AUTO ELECTRIC CORNER —
Test Fixture, eBay Alternator and Old Prestolite



BY MOHAMMAD SAMII

Test Fixture

Testing popular PM (Permanent Magnet) alternators made by Kokusan-Denki (acquired by Mahle in 2015) are the subject of occasional calls and questions on the ERA Help-Line. I wrote about my method of testing these in the January 2018 issue of the *ERA Exchange* in the Auto Electric Corner column. In that article I showed how I used the coil of a Chrysler alternator rotor as a load, with a 194 bulb across the coil to function as a visual indicator. I also showed the scope capture of the resulting AC wave form.

Some rebuilders use only a test-light across the two AC wires but I believe that might be insufficient to emulate the actual load. Additionally, if the alternator is good, the light gets very bright and with a slight increase in the RPM, it can blow out the bulb…which is a common occurrence.

Due to their small size and shape, securing these alternators on the test bench is tricky. So to find a better and more secure way to run them, I modified a broken Ford IAR DE housing by removing the center portion of it (*see Figure 1*) and drilling extra holes to mount the alternator (*see Figure 2*). This allowed a more secure way of installing and running them on the test bench. Of course, many alternator housings could be adapted for this purpose but the 3-inch (76mm) long mounting spool of the Ford DE housing makes for a sturdy platform of sort to run these on a test bench (*see Figure 3*).

I am hoping our ERA machinist guru Mike Dietrich forgives me for my sophomoric attempt at machining, milling, and grinding…! I also would like to solicit opinions from the readers to know what they use (if any) for testing these alternators. Please send me your ideas with pictures to be promoted here or on the ERA website, which may qualify you for a prize of some sort…!

eBay Ford Mod alternator

There are plenty of starters and alternators (as well as practically anything else under the sun) sold on the internet by eBay, Amazon and assorted online stores. There seems to be no slowing down in that regards. These online purchased units may or may not work for the application claimed. But at times we get to fix them as a last resort because the replacement would not function either. By then the customer has given up on the internet supplier and is desperate to have it done locally, even though he or she has spent a significant amount of money already.

Case in point was this self-exciting alternator that was a mixture of a 10-SI with a Ford type DE housing, made to fit a race car of sort with a Ford engine. The label "Tuff Stuff" that implied a robust solid construction was obviously a misnomer as it was dead-on-arrival and not very "tuff" at all…!

A teardown to inspect the internal parts quickly showed the problem. As you can see in the photo (*see Figure 4*) of the rotor. In addition to being open, it had loose claw poles that had shifted, perhaps causing the coll to become open. A replacement rotor from a 10-SI worked well but we noticed the turn-on speed was around 4000 RPM with his regulator. A new Regitar regulator

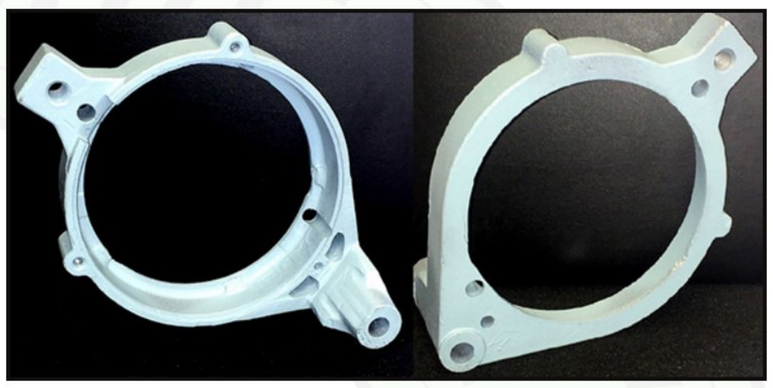


Figure 1 – Ford IAR housing modified to hold a Kokusan-Denki PM alternator

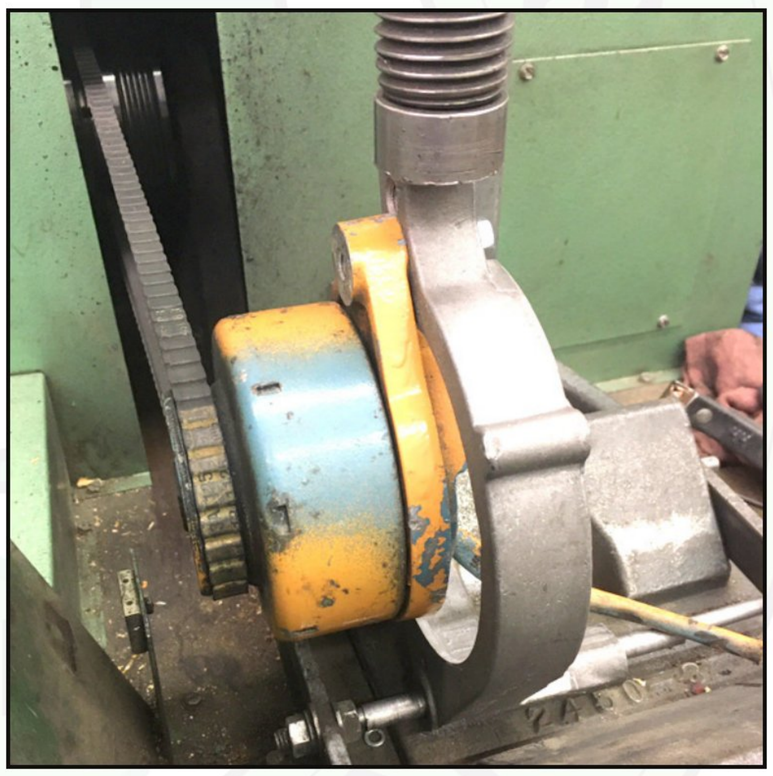


Figure 2 – Running a PM alternator using our MOD fixture



Figure 3 – The 3-inch spool making for a stable fixture

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was installed which brought the turn-on RPM down to a very acceptable 2000 RPM. As usual, I gave the customer a little lecture, emphasizing the benefits of getting things done locally with the people who live, pay taxes, and support the infrastructure in their own backyard, something that cannot be expected from an unknown eBay seller.

An Old Prestolite Alternator

When possible and feasible, I try to stick to rebuilding an original alternator that came with the machine rather replacing it with a 10-SI or and any other modified units. My reasoning is twofold: first, rebuilding the original unit, particularly if it is a rare hard-to-find one commands a much better price, and second, with these days of internet accessibility, almost everyone can find a self-exciting alternator, thus my services may not be needed as much. Whatever the reason; I prefer rebuilding the originals.

Case in point was this older ALK-6221 Prestolite alternator (*see Figure 5*) from an old Eaton (Yale) forklift that could not be found anywhere. The customer who depended on his machine was desperate as his effort to find one at various auto part stores did not pan out, and he was directed by one of them to us.

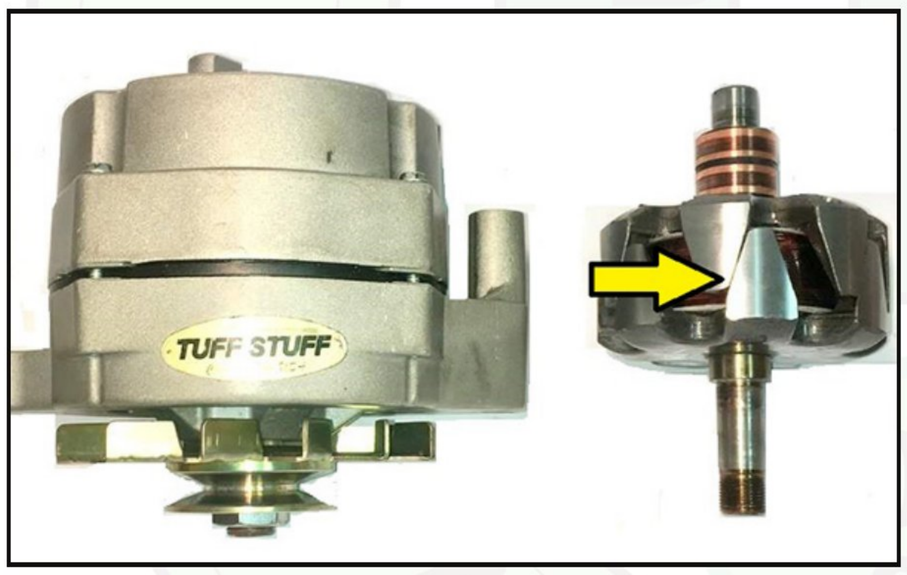


Figure 4 – Tuff Stuff Mod alternator for Ford application



Figure 5 – Prestolite ALK-6221 for an old Eaton (Yale) forklift

Rebuilding the alternator was a straightforward process as far as rebuilding an old Prestolite alternator was concerned. The teardown went as planned without breaking anything, the stator, regardless of its age, was in a very good shape, the slip-ring was good enough to be polished, and the regulator checked fine. The blown diodes were easily replaced and after cleanup and blasting, it turned out to be a satisfactory rebuilt, delivered in a clean and service-ready shape to a happy customer who did not think twice about our $275.00 invoice.

While rebuilding this alternator and changing the blown rectifier diodes, I noticed this was one of those old style units that has 4 diodes on the positive heatsink. Three diodes are the typical positive diodes that are attached to any positive rectifier heatsink but the fourth diode that acts as an isolation diode is Negative, even if it is pressed into the positive heatsink. A point that must be observed, otherwise the alternator would not work.

Since this single diode carries the entire alternator's output, it is preferable to use one with 35 or 50-Amp capability (*see Figure 6*). It should also be noted that there is a post on this alternator that the battery positive connects to. It is totally insulated and does not have any connection to anything inside the alternator. The isolation diode is connected to the output post which is connected externally through a short fusible link called a Reverse Polarity Protection or RPP link to the battery post. The RPP is there to protect the alternator from a reverse polarity connection, such as hooking up the battery backward (*see Figure 7*).

In our case the RPP link was missing, probably discarded during the long years of service. So we instructed the customer to use the output post for the B+ wire. For more details on this alternator you can check out "Look-Up Diagrams" heading of the Jimco on-line catalog on the ERA website, select Prestolite and click on PRES24 on the bottom row of the first page for all of the details.

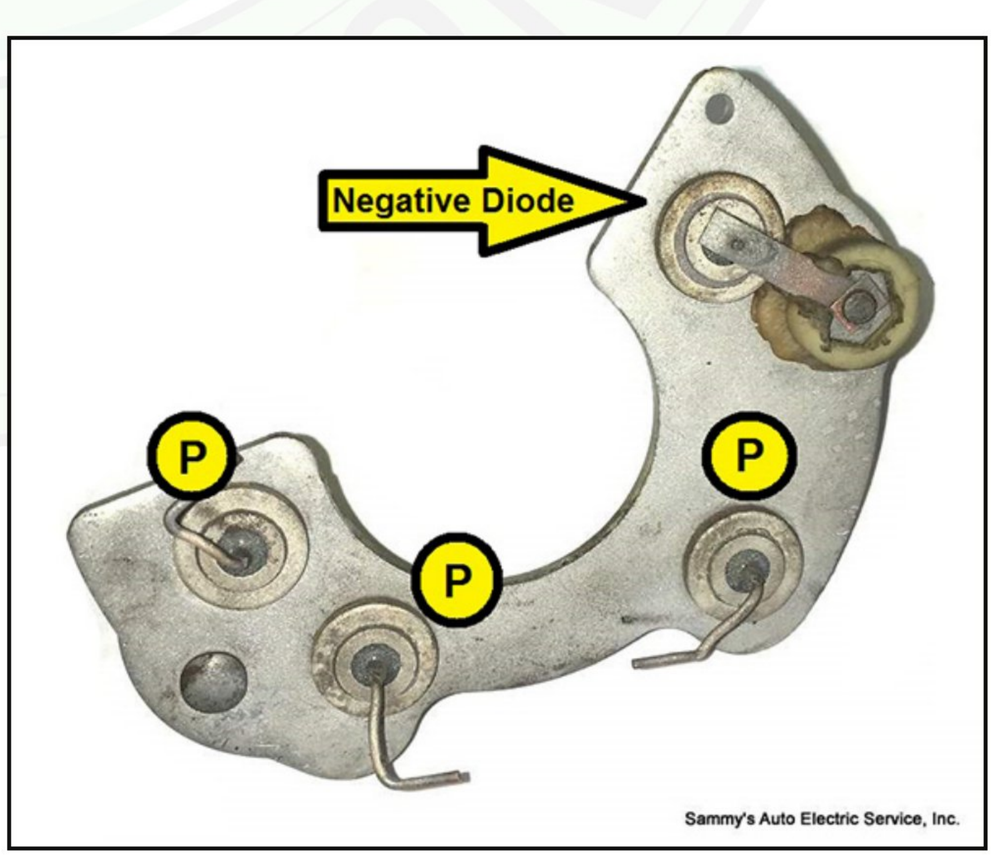


Figure 6 – Positive heatsink of the Prestolite ALK alternator

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Denso Drive Gear

Our shot blaster was running when we heard a loud noise followed by a repeated banging sound of a loose item in the blaster. We rushed to it and shut it down as quickly as we could to prevent any further damages. What caused the problem…? It was a drive gear for a Denso 228000-6320 starter. To clean and polish these gears, we usually tie them to a larger piece like the starter housing, and use a few twisted strands of discarded field coil or solenoid coil wires to prevent them from getting loose in the blaster. But this time the wire somehow broke and the gear got loose and fell through the basket.

The damage to the blaster was manageable and the broken paddle plate was replaced with a good used one that we had saved. It all worked fine while it could have been a lot worse. But now finding a new gear to replace the broken one became a challenge and almost impossible as every supplier with the exception of one did not show any stock (*see Figure 8*).

The unit belonged to an implement dealer. It was an original Denso for Kubota application, and as a dealer, they did not want a much cheaper and easily available aftermarket replacement.

At the last moment, Romaine came to rescue. They were the only vendor who showed any stock, with just three in their Kent warehouse. So an order was put in for two, the parts arrived a few days later and the Kubota starter was delivered to the dealer. Now I have one extra gear for this starter, waiting for a day that it could be needed. Many thanks to Romaine for saving the day for us.

Well, that's all for this issue. Until I see you again, stay healthy and keep up the good work.

You can contact Mohammad Samii by email at:
sammyselectric@sbcglobal.net, or by calling the
ERA Tech Help Line at 636-584-8324

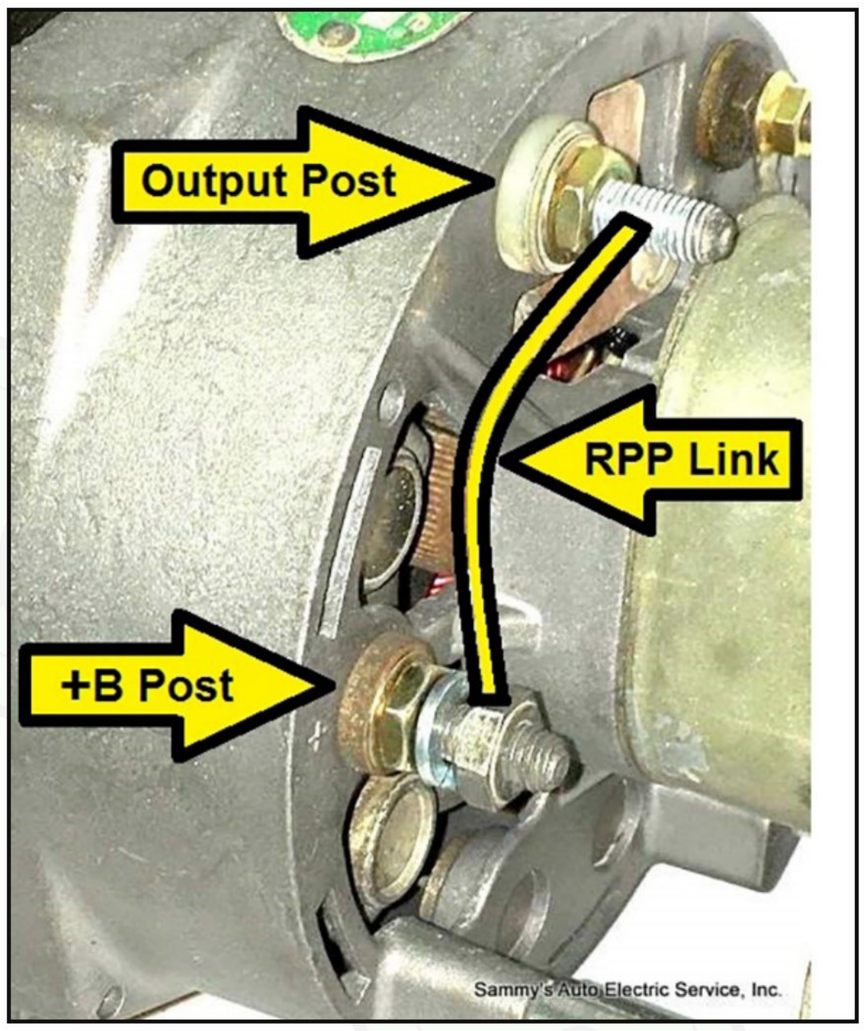


Figure 7 – RPP Link connecting +B and output post



Figure 8 – Denso 228000-6320 starter and broken gear

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