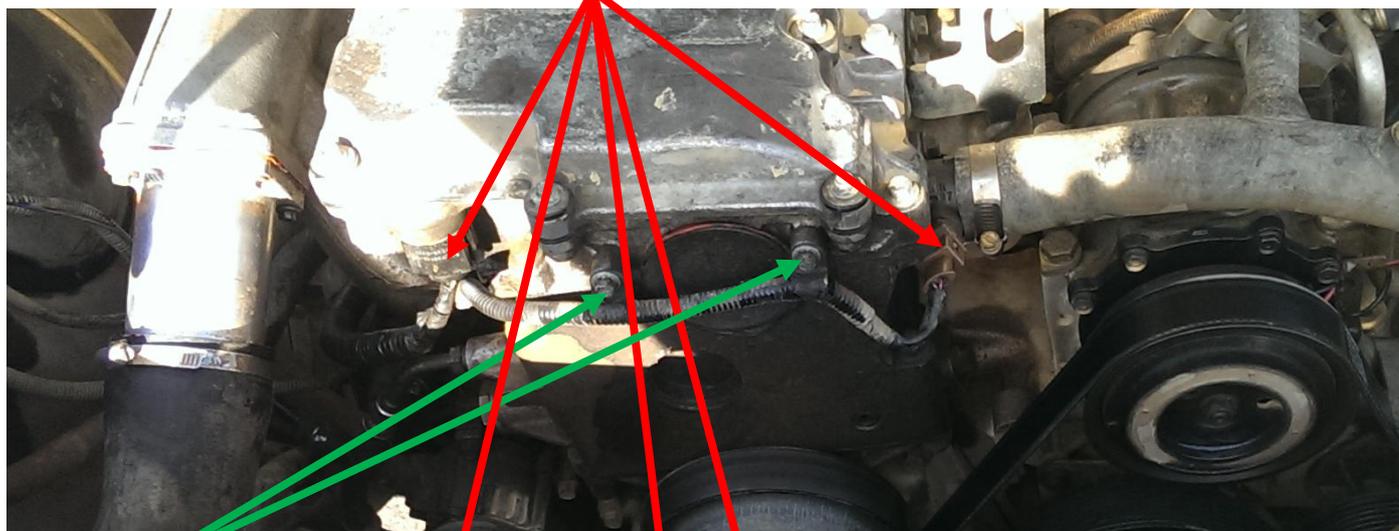
I studied a lot and once I got all the information I needed, I decided to recondition the alternator by myself. I decided to replace 2 of the 3 bearings (the vacuum pump bearing is in excellent condition), the brushes, the regulator and the rectifier.

The prices are:

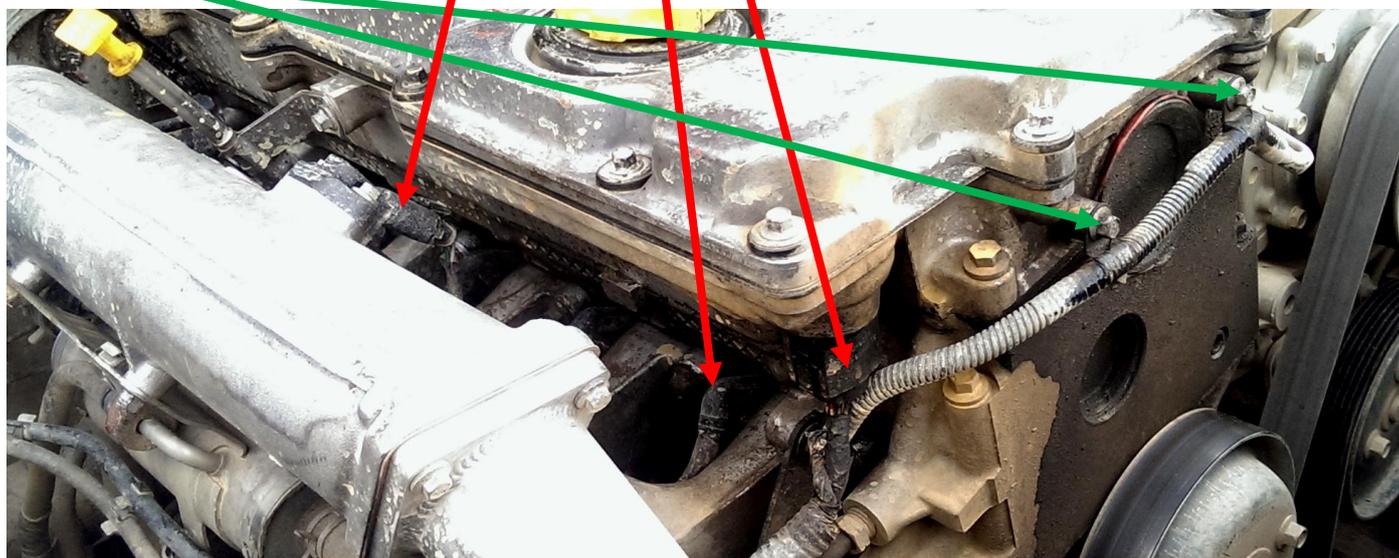
- Rectifier + regulator + brushes 150\$ (including shipping from UK)
- Whole alternator (p/n ERR6999) 500\$ (incl. shipping: <http://www.lrdirect.com/ERR6999-Alternator-Assy/?sfi=ERR6999>)
- Belt (AUversion with Air Con p/n HYM1132) 41\$ (incl. shipping from Ballarat www.roverparts.com.au)
- Driving belt tensioner (p/n ERR6951) 50\$ (incl. shipping: <http://www.lrdirect.com/ERR6951-Tensioner-Td5/?sfi=ERR6951>)
- Alternator/Vacuum pump seal (DENSO p/n 081103-0080; Toyota p/n 29341-64130) 30\$ (from Toyota dealer)
- Vacuum pump seal (DENSO p/n 081103-0060)

Let's start.....

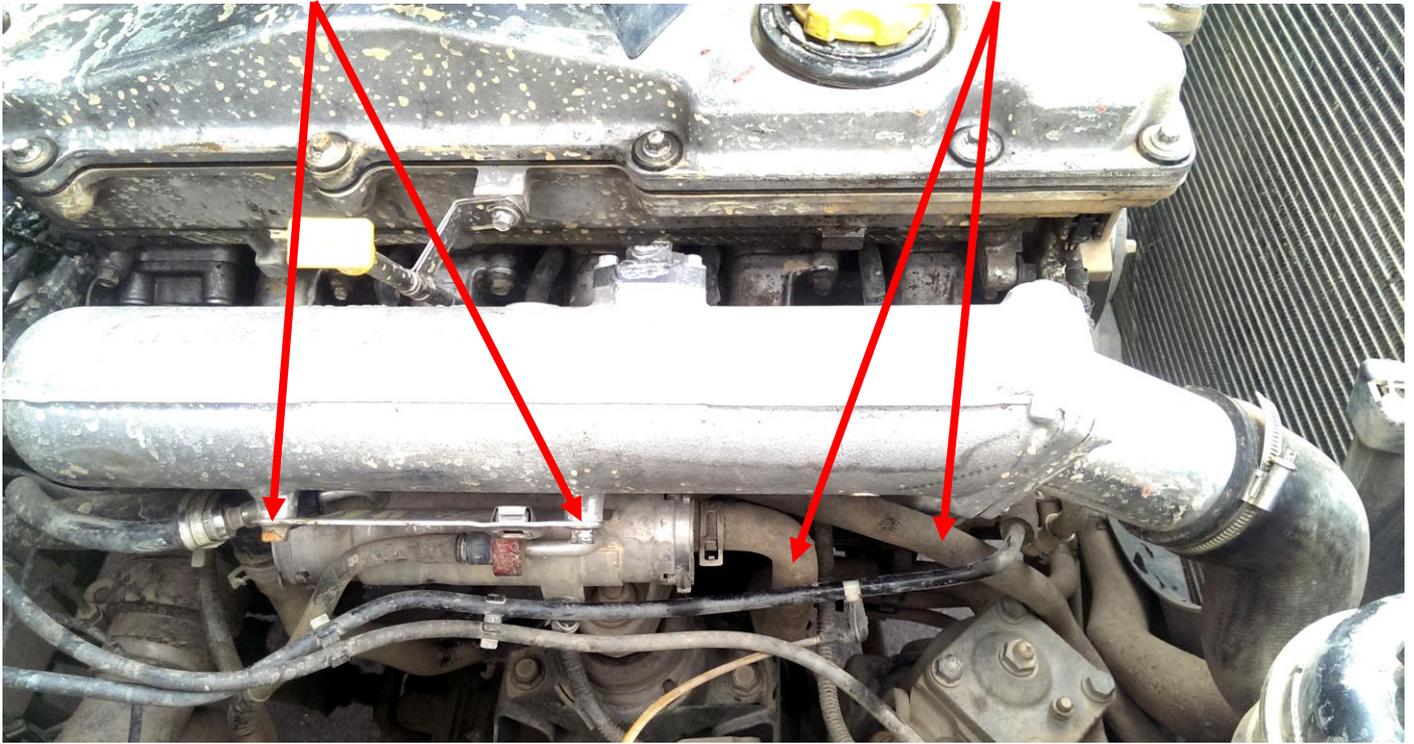
First remove the viscous fan. Then remove the **plugs**



And **wiring**



Then remove the **fuel cooler** from the inlet manifold and move it aside including the **pipes** in the way.



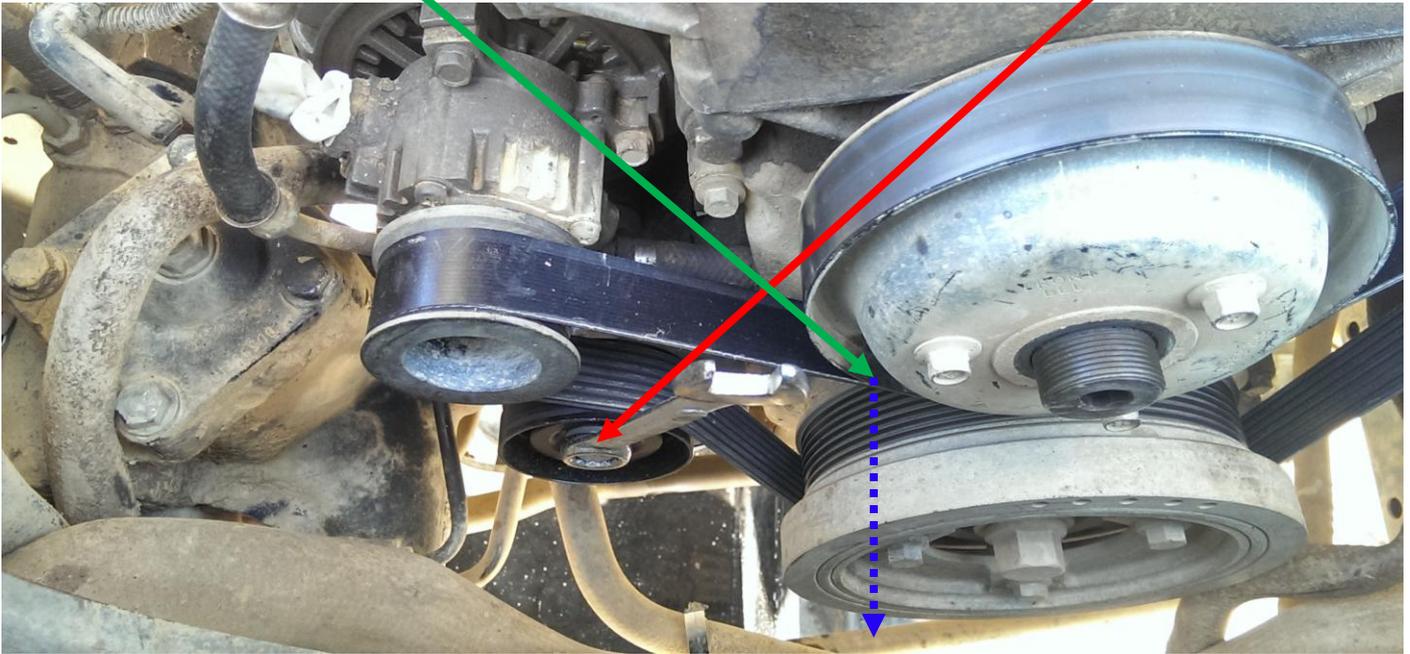
Before removing the belt, I suggest you measure it first, to be 100% sure of which belt you have to buy (I read too many posts of people buying the wrong belt). For the AU version with air conditioning unit it is not a Land Rover belt. It has different length. So I measured it with a wire along the whole path of the belt.



Drive belt (guess where is it made?!)



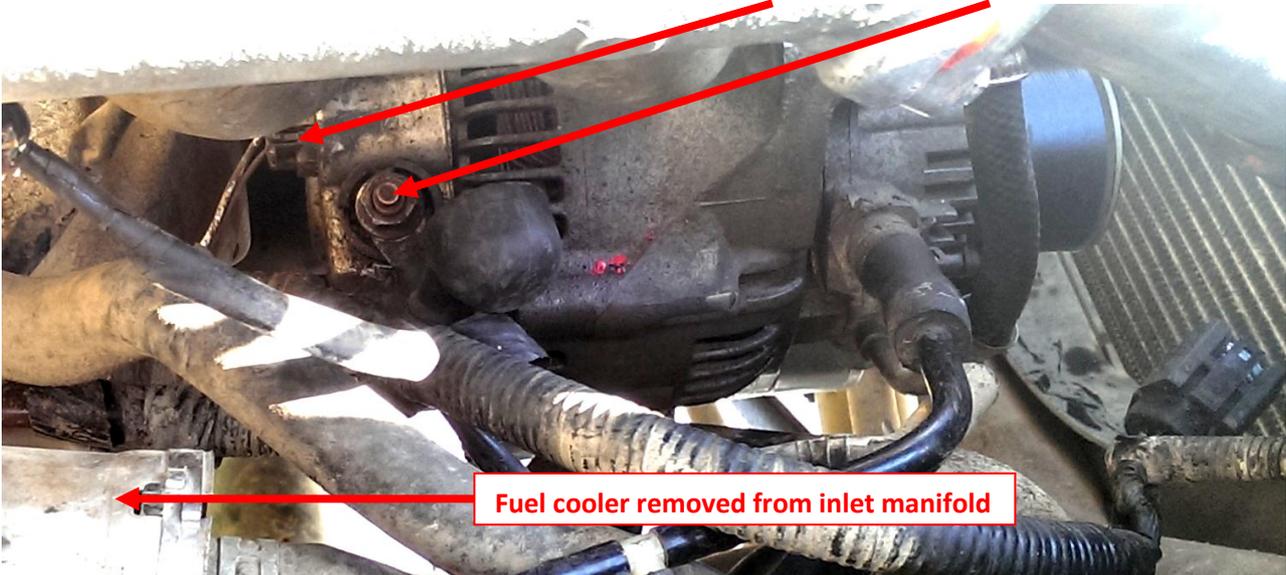
Now you have to remove the drive belt. To do so, use a 15mm spanner to disengage the **drive belt tensioner**, and remove the belt **pulling** from the **bottom**



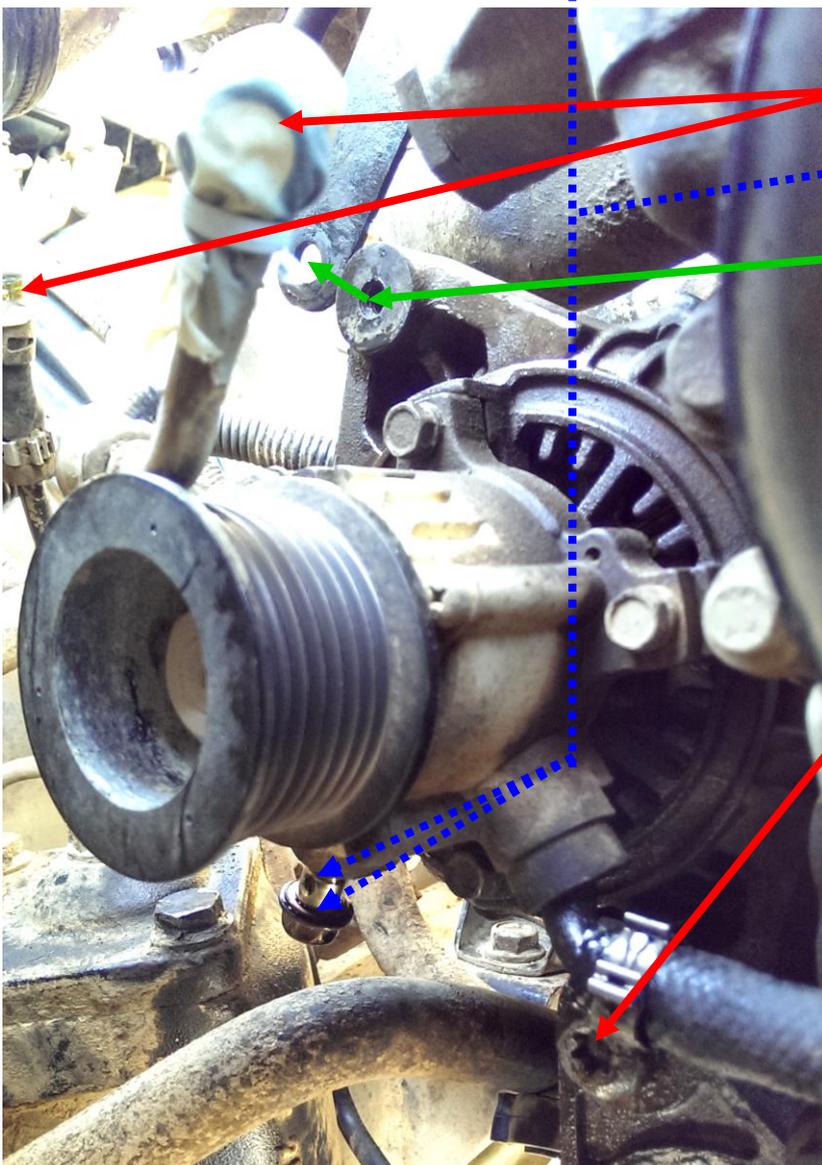
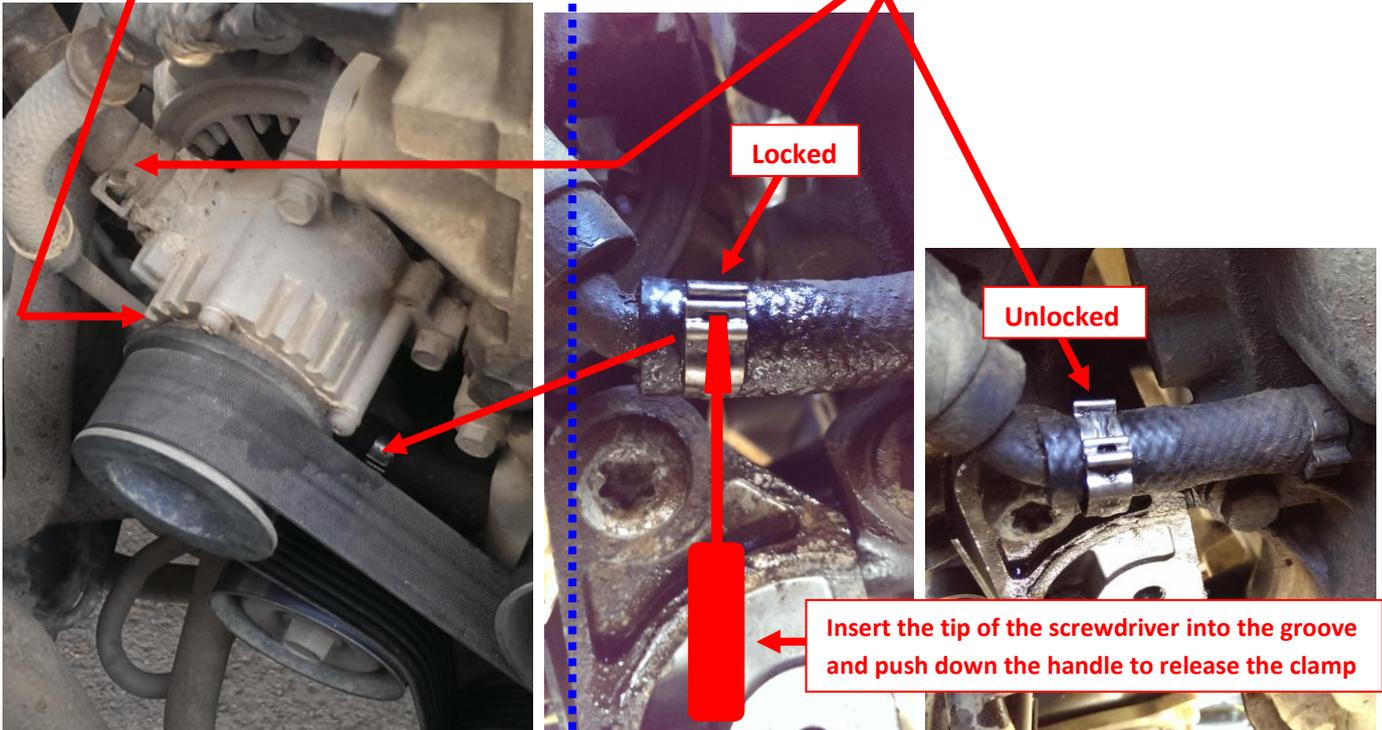
To remove the belt tensioner you need a 14mm socket



Disconnect the battery (if you haven't done already) and remove the **plug** and unbolt the **nut** and remove the cable.



Now put a bucket under the vacuum pump to collect the small amount of oil that will drip from the pipes. Unbolt the **nut** (be careful not to lose the 2 **copper washers**) and release the **clamp** on the pipes.



Once removed, remember to cover the pipes and the nozzles to avoid contamination. (I used the **fingers of a latex glove**). Bolt back in the vacuum pump **bolt + copper washers**.

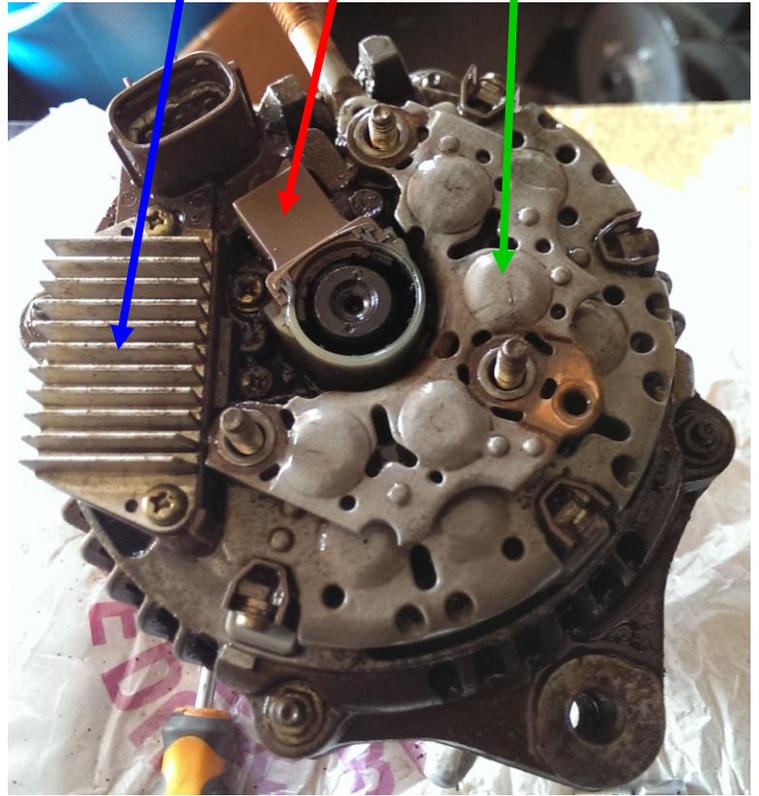
Now it's time to remove the alternator. Remove the **bracket bolt** and the main long **bolt** (Torx 50). The lock nut is on the back accommodated in a recess, leave it there



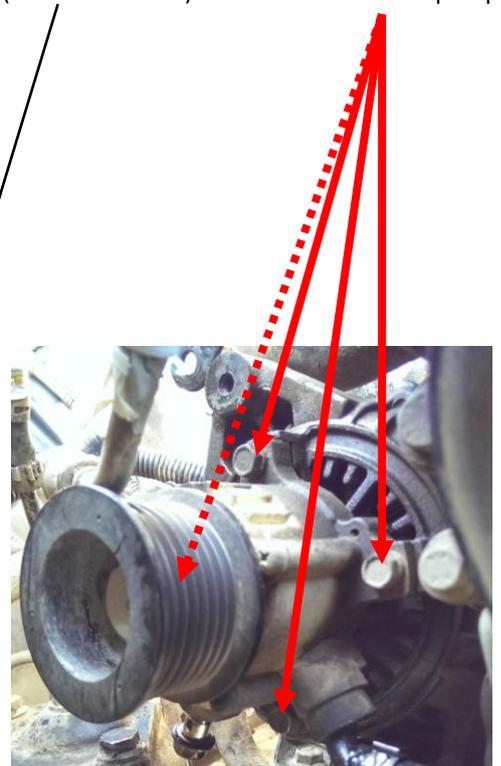
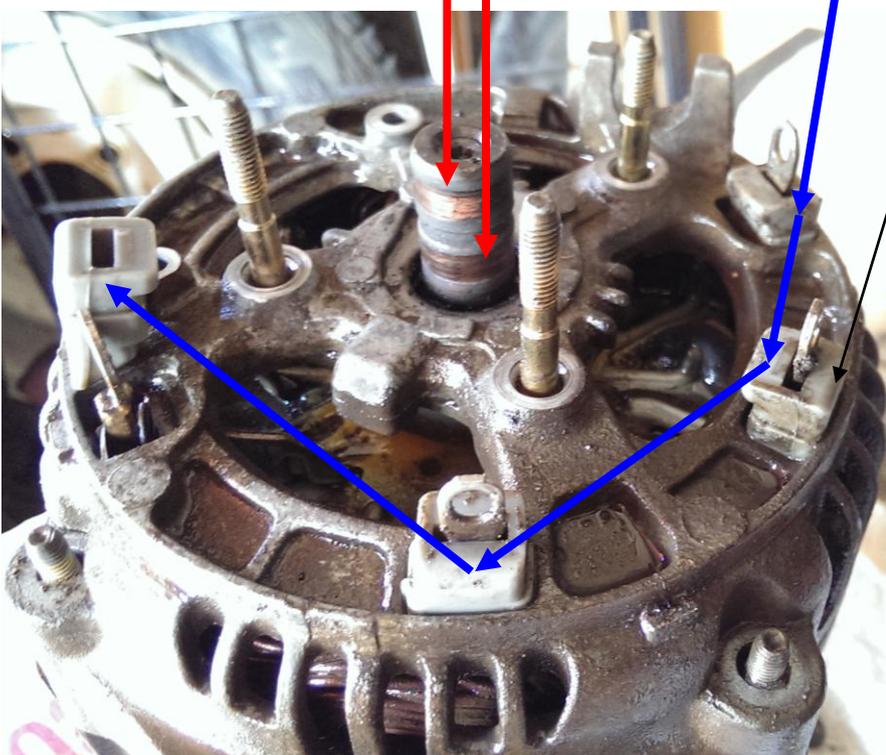
Unbolt and remove the cover.



Remove the bolts (screw them back in after removing all parts) to remove the regulator, the brushes, and the rectifier



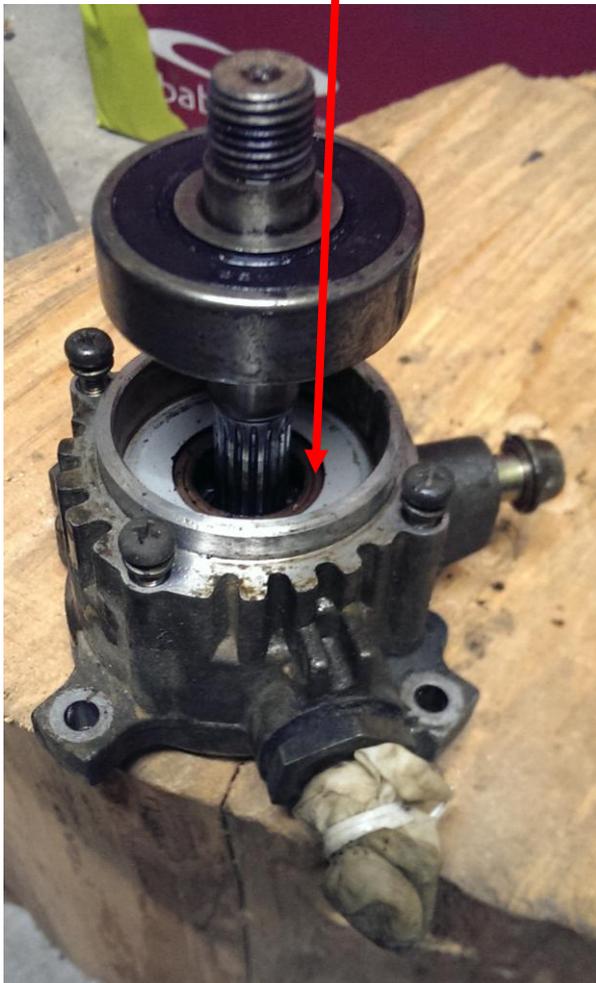
With a 00 sand paper clean the copper contacts. Then remove the rubber spacers (flat face outside). Remove the vacuum pump



This is the **seal** (DENSO 081103-0080 / Toyota 29341-64130). It is supposed to be replaced, but I put back in place the used one and it doesn't leak. It's up to you. Mine was not worn at all.



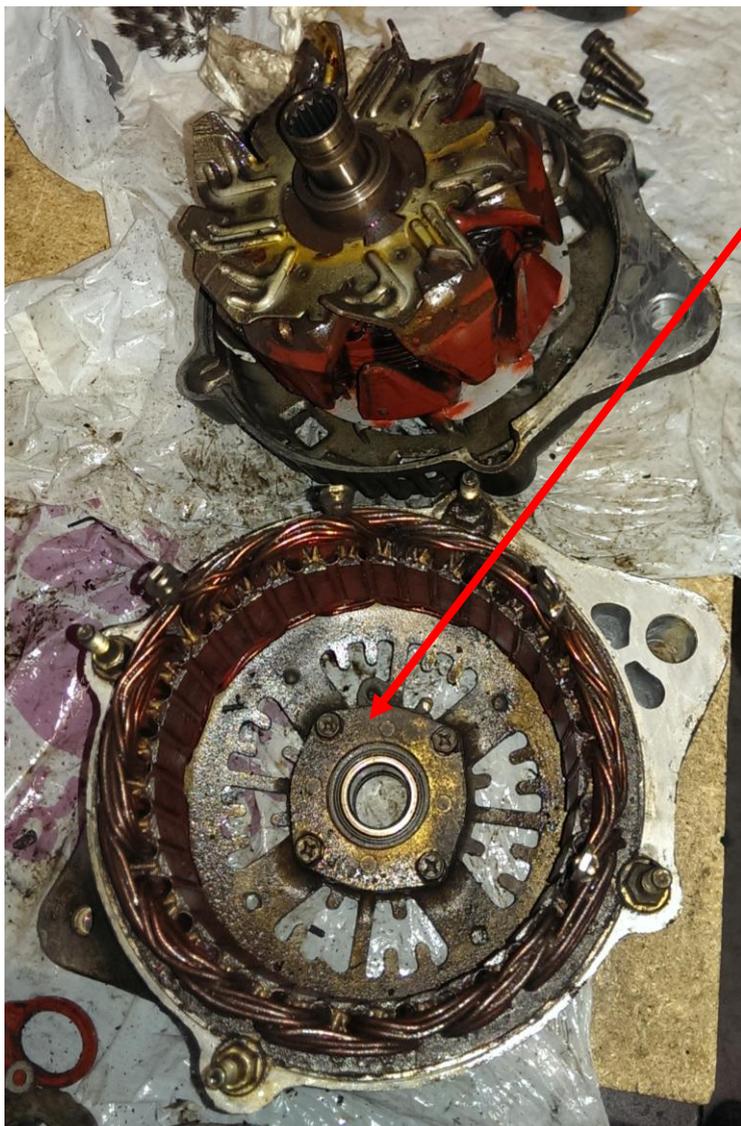
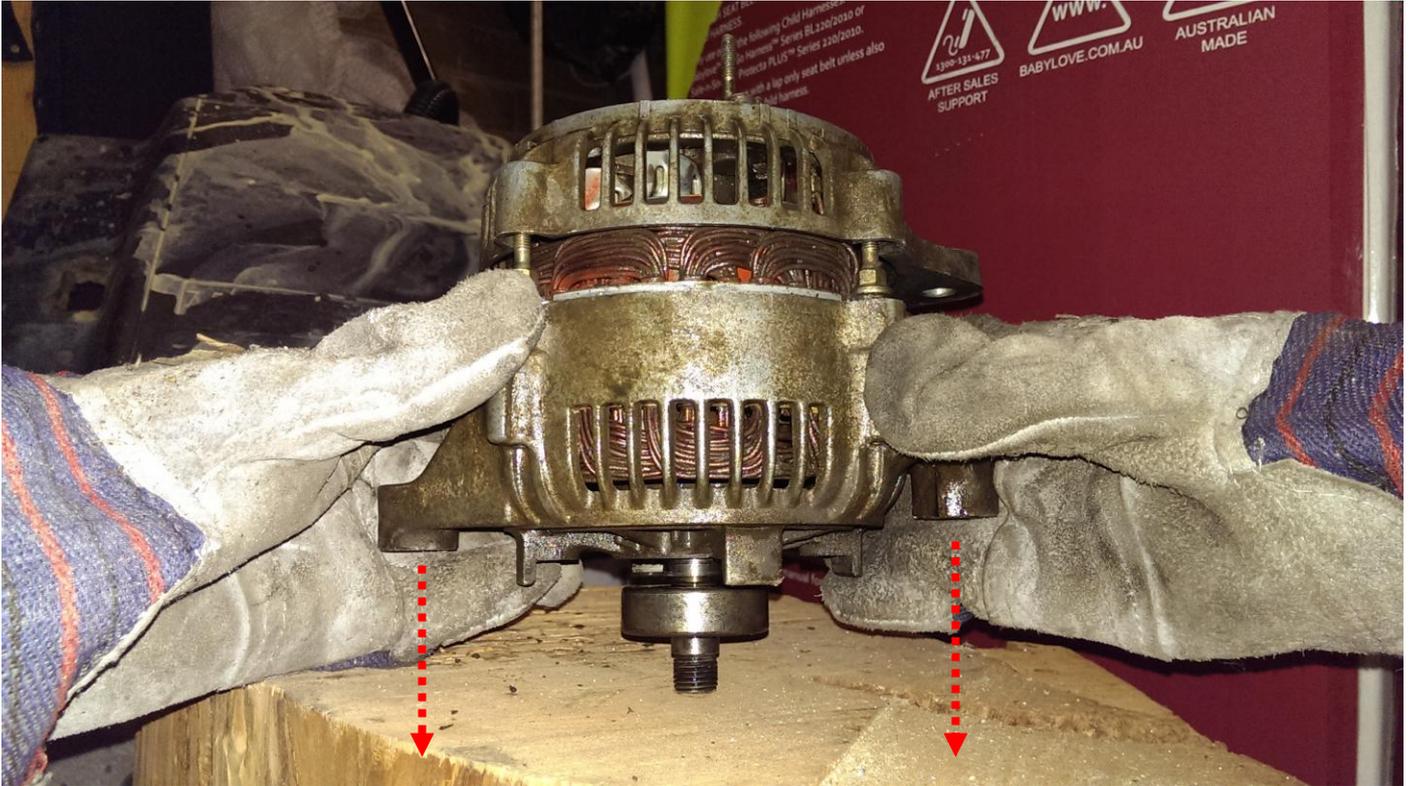
And this is the vacuum pump seal (DENSO 081103-0060)



I removed the shaft to check the bearing as well. Because the bearing is in excellent conditions, I haven't replaced it, thus I don't know the size, but if it is wobbling and you have to replace it, just measure it with a caliber.

All the bearing can be purchased at Bearing Wholesalers (10\$ each). Just go there with the right sizes (buy them before disassemble the alternator).

Now open the alternator case. I used the vacuum pump shaft as shaft, but you can easily use a big screwdriver.
Grab the alternator case from the bottom part (vacuum pump side), lift it up and **drop it hard** in order to separate the 2 halves

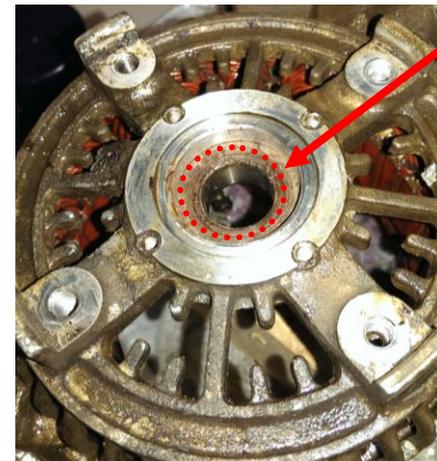


Remove the **bearing cover plate**,

then the **alternator/vacuum pump seal**



Remove the bearing (OD=40mm, ID=17mm, th=12mm) hitting with a hammer on a 22mm socket seated on the bearing.



Remove the metal ring and clean contacts with a 00 sand paper.



Use an extractor to remove the bearing (OD=35mm, ID=15mm, th=13mm)

In my case I had to adjust the extractor I bought because the claws fitted only if the arms were vertical.



Remove the rotor and clean all the parts with a lubricant.

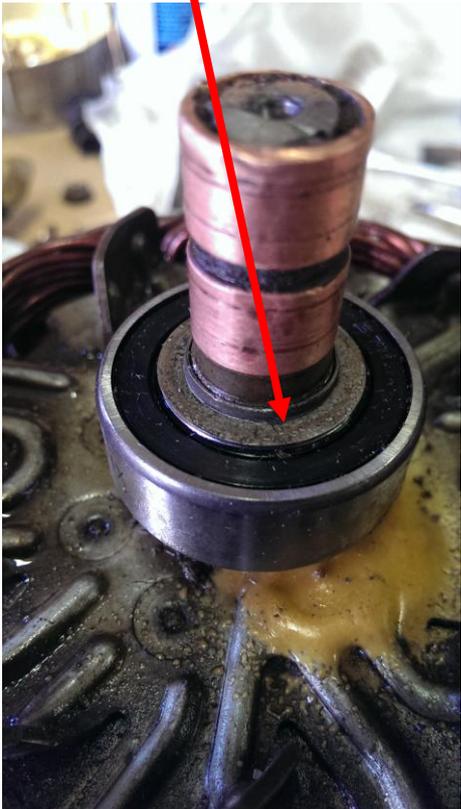
WELL DONE! YOUR HALF WAY!!!!

Now it's time to reassemble.....



Position the bearing, then place a spanner (the round side over the bearing) sitting on the inner ring of the bearing (I can't remember the spanner size, but be careful that the spanner ring sits only on the bearing inner ring), and use a pipe (I used a hollow socket extension) to push the bearing against the base. Be careful to use a long enough hollow pipe otherwise you will damage the copper contacts.

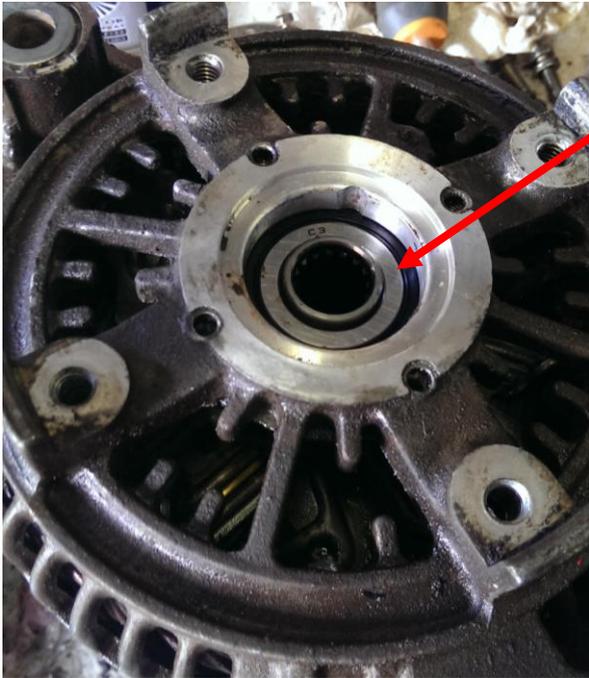
Then put the **ring** back in place, and the butterfly washer over it. (see figure in the following page)



Insert the other bearing in the alternator case. I used a wood stick because it is not possible to reach it with the hammer, and using a wood stick rather than a metal stick will avoid to damage the bearing. Hit the bearing only on the edge.

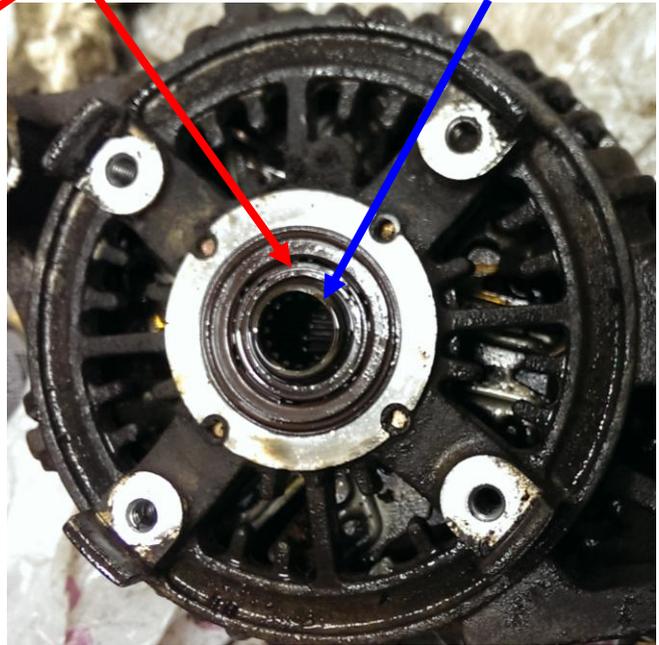
Then put back the bearing cover plate.





Insert the seal in the proper position.

Keep in mind how much the **shaft** sticks out



Reassemble the two half of the alternator case.

Remember to put back in place the **butterfly washer**.

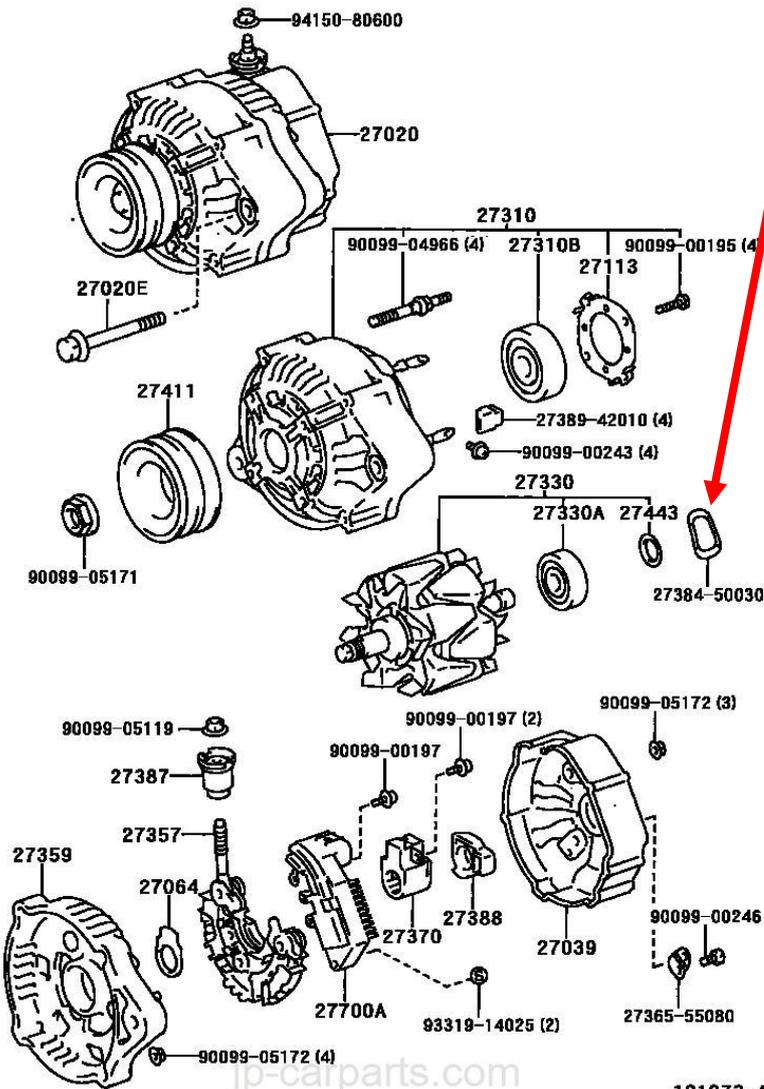
The butterfly washer makes hard to put back together the two half, so it is better to adopt the following procedure:

- Place the alternator with the **copper shaft** downward and the seal upward (exactly like in the photo).
- put a hollow pipe (or two wooden **spacers**) to keep the copper shaft away from the table.



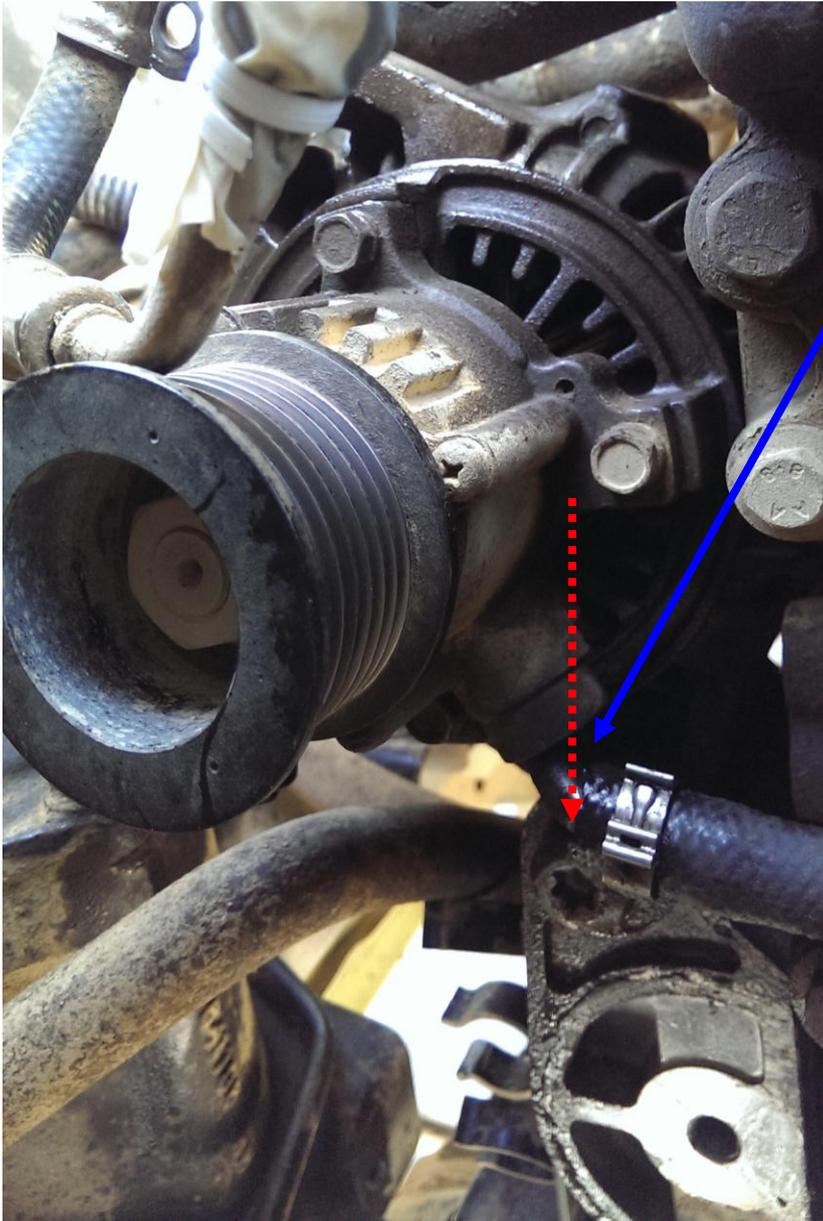
(I flipped this photo cause I didn't shot one in that moment. This to give you an idea of the arrangement)

- Place a wood plate on the seal on the top and hammer down the two half, then tighten the **bolts**



Then put back in place the rubber spacers, the rectifier, the regulator, the brushes and the cover, and finally the vacuum pump.

Time to reinstall the alternator on.



Now comes the tip (because I swore for 20 minutes before understanding the trick!).

The alternator cannot be put in place from the side, you have to **lower it down vertically**, this is the only way to put it in place!

Before to lower it down you have to insert the **nozzle** tip into the pipe.

Then bolt in the alternator bracket, and reconnect the remaining pipes, wiring and plugs.

Last thing to do is to install the belt tensioner, disengage it with the 15mm spanner (anticlockwise), install the drive belt, release the belt tensioner and give it a clockwise twist to ensure that it is properly engaged.

Now if you want you can put back the viscous fan.

My final suggestion is to install a plate below the alternator to protect it from the mud in 4wd driving, but I will do this next spring!

Hope you will find this helpful.

Cheers Landymates!

Davide

PS. Just found a UK supplier for the Denso seals, definitely cheaper than the Toyota dealer!!!!

The website is www.comlec.co.uk with p/n WOOEC3947G (3.2 £) + WOOEC3947K (3.52 £) + shipping (4.0 £)