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How to rebuild a Miata/MX5 alternator (54K unfriendly)

NA

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S

spikes · Registered

Joined Jun 26, 2011 · 154 Posts

Discussion Starter · #1 · Nov 28, 2013 (Edited)



Hey guys, thought I'd write this up. It all started with me just wanting to clean the two alloy case halves up, nek minute I'm ordering new bushes and bearings.

Okay lets start off, this is a NA8 alternator, its a Mitsubishi A2T80391.

I ordered the brushes off eBay, and bearings I got from a local bearing store.

The front bearing is a quite a common size, the 6303. Dimensions are 17mm I.D x 47mm O.D x 14mm height

The rear bearing is a 140419, 8mm I.D x 23mm O.D x 14mm height.

I didn't get any pics, but the easiest way to get your alternator pulley off is to wrap an old belt around it or grip it with mechanic gloves, and zap it the nut off with a rattle gun.

Then mark the outer casings so you can line it up again when you put it back together.



Remove these 4x 8mm bolts holding the two halves together



Give the mounting arms a tap with a hammer and the top half should come off. Be careful as the rotor can fall out, and damaging it.



Once the rotor and the top half is off, give the lower half a tap with the hammer and the stator should separate from the lower casing. Be careful here as the stator is attached to the rectifier/regulator unit. You want to tap it just enough to separate it from the casing but not too hard that you rip the wires from the rectifier unit.



Now you can go ahead and remove the rectifier and voltage regulator unit. Remove the three screws holding it in.



And then the 10mm at the back, if there's a cover on it, pop it off.



Now, remove the front bearing plate, and drift the bearing out



And drive the new bearing in.





New vs old



The rear bearing, use a 3-jaw puller to pull it off. I didn't manage to get any pics at this stage, was too involved and forgot.

This is the rear bearing



The rectifier/regulator unit



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✓ Discussion Starter · #2 · Nov 28, 2013 (Edited)



Re: How to rebuild your alternator (54K unfriendly)

I followed these steps to test my rectifier/regulator.

MAZDA MIATA/MX5



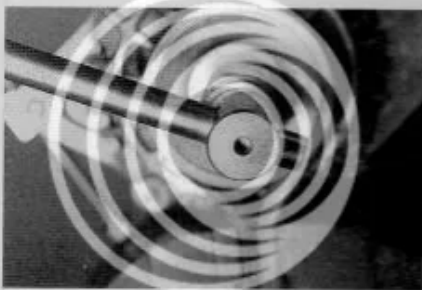
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teardown and rebuild of the alternator looks easy, but in reality you can get into real difficulties here. We left Wally, our Technical Adviser, to overhaul our project car's alternator...

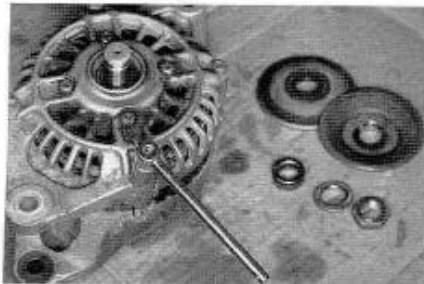
TEARDOWN

6 First thing to do is to remove the 22 mm pulley nut - if you managed to slacken it while it was still in the car you can skip this paragraph. You need to hold the pulley somehow while the nut is removed. You may be able to do this using a vise fitted with soft jaws, but be very careful that you don't crush and distort the pulley. A better way is to wrap an old drivebelt around the pulley and clamp that in your vise, keeping it as tight as you can. This will grip the pulley evenly and you can unscrew and remove the nut and its spring washer.



8/6 Remove pulley nut.

7 With the pulley nut and spring washer removed, the pulley comes off in two halves followed by a spacer. Next, remove the four 8 mm through bolts which hold the unit together. Carefully lift away the end cover (pulley end), leaving the rotor sitting in the remaining casing half - push on the rotor shaft end to separate the two halves. Inside the (pulley end) casing is the main rotor bearing, held in place by a square retainer plate. The plate can be removed after unscrewing the four crosshead screws which secure it, and the old bearing drifted out of the casing using a socket of around 15 mm.



8/7 Unscrew & remove thru bolts.

assembly released after removing the retaining screws. However, Wally couldn't get ours apart, and discretion being the better part of valor, decided to quit before he did any damage.



8/8 The dismantled alternator.

9 Wally's problems were just beginning at this point. To get the rotor back into the casing, you have to hold the brushes back against spring pressure while the rotor is fitted. Unfortunately, the back of the casing is blind - there is no apparent method of doing this. In the end, Wally drilled a small access hole in the end of the casing center, and used a length of welding wire to hold the brushes back while he slid the rotor back into position.

10 What we think should happen is that the stator windings should be pulled out of the casing, and the brush plate and rectifier assembly released by removing the external retaining screw as they are withdrawn. We have to confess that we never really resolved this problem - if you have had more success with an alternator teardown than Wally did, we would like to hear how you did it.

INSPECTION

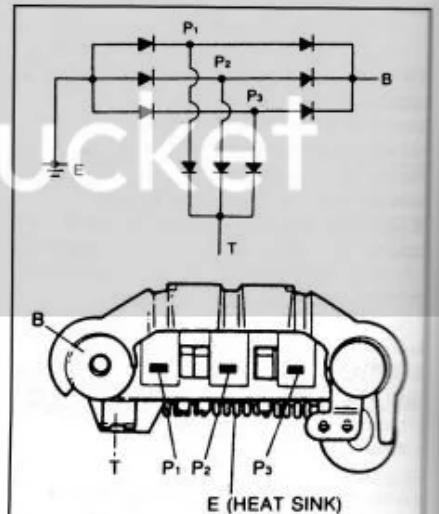
11 The first thing to do is to assess the overall condition of the alternator. If something catastrophic has happened, and the rotor and/or stator are obviously trashed, further work would be academic - it's time to say 'Hi!' to your Mazda dealer or auto electrical specialist.

12 Check the rotor windings for signs of damage. If they appear burned or the shellac coating is beginning to break up, you will need to get the stator rewound - again, check local auto-electrical specialists for price and availability, and compare this with the cost of a new Mazda part. Even if the windings look OK, check for shorting with an resistance check. At 20°C (68°F) you should find a resistance of 3.5-4.5 Ω, measuring between the two slip rings. Next, check for grounding of the windings by checking the resistance between each slip ring and the steel core of the rotor. No continuity should exist. If your windings are outside the

worn down to or near the wear limit (indicated by the rectangular surround of the Mitsubishi logo) you should fit new ones. We would suggest that it might be worth fitting new brushes as a precaution anyway, unless they are almost unworn.

15 You are supposed to check the brush spring pressure at this stage. With the brush projecting by 2 mm from the holder, the standard reading should be 3.1-4.3 N (320-440 g / 11.3-15.5 oz) and the service limit is 1.6-2.4 N (160-240 g / 5.6-8.5 oz). If you have some way of determining this, then check it by all means. We suggest that it might be good policy to fit new springs along with the brushes.

16 Finally, check the rectifier assembly, referring to the accompanying drawing. Note that in this test you are checking for continuity of the



Negative (Black)	Positive (Red)	Continuity
E		Yes
B	P1, P2, P3	No
T		No
P1, P2, P3	E	No
	B	Yes
	T	Yes

D8/16 ALTERNATOR RECTIFIER - TESTING

rectifier diodes. For each pair of terminals, check for continuity, then reverse the meter leads and repeat the test. You should read continuity in one direction only. If in any of the checks you find continuity both ways, or no continuity either way, the diode has burned out and the rectifier should be replaced.

REBUILD

17 Fit the brush holder and rectifier unit as



Now, put the stator/rectifier/regulator back in, screw it back up and find this hole at the back, if you don't have one, drill one. This is to insert a pin or needle to hold the brushes back.





S **silvermazda** · Registered
Joined Sep 23, 2011 · 1,178 Posts

#3 · Nov 28, 2013



Re: How to rebuild your alternator (54K unfriendly)

Very nice. I was thinking of doing one myself pretty soon.
Next do a starter!

2000NB Silver/tan. Done: FM springs, Bilsteins. [Build thread](#)

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amptramp · Registered
Joined Mar 12, 2009 · 377 Posts

#4 · Nov 28, 2013



Re: How to rebuild your alternator (54K unfriendly)

I have a bad alternator sitting in the garage with very rough bearings and a bad regulator transistor. Since it is a 2001, most of the regulator electronics is in the ECU with just the power transistor and flywheel diode and a couple of resistors in the alternator itself. I will be checking back on this thread once the car finishes digesting my second alternator (pulled from a 2004 Miata).

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S **spikes** · Registered
Joined Jun 26, 2011 · 154 Posts

Re: How to rebuild your alternator (54K unfriendly)

Take some pics! The NB alternators are Hitachi units, I curious to how they internally differ to the Mitsubishi ones.

@silvermazda, I do have a spare 1.6 starter lying around. If I get a chance, I'll put it apart and do a writeup.

Reply

Quote

S

silvermazda · Registered

Joined Sep 23, 2011 · 1,178 Posts

#6 · Nov 28, 2013



I have a NB spikes. Currently looking for a cheap one to rebuild that doesn't have a rusty pulley. Couldn't even tell you where I would begin if it was rusty. Probs sandblast? But that doesn't sound right in my head for some reason.

2000NB Silver/tan. Done: FM springs, Bilsteins. [Build thread](#)

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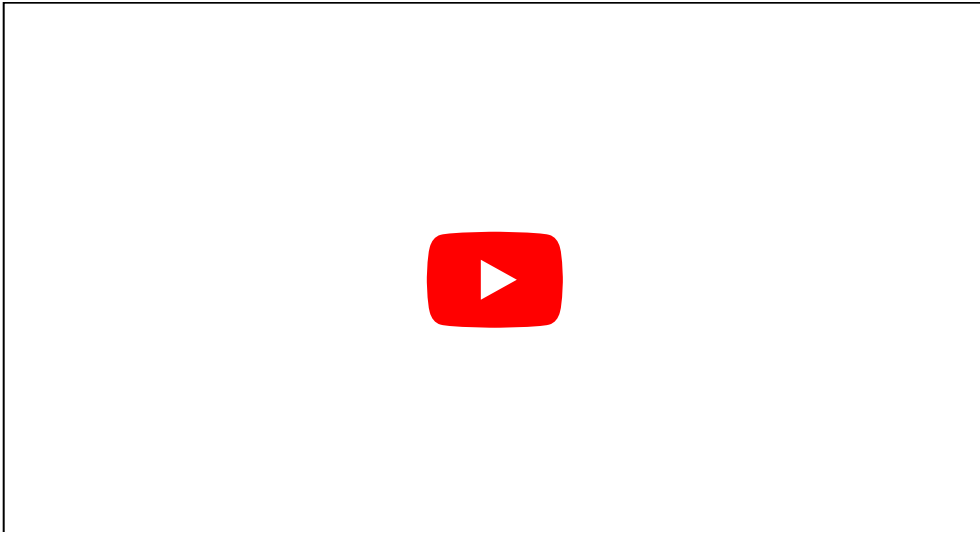
Discussion Starter · #7 · Nov 29, 2013



silvermazda said: ↕

I have a NB spikes. Currently looking for a cheap one to rebuild that doesn't have a rusty pulley. Couldn't even tell you where I would begin if it was rusty. Probs sandblast? But that doesn't sound right in my head for some reason.

I'd try soda blasting, you can easily rig up a ghetto DIY one.



S **silvermazda** · Registered
Joined Sep 23, 2011 · 1,178 Posts

#8 · Nov 29, 2013



Just said that because yours was very clean. But then again I've seen high temp leave a good cast like finish.

2000NB Silver/tan. Done: FM springs, Bilsteins. [Build thread](#)

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 **freedomgli** · Supporting Member
Joined Apr 1, 2006 · 12,196 Posts

#9 · Jun 1, 2014



Nice writeup. I'd love to paint mine with Eastwood Alumablast to give it a fresh look but I don't want to go through all that effort to disassemble the alternator.

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 **MC70** · Registered
Joined Oct 12, 2012 · 3,011 Posts

#10 · Jun 1, 2014



Excellent! I love when other people do this stuff! Thanks.

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