

ERA EXCHANGE

YOUR GUIDE TO ELECTRICAL REBUILDING

October 2017 \$12.95

AUTO ELECTRIC CORNER

Bosch and Denso Regulators and More

MODEL T GENERATOR

A Lesson In Leaking Voltage

INDUSTRY NEWS

**PLAIN
TALK**

FOR THOSE WITH EYES AND EARS



A WORD FROM THE PRESIDENT

When Your Competition Closes



Back in June, a post on the Off-Topic section of the Forums labeled “Customers” caught my attention. The author raised some really good points and great questions. The responses from other members that followed were also very interesting. In the first paragraph the author talked about an increase of new customers due to other shops going out of business in his area. The following is my take on this subject.

A lot of us would think right away that a competitor's closing would be a good thing for our own business. I believe that can be true, but only if you approach these potential new customers with caution. First you have to consider the fact that if this closed business had nothing but good profitable customers, then why are they out of business? Sure, there are circumstances that will cause a profitable business to close, such as health, death, financial disaster or just plain old retiring. I would suspect that most of us have a pretty good idea why our local competition shuts down when they do. A good indicator would be that you were starting to see some of their customers before they closed. As a business starts to decline in

profitability, so does the quality of their customer base. If the business does not change their strategy and practices, catering to a low quality customer base will be their eventual demise.

Though this industry is dramatically changing, I am still in business and making a profit. I consider some of the reason for that has to do with the fact that I do not change my business model to pick up a potential non-profitable customer.

Having said that, do not be too quick to judge potential new customers. Keep in mind that the reason a competitor's customer may

“If the potential market is there, a good business model and sound practices will bring you profit.”

seem to have unreasonable expectations is because of the way they were treated by the shop that is now closed. Explain your policies to them. Let them know how you operate your business and what they can expect from you. So when a new customer comes in wanting it right now and for next to nothing, consider the possibility that was the type of service they were getting from your now out of business competitor. Give them alternatives and solutions. If they are still unreasonable, let them go to another competitor and put them out of business too. If the potential market is there, a good business model and sound practices will bring you profit. That formula does not change, but the potential market is always changing.

Mike Dietrich

NEW ERA MEMBERS

Nelson Repair
Cherokee, Iowa

ABOUT THE COVER

Adjustable 3rd Brush on Model T Ford Generator.

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Rebuilding is Recycling!

INDUSTRY NEWS

& ANNOUNCEMENTS

Roy Cline

Roy Cline, known by many for the National Rebuilders Warranty Service that he founded, passed away October 18, 2017. Roy was a visionary electrical rebuilder who realized long before any of his peers that there was a need for a warranty network of some kind to remain competitive in the long haul trucking market. What was started as a side business to help other rebuilders and himself was eventually purchased and renamed the Rebuilders Warranty Assurance Program by the APRA. They hired Roy to manage and maintain it. He personally answered the warranty phone calls and handled arrangements on both ends to see that customer's claims were taken care of. He continued to service customers, even after the APRA dropped the program several years ago.

Extended Hours for ERA Office

Beginning on October 2, the ERA's office hours will be increased to five days a week with longer hours each day. The new office hours are Monday through Friday from 9:00 am to 5:30 pm Central Time. Members can now call the office any weekday using the same number as before: (636) 584-7400. You can email the office at: office@electricalrebuilders.org.

Michele Schroeder, known by many for her smiling face and diligent work at trade shows, has taken over the task of running the association's office. If by chance she happens to be unable to answer your call, please leave a message so that she can be better prepared to return your call.



Plug Codes Online

Keeping up with the proliferation and complexity of charging systems has never been an easy task for any electrical rebuilding shop. Testing new or unique alternators has become one of the biggest challenges that we face today. But a new feature, debuting this month on the ERA's website, will lighten that load.

A Plug Code search tool, accessible from the ERA homepage should be available by the time you receive this issue. The tool was conceived and developed through the efforts of Dan Bell, owner of

Whatcom Electric in Bellingham, WA, the ERA and many others. Alan Melton of AMFOR Electronics in particular played a very important role in validating data for this project.

It came about largely based upon the need for a single source to verify and assign plug codes. Conflicts between various sources had developed and caused confusion. The situation was worsening. Bell volunteered to head a team, committed his own resources and sought cooperation from throughout the industry.

"We had the cooperation of WAI, who started assigning plug code numbers when Joe Davis was there," Bell said. "Transpo and Regitar-USA both helped with the project, as well as JIMCO, AMFOR and D&V."

The plug code data on which the ERA's search tool is based is part of the Apptrak database, Whatcom Electric's own in-house documented data. That database is being serviced and updated daily, which means that the plug code search data is always current.

To use the new tool, simply log in on the website and select "Plug Codes" on the right side of the top menu bar (the green bar across the top of the homepage). This will take you directly to the Plug Code search page (see Figure 1), where you can type your unit number into the Search box. The original equipment unit number or Lester number will yield the best results.

When you hit the "Search" button, a diagram of the plug itself will appear as shown below (see Figure 2), along with the part numbers of the test leads made by AMFOR and JIMCO to test that alternator. Also listed is AMFOR's part number for the alternator's harness repair lead.

If you are an Apptrak user, you can also access this Plug Search from the "Tools" menu bar. It will open a similar search page. If you conduct a plug code search using Apptrak, it will also provide all unit numbers using the code that you look up.

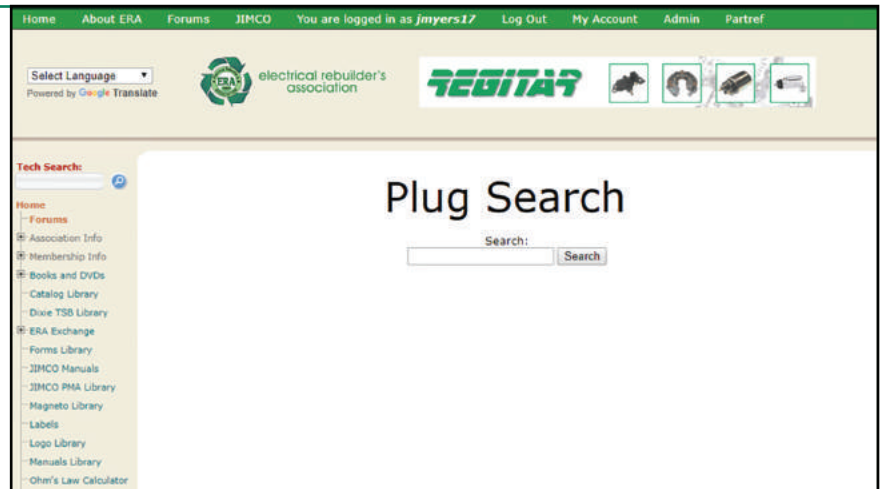


Figure 1

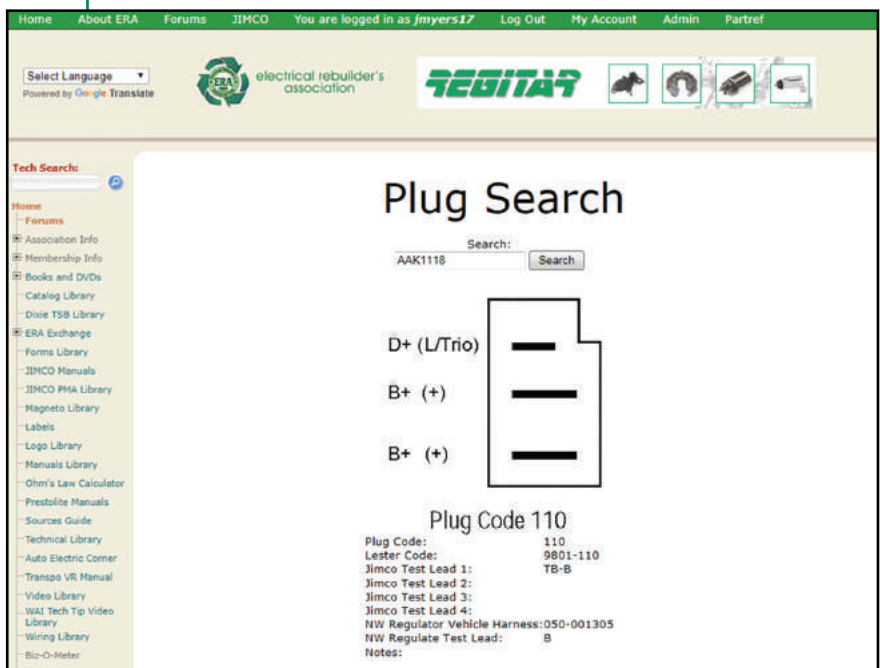


Figure 2

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AUTO ELECTRIC CORNER — Bosch and Denso Regulators and More



BY MOHAMMAD SAMI

That old adage “You can’t sell what you don’t have...” came through for me late on a Friday afternoon when a first time customer from a town 20 miles away was referred to us as a last resort to see if we had a starter they were needing badly.

The Bosch 18949 starter is a common industrial starter that fits a lot of Perkins engines used in generator sets and also some light industrial equipment. Since the last few calls for this unit were only R&R which some were totally destroyed, I decided to buy one and have it on the shelf...just in case. Well, the case was the unit the customer wanted badly that Friday afternoon. The parts store she had checked with had crossed the number and given her the Wilson 91-15-7143 part number, which she handed me on a piece of paper! Crossing the number led us to J&N’s 410-24078 (18949) which we simply pulled off the shelf and sold for a very healthy price.

But the whole point is this: availability of nearly everything which can be had overnight by almost any part store has drastically cut into what we considered to be electrical rebuilders strongest niche. The reasons I made the sale were a hurried customer who needed it immediately, and the availability of the item in my stock. If either one of those two factors had changed, there was no way I could have made that sale or even seen this customer coming through my door. I know that sitting on a large inventory is not feasible for the most of us, but again, there are occasions that it can pay off.

Bosch Alternator

It is sort of surprising to see units that are a little different from what we are used to seeing, and for me, this particular Bosch alternator and its regulator was a little different.

A customer brought this fresh factory-remant Bosch alternator to be looked at because it was not charging. A brief diagnosis showed it needed a regulator. The 9-190-067-018 regulator (Transpo IB-392) differs from the typical Bosch attached/internal regulator because of the plug (Code 360) that uses an “S” and “L” pin, a little uncommon in this family of Bosch industrial alternators.

The regulator testing also requires attaching a stator input from the regulator tester, otherwise the warning light would not shut off—another feature that is rarely seen on this family of Bosch regulators. (see Figure 1)

The field lead attached to the regulator terminates in a blank post built into the SRE housing that extends outward from the back of the alternator. It has nothing to do with the operation of the alternator but is an analog output to show the duty cycle of the field, sort of F/Fr/DPM regulator signals that we have been familiar with. (see Figure 2)

The alternator was used in the Thermo-King refrigeration unit which in certain model uses a control board for stop/start feature of the machine and control of the charging rate by controlling the engine speed. I suppose the external field post in this application provides the load information.

However the cheaper versions of this alternator (12223 or 13224) are available, a Bosch replacement such as AL929N commands a much bigger price tag than the aftermarket

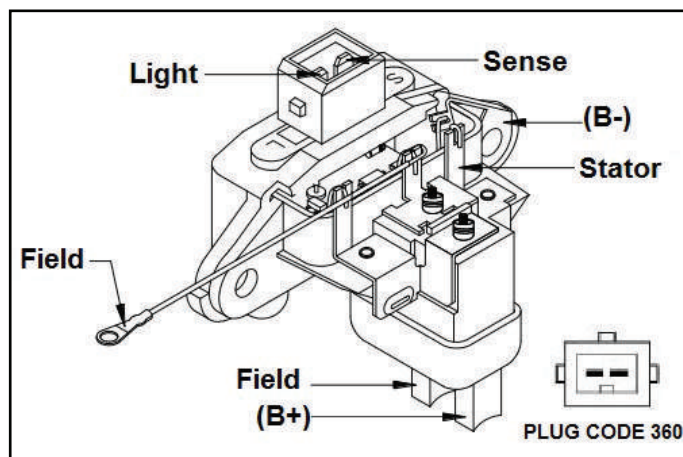


Figure 1 – Bosch IB-392 Regulator with Plug Code 360
(Source: WAI/Transpo)

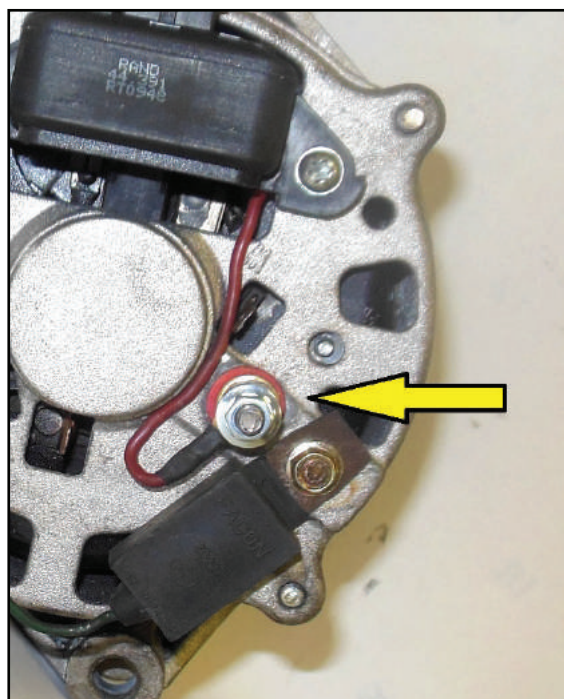


Figure 2 – External Field Post on SRE Housing (Arrow)

replacements, which I believe should reflect on your rebuilding price. And since we are on the subject of Thermo-King alternators, in most models the alternator output is routed through the aforementioned control board. Replacing the alternator with larger aftermarket replacement may damage or burn the control board and cause expensive repair, not to mention the liability of a refrigeration unit failure spoiling a truck-load of perishable goods.

Denso Regulator with “P” Terminal

Denso alternators with a 328 plug code (P-IG-L) are mostly used in light industrial units on a variety of applications including Kubota, CAT, John Deere, New Holland...etc. I had a couple of calls regarding testing alternators with such regulators where the rebuilder questioned the value of “P” terminal voltage

AUTO ELECTRIC CORNER

while testing this alternator.

"P" is simply the "Stator" and it reads $\frac{1}{2}$ of the system voltage in a working alternator, around 7.2 Volt. There are similar regulators with 318 plug-code (D-IG-L) where the "D" is not used. In both systems the alternator is activated by "IG" terminal, and "L" operates the warning light.

In applications where the "P" terminal is used, it drives the tach, and in some applications it also drives a fuel solenoid or glow plug controller. It is obvious that the use of a wrong regulator that lacks "P" terminal can interfere with the engine operation and cause a running problem in systems that need this signal.

If the part number of the regulator is missing, there is a simple way of identifying the existence of "P" terminal. Simply checking the resistance between the stator connection of the regulator and the first pin of the regulator (you must read "0" Ohm), confirms that the regulator has a "P" terminal. (see Figure 3)

Brushless Cooling Fan Motor!

Electrical rebuilders are always in search of opportunities to expand into rebuilding other types of DC motors, and some have been very successful in rebuilding traction motors, variety of motor/generators, heavy-duty blower motors for buses and more such items.

The trend toward brushless DC motors and their increased usage in blowers and cooling fan motors could be an opportunity for rebuilding such motors. But unfortunately I believe their sophistication, lack of viable remanufacturing information and service parts makes it difficult to get into.

A diagnostic case we were doing for another shop may

explain the complexity of the system. The A/C compressor would shut down on this 2013 Dodge Durango due to intermittent operation of the radiator cooling fan. They wanted us to confirm the cooling fan was defective before replacement, as the assembly cost over \$1100, and they did not want to guess on such an expensive part. (see Figure 4)

The cooling fan motor only has a positive and negative power feed, along with a small PCM command wire. PCM applies a pulse-train to the motor with varying pulse width. Our scope capture showed that the signal existed and would increase its pulse-width to increase the motor speed, but the electronics of the motor would not respond. Spinning the blades by hand would get the motor started and run for a while but on the next cycle it would not run again.

Looking at the motor, the plug, and the control signal, along with the internal electronic circuits of the motor, it makes me skeptical that rebuilding such item is within the ability of a typical electrical rebuilder (such as myself) in this point and time. Maybe future generations of electrical rebuilders will be able to handle it better than we could at present.

Until I see you again, keep up the good work.

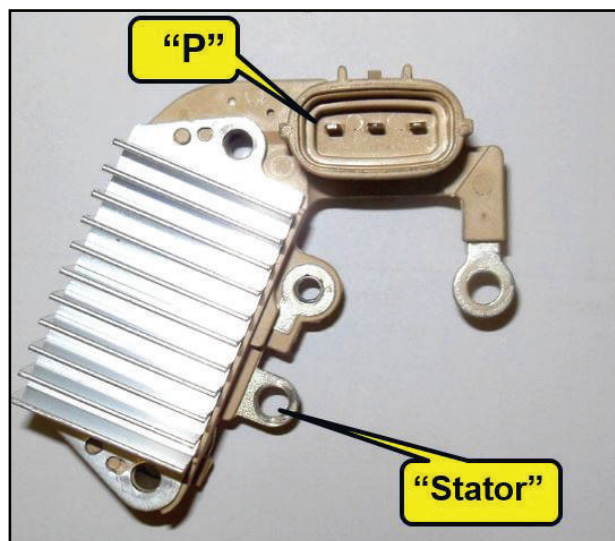


Figure 3 – "P" and "Stator" Terminals Should Have "0" Ohm Resistance



Figure 4 – A Chrysler Radiator Cooling Fan with Brushless DC Motor

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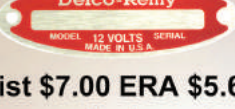
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PLAIN TALK — FOR THOSE WITH EYES AND EARS



BY ROB BUKSAR

Back in another life, I used to belong to a health club and swam two or three times a week. It was great for me and sometime in the near future, I hope to resume this activity.

Health clubs are like churches that draw all sorts of people for different reasons, although exercise isn't the only benefit. You didn't think people went to church and health clubs just to pray and exercise, did you? Folks attend for lots of motivations. Mostly for reasons that you would never suspect! Nevertheless, I went to swim and meet new people!

I accomplished both tasks in good order. The exercise was always good. Meeting new folks was hit or miss. Sometimes, I regretted offering my hand. Yet, other times, I'd connect with a good one and I have to tell you, the rewards were well worth the risks!

Two fellows come to mind. They were so potent as individuals that they have left a lasting impression on me. I would like to share a little about these two guys because what they had to say is important to all of us, especially these days.

The first was a retired Marine Corp general who owned his own insurance agency. We called him either general or sir. Believe this or not, his mere presence commanded respect so that's what most all of us gave him. Even those who knew nothing of his past gave him respect and deference. The look about him commanded it!

The general had loads of experience and stories to tell. He had been through countless campaigns and lived to talk about them. We had duffle bags full of good questions and he was always willing to share. I asked the general what was the secret to his success and/or how do you win battles? Further I asked, how do you keep your business moving forward in light of incredible competition? "It's quite easy, hire or recruit people who are smarter than you are then manage their efforts. They will get the job done as long as your ego doesn't get in their way and prevent them from doing their thing." The problem is that we usually get in the way of our own success because someone else came up with the winning idea or plan and we couldn't stand the fact that it wasn't us! So, we put a huge roadblock between ourselves and victory. Really dumb! No success there!

My other new friend was an East Indian fellow who immigrated here at that time about 40 years ago. He was also the most patriotic soul that I've ever met. He loved America. In his country, your destiny is determined by your family's caste or birthright. You are born rich or poor and that's your life. There are no choices, as is the case in most of the world. In the U.S., one's potential is as great as the hard work and dedication you're willing to put towards it! My friend became a college professor with two PhDs. The rest of his family immigrated here also. They all became professional people of one sort or another and had nothing less than master's degree under their belts. Along the journey, the family was able to acquire a mix of 30 Dunkin' Donuts and

convenience stores which all of their offspring manage. "God Bless America", he says! "Nowhere else on the planet could a pilgrim migrate to a new land and achieve such results. Americans are so overwhelmed by opportunities. They can't see the forest because of the trees. Instead of capitalizing, too many criticize and complain."

I still chat with more small business folks than most. What is interesting is the whiners and complainers are rounding the rim of the drain as they lament over the good ole days and focus on what was. Without exception, the guys doing well and operating the money machines are focusing on the here and now, seeking out the windows of opportunity.

If your gray matter is functioning, it should be clear to one and all, businessman and worker alike that America is in another transition period on many different levels. Regardless of your feelings, there is no telling how this is going to shake out.

I know I go on and on about this but it hurts me to see the highways and byways littered with unnecessary victims because of lots of fixable circumstances and mindsets!

So, what's the moral of the story? Please do not waste your time, money and energy on what was and won't return. Heard that before? I'll bet you replied; "I know". Then continue on repeating the same routine like a broken record! I hope not!

Either hire folks smarter than you or if that's not possible, find folks to work with who can advise you. Lastly, the U.S. economy is teeming with great opportunities and not enough qualified people or shops to fill the bill. Those windows of opportunity are open and opening everywhere. It's just that those of us born and raised here have been in the middle of the economic forest so long that we are no longer able to see the trees. The folks that are still flooding into America aren't risking life and limb to get over here and starve. Is there something visible to them that is no longer visible to us?

One last thing I'd like to add. I was told by a really smart guy that if I wanted to see where I'd be 5 years from now, take a hard look at who I was hanging with. If your friends or family are negative, counter-productive or critical about being successful, they have to go. Flee from their company because they will surely drain all your batteries fueling their negativity! Misery likes company and they will guilt you into staying miserable and sharing theirs.

It's not lonely at the top. There are just better seats and more parking. Go for the gold and leave rubbish behind!

God bless America and our little industry!

*Rob can be reached at hoosierelectric@comcast.net
or 219-545-8682*

MODEL T GENERATOR

A Lesson in Leaking Voltage



BY BOB THOMAS

Nearly 15 million Model T Fords were sold between 1908 and 1927. It has now been ninety years since the last one was produced, but surprisingly there are still quite a few them out there. Albeit not many are being driven regularly. A conservative estimate based on Model T Ford club data is at least 100,000. The first Model T's had no electrical system besides the magneto's induced spark. They were hand cranked and used acetylene lighting for driving at night. But electric lights were introduced in later production years. That required a battery and a generator, which opened the door for electric starters too. Most running T's today have electrical systems.

The Model T generator (see Figure 1) is gear driven CW with an adjustable third brush (see Figure 2) to control amperage output. The system was six volt, negative ground when the T's came off the assembly lines. But when the Model A was introduced in 1927, its ground was positive and Ford continued to use positive until 1956 when auto manufacturers

agreed to standardize with 12 volts and negative ground. Consequently, you might encounter a Model T that was changed to positive ground prior to 1956 to conform with other Fords of the day. It is advisable to ask your customer about voltage and polarity on any vehicle when you rebuild, repair or test their generator. Most T's that have been converted to 12 volts have been fitted with gear driven alternators.

I recently had the opportunity to work on a Model T generator. The vehicle had been in storage for more than a few decades. The previous owners had never been able to get it started. The new owner, an experienced aircraft mechanic, got the engine started only to discover that the generator was not charging. When he brought the generator to me, it failed a motor test, which indicated there was definitely something wrong within the generator. Since it was heavily rusted, a good cleaning would be the starting point.

Some Basics

Generators are relatively simple devices when compared to any part on a 21st century vehicle. They have a limited number of components, which may differ in appearance from one generator to the next, however they all work the same way. Generators all use a spinning armature, surrounded by electric field magnets to supply DC current to the brushes. They self start from residual magnetism in their pole shoes which can be easily established by performing a motor test. It is not rocket science or even 1970's auto electrics. It is based entirely on 19th century technology.

Since the armature appeared and tested OK and the field coils checked out, I decided to remove all the rust and corrosion and then reassemble it for another test prior to restoring the parts cosmetically. The generator then motored fine and on the test bench it easily began charging on its own. However my initial elation that this project was going to be easy soon went south.

The third brush on most generators of the Model T's era was their only means of output control. And a third brush can only control amperage. In this type of system the battery's capacitance and vehicle's loads are depended upon to hold down the voltage. Knowing the electrical loads of the vehicle is the most important consideration when adjusting the third brush on your bench. In most cases, five to ten amps is a good starting point.

The third brush was actually intended to be adjusted by the driver as needed, using the vehicle's ammeter as a guide. If the ammeter was reading high or showing a discharge, then the operator had to adjust the generator's output by moving the third brush. In most cases, that would be toward the output brush to increase amperage or away from it to lower amperage output. But the Model T is slightly different, which we will get to later.

On the vehicle, two to four amps was deemed sufficient to keep up the battery. Slightly higher (five or six amps) was OK for short periods, say 15 minutes or less. Long extended drives required a low setting of two to three amps. Keep in mind that "on the vehicle" means that the ammeter readings are not the



Figure 1 – Gear-driven Model T Ford generator – 6 volt, negative ground.

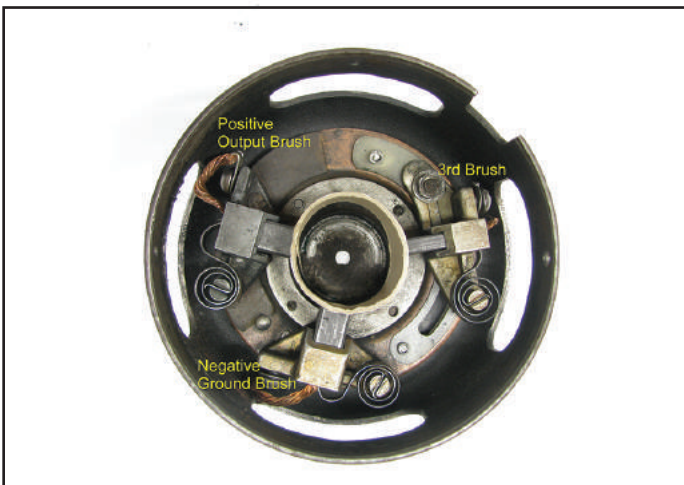


Figure 2 – This is the Model T's 3rd brush and the nut that must be loosened to make adjustments.

MODEL T GENERATOR

generator's full output but only the amount going to the battery.

The job of the third brush is collecting current from the armature's commutator and supplying that current to the field coils. A fundamental property of a third brush's current is that its voltage level is adversely affected by any increases in the armature's shaft speed. This phenomenon is caused by a shifting of the magnetic flux lines from the pole shoes, distorted by the movement of the magnetism emanating from armature's spinning iron core. In effect, any increases in armature speed will shift optimal output away from the third brush on the commutator. Consequently, the voltage picked up by the third brush decreases as armature speed increases. This effectively prevents the generator from overcharging at high speeds.

I normally search for the "sweet spot" in shaft speed that produces the highest output level prior to making third brush adjustments. You can do this by increasing the speed slowly until the generator begins to charge and hold it there until amperage output stabilizes. Then increase and decrease the speed gradually until you find the shaft speed that produces the most amperage. Only then can you accurately make your third brush adjustments. In most cases, I've found it is slightly above what would be idle speed on the vehicle.

Voltage Upside Down

But as I was attempting to make this adjustment on the Model T generator, I found that moving the third brush had little to no effect. In addition, increasing the speed had no effect either. Even at low speeds, amperage was going past 20 amps. It seemed to make no sense. The only way I could control amperage was by keeping shaft speed very low, at or below what would be idle.

In the past, when the brushes were accessible, I have monitored voltage on both the third brush and the output brush, to get a comparison. What I have found is that field brush voltage is always lower than output brush voltage and the variance increases with shaft speed. From past experience with 6 volt generators, I have seen third brush voltage drop below one volt at very high shaft speeds. When I conducted this test on the troublesome Model T generator, I discovered that the exact opposite was happening (see Figure 3). Not only was the third brush voltage higher than the output brush, but the difference between the two increased with shaft speed. That explained my inability to control the generator by moving the third brush. High voltage on the field coils caused amperage and magnetism to increase, but what was causing this voltage anomaly?

At this point I began to question everything. But in the end, the only plausible answer was in the finding that output voltage was lower than the third brush's voltage. That was definitely causing the run-a-way amperage output.

I considered the facts that I knew to be true:

- Both brushes were receiving voltage from the same commutator.
- Both brushes used the same ground brush to complete their respective circuits.
- The output brush was positioned to get optimal voltage.
- The third brush was positioned to pick up a lower voltage.
- You can't get something for nothing.

It was scientifically impossible for the third brush to receive

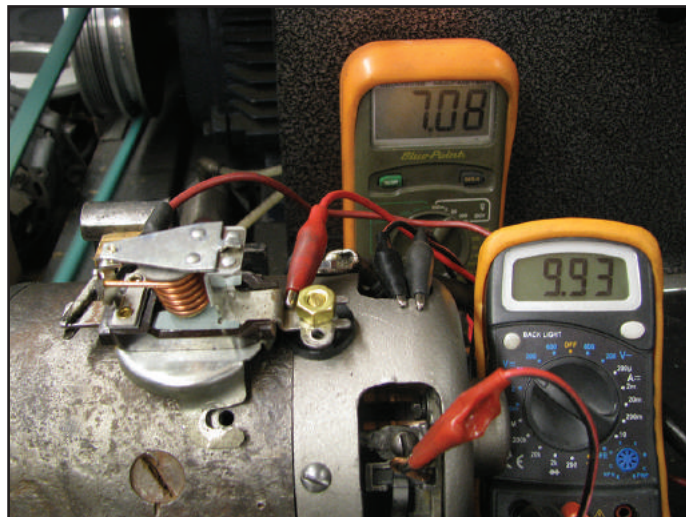


Figure 3 – Notice that the 3rd brush voltage in the foreground is higher than the voltage at the output terminal.

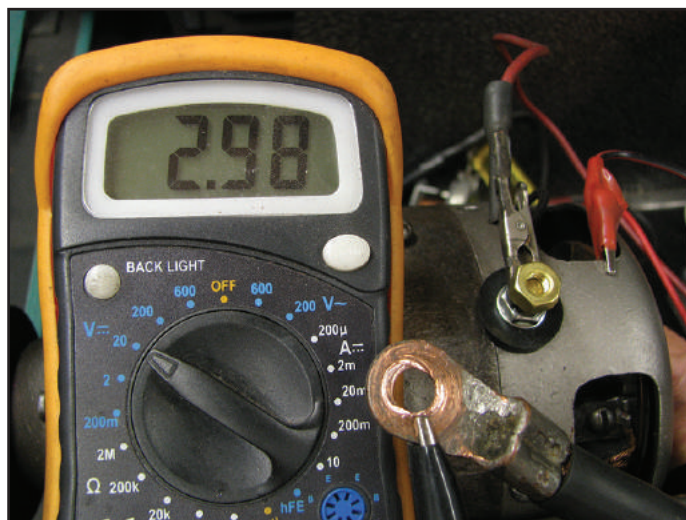


Figure 4 – Six volts positive is being applied to the output terminal and reading almost 3 volts leaking to the case.

a higher voltage. Therefore "something" was pulling down the voltage on the output brush. Could it be leakage to ground? I had checked for a brush holder short to ground using a 12 volt power supply and found none. It seemed unlikely given the generator had put out over 20 amps, but it would explain the backwards voltage differential between the third and output brushes.

I had performed voltage drops testing between generator ground brushes and case grounds in the past with a high rate of success. A similar test by applying positive voltage to the output terminal could confirm leakage if it was present. Instead of grounding the case, I grounded my voltmeter and then tested the case for positive voltage (see Figure 4). Alas, this confirmed that leakage was present.

Of course, a hi-pot (high voltage potential) test would have easily found this amount of leakage. However, I try to not use the hi-pot on very old parts, simply because it can damage something that might not be available. Looking back, I know that it would have saved me a lot of time and grief. But if I had, you might not be reading this now.



Figure 5 – After removing the positive brush's holder, you can see the burned rivet insulator.



Figure 6 – That is not a C-clip on the lower right. It is what was left of the round rivet insulator.

I removed the brush holder for a second closer look and disassembled it by removing the rivets. That revealed the source of the leakage (see Figures 5 and 6). As you can see in the photos, a small round insulator for one of the holder's rivets had deteriorated. The gap it created was partially filled with carbon debris, creating a high resistance path to ground. Not enough to visibly illuminate a 12 volt lamp but certainly enough to lower output voltage.

The original insulators were made of fiberboard, but a glass laminated replacement is offered. It may be more expensive but it is much more durable. The tiny rivet insulators were not readily available, so I made new ones with epoxy using the brush holder itself as a mold (see Figure 7). Once the epoxy cured, I drilled a 1/8" hole in each one to fit the rivets (see Figure 8). The finished brush holder (see Figure 9) easily passed a hi-pot test.

ERA member Joe Mazzone of Buckeye Auto Electric in Painesville, OH had told me that they reclaim very few Model T brush holders. The Model T generator is one his long-time specialties. He confided that about 80% of the brush holders they encounter require rebuilding.

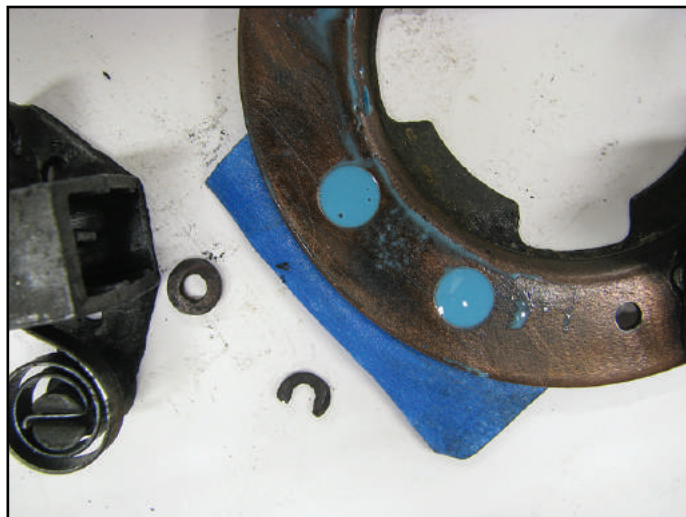


Figure 7 – Here we used Vensel Enterprise's blue epoxy to replace both rivet insulators.

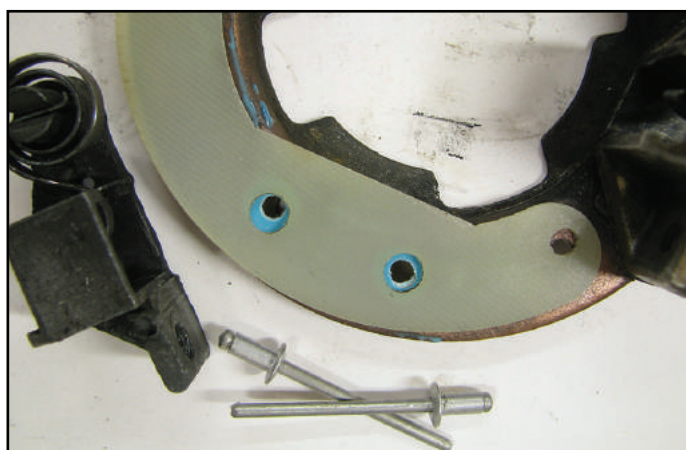


Figure 8 – After drilling 1/8" holes in the epoxy, it is ready to reassemble using a glass reinforced brush holder insulator.

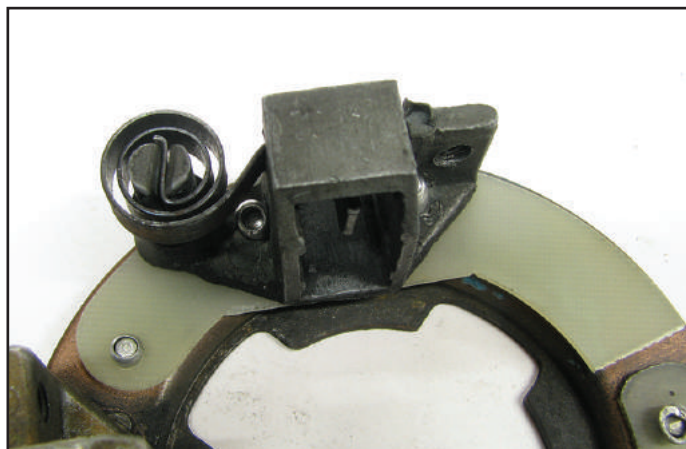


Figure 9 – The once leaking positive brush holder is now better than it was when new in the 1920's!

I mentioned earlier that this third brush's adjustment is a little different. To begin with, it has two means of adjustment. In addition to the movable third brush, the entire brush holder can be moved in relation to the pole shoes. This is possible by loosening the four mounting machine screws that hold the brush holder to the commutator end housing. These screws

MODEL T GENERATOR



Figure 10 – The steel ring with four threaded holes effectively clamps the adjustable brush holder assembly to the end frame.

thread into a steel ring that clamps the brush holder in place (see Figure 10). As you can see in the photo, the steel ring with the threaded holes is a separate piece. The brush plate itself is slotted for the screws (see Figure 11), which allows about 30 degree movement.

Before making any adjustments to the third brush, the plate must be set first. Follow these steps in order:

1. With the generator on your bench, loosen the four screws so the brush plate can be moved.
2. Motor the generator by applying B+ to the output stud or wire and grounding the case. It should motor CW.
3. Disable the third brush by lifting it off the commutator and move the spring to its side to secure it.
4. Motor the generator again. It will be motoring on residual magnetism only. Slowly rotate the brush plate to find the spot at which it will not motor at all, then back it up to where it has a tendency to motor.
5. Re-tighten the four screws. Slip the third brush back into place.

Now you can spin the generator and use the 3rd brush to adjust amperage output. As in all other 3rd brush generators, moving the brush in the direction of the armature's rotation will increase amperage. Moving it against the rotation will reduce output. If voltage on your battery goes too high, you will have to apply enough load to keep it down.

Spinning a gear-driven generator on a test bench can be a challenge. I used a common wide groove single pulley with a key slot, which fit relatively tightly on the shaft. I intentionally misaligned the generator's pulley with the drive pulley to insure the belt applied pressure toward the generator. It is not necessary to spin these older generators very fast. Adjustment of the third brush allowed me to set the output right where I wanted it at 10 amps.

A tip that I picked up on the Model T Forums (mtfca.com) is protecting the field coils with a fuse, which is remarkably easy to do, using an ATO 5 amp fuse (see Figure 12). Just install the

fuse between the 3rd brush and the field lead. This protects the field coils in the event that the cutout fails to close. When that happens, voltage inside the generator is uncontrolled, quickly go to 50 volts or more, and burn out a new set of field coils in seconds. Since I installed new fields, I also installed a fuse, to protect them.

Should you encounter one of these down the road, nearly any part needed can be purchased from Lang's Antique Car Parts, online at: modeltford.com. Field coils, Ace #40, are still being made. Armatures can be rewound.

Special thanks to ERA member Joe Mazzone of Buckeye Auto Electric in Painesville, OH for his advice and guidance. Thanks also to the Model T Forums experts who's posts contributed to this article.

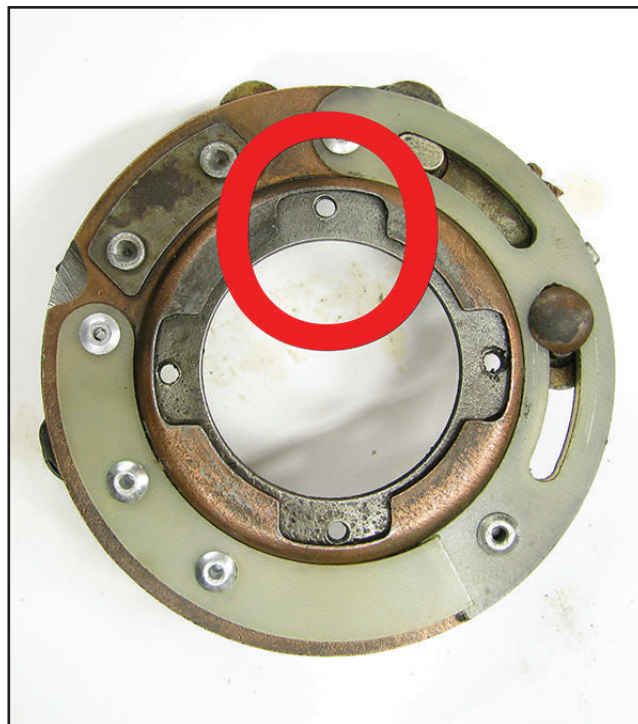


Figure 11 – Notice the open slots in the brush plate, which allows it to be rotated about 30 degrees.

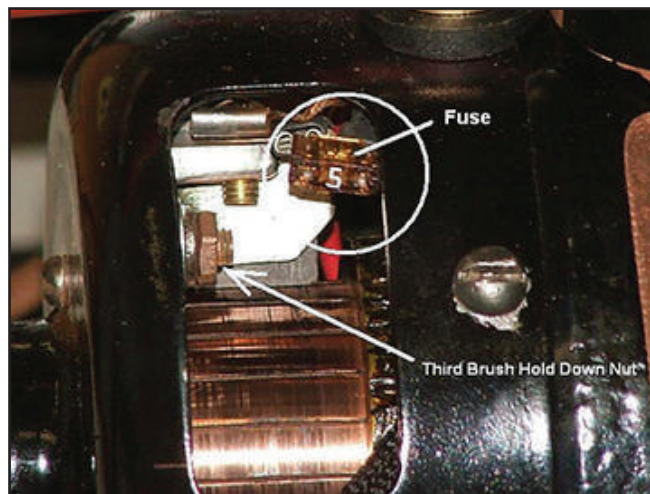


Figure 12 – Here you can see how an inexpensive 5 amp ATO fuse can be used to protect the field coils from accidental high voltage.

NO CUSTOMER LEFT BEHIND We're In It To Win



BY DOUG SLUITER

My brother, Steve and I inherited ownership and control of Sluiter Auto Electric after our father passed away. Dad was one of the local pioneers in this industry. He wasn't there right at the get-go but was close enough to the start to be on a first names basis with guys like Al Mansfield, Barney Kaplan, Phil Bard and a host of others.

We grew up literally in the midst of the business. Dad had his shop in our basement for what seemed to be eons. When we went to school, we thought there was something wrong with you if you didn't smell like cleaning solvent; LOL!

Nevertheless, the basement enterprise ran its course and the time came to move on to bigger and better things. It was a great run for all of us!

Dad bought property on the corner of Indiana and 168th St. in South Holland, IL. He built the custom building of his dreams and did a lot of business there up until he was hospitalized and passed away. We've expanded the building a bit, actually, to the limits of the property lines. My brother and I are still rebuilding as dad did. We just do a whole lot more rebuilding with customers that dad would not have considered during his reign.

We rebuild just about any type of starter, alternator and

generator. We have now begun to dabble with large D.C. motors and other fork lift related items. We also sell and service a line of industrial and automotive batteries. Aside from that, we all work long hours and incredibly hard!

In order to keep our costs down, we all are on the bench rebuilding something. Everyone gets their hands dirty, we have no executives. Global economic policies have not only put us in direct competition with our suppliers, it puts us in competition with entire nations! Who would have thought? This has been no picnic. I'd be lying to you saying that after all these years, the dues have been paid and we're half-stepping for big money. If anything, this is harder and requires more work than ever!

Anyone on our payroll is subject to drop what they're doing and deliver to a customer. Sometimes, our shop is almost empty because most are out delivering to customers somewhere. My brother and I realized early in the game that missing sales is a quick route to extinction. Besides, these days every customer has a slew of choices from whom he can buy from. Of course, we want and need it to be us. We've found that a rapid response is equally as important as a well-built unit!

Staying at the top of your customer's speed-dial is vital. Lose your spot to another source and it may be years before

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NO CUSTOMER LEFT BEHIND

you get it back, if you get it back at all. Getting customers what they want when they want it is imperative. In dad's day, customers didn't mind waiting a bit. Today, the word wait isn't in most people's vocabulary.

Dad never spent anytime reclaiming components. If he could buy it, he cut the best deal that he could and that's what he did. We've continued with that thinking. Focusing on unit productivity per man-hours is where the money is at and that's where we concentrate. We've never worked on armatures or starter drives. Although, we have always rebuilt our own solenoids, for quality reasons, and prepared all of our field housings.

A recent departure from the past is that we've developed a small, effective stator rewind department which does an incredible job! This was developed out of necessity. Almost all of our rewinders are gone but we still have the need. Our customers have very old or very new items where stators just can't be bought without buying the entire alternator. We also have customers who need voltage changes and high amp upgrades. No one can afford to say no, we can't do it or any other unfavorable response to the customer. If you do, they won't call you back.

So now we are in the stator business. We have never taken this to the market place so we have a whole lot more

capacity than we need. So, if you find yourself wound around an axle looking to get a stator rewound, try giving us a call. I'm sure we can help you. Face it, none of us can afford to miss income opportunities, so don't.

Rebuilding has never been easy. Actually, we find it more difficult than ever. Between the price cuttings, price matching killer and competition from everywhere, some days it is hard getting out of bed in the morning. From here on end, this industry is going to take a tough, hardworking and very resilient effort to keep the doors open and make money. We are up to the challenge at Sluiter's. Not that we haven't had our bumps and bruises, we have and continue to have our share. Yet, in spite of it all, we are definitely doing okay and have every intention to continue doing so.

This is a good place to close, so I will. In conclusion, we advocate customer-customer-customer. Try hard to stay on top of the speed dial. Work hard, and last but not least, ask God to show us the windows of opportunity so that we all can continue to walk through and prosper. We're in it to win it!

Good luck to all and may God bless.

Doug Sluiter is co-owner of Sluiter's Auto Electric in South Holland, IL and a Charter Member of the ERA. Doug can be reached at 708-333-5000.



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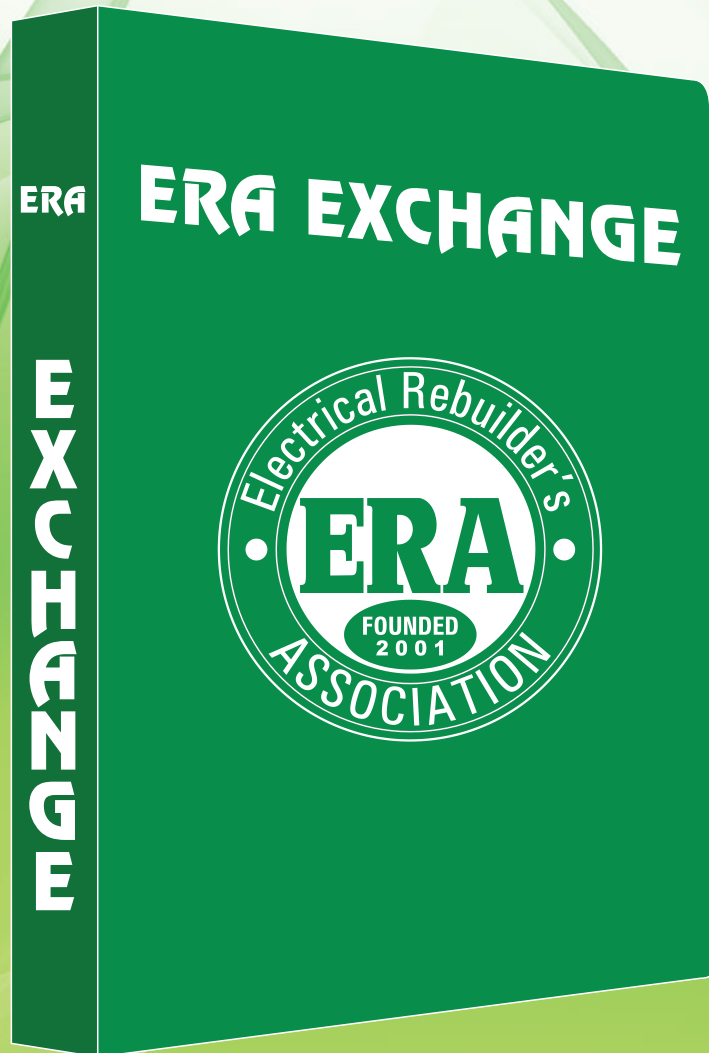
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- 3 – Only current Rebuilder and Honorary ERA members are eligible.
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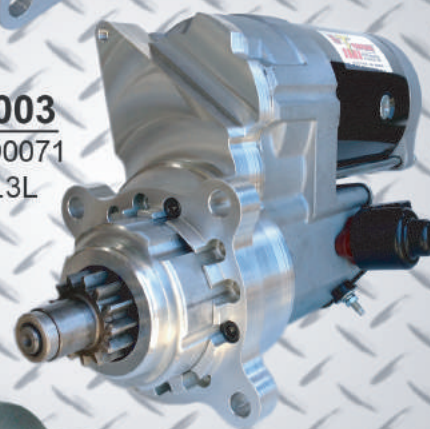


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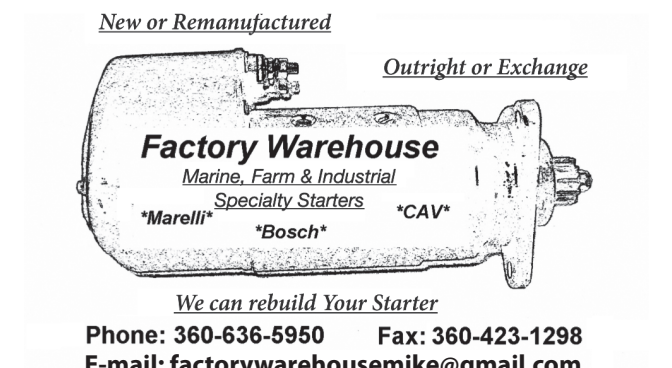
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