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Bosch Starter, Test Pulley, DIY Engineering, Lexus Starter

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Electrical Rebuilder's ERA FOUNDED 2001 ASSOCIATION

A WORD FROM THE EXECUTIVE DIRECTOR

Tradeshow Committee Chooses Tour for Show!



The tradeshow committee has chosen to kickoff the show by adding a bus tour to the Gateway Arch National Park on Thursday morning April 4th, 2024, to the schedule of events. The tour of the Arch, known to be one of the tallest National Monuments in the U.S. will fill the morning with fun, education and excitement!

The Arch, designed by Eero Saarinen, a Finnish American Architect and Hannskari Bandel, a German American Engineer was chosen as the winner of an architectural competition held in 1947 to create a monument for the Jefferson National Expansion Memorial, a memorial for President Thomas Jefferson which began in 1935 by the US Government. The Arch project that became known as the "Gateway to the West" construction started in 1963 and was completed on October 28th, 1965.

The Arch is one of America's engineering marvels standing 630 feet tall on a foundation 60 feet deep underground, the legs covered with stainless steel are 54 feet wide at the base and 17 feet wide at the top of the arch. The underground area beneath the Arch contains a restaurant, a 285-seat theater and gift shop as well as a museum full of information about the project.

Everyone will have time to view the 35-minute documentary film in the theatre as well as to take a very unique tram ride to the top of the Arch to its viewing area. On a clear day, visibility is nearly 35 miles, being able to view Illinois to the east and Missouri to the west.

The Gateway Arch stands on the west bank of the Mississippi River just south of the confluence of the Mississippi and Missouri rivers, the starting point for the famed Lewis and Clark Expedition in 1804. Upon their return they were said to have landed on the bank of the Mississippi in the area of the now Arch Grounds.

On the west side of the park, stands "The Old Courthouse" built during the American Civil War, having a dome similar to the one on the United States Capitol in Washington DC, became famous when it hosted the trials of the Dred Scott decision, an infamous trial in 1857 when Dred Scott, his wife Harriet and two daughters unsuccessfully sued for their freedom as slaves, just prior to the beginning of the Civil War.

Upon our return to the hotel the group will enjoy a buffet luncheon and then begin a series of training seminars, topics to be announced soon!

Friday, the Expo will be open all day, ensuring enough time to interact with all the Suppliers! Saturday will once again be filled with more training events. Seminar topics and a more detailed itinerary will be announced soon!

Myself, the ERA Staff and the entire Board of Directors wish everyone well as we begin the Holiday Season.

Happy Thanksgiving!

Mike Schroeder

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ABOUT THE COVER

A Modified (!) 11272 Alternator Brush-holder
Photo Credit: Mohammad Samii

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& ANNOUNCEMENTS



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AUTO ELECTRIC CORNER —
Bosch Starter, Test Pulley, DIY Engineering, Lexus Starter



BY MOHAMMAD SAMII

During the course of running our business and handling units, cars, and trucks, we run into rebuilding, diagnostic, and repair issues that the problem is at times self-inflicted, or the OE unit is something that we do not see often. So, I make a note of it and try to share it in this column with the hope of maybe it will help someone in the future.

The units and issues are so diverse that cannot be classified in any type of heading that makes sense, but I am going to point out to a few of them in no particular order. Let's start out by looking at this old Bosch starter.

Bosch/Porsche Starter

I had this old Bosch starter that came in for rebuilding. It was off of an old (1957) Porsche that the owner had it restored to a showroom condition based on his claim. (*Figure-1*)

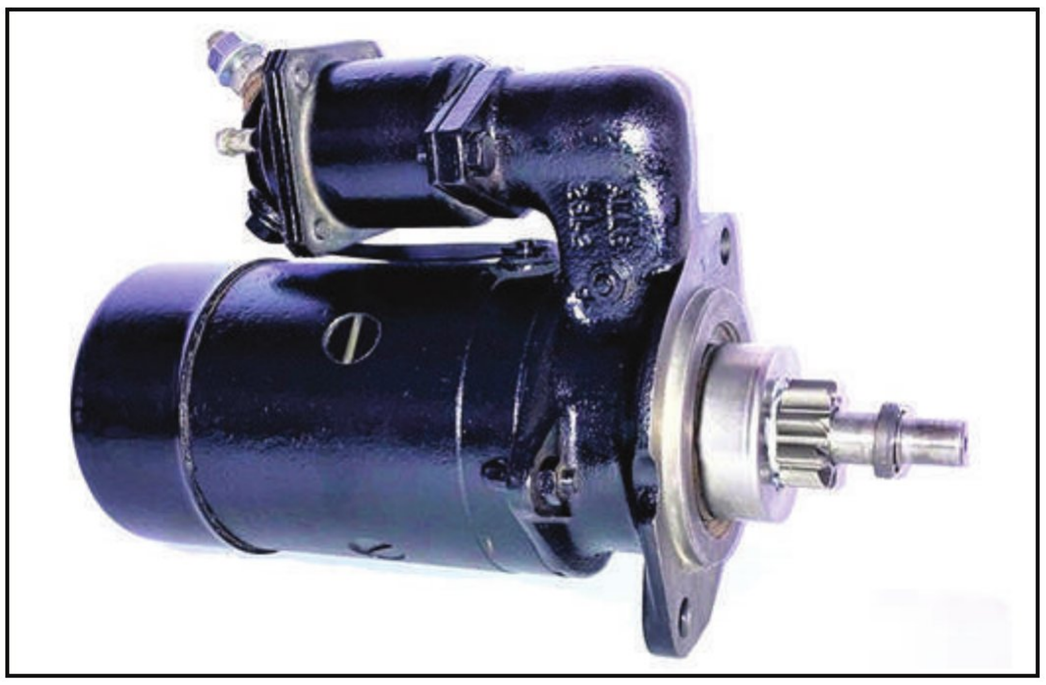


Figure 1 – Bosch/Porsche EED Starter

It was an old EED series of Bosch starters that lack thru-bolts but the field housing is attacked to DE housing with a couple of elbow shaped linkage and nuts. This was common on the very early design of Bosch EE series starter (*Figure-2*). Another feature of this series starter is that the brush-holder plate is attached and is a part of the field case.

A search through my old and obsolete Bosch catalog (a six inch thick book) did indeed show a breakdown of the starter which was surprising (*Figure-3*). What I badly needed was a set of brushes that had accidentally hid themselves from my many rages of cleanup and discarding of the old unused stuff, but there were still 4 of them tied together, hidden way back in a box of old Bosch parts for the day that I thought it would never come…but luckily that day finally came!

Another needed item was the badly slipping starter drive without any number of any sort on it and was hard to identify. This drive was sent to Standard Starter Drive (The Drive Doctor) which was quickly rebuilt and returned at a very fair price and excellent quality, much to my delight and appreciation. (*Figure-4*)

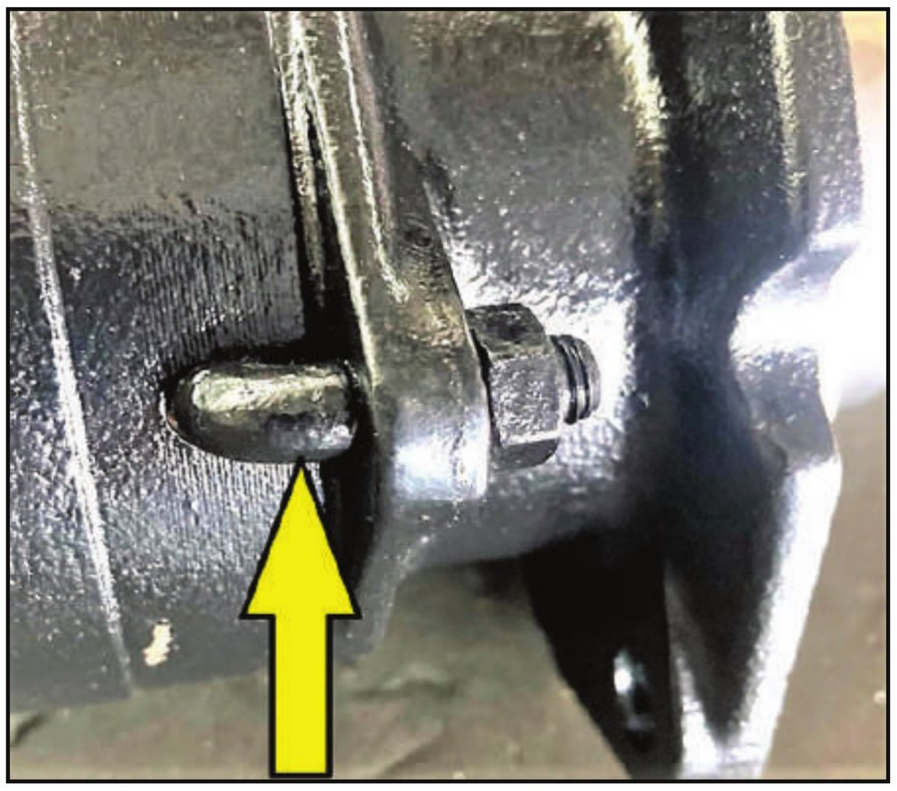


Figure 2 – Attaching Hardware (Elbow and Nut)

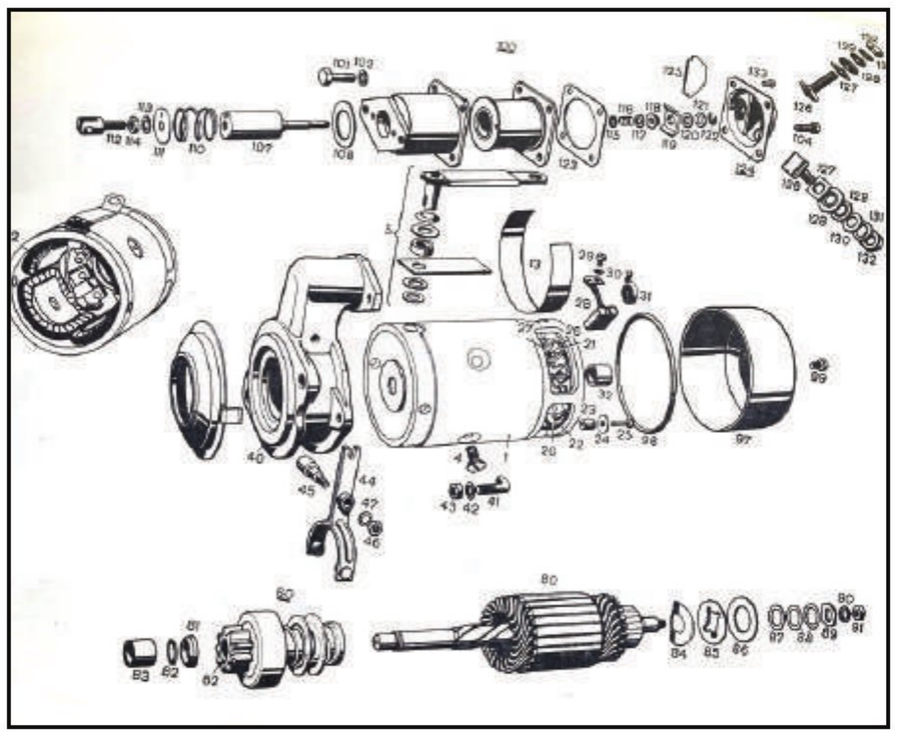


Figure 3 – Exploded View of Bosch Starter



Figure 4 – The Drive Assembly

The starter was assembled and tested. This unit doesn't have a nose support and bushing and has to be supported to be tested properly. So I searched and found my old VW support housing that I had perhaps for over 40 years (*Figure-5*) and used it for checking this starter. (*Figure-6*)

The customer was happy to receive this starter that he claimed the car was his baby and needed it for a show event for the weekend, and considered it a job well done. A little search on EBay I found similar starter for a whopping price of $749.99, which made me feel better for the price I charged the customer who was full aware of the cost of such rare unit.



Figure 5 – Armature Support Fixture

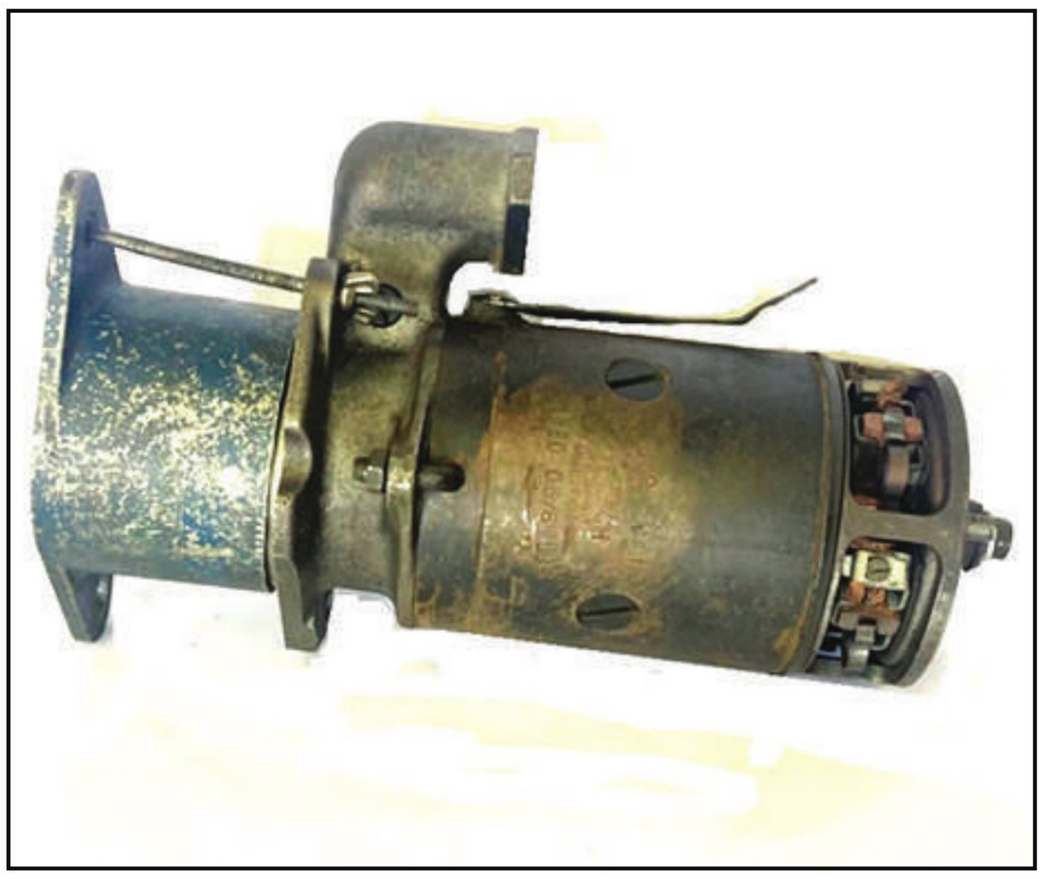


Figure 6 – Testing the Starter with Armature Supported



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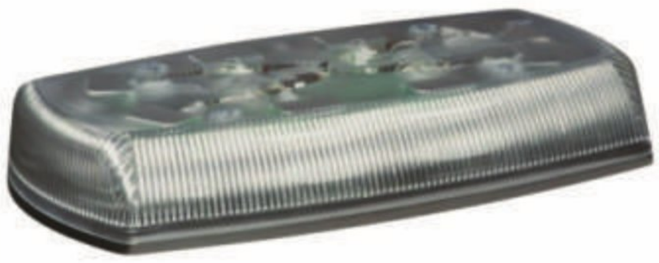
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Test Pulley…Harley-Davidson Generator

Running Harley-Davidson generators (*Figure-7*) on the test bench requires some out-of-the-box thinking due to unusual shape of the armature shaft and the attached gear, in case if there was any gear attached at all (*Figure-8*). The unusual shape of the gear prevents the use of any belt to spin the generator.

I am sure every rebuilder has his own way of doing it but here I would like to share my method! I bored out a common single groove pulley to about 18mm, just short

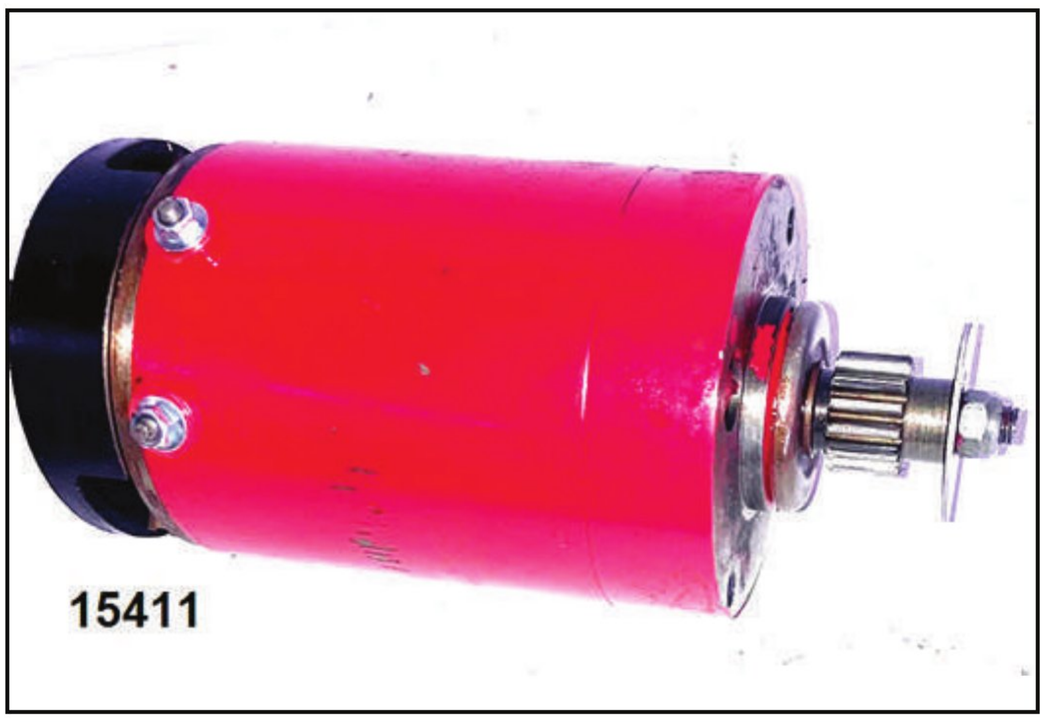


Figure 7 – A Typical Harley-Davidson Generator

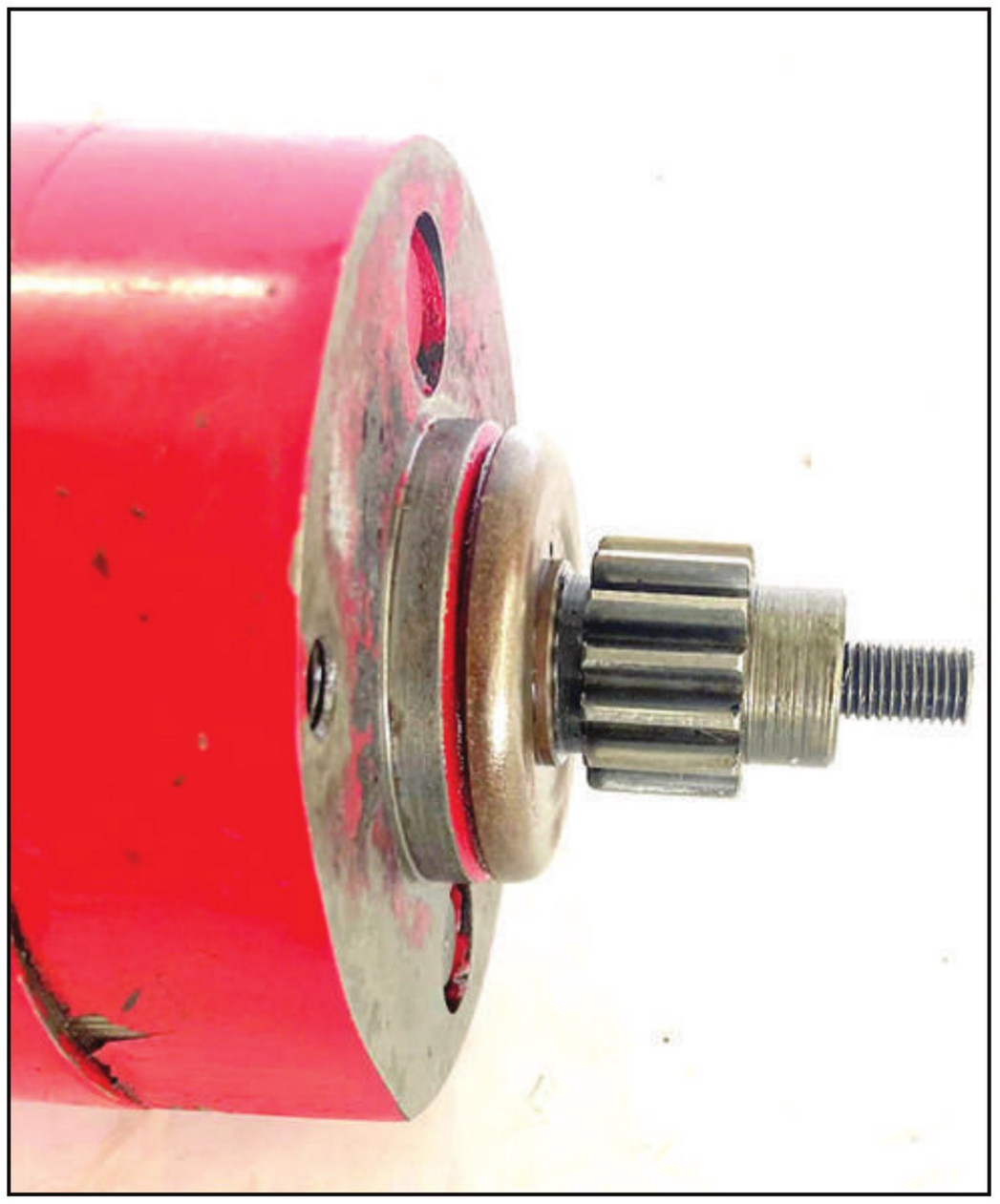


Figure 8 – The Generator's Drive Gear

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2.7kW

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1.2kW

Yanmar Marine Applications
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Hitachi# S114-303
Yanmar# 128170-77010, 128170-77010D, 428170-77010

of ¾ of an inch (about 0.709") as shown on *Figure-9*. Once the attaching nut and flat washer are removed from the armature shaft, this test pulley is installed on the collar right next to the gear and held in place using the very same hardware that holds the gear as shown in *Figure-10*. This makes the process of running the generator on the test bench much easier without needing anything else.

A reminder: Harley-Davidson generator rotate in a CCW direction, so just make sure you are spinning it at the appropriate direction otherwise it would not show any charge.

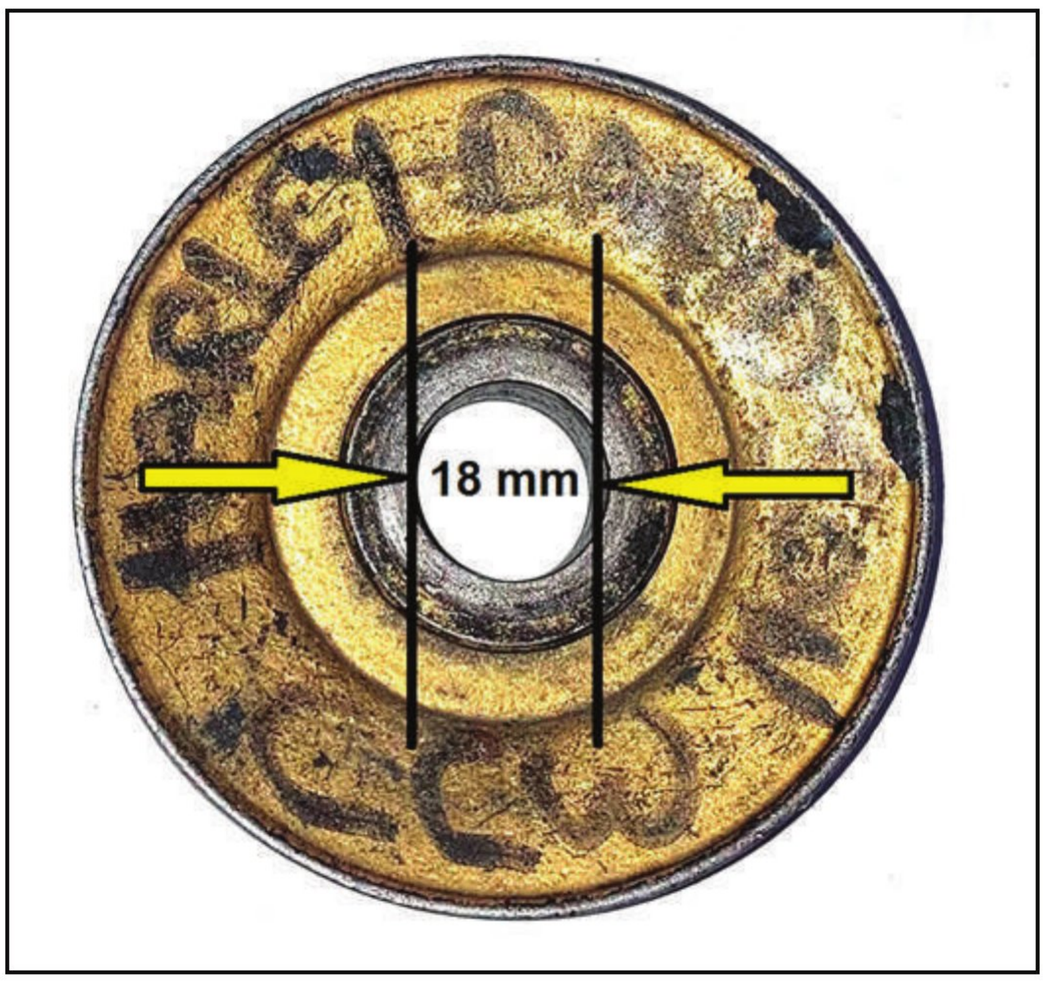


Figure 9 – Modified Pulley for Generator Testing

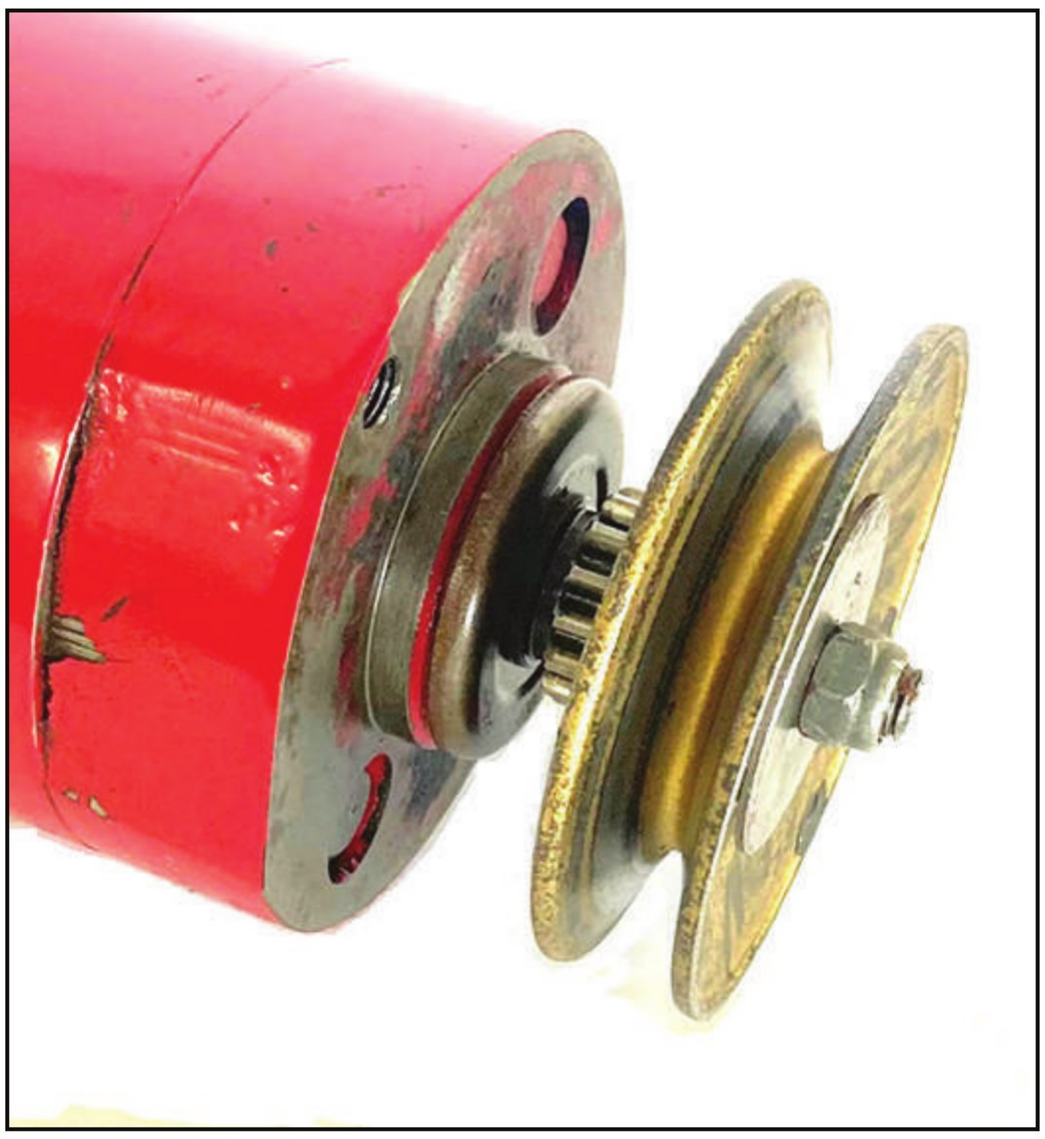


Figure 10 – Installed Test Pulley for Easier Spinning

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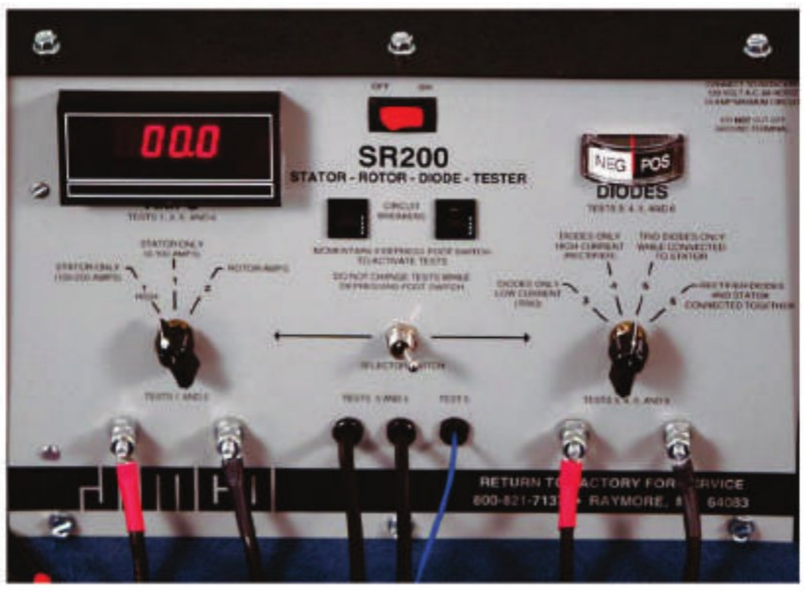
All entries need to be submitted to: Jimco@jimcotest.com
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DIY Engineering…!

One of the interesting cases that I came across lately was this 11272 alternator for a 2009 Ford Focus. A lady stopped and said her son's car needs to be looked at but due to distance, they are afraid to drive it for the fear of running out of battery power and getting stopped before they make it in. I guessed towing it was out of the question due to distance and cost.

She also added this alternator had been replaced by a one from a part store but the battery still runs down. Knowing this was a Ford-PCM type charging system, given enough RPM the part store alternator would have at least energized and charged in default mode even if the PCM or wring were the issues. So, I asked to bring in the core if for some investigation if it is still available, which it was and was brought in…and that's when the fun begun…!

The alternator, however intact, it had a wire sticking out of it that was hooked to the field brush (*Figure-11*). It looked like someone had drilled out a hole in the brush-holder to extend the field lead for outside access for whatever reason.

After splitting the alternator, I noticed the field brush was barely sticking out of the brush holder and could not have touched the slip-ring sufficiently at all. Further investigation showed they had somehow lost that brush spring and had crimped their extended wire to the brush lead right at the brush (*Figure-12*). Now why someone in his/her right mind would think this modification could restore the alternator back into operation is an open question, perhaps without any reasonable answer.

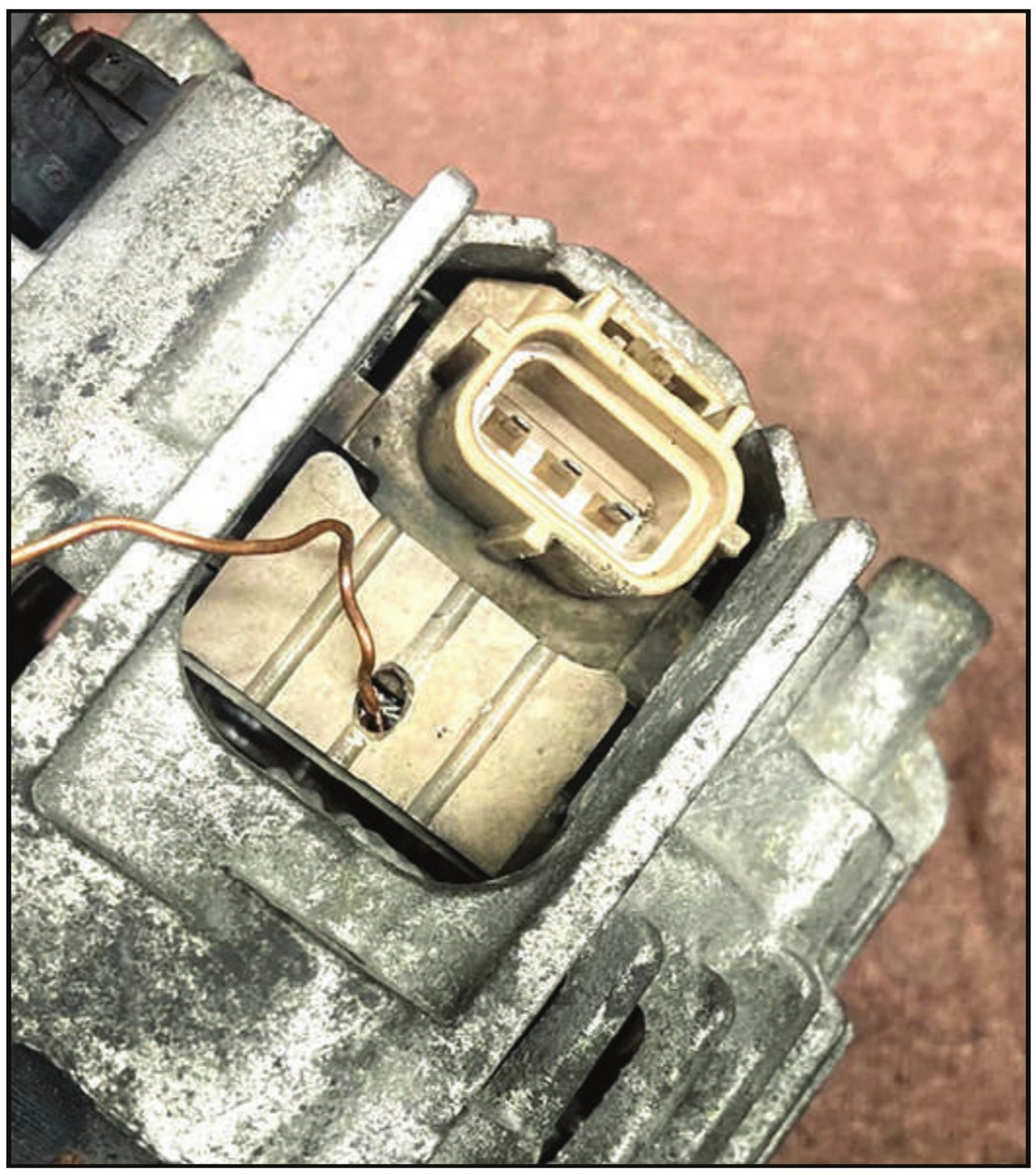


Figure 11 – A Modified (!) 11272 Alternator Brush-holder

Needless to say a regulator was needed to restore this alternator back to operation but they refused and picked up the unit as it was. I never figured out who and why this *modification* (using the term lightly) was done and what YouTube clip inspired them to do this supposed repair with the hope of fixing their alternator.

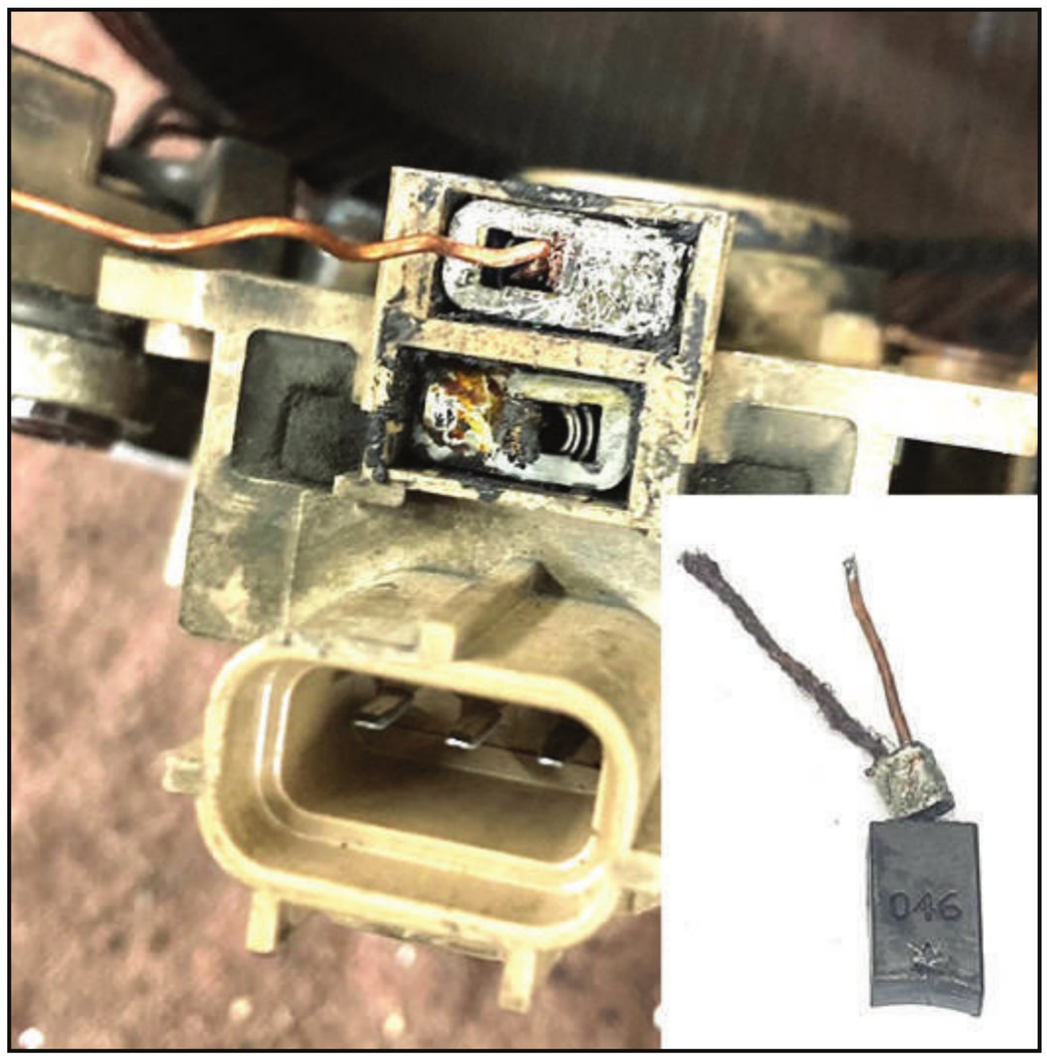


Figure 12 – The Wire Attached to the Brush

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Lexus Starter

Denso 228000-9200 (17824) is a typical Denso RA series starter that fits some early to late 2000 models of Lexus SC, LS, and GS series vehicles with 4.3L V-8 engines as shown in *Figure-13.* What makes this familiar type Denso OSGR starter differ from its likes is the design of its solenoid housing.

The solenoid housing is split in two parts (*Figure-14*). The main aluminum cast part houses the coils and yoke but the top part that is made of hard plastic such as PVC —which in modern industrial usage replaced the old Bakelite—and contains the motor and battery post and contacts. (*Figure-15*)

Why this starter has been designed this way is an open question for Denso engineers but it is possible it was enforced by Lexus design people to dampen or quieten the contact to plunger impact noise in a car that wrote new standards for a Luxury sedan. When installed, the initial "click" of the starter is almost imperceptible and I assume that was what the Lexus engineers had in mind.

A lot of replacement starters on the market by most industry supplies lack this feature and are built with solid

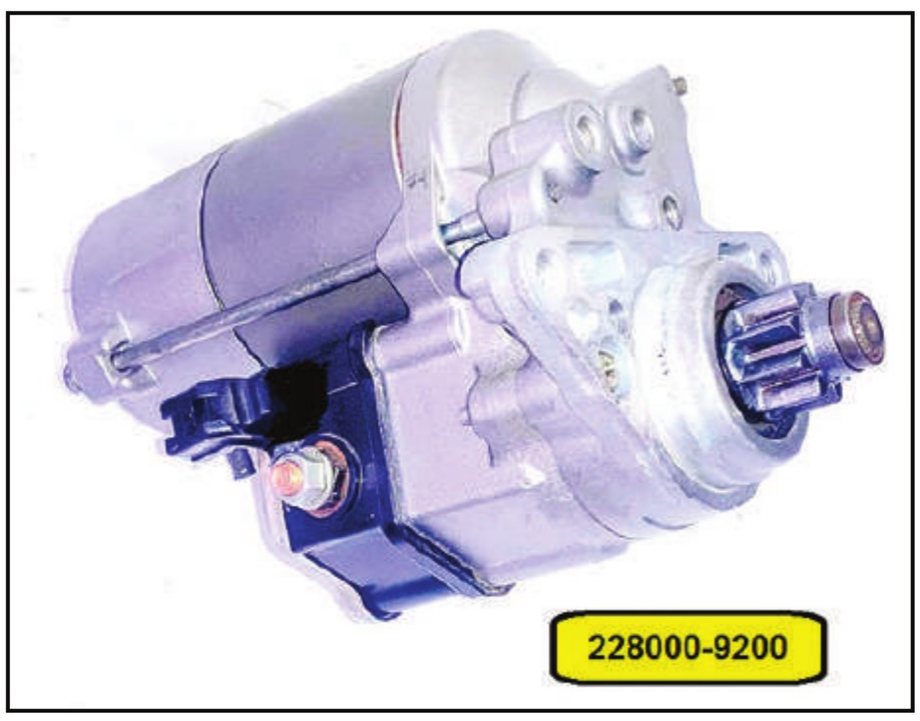


Figure 13 – Denso/Lexus 17824 Starter

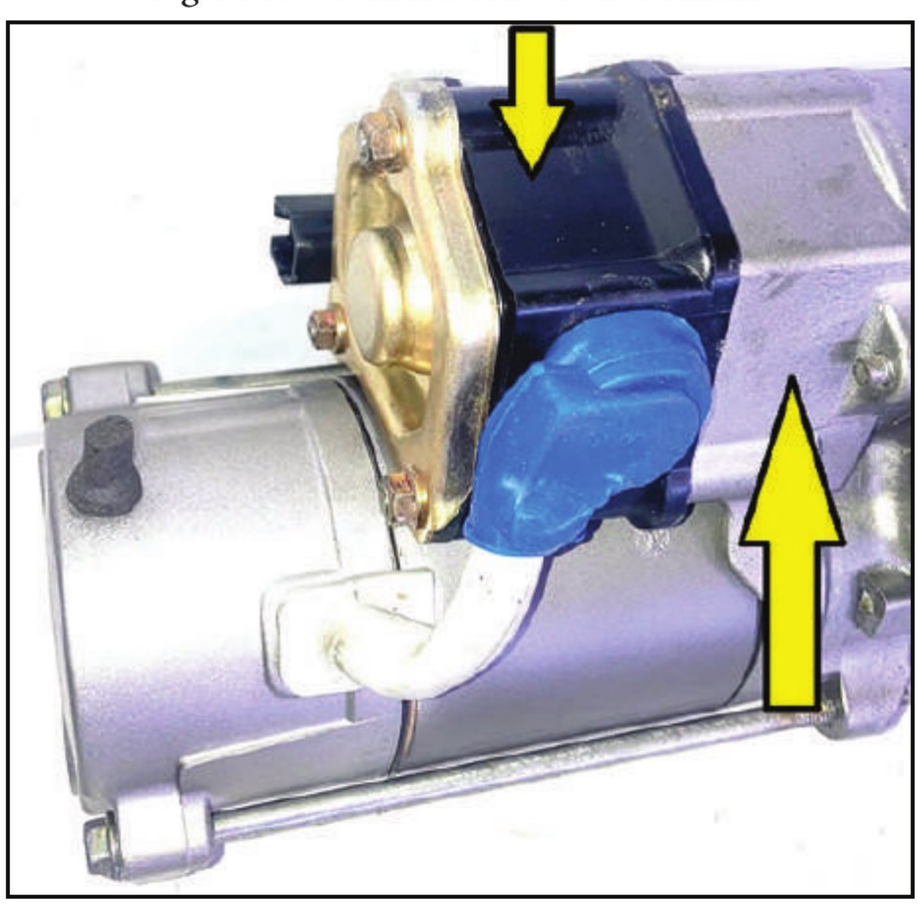


Figure 14 – The Two Parts of the Split Solenoid

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solenoids. In nearly almost all online sources this starter is offered with standard solid solenoid and it is rare to see one with PVC housing but I guess they can replace the OE type and it works fine. You seldom hear a complaint about the intensity of a starter clicks on a 20-plus year old Lexus! This difference in type is a good point to explain to prospective online shoppers who claim they can by a cheaper one online rather than having their own rebuilt.

Rebuilding this starter is straight forward. With a little effort and unsoldering a couple of wires the two half separate easily but in most cases this is not necessary. However, you have to remember the typical solenoid's motor contact which I am sure we all have a handful does not work in this type. You have to have the right ones to make a quality rebuilt. The correct contacts are available through Wagner and J&N and perhaps some others. (*Figure-16*)

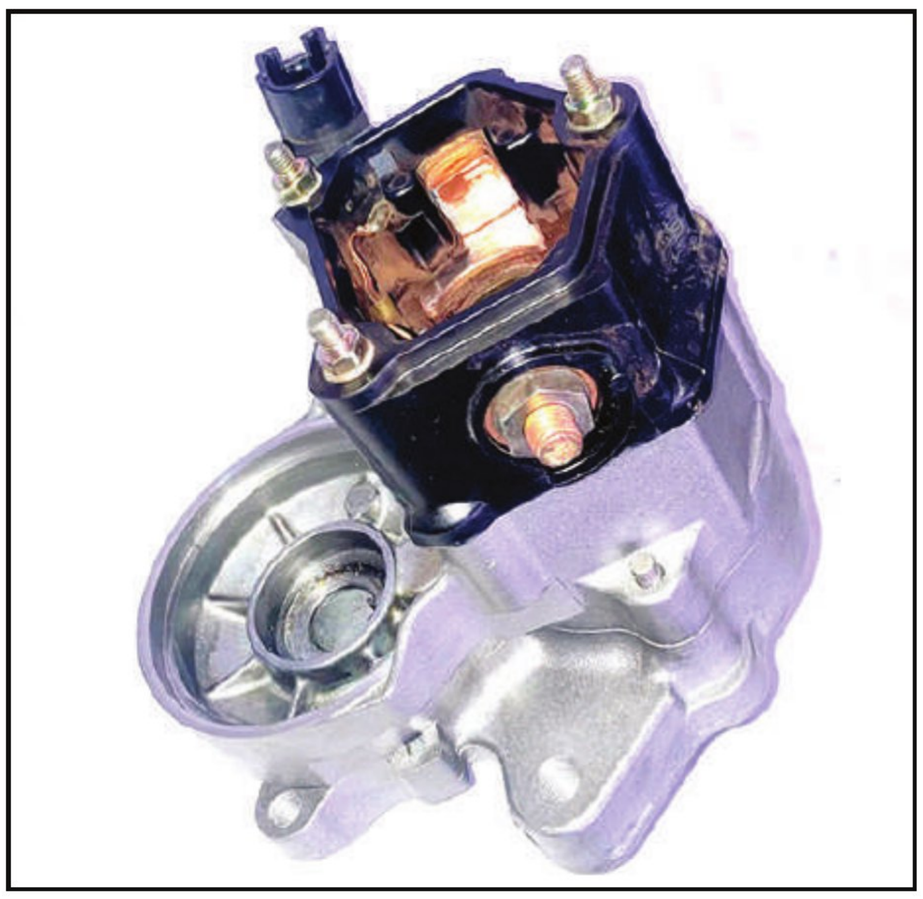


Figure 15 – Upper Part Containing the Contacts and Posts

In closing, you probably know the 2024 ERA Show is scheduled for April 4-7 in St. Louis, Missouri. If you have any subject or units you want to be investigated and discussed, please drop me a line or call. I will do my best to research and provide the needed information during the Show Seminars.

Well, that's it for this issue. Until I see you again, please remain COVID-free 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

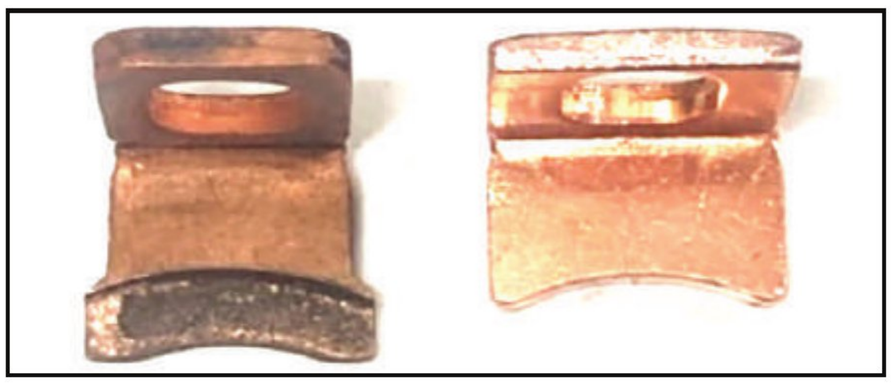


Figure 16 – Motor Contacts Comparison



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Look The Same Only They're Different!



BY MIKE SCHROEDER
& LARRY HAGEMEISTER

With the introduction of new technology starters, namely planetary gear reduction (PLGR) to the Ag and Medium/Heavy Duty applications it has come to our attention that the index ring diameter on the drive housings, primarily on 30/35MT starters are at least two different dimensions. (*Figures 1 & 2*) After speaking with a number of our rebuilder members, some have been aware of this discrepancy for some time now. We have attempted to identify the different applications of each housing, only to find too many different applications of each to mention here in this article.



Figure 1

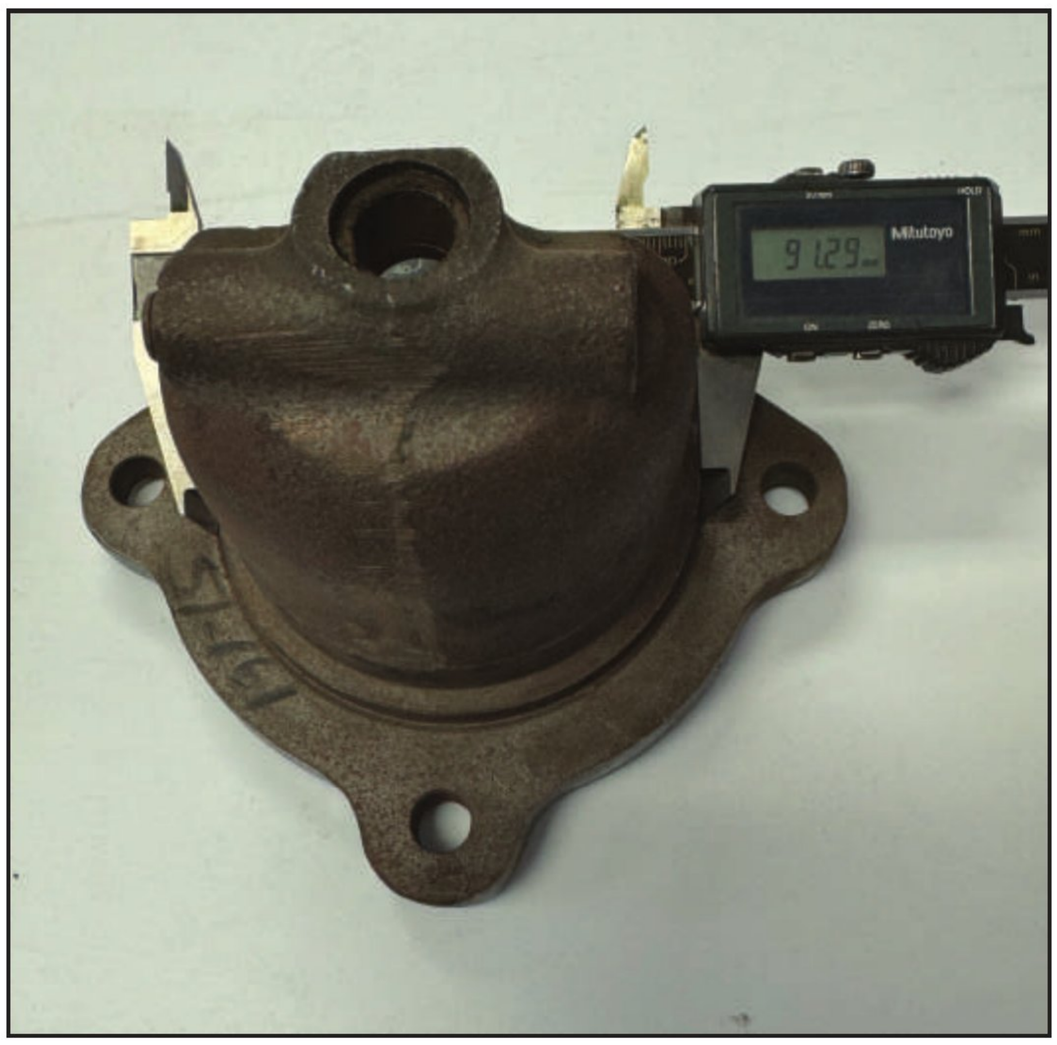


Figure 2

If you are rebuilding your customers starter (R & R) you will not be as apt to encounter a problem unless you're replacing the D.E. Housing. However, if you are selling a new replacement or selling an exchange starter you need to beware! As rebuilding shops become fewer and customers are driving greater distances to get to your shop you need to double check the diameter of the index ring to ensure they are the same, they can become very irate! and become a former customer really fast! if you sell them one that won't go in the bell housing hole!

The difference between the two different housings measures only three millimeters different, **88** vs. **91**. We have identified these different housings in both internal and external indexing versions. (*Figure 3*) While the indexes measure differently, the bolt patterns measure the same, commonly referred to as the SAE 1 pattern.

When we initially discovered the difference, we had two housings with the same part number cast into the housing that measure different. (*Figure 4*) We're not sure how this happened unless one was aftermarket, or someone had machined the index to the smaller size???



Look The Same Only They're Different!

This minute difference is not visible to the eye; thus, it becomes necessary to measure each or use a go-no-go gauge. One ready-made gauge does already exist, some of you may already have one on your parts shelf. It is widely known as a SP-2 spacer made by IMI Performance used to convert from a 16658 to a 17578 on Ford Turbo Diesels. (*Figure 5*) It is available from various suppliers to us. This device takes away the guess work fast!

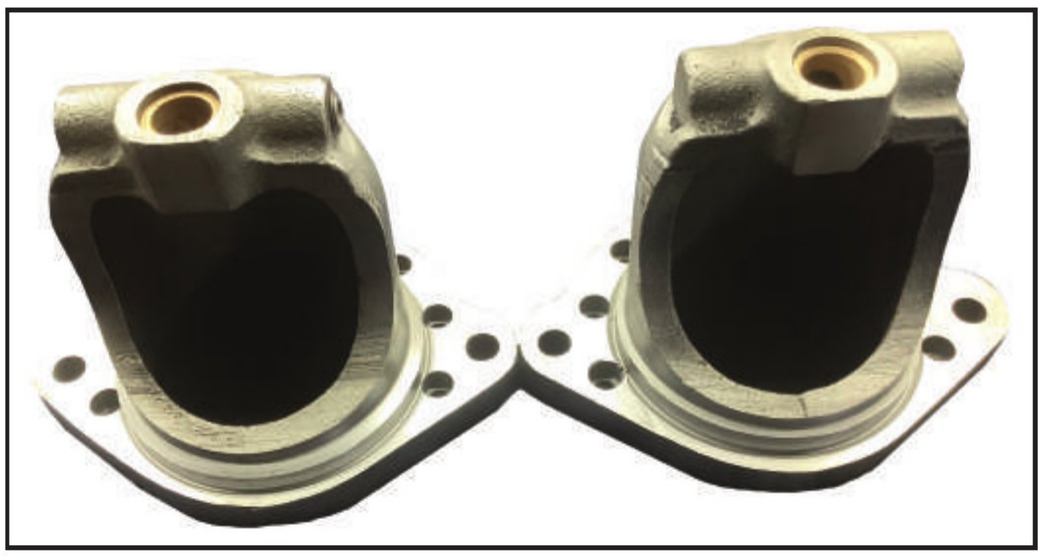


Figure 3

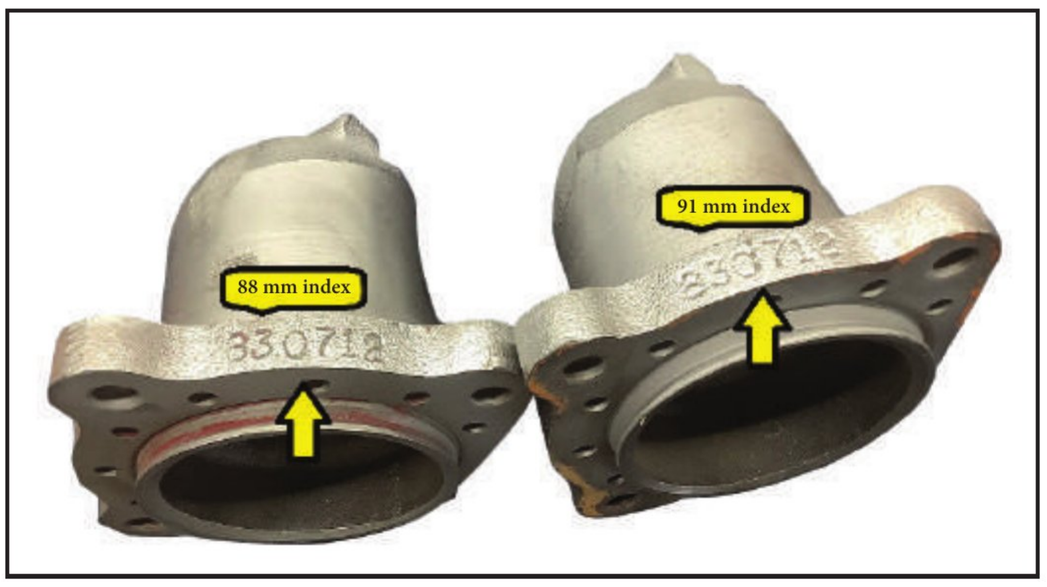


Figure 4



Figure 5

ONLINE CATALOG

PARTREF.com

50,000 Rotating Electrical Units

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3500 AND 3599 CORES. Contact Larry at Hagemeister Enterprises. 800-944-0494

Armatures for sale. $80 each plus shipping. Starter Repair 269-625-5400. GAR2116 Lester 4060-878, MAW2128 Lester 5060-1745, MZ2211 Lester 5060-1800, MAW2030 Lester 5060-1970, SM453 Lester 5050-2115

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