ERA EXCHANGE

YOUR GUIDE TO ELECTRICAL REBUILDING

July 2020 $12.95

AUTO ELECTRIC CORNER
Solenoids, Brush Position and Hidden Batteries

BATTERY CHARGER REPAIR PT. 2
Manually Controlled Transformers

1953 DIAMOND T FIRETRUCK
Needed 6 & 12 Volts - A Unique Solution

COMMON SENSE
A Simple Act of Kindness - Paying It Forward

A WORD FROM THE PRESIDENT

Reopening, Website Improvements & Refunds



In Connecticut, we have just begun Phase II of our governor's reopening plan. Fortunately, my shop has been continuously open all along. Since we supply many providers of essential services, both government and private, we were not forced to close like restaurants, bars and theaters. Neither I nor any of my employees have come down with the virus so far. Yes, I did have to cut back on their hours, but thankfully they all continued to receive a weekly paycheck. With the past week of demonstrations nationwide, I hope that we don't return to the pandemic of this past March.

Enough on that subject and back to ERA business. For those members that visit our website, you may have noticed more improvements to the home page. The left hand menu has been condensed with multiple drop downs for related items and subject pages. For those who don't visit our website often, I encourage you to do so as you are missing out on a big part of what your dues help to pay for.

As for the registration refunds for the cancelled 2020 ERA Trade Show, the ERA office has put together a plan to document and disperse funds back to each registrant's credit card account if it was paid with credit card or by sending a check by mail if it was paid that way. The ERA office will be contacting all registrants to verify method of repayment.

The office has informed me that many registrants including some supplier vendors have told the office that they do not want the refund. Instead they are giving their refund back to the association. WOW!!!!

One rebuilder who had registered four people contributed all of his registrations fee back to the ERA. He commented, "The ERA is family, and I would hate to see the association move in reverse." He said that he has been an ERA member for many years and is very grateful that the association has continued to be successful in bringing our industry the much needed training and support. Speaking on behalf of the ERA Executive Board, Board Of Directors, & Board Of Advisors we thank you all for your generous voluntarily contributions to help the ERA get past the loss of show income for this year.

Ken Plourde

NEW ERA MEMBERS

US Alternators
Canton, Michigan

Chambers Auto Electric
Carthage, Mississippi
Recruited by Joe Mazzone at Buckeye Auto Electric

Carver Starter & Alternator
Jonesburg, Missouri

Whatcom Electric
Bellingham, Washington

ABOUT THE COVER

A battery charger transformer's outer (primary) winding.

ERA EXCHANGE

Volume 37 Number 8

July 2020

Published monthly by the
Electrical Rebuilder's Association
PO Box 906
Union, MO 63084
Phone 636-584-7400
office@electricalrebuilders.org

EDITORIAL ASSISTANT / Bob Thomas

DESIGN & PRODUCTION / Stephanie Schroeder

CONTRIBUTING WRITERS / Mohammad Samii, Ken Plourde, Larry Hagemeister, Rick Polete, Bob Thomas

CONTENTS

2 A WORD FROM THE PRESIDENT
2 NEW ERA MEMBERS
3 INDUSTRY NEWS
4 AUTO ELECTRIC CORNER — Solenoids, Brush Position and Hidden Batteries
8 COMMON SENSE — A Simple Act of Kindness Paying It Forward
10 1953 DIAMOND T FIRETRUCK Needed 6 & 12 Volts - A Unique Solution
11 BATTERY CHARGER REPAIR PT. 2 Manually Controlled Transformers
15 CLASSIFIED ADS

Copyright 2020 • Printed in the United States

The publisher retains the right to edit for content, style or space. All submissions become the property of the ERA Exchange. Opinions expressed herein of contributing authors do not necessarily reflect the opinion of the staff or policy of the ERA Exchange. All advertisers herein warrant that they are duly authorized to engage in the business described by them when applying for advertising and further warrant they are duly authorized to use any copy, illustration and any trademarks or trade names which may be specified for use in their ad. The ERA Exchange limits its liability due to production errors or omissions to the running of a correction in the next issue.

Rebuilding is Recycling!

INDUSTRY NEWS
& ANNOUNCEMENTS

APPTRAK Adds John Deere Application Data

Apptrak recently announced the addition of the most complete John Deere equipment application data (by model number and unit part numbers) in our industry. It now covers both the newest and oldest John Deere models. Some of these applications have never been covered anywhere in our industry before.

Apptrak is a web-based starter/alternator information database tool created for electrical rebuilders and managed by an electrical rebuilder, Whatcom Electric. Having the parts and cross-reference information that you need, right at your fingertips, saves you time and eliminates trial and error guess work. Apptrak is designed to help electrical rebuilders operate more efficiently and produce a higher quality product by quickly providing the data that they need when they need it. Having the parts and cross-reference information that you need, right at your fingertips, saves you time and eliminates trial and error guess work.

"Over twenty years ago we recognized the need for a software that catered to the needs of a rotating electric rebuilder, like ourselves; software that was structured to fit the mindset of the rebuilder, as well as software that would provide quick, concise and complete answers to the varying questions seen in the day to day rebuilding and sales operations," explained Dan Bell, founder and owner of Whatcom Electric Company in Bellingham, WA. "We put a lot of effort into structuring Apptrak in a format that is easy-to-use and easy-to-learn."

"Our team of research staff, engineers and technicians work together with our industry partners to test and verify every bit of information that we put into Apptrak. As the rotating electrical remanufacturing industry evolves to meet the demands of the consuming public, both retail and wholesale, our commitment at Apptrak Online is to continue to provide our rebuilder users with the best information available."

The normal subscription price for Apptrak Online is $395/year, but ERA members receive a special price of $249/year that includes two users. They also offer a free two-week trial if you want to try it out. Just call 360-255-5990 to get started.

COLLET BEARING PUSHER

A newly improved bearing removal system for removing those challenging bearings.



A Tool that Pays for itself in Time Saved!

DELCO
Automotive, Industrial, Marine
Applications with 35mm bearings behind slipring, against straight or spiral fan blades

DENSO
Automotive, Industrial
Denso hairpin type alternators with 35mm bearing inside dust shield

Removes Bearings & Races Super-Fast In Seconds!

CAE PULLERS LLC
Tel 727.432.2406
Email caepuller@yahoo.com

MEMBER OF ERA Electrical Rebuilders & Associates

Tools designed by a Rebuilder for Rebuilders Since 1989

AUTO ELECTRIC CORNER —
Solenoids, Brush Position and Hidden Batteries



BY MOHAMMAD SAMII

Solenoids and Quality…!

Familiar can-type solenoids which are used in starting systems, powering up glow-plugs, hydraulic pumps, lift-gates and winches, as well as many other applications are actually hi-power relays. For reasons that are still unknown to me they are called solenoids.

A solenoid by definition is an electro-mechanical device that uses electricity to accomplish a mechanical action such as closing or opening a valve as an example. Starter solenoids have a dual function, not only do they provide a mechanical action but also act as a hi-power relay, connecting the battery to the motor terminal. So why these can-type relays are still called solenoids is a mystery to me.

These solenoids (?), regardless of their configuration and the number of posts, come in two major categories that are of concern to electrical rebuilders. They are classified as Intermittent or Continuous Duty solenoids. If their part numbers are not known, they are indistinguishable from each other because they look identical. More about their differences later (*see Figure 1*).

A recent new solenoid failure on an expensive hydraulic pump motor assembly that we rebuilt and failed after a day of use became a serious cause of concern to me. The failed solenoid was new and the customer was indeed correct; it had failed to energize to run the pump, and a replacement took care of the problem. Thus I was concerned why the new solenoid failed and what I should do to prevent that I from happening again in the future. So I decided to open it up, dig out its internal components and narrow down the cause of the failure.

Well, the results were disappointing. The manufacturing quality was very poor. It was no wonder that this thing did not last more than a day. The can when opened showed a good amount of corrosion inside. Something that could not have happened in a day of operation or sitting on our shelf for a few weeks.

The main posts were a four-cornered, hollowed out, stamped stud. One flat side of it was used to make contact with the disc. The coil input wire was wrapped around the "S" terminal stud, without the use of any eyelet or being soldered. The worst part was the ground connection of the coil. It was simply a loose piece of wire that the manufacturer hoped would touch the can and make a ground connection. Well…it did in the factory and when the pump was tested, and then quit after a day in the field (*see Figure 2*).

I believe we can classify these solenoids as a brand-name product, like Cole-Hersee, Prestolite or Ametek that have a history of proven quality, or an imitation (read: cheaper) version of the same, which nearly all are imported. Of course making a less expensive product requires cutting corners in labor time and materials, but in my opinion, wrapping the input lead of a high-power relay coil around the stud without soldering, and laying the other end loose, hoping for it to make a solid consistent ground contact is far from making a device that one can rely and expect reasonable extended performance from it.

On the differences between the intermittent and continuous duty, my measurements showed that the difference is on the relay's coil resistance, resulting the amperage draw and perhaps a lot less or actually no difference in their contacts and disc. As shown in the photo (*see Figure 3*), the continuous duty solenoid drew a little over 725mA, and the intermittent almost 3 times as much, well over 2 Amps. That equates to a wattage difference of 10W compared to 30W. The resulting generated heat in

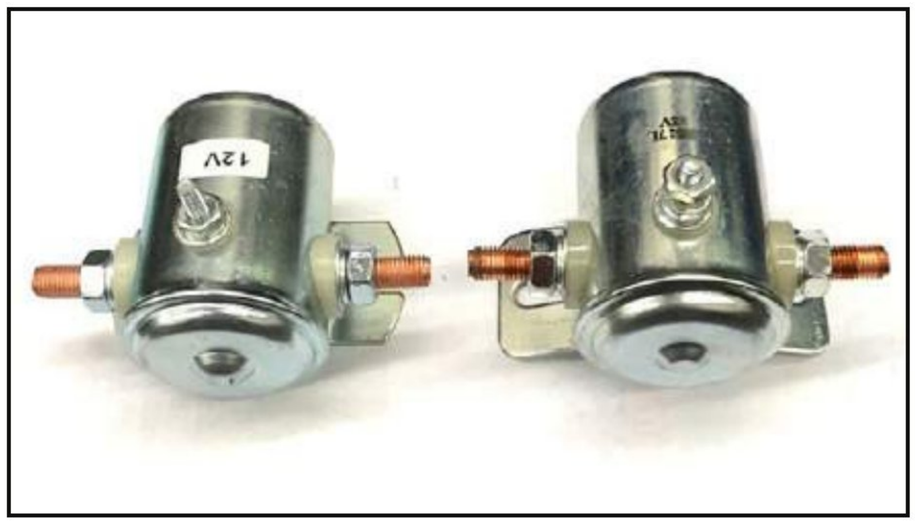


Figure 1 – Continuous and Intermittent Duty solenoids are identical in appearance.

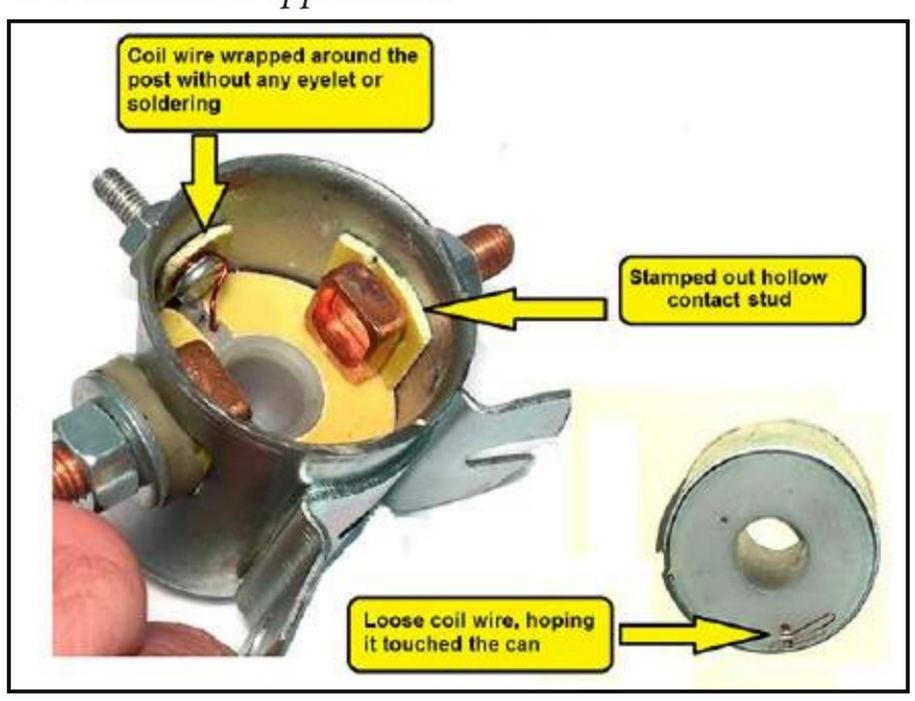


Figure 2 – Poor quality and shoddy workmanship of an imported solenoid.



Figure 3 – Coil amp draw difference of the two types.

the latter could overheat and melt the coil, while the other one can easily disperse the heat and run for a long time without overheating.

This is an important point to remember on applications like a contactor relay, connecting one set of batteries to the another (such as those used in RV's or Limo's). A Continuous Duty relay must be used in such applications because they are "ON" as long as the ignition is turned on and the engine is running. It is also important to know that the differences shown in amp-draw are more consistent with name brands and a lot less with the cheaper imitations.

After my experience with the above relay, I have decided to abandon any alleged savings gained by using the cheaper relays. It is now brand names only. We will price out the work accordingly and minimize the chances for unexpected failures. The sample that I took apart was certainly not an acceptable product.

Hitachi Alternator Brush Position

A recent experience with a Hitachi LR1110-501 alternator (12536) that is commonly used on Isuzu NPR trucks and similar applications turned out to be a learning experience about its regulators.

Typically any internally regulated Hitachi that I have seen, the outside brush riding on the slip-ring has been the field brush. Actually this is the way one can bypass the regulator by sticking a grounded pin through the brush pin hole to bypass the regulator to determine where the problem lies. This particular alternator, using a Regitar VRH-2000-71 (WAI's IH-748) is different, in that the field brush rides on the inside slip-ring. (*see Figure 4*)

When the new regulator was tested before installation and it would not work, I looked up the details on Regitar's website to find out that this regulator, a typical A-circuit ,has a reversed position for the field brush compared to every Hitachi regulator I had ever seen! The point is, if this regulator had been installed and I had attempted to bypass it on the test bench, there would have

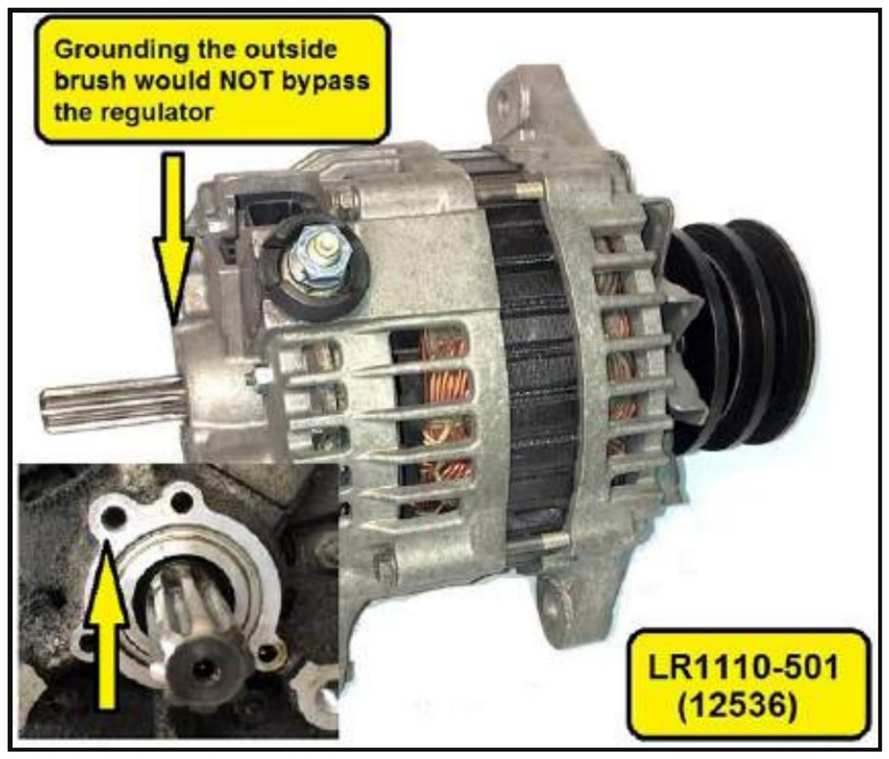


Figure 4 – LR11150-501 Hitachi alternator and brush pin-hole location.



been a good possibility that it would have been damaged by grounding the positive brush - a point to remembered for the future (*see Figure 5*).

As you know, the vacuum pump attaches to the back of this alternator and is lubricated by engine oil. When the seal at the SRE frame fails, the oil will penetrate inside, saturate the slip-ring and wear the brushes out in a short time. The seals are available and must be replaced during the overhaul, but the condition of the rotor shaft extension must be also considered. If it is deeply grooved, it may allow the oil to seep in, which will disable the alternator in a short time.

Battery and Connections

No-crank, no-start issues are a common problem that we routinely encounter on vehicles that are towed in for service. The problems can range anywhere from a bad/dead battery, excessive parasitic draw that has fully drained the battery, or an anti-theft problem that does not recognize the key, has disabled the starting system, and is not allowing any cranking. At the extreme end of the spectrum, we see failed PCM or its lack of related communication with the other modules that must exist for the car to crank and start. Regardless of the methods used to pinpoint the problem, the first step is always a thorough examination of the battery, cables, state of charge, load test, and its actual physical condition.

One recent case was a 2008 Dodge Avenger that was towed in for a no-start problem. To access the battery in this vehicle, it must be lifted, its left front wheel removed, and the inner fender skirt pulled out to allow a glimpse at the battery. The poor physical condition of this battery and its connections did not allow any meaningful testing to be done, so we pulled the battery out to take a close look at it (*see Figure 6)*. This photo is the top of the battery as it was taken out of the battery tray.

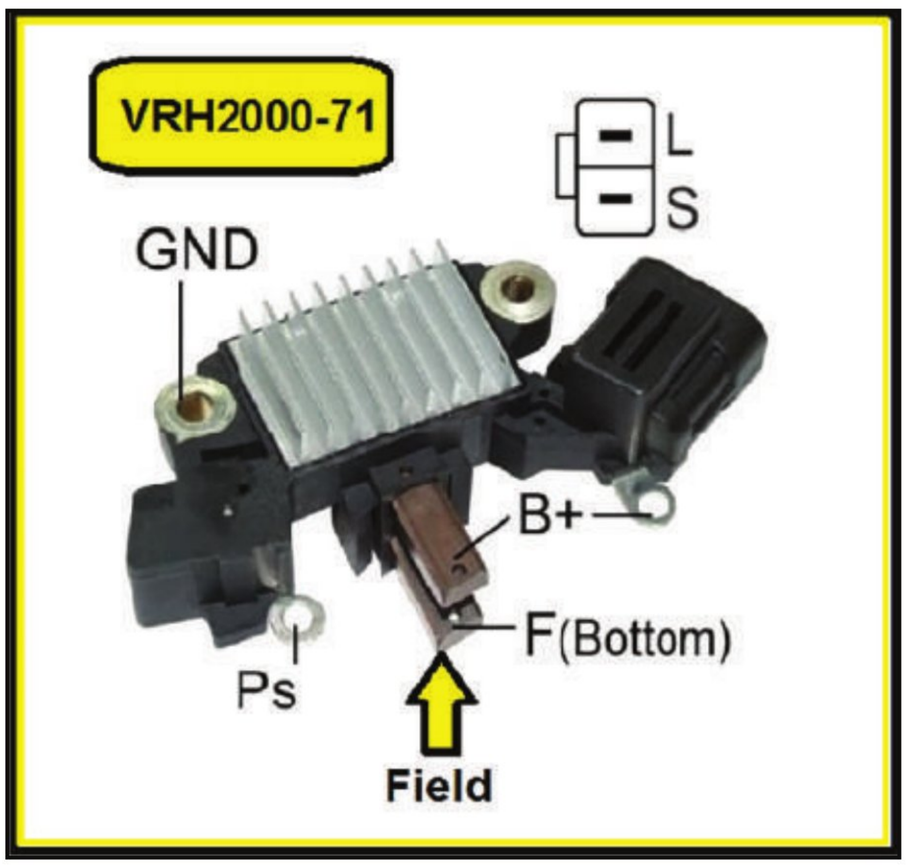


Figure 5 – Field brush on the inside slip-ring (photo courtesy of Regitar USA, Inc.).



It looked as if the years of neglect had taken its toll and the battery cables literally fell apart during the battery removal. Once the wiring to the cable-end was inspected, it was determine the corrosion has built along the cables, which required a portion of it to be replaced. So the battery was cleaned, serviced and charged. Surprisingly, a load test showed that it was still serviceable. The corroded portions of the cables were replaced and new eyelet and battery cable-ends installed (*see Figure 7*). Upon completion the car started and run just fine.

Hidden batteries that are being more common in newer designs and are very good candidates for neglect. When they are out of sight, no one is going to spend the required time to pull them out and service them. Servicing batteries and its cables is not something usually done during a starter change by a hurried technician, but in the case of any hard or no-cranking, the starter rebuilder or the supplier is the first one to hear about it.

Well, that's all for this issue. Until I see you again, 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 6 – Battery location inside the front left wheel-well.



Figure 7 – The neglected Avenger battery as it came off the car.



COMMON SENSE — A Simple Act of Kindness
Paying It Forward



BY BOB THOMAS

A few years ago, not too long after I closed B&H Electric, something happened to me at a checkout counter in a grocery store that has greatly impacted not only my own life, but some others too.

To digress a bit, I have been doing all of our grocery shopping since my wife Sarah was diagnosed with an auto-immune liver illness. It is a small weekly chore that is accomplished efficiently every Wednesday morning when the least number of shoppers are in the store. I was doing it this way long before there was a pandemic.

Sarah usually prepares a list of what we need and know the store well enough to almost fill the cart blindfolded. I walk fast and waste few steps. Typically, it takes less that 30 minutes from the time that I pull into the parking lot until I am driving back out again. Sarah says that I'm always in a hurry, like that is not a good thing. And I confess that sometimes I forget essential items when I leave home, like the shopping list itself, my watch, my sun glasses, my cell phone or in this one instance, my wallet.

On this day, I had already placed all of my groceries on the counter as the last few items belonging to the lady in front of me were being rung up when I reached for my wallet. It was not there. In a panic, I told the cashier not to ring up anything. As I began to hurriedly put everything back into the cart, I asked if she could hold the cart while I drove home to get my wallet – about a 30 minute trip each way. I assured her that I would return in about an hour.

It was at that point that the lady in front of me instructed the cashier to ring up my groceries with hers. It caught me completely off guard. I attempted to refuse her offer, feeling that it was far too generous, but the cashier, who had just finished with her items began following the request. Once a few of my items were already added to her tab, further resistance was futile. I inquired about how I could repay her – a mailing address or a meeting at her convenience? "No," she said. "I want to do this for you. If you want to repay me, then pay it forward. Do something for someone else in need." Suddenly, I understood what was happening. I thanked her profusely and promised that I would

JIMCO

!!NO SHOW SHOW SPECIAL!!

Orders must be placed in during the month of July
Request Delivery anytime Prior to Sept 31, 2020



10% Any Test Bench

15% off all Test Leads

15% off all Wire Parts

15% off all Brackets

All Other Standard Terms & Conditions Apply

CALL TO PLACE AN ORDER OR FOR PRICING

Ph: 816-331-1917 Email: jimcoinc@aol.com

pay it forward.

While I've always tried to do good deeds, it was usually simple things like holding the door for someone behind me and allowing them to walk in before me. It was a way to make the world a friendlier place for a total stranger. But now I found myself looking harder to find someone who was really in need. Weeks later, a woman asked for a dollar or two in the same grocery store parking lot. She did not have enough gas in her car to get home. I looked at the car and gave her a $20 bill. Did she really need gas? I will never know for sure. But if she did, I gave her enough to get home with her groceries.

Months passed by with me feeling like I still had a serious debt to pay forward. An incident with a neighbor's out-of-control dogs attacking and biting my dog, led me to the local animal control facility. I spoke to the dispatcher who assured me that they would follow up on the dog bite. As I thanked her, I casually mentioned that if I could ever do anything to help them, they should contact me. I was of course volunteering to help, not having a clue what that might entail. She said, "You need to talk to our supervisor." and she led me into his office. His name was Bob Pierce, but the staff called him Mr. Bob.

Aside from sharing the same first name, we were about the same age and found that we had a lot in common. We both grew up in Southeast Florida. We both served in the military around the same time. We both had owned and operated small businesses. I filled out some forms, which were all approved by the county, including an OK to drive any of their vehicles.

I started out doing small chores like picking up donated animal food in their pickup, then helping out with local adoption events. Over the last two years I have fixed things around the shelter that the county's maintenance staff could not get right, transported dogs to pet rescues as far away as Georgia, taken dogs and cats in their truck to out of county adoption events on weekends and made emergency runs to veterinary hospitals. Last year they gave me a set of keys so that I can come and go when the shelter is closed.

Mr Bob has since left as supervisor but he and his wife hold dog training classes, something they have done for most of their lives. The course is the American Kennel Club's Canine Good Citizen program, which is open to all dogs and owners. They gift the shelter enrollment for two dogs in each class at no charge. I've been a volunteer trainer since this began and have taken four shelter dogs through the course. Each one of them was subsequently adopted. These were all dogs that were once considered anti-social and uncontrollable.

I am not 100% sure that the incident in the grocery store led directly to the part-time volunteer job for local government, but it is doubtful that I would have become as involved if I had not forgotten my wallet that Wednesday morning many months ago. I am also not sure if I'm there for the many homeless animals or for the under-appreciated and under-payed county employees trying to operate the shelter on a limited budget. During these times, it is especially difficult for the staff to do their jobs. More animals are coming in and adoption events have been essentially shut down for several months.

But what I am sure of is that if I could go back and do it all over again, I would remember to take my wallet with me that day. And I would volunteer at the shelter years sooner. You can learn more about this shelter and the dog training classes at;
PawsForPutnam.Org

You can contact Bob Thomas by email at ere.bot@gmail.com or by phone at 904-673-7301.



1953 DIAMOND T FIRETRUCK
Needed 6 & 12 Volts - A Unique Solution



BY LARRY HAGEMEISTER

We recently received a first-time odd request from a customer. He wanted a dual voltage alternator capable of putting out both 6 and 12 volts for a restoration project. The vehicle was a 1953 Diamond T firetruck with a six volt system (*see Figure 1*). This was a pumper firetruck and the water pump was coupled to the engine. The starter had to turn both at the same time and it was unable to do it. The owner had already figured out that the starter would crank fine on 12 volts. Some original 6 volt accessories that included a unique siren that he wanted to keep, was the reason behind the strange request.

After thinking this over, I came up with the idea of converting a 12 volt alternator with a 24 volt transformer into a 6 volt alternator that would then put out 12 volts from the transformer. We still see some of the Delco 30SI alternators with a transformer mounted on the back. It was used on some of the bigger Steiger tractors in our area, Lester 7947. We do not see them on trucks any more, but you can still get the complete unit and the transformer is available in both aftermarket and OE. We also had plenty of cores on hand, making it the obvious choice for replacing the original 6 volt generator.

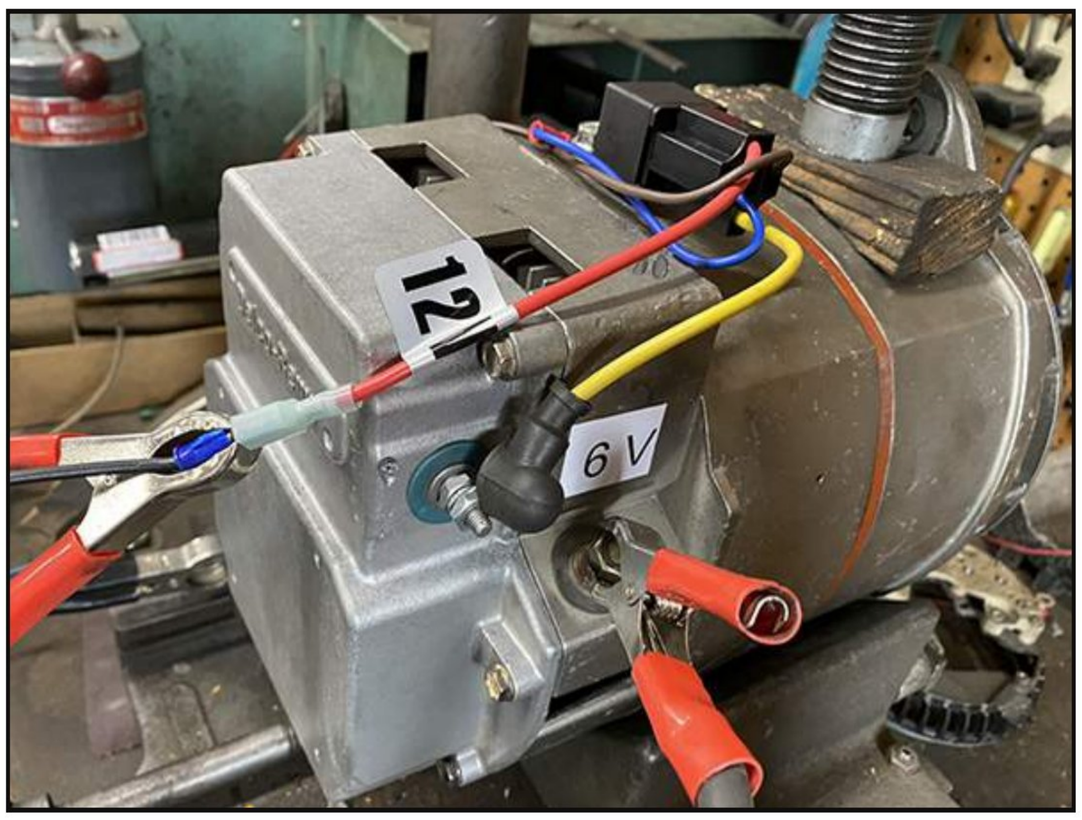
To convert the alternator, I installed a 25SI stator because its wye configuration provides a faster turn on. I used a D10SE6 voltage regulator. The unneeded "R" terminal connection was disconnected on the inside and attached to the trio's output side. This gave me a driving source for a 6 volt Bosch relay that we mounted on top of the alternator (*see Figure 2*). When the alternator activates, it trips the relay connected to the output post on the transformer for charging the 12 volt battery. I added this relay because the 12 volt transformer post was showing 6 volts at rest and I did not want it connected straight to the 12V battery. This prevents any possible 12 volt feedback into the transformer because the relay isolates the 12 volt battery until the alternator begins charging.

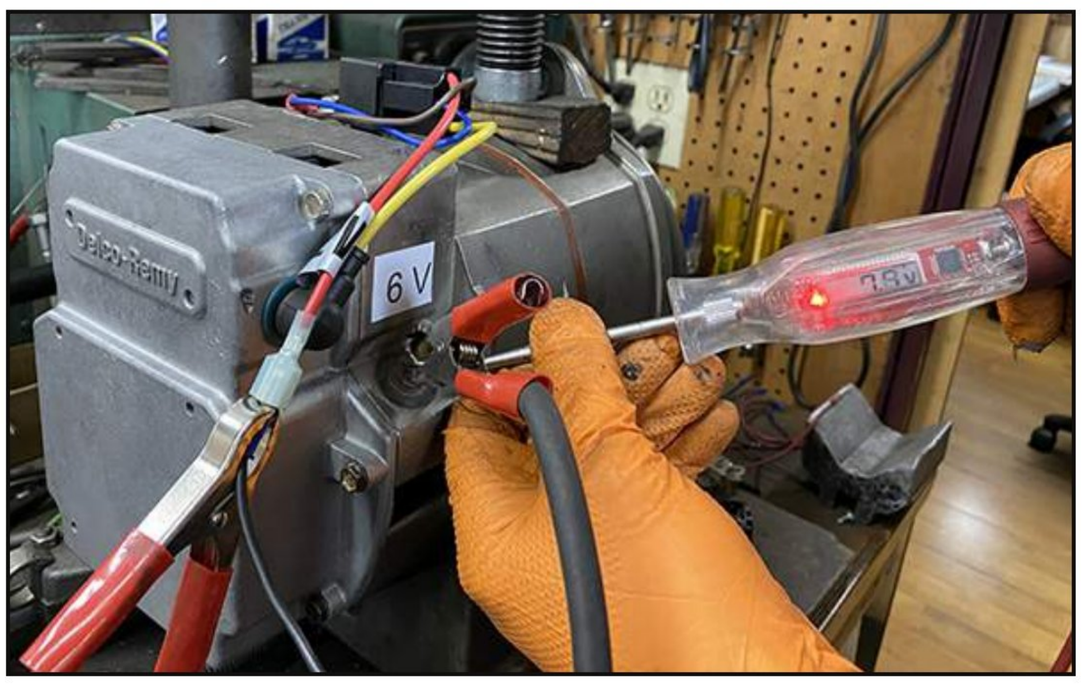
When we bench tested it connected to batteries, the 6 volt side charged at 7 volts (*see Figure 3*) while the transformer provided 14 volts to the 12 volt battery.

I want to eventually add a video of the alternator in operation on the truck to our website, but they have a lot of mechanical work to do on the truck yet. I have been told that the 30SI is on the truck and working but they cannot move the truck because the rear brakes are still apart. Hope this helps you if you ever get a strange request like this. This same circuit could be used with a 10SI by mounting the transformer remotely.

Larry Hagemeister is the owner of Hagemeister Enterprises, Inc in Lebanon, OR.







BATTERY CHARGER REPAIR PT. 2
Manually Controlled Transformers





BY BOB THOMAS & RICK POLETE

In last month's issue, we presented some basic information on battery charger repair and made the general statement that charger transformers rarely fail. This is especially true for transformers that have coils wound with copper wire (*see Figure 1*) as opposed to aluminum. Generally, these are the older or higher end chargers that you are most likely going to encounter.

We also stated that if a transformer is bad, then it is not cost effective to repair that charger. In this issue we will explain transformers and their control circuits in greater detail and provide a simple method that you can use to test a transformer before replacing any other parts.

Since the control switches supply the input power to the transformer and it is not uncommon for a timer or selection switch to fail, that is the most efficient place to begin your testing. You can find diagrams for many brands of chargers on manufacturer's websites. Some may even have a diagram inside the cabinet (*see Figure 2*). But even without a diagram, most charger circuits are not too difficult to figure out.

Begin your evaluation by verifying that you have AC voltage (usually 120v) coming in by following the black, white and green wires coming into the cabinet through the power cord. Test for correct voltage between the black and white leads. The black wire (hot) will usually go to the timer, which acts as the on-off switch. The white wire (neutral) may go directly to one side of the primary coil or another switch. It only takes a second to verify that the power cord itself is not bad, a problem we have found on older chargers before. The green wire (safety neural) is almost always grounded to the cabinet itself. A reading between black and green should be the same voltage as between black and white. At this point, you can clip one of your meter's leads to the neutral wire while you follow the hot side of the circuit.

Turn the timer switch on. You should hear a humming noise coming from the transformer and if there is a fan it should come on too. Verify that voltage is the same coming out of the timer. Usually two black wires are connected to the other side of the timer, one to the fan if it has one and the other leading to the voltage selection switch. You may find a thermal breaker in between (*see Figure 3*). Follow the voltage to each location.

If the transformer is testing dead – no hum, no secondary voltage, this does not necessarily mean that the transformer is scrap. Many charger manufacturers place a thermal fuse in the primary AC circuit and

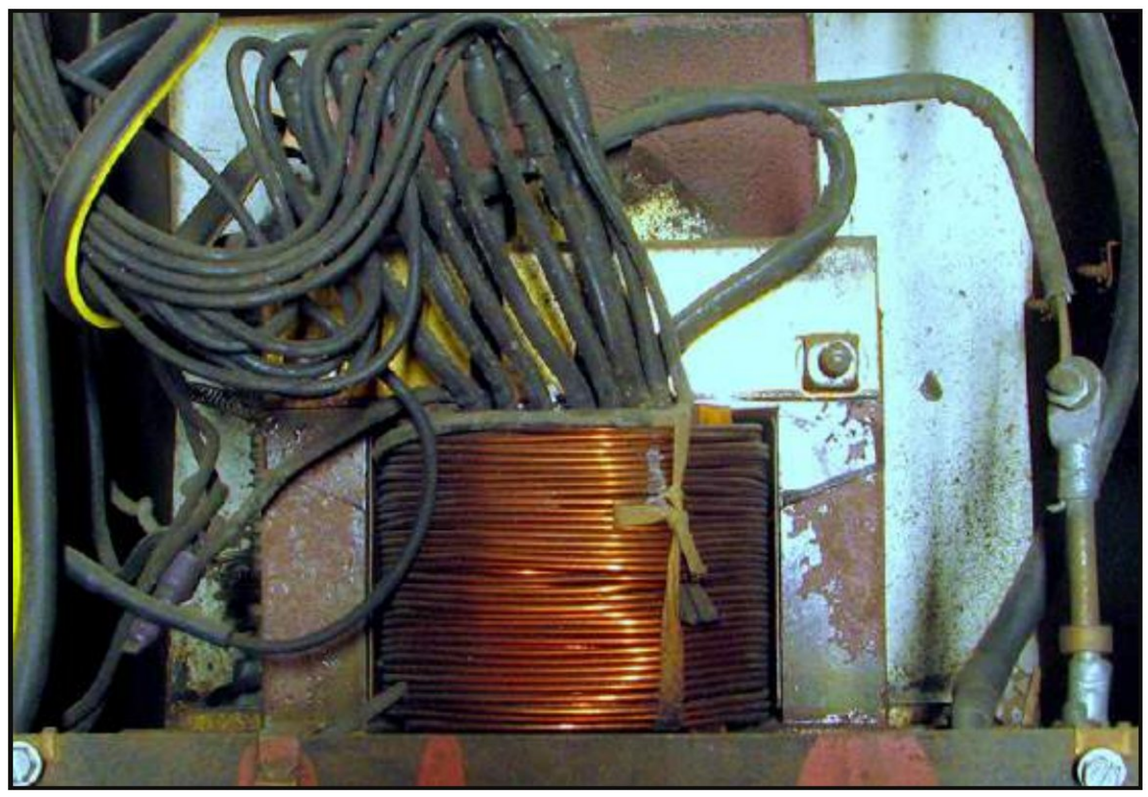


Figure 1 – Battery charger transformer with multiple primary winding taps.

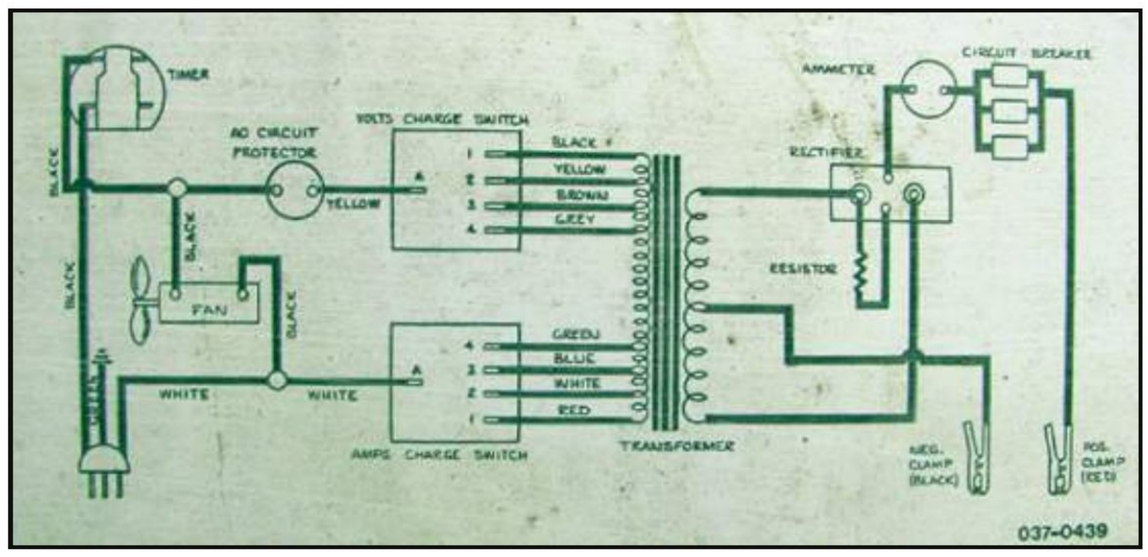


Figure 2 – Battery charger diagram found inside an Associated Equipment charger.

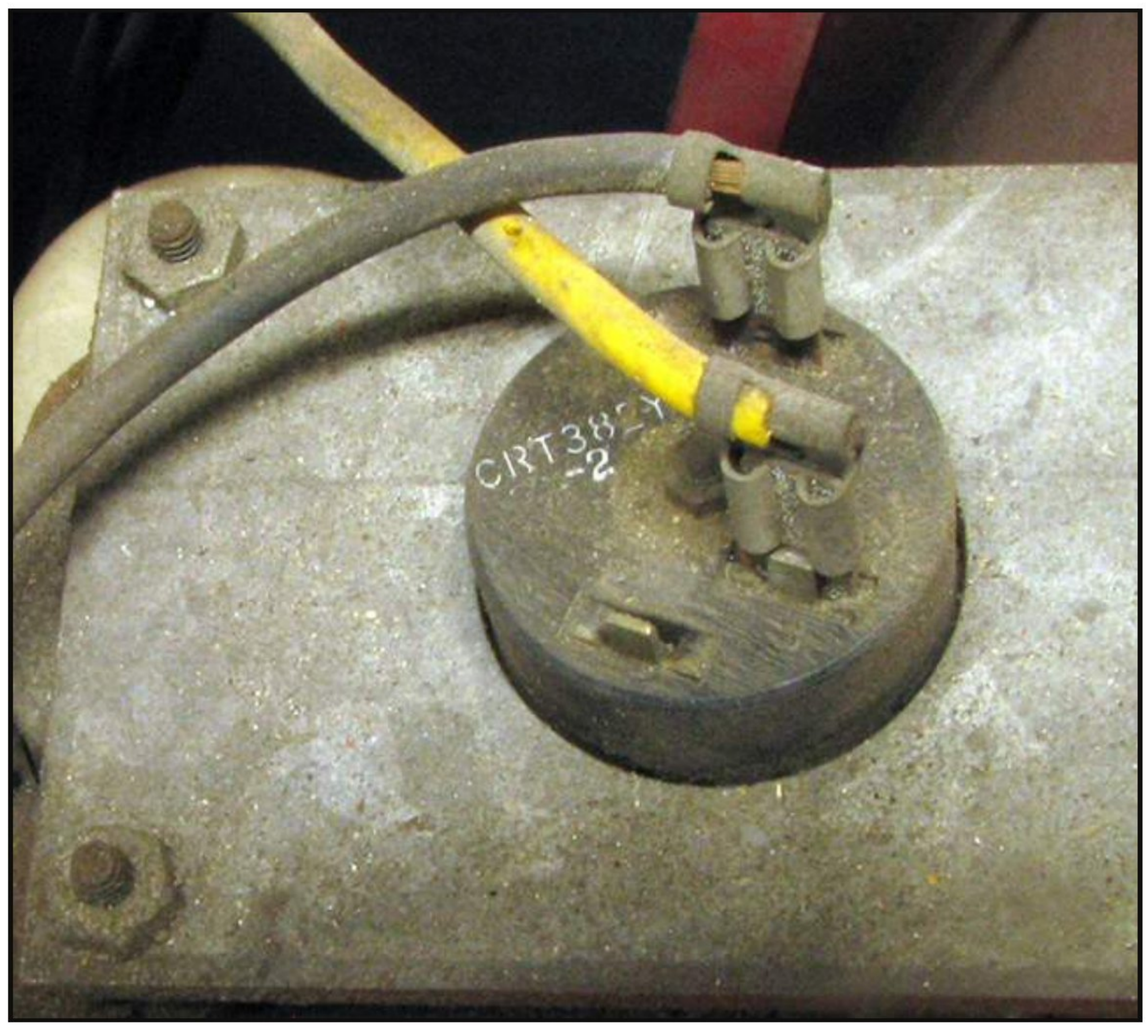


Figure 3 – Incoming AC power supply circuit breaker.

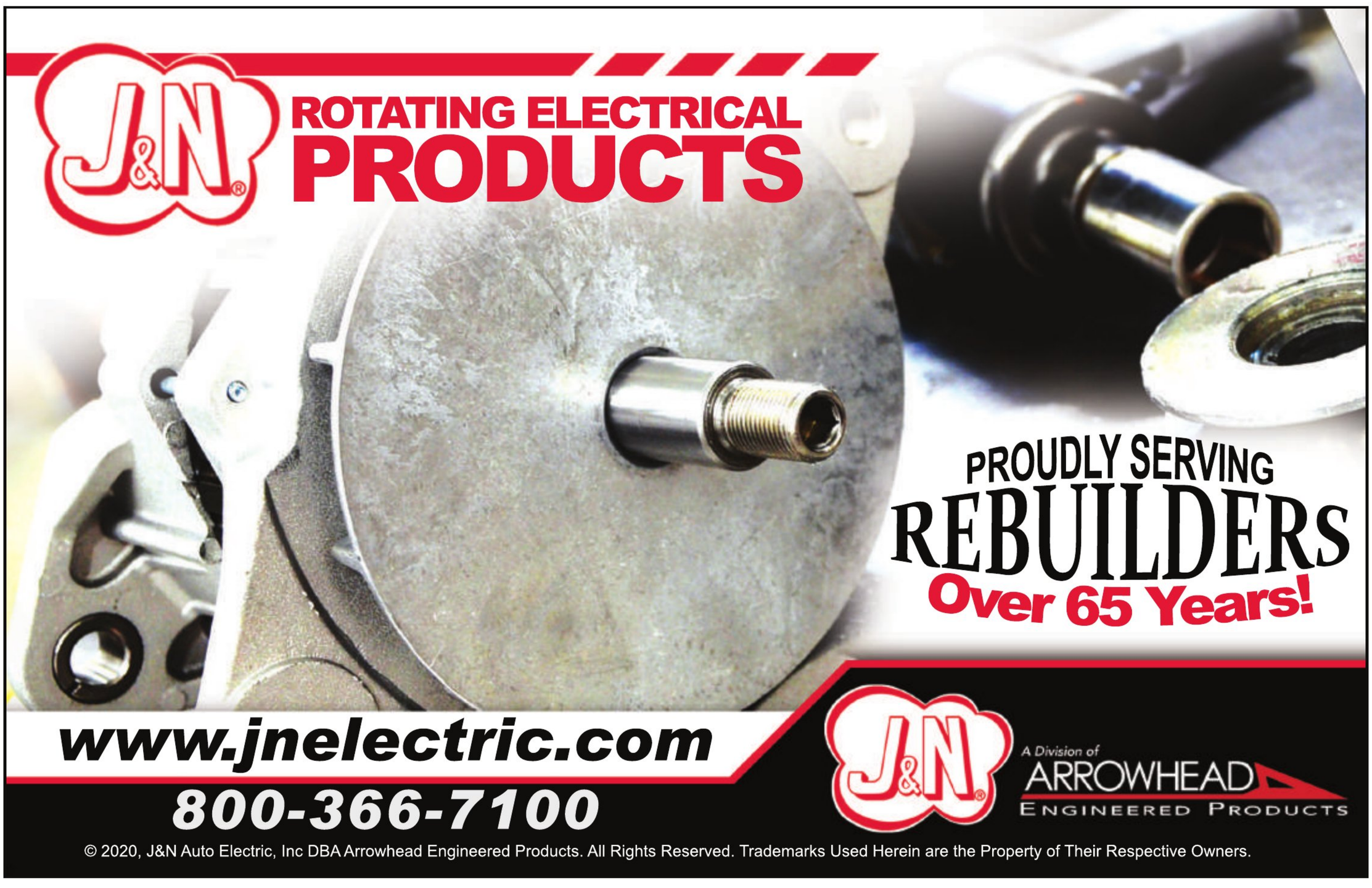
insert this device within the transformer's primary coil windings, where it protects the transformer from overheating. They can be difficult to identify because they are usually wrapped in insulating paper where they are inserted. However, close inspection will reveal the thin leads of these fuses, poking out the side of the transformer windings, wrapped in paper and covered in varnish. When you have a "dead" transformer, jumper across these leads to determine if the fuse is blown and needs to be replaced.

Keep following the AC voltage through each wire coming out of the voltage switch, as you test each setting by rotating the knob. You should see voltage close to line voltage for each switch position. All of this is a good indicator that the switch is OK. But one more test will confirm if the transformer is OK. That is to read the low voltage AC output directly off of the transformer's secondary coil before it passes through the rectifier. This secondary AC voltage should change incrementally as you move through the switch positions.

To locate those leads, look for the large wires coming out of the transformer. You will usually see three, but do not let that confuse you. Remember that many chargers split the end of the coil that goes to the rectifier into two leads. This is to evenly distribute the load. If you look closely, you can probably see where they are connected.

But be aware that some transformers tap the secondary coil in the middle for the ground charging cable (the diagram shown early is an example of this). This essentially creates two primary coils in parallel. Unless you can visually see a connection between the rectifier leads, you need to assume that you have two coils and measure the voltage going to each rectifier separately (*see Figure 4*). Connect your other meter lead to the secondary connections going to the ground cable (*see Figure 5*).

Once you have your meter attached and have insured that the battery cables are open circuit (not touching each other or connected to a battery), turn the charger on and rotate the voltage selector switch through all of its positions. You are looking for incremental change in the output as you rotate the switch. In most cases you should see AC output that is roughly two to three times higher than the DC charging voltage that you would expect. Your initial inclination might lead you to believe that 30 to 40 volts AC is too high for a 12 volt battery. But this is normal, due to the fact that there is no load on the transformer. Once it passes through the rectifiers and is connected to a battery, the charger's output voltage will be correct. If you see an AC voltage that is somewhat lower and closer to normal charging voltage, do not fail the transformer so long as you see incremental changes. This completes the testing of the AC side of the charger circuitry.



Now, it's time to test the DC side – and the most common culprit is next in line, the rectifier. If it's a selenium rectifier, a visual inspection for tell-tale burned pin-holes is usually sufficient. More commonly, a diode rectifier is found. At this point, you can check the diodes, unless you have already noticed that that they are bad. Once the current is rectified, it may pass through an ammeter or an ammeter shunt. There is usually going be a protection device there too, like a gang of thermal circuit breakers (see Figure 6), or a single, larger breaker. Klixon breakers are very common. They can be tested at the same time by reading DC voltage on both sides. Pay particular attention to each of these DC connections. Note any excessive heat under load or looseness of the connections. Breakers, internally shunted meters, and clamps can hide heat damage that will create resistance, generate heat, and prevent full output. Check for loose studs on meters, and poor clamp connections.

Some chargers have additional control switches for battery type, amperage control or fine adjustment of charge voltage. That switch, if it exists, works in tandem with, and in a way that is similar to the primary voltage switch. It too may tap into an additional set of multiple leads coming out of the primary coil. If you have this, you would have discovered that the 120v AC white (neutral) wire was attached to the second switch instead of going directly to the primary coil. If the charger has a second selection switch, do not let yourself get confused. Just remember that each control switch (voltage, amperage or battery type) is controlling one end of a primary coil winding.

Once all defective parts have been replaced, you should conduct a load test. The real proof is when you test the charger with a battery and attach a load. With just a small 125A load tester, you can place a load on the battery for 2-to-3 seconds while it's on the charger. Watch the charger's amp meter. It will indicate the charger's max output at each setting - at least up to the amount of load that you place on the battery. You can compare this to the charger's rated output.

In a future issue we will cover electronically controlled chargers, like those used in golf carts, forklifts and some other applications. In the meantime, get some practice in with the more common conventional chargers. Ask your commercial customers if they have any broken chargers laying around. Once you have a done a few, you will find they are incredibly easy to work on and can be highly profitable once you get some experience under your belt.

Rick Polete is one of the original founders of PLP Battery and he has been repairing battery chargers for over 30 years. His expertise made this article possible. You can contact Bob Thomas by email at: ere.bobt@gmail.com or by phone at 904-673-7301.

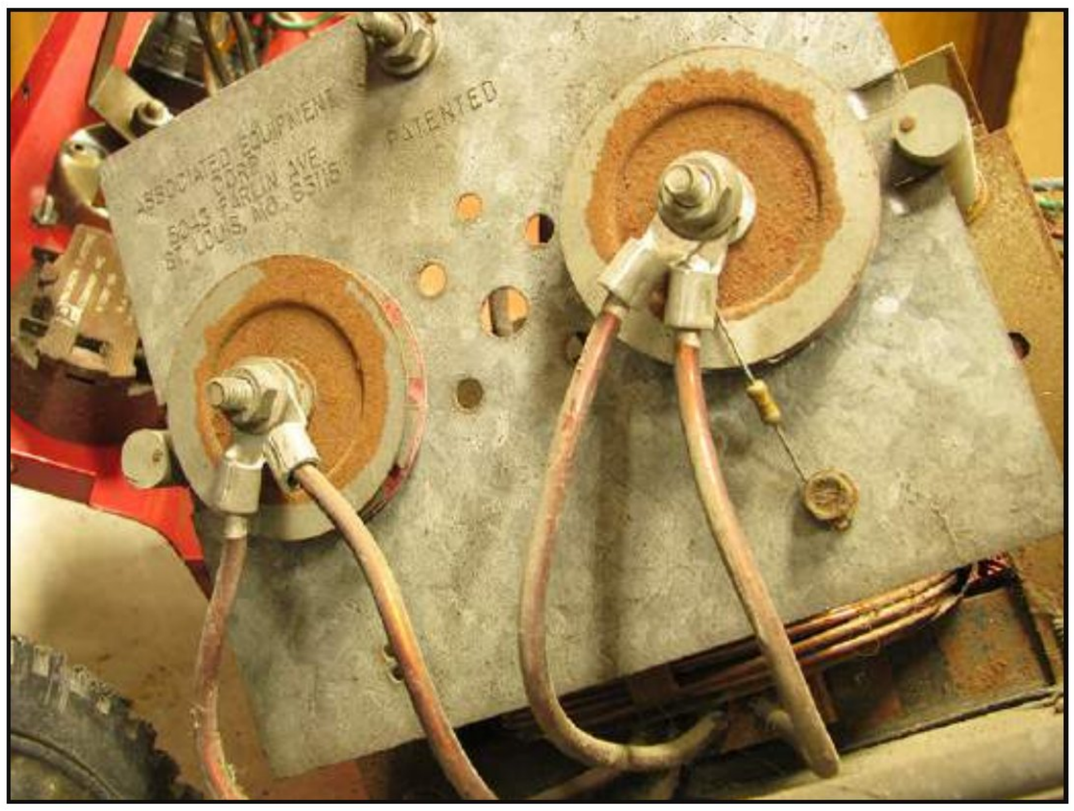


Figure 4 – Secondary winding leads where they attach to the rectifiers.

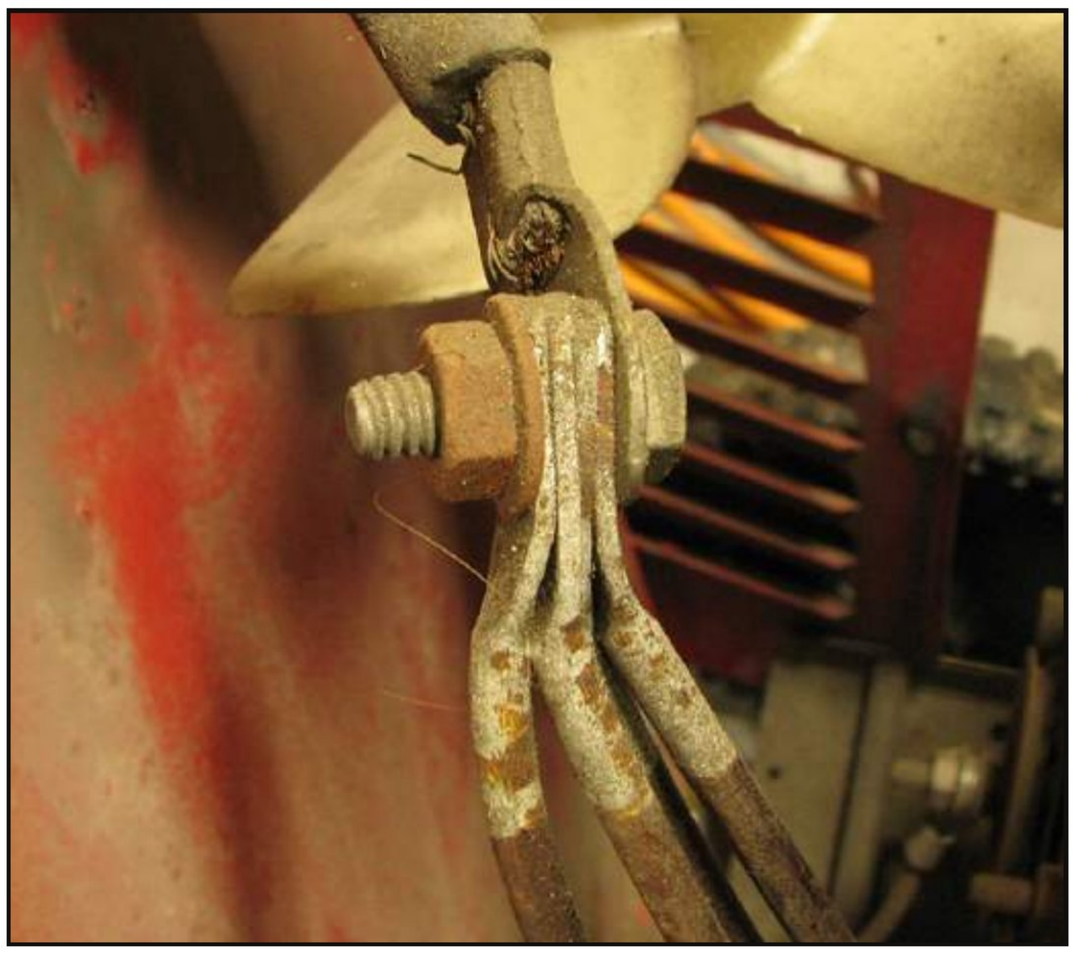


Figure 5 – Secondary winding leads where they attach to the negative charging cable.



Figure 6 – DC circuit breakers between rectifier output leads and the positive charging cable.

NEED HELP?
It's just a phone call away

1-636-584-TECH (8324)

Tech Help from Mohammad Samii



Do you need help testing an alternator or getting it to work as it should on a vehicle? Call the ERA Tech Help Line and talk to an industry veteran that has over 40 years of rebuilding and on-car experience. Mohammad Samii can help you to find the answers that you need to solve any rebuilding problem. No question is too difficult. "Sammy" has a formidable list of resources at his disposal and is backed up by a line of regular ERA Forum contributors. The ERA is there to help when you need it.

ONLINE CATALOG

PARTREF.com

50,000 Rotating Electrical Units

Lookup by Vehicle App, Part # or Attribute

Includes Product, Bills of Material, Specs & more

Offered FREE to ERA members accessed through ElectricalRebuilders.org

Non-Members who want access, please use contact info below

YouTech Group LLC

(866) 285-1292 • dennis@youtechgroup.com

NEW ERA MEMBER BENEFIT

from

LESTER

CATALOG COMPANY

Effective January 1, 2019

Lester Catalog is offering a $100 discount for an annual subscription to ERA members

lestercatalog@waiglobal.com

or call

1-800-877-3340

Contact your customer service representative at WAI Global to request your discount upon purchase or renewal of Lester Catalog

Electrical Rebuilder's ERA Association Founded 2001

Members Helping Members

C.C. BATTERY CO., INC.

TRUSTED QUALITY AND SERVICE SINCE 1923

WANT IT BRAND NEW & OEM?

WE'RE YOUR WAREHOUSE FOR

Prestolite electric · QuickCable · Leece-Neville · C.E. Nichoff & Co. Charging and Power Management Systems · Littelfuse · Cole Hersee · MAHLE Driven by performance · Delco Remy · DENSO · dixie

...& MORE!

REWOUND, REMAN OR NEW?

WE DO THAT, TOO!

ARMATURES ROTORS STATORS

CATERPILLAR CONVERSIONS

D.E. HOUSINGS COMPLETE UNITS

NEED MORE?

WE ALSO STOCK

COMPONENTS DRIVES SOLENOIDS

OR ANYTHING ODDBALL...JUST GIVE US A CALL!

ccbattery@aol.com **(800) 531-1038** www.ccbattery.com

3513 Agnes St. Corpus Christi, TX 78405

REBUILDER'S MARKETPLACE

PARTS, SUPPLIES, EQUIPMENT FOR SALE

Vintage starter and generator field coils. Ace, Autolite, IPM, Preferred Electric and Vulcan part numbers. Listed in Excel spread sheet to send via email. Call 860-528-8174 or email ken@guyselectric.com

---

Battery charger repair parts for all brands, batteries and battery chargers for all applications. PLP Battery Supply 800-642-3451 www.plpbattery.com

---

WANTED rebuildable Military electrical cores, any quantity, Prestolite 60 amp alts, Leece Neville 24V starters, CE Niehoff 24V alternators, Bendix 650 amp oil cooled alts, 300 amp Teledyne generators, any quantity, send your list or if not sure send pictures, and we can identify. 305-633-1524 or hy@cmearma.com

---

Selling a used Jimco brand test bench for starters, alternators and generators. Call 815-747-6110

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

For sale lots of cores heavy duty, industrial, agricultural and import. Call with OE or Lester numbers 314-664-2101

Do you have any surplus tools, equipment or parts that you don't need and would like to sell? As an ERA member, you can list up to 25 words for free right here. It is just one of many ERA membership benefits.

ADVERTISING: If you'd like to submit a classified ad, email Stephanie at smsdesigns@hotmail.com. ERA members receive the first 25 words free. It's an ERA benefit!

BUSINESS FOR SALE

Complete starter and alternator rebuilding business w/house, shop and barn on two acres in the country. Well established with loyal clientele. $210k (920-566-2723)

Need technical help with an alternator that won't charge or a starter that won't crank? Call **Mohammad Samii** at the ERA Tech Help Line - **636-584-TECH (8324).**

SERVICES

R&R ALL STARTER DRIVES. North Atlantic Starter Drive, 741 Broadway, Pawtucket, RI 02861 800-822-2735 Email: popsy26@verizon.net

MISCELLANEOUS

United Battery Systems in Portland, Oregon is seeking an experienced Rotating Electrical Rebuilder. Qualified Applicants will have 3 to 5 years' experience rebuilding Alternators, Starter Motors and Generators. Please email a resume to susan@unitedbattery.net to apply for this position.

Partner wanted in great weather Myrtle Beach. Bring your shop or stock too much work here for just me. 50-50 deal 843-455-8062

HIRING: Looking for a change but want to stay in the industry? Join our growing Sales team! Please email info@regitar.com for more information.

Would you like to know what other members think about a particular issue related to your rebuilding business? Go the the ERA's website – **electricalrebuilders.org** and check out the ERA Forums.

Have you seen this ERA label?

This 1.5" x 3" tough waterproof vinyl label provides space to write or stamp a unit number, your invoice number or date, the units voltage and the unit's amperage. This 2-part label comes with a self-adhesive cover sheet to preserve your unit info.

These attractive labels are affordably priced and can be ordered today by calling the ERA office at **(636) 584-7400.**





ERA EXCHANGE
PO Box 906
Union, MO 63084
CHANGE SERVICE REQUESTED

PRSRT STD
U.S. Postage
PAID
Permit No. 137
Washington, MO
63090

NEED HELP? It's just a phone call away. 1-636-584-TECH (8324)



The ERA ... We've Got It All Online For You!

Books • Forums • JIMCO Manuals • Wiring Diagrams
DVDs • Technical Library • Training Videos • Supplier Sources
Equipment Manuals • Forms • ERA Exchange

WE'RE HERE FOR YOU 24/7
www.electricalrebuilders.org



REGITAR USA

Automotive Electronics & Power Tools & TPMS

Introducing the new **Motoplat VC-05** COM alternator handheld tester! This easy to use tester allows you to diagnose an alternator even if it's still mounted in the vehicle or used in combination with all conventional test benches. As the exclusive distributor in North America, contact us for the complete list of Test Benches, Bench Top Testers, Parts Testers, and Handheld Testers.

We provide **Technical Support** on these and all our Products!




TEST BENCHES


PARTS TESTERS


BENCH TOP TESTERS


HANDHELD TESTERS

MEMBER OF ERA Electrical Rebuilder's Association

www.regitar.com

REGITAR USA, Inc | 2575 Container Drive | Montgomery, AL 36109 | Toll Free: 1.877.REGITAR | info@regitar.com