ERA EXCHANGE

YOUR GUIDE TO ELECTRICAL REBUILDING

August 2016 $12.95

CONTACT RESISTANCE
It All Adds Up

DENSO–FUSED FIELD COILS
Rebuilding Opportunities Are Alive

PONTIAC CONFUSION
Looks Can Be Deceiving

PLAIN TALK | WE'RE DIMINISHED BY ANOTHER

A WORD FROM THE PRESIDENT
Buying A Domain Name

Last month, I asked you to check out your own business' Internet presence. Every business has a some visibility on the web, supplied primarily by a growing number of online business listing services that have taken the place of phone books. But beyond that, how are you represented online?

Do you have your own website, selling your business, your goods and your services 24 hours a day, seven days a week? In today's world, nearly everyone uses the Internet before buying. Without a website, you are missing opportunities daily.

Constructing a website is a little bit like putting up a building. You can pay someone called a web developer to do the entire job for you. You could build it yourself if you are computer savvy and willing to spend the time. Or you can hire a professional but play an active part to insure that you get exactly what you want. No matter which of those you choose, there are some things that you should do yourself. That is what I will explain today – to help you get started.

Selecting and acquiring a domain name is the first step in building a website – sort of like purchasing the land, although the cost is a whole lot less. At one time a catchy name that people could easily remember and associate with you or your business was important. While still a good idea if the name that you want is available, search engines have all but eliminated the need for any of us to remember anything.

The domain extension ".com" is the original ending for US commercial domains. However, as the web has grown, many other domain extensions are now offered, the most popular of them being .net and .biz for commerce. The downside of using an alternative extension is that someone out there has the same name under .com and anyone who types in your web address might use .com from habit. That would send your customer to another website instead of yours.

Domain names are not very expensive with annual fees ranging from $5 to $40. All registrars offer discounts for purchasing multiple years at a time. Some hosting services offer packages that include a free registration with hosting, which I'll explain next month.

> **"Do you have your own website, selling your business, your goods and services 24 hours a day, seven days a week?"**

To search for available names go to; **https://whois.icann.org/en**. ICANN is the Internet Corporation of Assigned Names and Numbers, a non-profit corporation that maintains the database of domain names and their IP addresses. Part of your registration fee goes to support ICANN, presently 18 cents a year.

While all registrars offer domain search, there are some that may lock the name themselves on speculation and offer it to you at a higher than normal price. ICANN is the safest place to search for an available name. They cannot register names. Once you have found the name that you want, go to a registrar offering a reasonable price and lock it up under your name.

Mike Dietrich

NEW ERA MEMBERS

SJ, LLC
Wilsonville, Alabama

J & J Auto Electric
West Palm Beach, Florida

Little River Alternators
Little River, South Carolina

ABOUT THE COVER

Measuring a solenoid's contact resistance in volts.

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office@electricalrebuilders.org

EDITORIAL ASSISTANT / Bob Thomas

DESIGN & PRODUCTION / Stephanie Schroeder

CONTRIBUTING WRITERS / Mike Dietrich, Rob Buksar, Bob Thomas, Art Glass, Gene Kaiser

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Rebuilding is Recycling!

PLAIN TALK — WE'RE DIMINISHED BY ANOTHER

BY ROB BUKSAR

It was in another life when I found myself up at IPM looking for a piece of winding equipment. Even in those days, it was difficult to find someone who *really* understood the ins and outs of machines and tooling. Back then it was just as hard finding a soul who could translate some pretty difficult engineering concepts into a language that a non-engineer could understand. Most of us in rebuilding were pretty darn good hands-on wrench guys but engineers we were not. Enter Dick Vensel!

Dick clearly had a talent. He could take incredibly difficult mechanical concepts and translate them into pure simplicity. Once Dick was done with you, your self-esteem was so high that your feet could hardly touch the floor. Why? Because now you truly understood how something worked and it was now fixable when just moments before it was a mystery!

Dick's days with IPM were numbered which was probably a good thing because IPM's days were short also. He struck out on his own and created his own company called Vensel Enterprises. For many years to come, Vensel Enterprises would be the premiere tool, gadget and equipment source in our industry. Dick's product lines grew and grew making him a one-stop and shop operation. If he didn't have it, he'd find it. If it couldn't be found then Dick collaborated with the best minds, who drew it up and had it made for you. The bottom line was this; you had your machine or tool, your problem was solved and the cost was paid by the production savings.

Dick and I crossed paths more than a few times through the years, all of which were pleasant and productive. Yet, never as much till I was asked by Polly Ferree to write for the Electrical Rebuilders Exchange. Dick was already doing technical columns, good ones, before I got there. Both of us were contributing on a monthly basis, giving us the platform to build and develop a very different yet very good relationship.

Dick was not only smart and insightful for an old Marine; he was kind, considerate and caring. If someone got hurt on his watch, it was without his knowledge or got past him somehow. It was never his intention to hurt and always his desire to at least attempt leaving a situation in better shape than he found it!

Back in the day when a large contingent of the industry was discontent with the APRA, Dick along with me and a small handful of suppliers and rebuilders became the founding contingent of the Electrical Rebuilders Association. In those days, Polly Ferree owned the the newspaper and the soon to be new ERA. Let me tell you, those early days were as emotionally charged and diverse as a presidential election. Why not? The same folks were involved in both. The outcome was different but the process was the same.

Everyone had their own point of view and of course it was correct because as is in American politics, each group has an exclusive on the truth and an individual sense of what is really important!

For those of you critical of the democratic process, I suspect it's because you probably have never really participated in it. Getting two people to agree on something can be a real stinker. Getting a group to see things the same way and agree, borders on the impossible. When it came to the early days of the ERA, Dick was always the voice of *reason*. He was a solid advisor to Polly and the voice of peace and productivity to the industry. Dick knew the split was inevitable yet intimately understood when others did not, that we were still all the same family - connected and couldn't survive without each others involvement on some level. That being the case, Dick spent a lot of time putting out fires and making peace before it turned into a war. He did all of this and more behind the scenes without fanfare or glory.

Dick did not find profit to be a dirty word. He needed to make a buck just like the next guy. Vensel Enterprises, like your own shop, couldn't survive on good tidings and best wishes. He needed to show, tell and sell, just like the rest of us! If you ever attended any of the shows, ERA or APRA, Dick always had one of the most impressive booths. I fondly thought of it as Pee Wee's Playhouse.

He had more gadgets, machines, jigs and tools openly on display than anyone at any place that I've ever been. What was really cool is Dick not only knew what they all were; he could explain each and every one if called upon to do so. Dick always wore a white lab coat and was accompanied by Barb, his wife, and Sandy, a good, trusted and loyal friend and associate from the IPM days. The three of them formed the nucleus of Vensel Enterprises. The three musketeers of machines, tools and ideas to help all interested enjoy a better tomorrow through better and more productive use of their time.

"He put up a hell of a fight as you would have expected the Marine in him would."

If you haven't figured where I'm going with this, let me just put it out there. My friend, Dick Vensel, a good husband and father, a friend to many, a positive force in our industry passed away June 26, 2016. He put up a hell of a fight as you would have expected the Marine in him would. Yet, at the end of the day, he passed in peace and with dignity.

When I was at my wits-end lying in that hospital bed, beat up and disabled, thinking the end was near, I'd get an unexpected phone call. It was Dick Vensel. In his loud growling voice, demanding to know why I was still laying around on my backside and not in my shop where I belonged. Dick encouraged me in more than a few calls during that hospital stay. He said that if I was still in there, I haven't been working hard enough to get out. I'll never know what impact Dick's admonishing prodding had on my release date but they sure didn't hurt!

I will miss Dick until the end of my days. You just don't fill the hole that the loss of a Dick Vensel leaves. He had too great of an impact on too many people, times and circumstances.

Let me sum this up with a slight slant. Many of you find excuses not to attend trade shows or industry get togethers. I've heard most of the rationale and it's mostly pretty simple - close-minded and frankly, pretty sad. Attending shows, unless

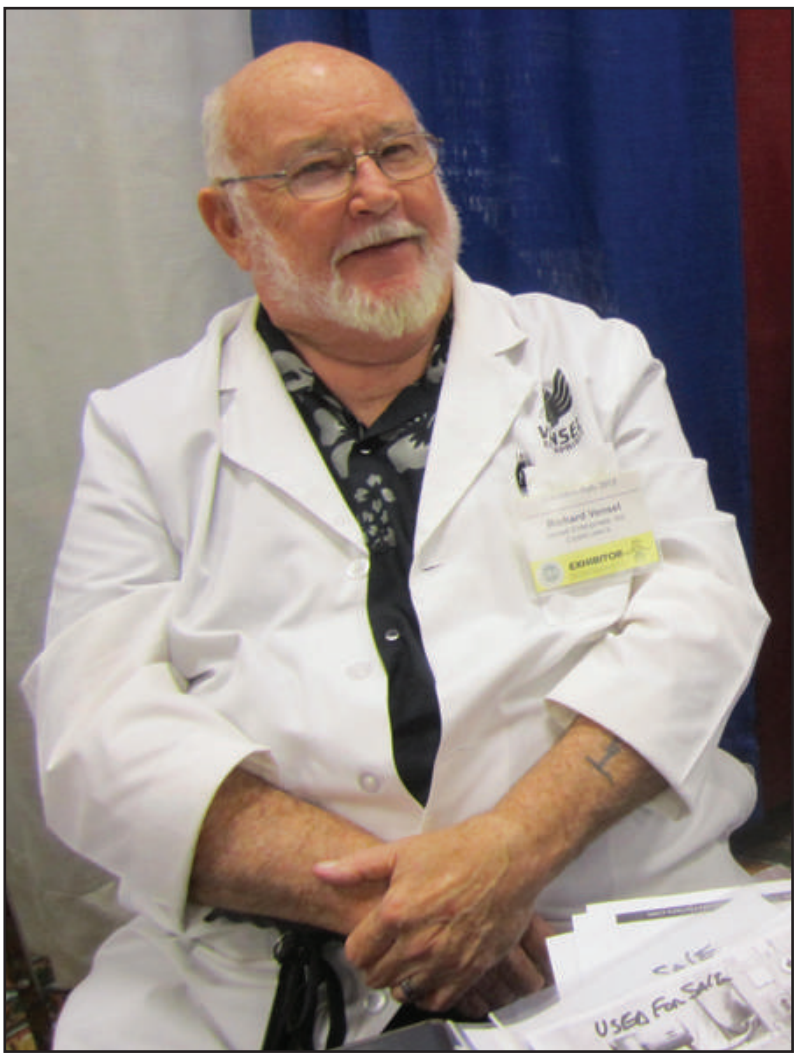
you're a wallflower, always gave you the opportunity to meet and rub shoulders with our industries' best, one of those being Dick Vensel. I'm so sad that I won't have the opportunity to talk to my friend and peer any longer. Yet, I'm so glad for the times and experiences that we *shared*. I am better off today for having known and associated with Dick. I rejoice in this. I mourn for those of you who allowed the opportunity to interact with Dick to slip through their fingers, for this I am most sad.

Barb, Sandy and the rest of the clan, I share your loss and celebrate Dick's life. I loved him as a friend and respected him as a fine businessman and associate in many endeavors.

Dick exited this life and entered the unknown where I'm confident that he will be welcomed for the fine man he has been, his good works preceded him. By the way, Dick left Vensel Enterprises in the capable hands of Tom Dunn and Sandy Hendershot, where the tradition of good works that Dick established lives on.

May God sustain Barb, Sandy, family and friends.

God bless America, and thank you Dick Vensel for all of your help!



In Memory of Richard "Dick" Vensel

Richard Vensel was born on August 29, 1939 and passed away peacefully on June 26, 2016.

He was both a mentor and friend to many in our industry. From the first time I sat through one of his seminars at an APRA clinic in the 1980's, it was obvious that he knew precisely what he was talking about. He had a passion for passing that knowledge on to anyone willing to listen.

He was always blunt honest in conversation, but was kind and respectful at the same time. His mission was helping others and he found a way to make a living at it, supplying the tools, equipment and supplies that the electrical rebuilding industry needed. He could not give his tools and equipment away but he did unselfishly give away his time to anyone that asked him a question – whether he knew them or not.

He provided me with advice and corrected my errors more times than I will ever remember. I will be forever grateful for that. I know that he did the same for countless others.

– Bob Thomas

⁎ Dick was one of the 25 founding members of the Electrical Rebuilder's Association and an Advisory Board member. He was awarded a lifetime ERA honorary membership for his contributions to the electrical rebuilding industry.

CONTACT RESISTANCE
It All Adds Up

BY BOB THOMAS

Contact resistance refers to the resistance between any two contacting surfaces through which current must flow to complete a circuit. In the case of charging and starting systems, many such connection points can be found both internal (within the alternator or starter) and external (as part of the vehicle's electrical system). That could also include the resistance across the set of contacts inside a solenoid. Resistance in any circuit is cumulative – it all adds up.

The amount of resistance in any of these connection points is dependent upon the physical amount of contact area, the condition of the contact surfaces and to some degree the force or pressure that is holding the two surfaces together. The compositions of the joined conductors also plays a part.

Keep in mind that a contact area may be difficult to evaluate visually because no matter how they may look to the eye, few surfaces are perfectly smooth. In most cases, there are low spots that do not make connection and thus cannot pass current. Pressure may help that when the connection is fastened tightly together, but in the case of closed solenoid contacts the pressure is dependent entirely on electro-magnetic force overcoming a return spring.

Some resistance is always present at each contact point, but ideally it is small enough to be considered inconsequential when taking the circuit's total resistance into consideration. To measure it, you need a meter capable of measuring small fractions of an ohm (*see Figure 1*), or you can simply measure voltage drop under current load, as will be explained later.

Unfortunately contact resistance is often assumed to be non-existent by some technicians and rebuilders, most especially on the ground side of a circuit. Corrosion of the contacting surfaces is the primary cause of exceedingly high contact resistance.

Galvanic Corrosion

If or when the contacting surfaces are made of different metals, galvanic corrosion can quickly degrade a connection and increase contact resistance. It most often gets started while the vehicle or equipment is sitting idle in a damp environment. Galvanic corrosion is an electro-chemical process that takes place whenever dissimilar metals contact one another in the presence of an electrolyte. In most cases involving alternators, starters and engine mounting, those dissimilar metals are steel and aluminum. Water contaminated with any ionic compound can serve as the electrolyte. Many ionic compounds can be found in simple road dust.

When galvanic corrosion takes place, the less noble metal becomes the anode side of an electro-chemical cell and erosion begins. Nobility refers to a metal or alloy's ability to resist corrosion. Tin, lead, nickel, copper, cast iron, steel, aluminum and zinc are all on the bottom half of the nobility chart, listed here in order with zinc as the least noble of all metals. Zinc is often used on boats as a sacrificial metal to divert galvanic corrosion away from the bronze or stainless fittings. As you can see, aluminum, an increasingly popular material in today's vehicles is just above zinc and below steel.

Tale of Two Starters

Our first example is a Mitsubishi PMGR starter that comes from Larry Hagemeister, owner of HEI in Lebanon, OR. It was removed from a Jeep with about 70,000 miles on it. "The customer who brought it to us wanted to buy a new set of brushes and a solenoid – yea right, we've all heard that before," Hagemeister explained. "The original brushes did not have very much wear at all and since they do not salt the roads here, corrosion is seldom a problem. There were no signs of corrosion on the outside of this starter. In fact, it looked almost new. But once we broke it down, the cause of the customer's cranking problem became obvious. It quit working because it was searching for a ground between the field case and the drive end housing."

In the photos (*see Figures 2 and 3*), you can see where galvanic corrosion has taken place between the steel field case and the aluminum drive end housing. Notice that the aluminum housing, acting as the anode, has clearly lost much of its contact surface area where it mated to the steel field case. This is a classic case of galvanic corrosion that took place on a vehicle driven on roads that are not salted in winter. It can happen anywhere that moisture is present.

The second starter is a Delco 28MT that was used on a wood chipper in Florida. It came to me with what looked like melted bits of aluminum at an odd spot (*see Figure 4*). Like the Jeep starter, the 28MT showed very little sign of wear internally and no corrosion on the outside. But this wood chipper, like many pieces of tree trimming equipment, is often kept out of doors where it may sit unused for a week or more at a time. As

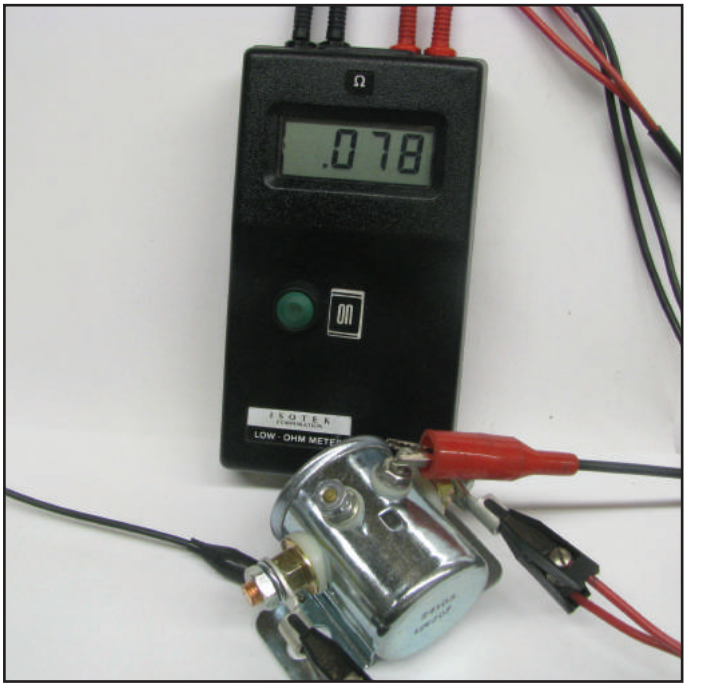


Figure 1 – Using a low ohm meter here, we are testing contact resistance of an external start relay.

you can see in the other photos (*see Figures 5 and 6*), the aluminum melted from extreme heat, that was generated by heavy current flow across an electrical connection that had high contact resistance. Aluminum melts at over 1,200 degrees Fahrenheit. While much of the visible damage in the photos is melted aluminum, it was caused by a contact surface that had been previously eroded by galvanic corrosion.

Note that there is no sign of corrosion on the other side of the intermediate housing (*see Figure 7*). That surface mates with the aluminum drive end housing – a same metal connection. Even though it was exposed to the same moisture and the same current, it is in absolutely perfect condition. As with the Jeep starter, it was an aluminum to steel dissimilar metal connection that caused the failure.

Oxidation and Prevention

Oxidation is another possible cause of high contact resistance. It can take place whenever surfaces are exposed to air – even in small amounts. Oxidation occurs when metallic atoms on any materials surface bond with oxygen. In the case of cast iron, two iron atoms bond together with one oxygen atom in the presence of moisture to form iron oxide, commonly known as rust.

Most oxides are very poor conductors while aluminum oxide in particular is an electrical insulator. Oxidation can degrade any connection with low nobility metals being the most susceptible.

The most effective method to prevent either galvanic corrosion or oxidation is to seal the contact area with a barrier that prevents moisture and air from getting to the metals. Silicone paste or dielectric compound as described in last month's issue by Dan Marinucci is an obvious effective choice. While it may be impractical to treat all starters and alternators in this way, it is worth considering on applications that you know will be subjected to moist environments.

Solenoids and Relays

Earlier I mentioned that there is contact resistance in solenoids too. While a solenoid's contacts can get corroded if exposed to enough moisture, it is a rare occurrence unless a starter has been submerged or subjected to corrosive liquids. For

Figure 2– Note the aluminum that was deposited on the steel field case of this Mitsubishi Jeep starter.

Figure 3 – Here you can see where the aluminum came from, taken from the drive end housing by galvanic corrosion.

Figure 4 – The bits of molten metal on this 28MT intermediate housing got my attention when I checked it. I suspected contact resistance as being the cause.

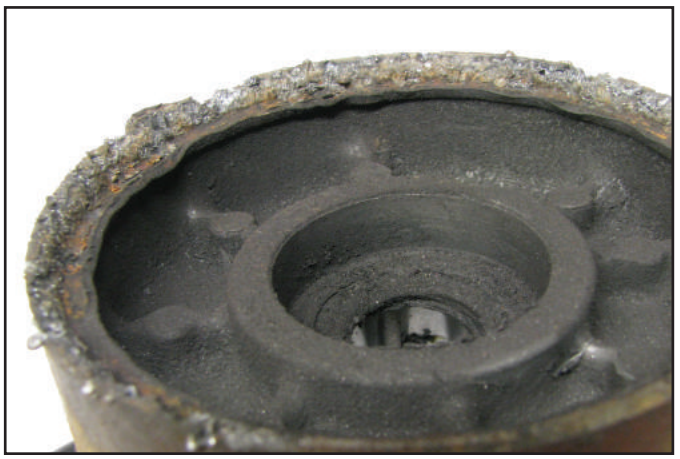


Figure 5 – Once apart, I could see that the intermediate housing was severely eroded where it had been in contact with steel.

one, the contacts are usually made of copper, sometimes tinned and only touch when the solenoid is activated. In addition, most solenoids are fairly well sealed and the contacts only touch one another. While copper contacts can oxidize, frequent use will burn it off. However, those contacts are susceptible to high resistance for other reasons, like miss-alignment, contact surface damage or mechanical binding. In addition, return springs, plungers and contact rods are usually steel and can rust if exposed.

The best starter and solenoid testers measure the voltage drop across the contacts under load which can be converted to resistance. This is a fairly easy test that anyone can perform when free spinning starters. A simple digital voltmeter connected to the the battery and motor terminals (*see Figures 8 and 9*) is all that it takes. If you have a way to measure the starter's amperage draw when performing this test, you can easily calculate the exact resistance.

Figure 6 – Here you can see that the contact area on the steel field case is heavily coated with aluminum particles from the housing.

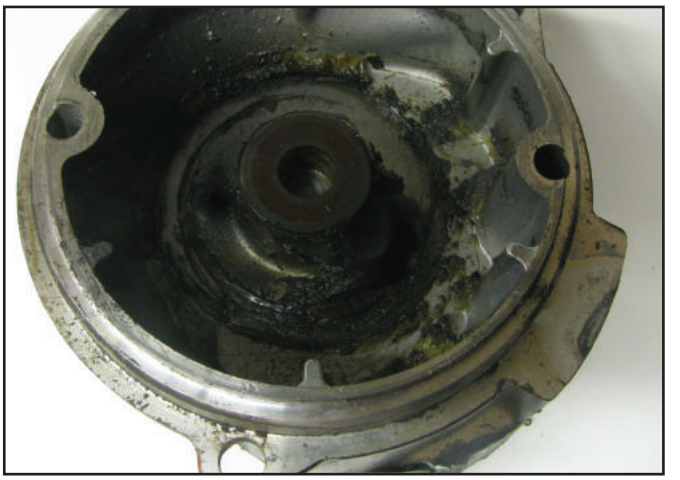


Figure 7 – The other side of the intermediate housing that was in contact with the aluminum drive end housing was in perfect condition.

CONTACT RESISTANCE

You can test external starter solenoids and continuous duty relays in a similar manner by connecting it in series with an alternator on your test bench (*see Figure 10*). B+ is connected to one side of the relay and the alternator's output terminal is connected to the other side. This will allow you to pass the alternator's output current through the relay's contacts at a known amperage that should not exceed the relay's rating. Simply control output to a predetermined value and measure the drop across the solenoid's contacts. Then use Ohm's Law to calculate the contact resistance across the contacts. In the last photo, the alternator was charging at 50 amps when the voltage drop was 0.14 volts. Voltage = Amperage X Resistance. Therefore, resistance across the contacts was 0.0028 ohms.

Obviously, nobody wants to take the time to test every solenoid or relay that they sell. But if you suspect a problem or question the quality of a part, there are ways to test its contact resistance.

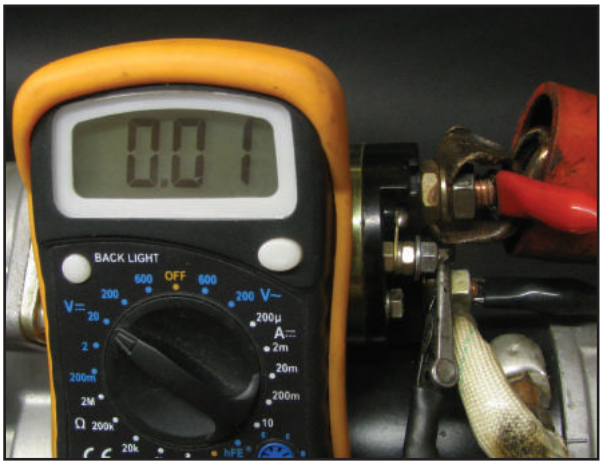


Figure 9 – Here we test a 28MT solenoid's contacts for voltage loss using the same test.

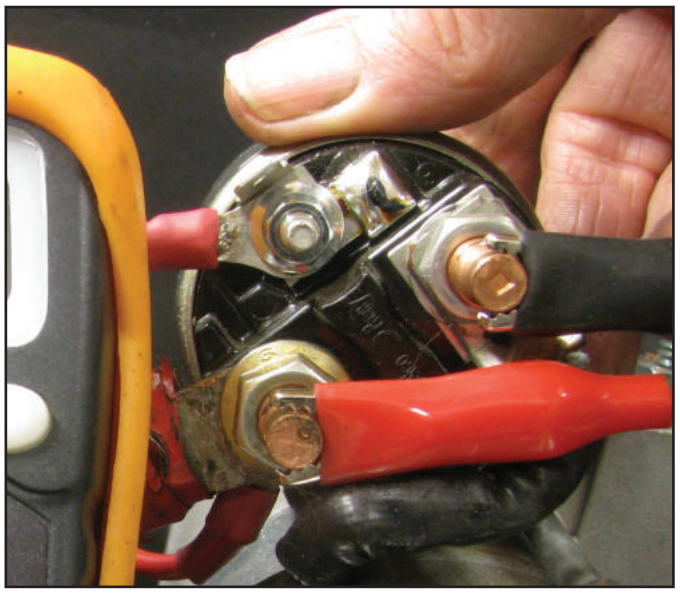


Figure 8– To test a starter solenoid for contact resistance during a free spin or loaded test, simply connect a voltmeter to the battery and motor studs.

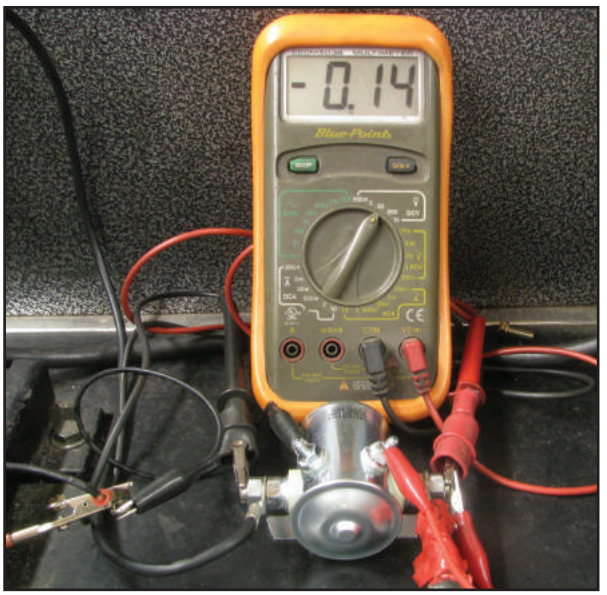


Figure 10 – Here we are testing a 12 volt continuous duty solenoid for voltage drop while running current through it from an operating alternator.

DENSO – FUSED FIELD COILS
Rebuilding Opportunities Are Alive

BY ART GLASS

Recently, a Denso 2kW planetary gear starter came in with what appeared to be burned out connection wires between the main field case lead and the coils (*see Figures 1 and 2*). There was absolutely no sign that the armature, brushes or field coils had been overheated. In fact, the brushes were not even completely broken in and the rest of this starter was in "like new" condition. This starter's Denso part number is 228000-4593. It fits a many Kubota compact tractor and small equipment applications from the late 90's through 2009.

We decided that the burned connection bar was most likely a fuse wire and could be easily repaired. Denso has fused the field coils in several different series starters going back into the late 1990's to protect them from over-cranking. You could look at that as a potential problem area for the over-zealous and under-educated operator. But at the same time, it presents an opportunity to rebuilders.

To begin the repair we first cut away the damaged wire. Then we measured an undamaged section of the original wire (*see Figure 3*) to confirm the wire size. As you can see from the chart that we found using a web search (*see Figure 4*), the 2 mm wire size is rated at 100 amps, meaning it should be able to withstand 100 amps for extended periods without burning. Fuse wire can

Figure 1 – This is the 2kW Denso field case with burned field coil lead wires.

Figure 2 – Here you can see where they burned open on both sides of the field case lead.

Figure 3 – Precise measurements are needed when replacing fuse wire.

withstand a higher amount of current for brief periods. While that seemed to be a little low for a 2kW diesel starter, we decided to take the prudent approach and follow what Denso had used.

We used a spot welder to connect the new wire (*see Figures 5 and 6*). You could use silver solder in place of welding if you do not have access to a spot welder. But in our shop, we spot weld when the application is diesel. Note in the photos that this starter has a shunt coil connection in parallel with the series coils. You can see it on the right side in Figure 5 and on the bottom in Figure 6.

Art Glass is Owner of Willard Generator Inc in Bridgeville, PA.

Fuse Wire Size Chart

Fuse Wire Rating - Amps	Fuse Wire Size - Millimeters
3 A	0.15 mm
5 A	0.20 mm
10 A	0.35 mm
15 A	0.50 mm
20 A	0.60 mm
25 A	0.75 mm
30 A	0.85 mm
45 A	1.25 mm
60 A	1.53 mm
80 A	1.80 mm
100 A	2.00 mm

Figure 4 – This chart helped to identify the size and amperage of the fuse wire we needed.

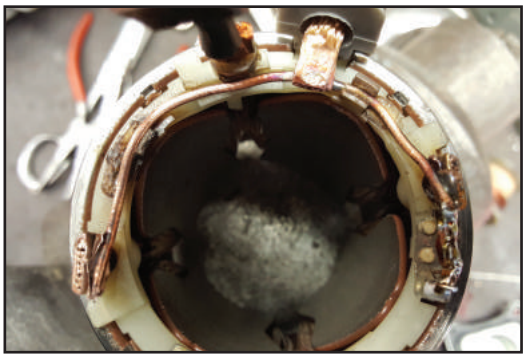


Figure 5 – Here is a view of the repaired field case.

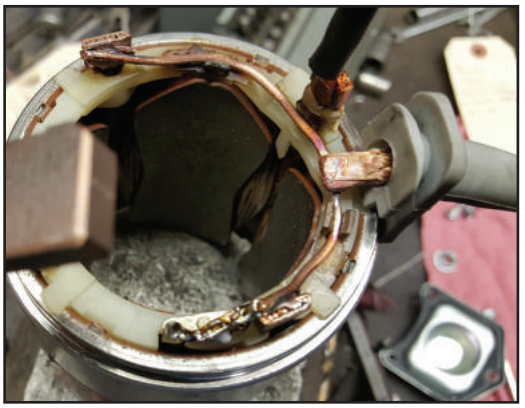


Figure 6 – Another view here. Note the shunt coil connection on the bottom of this photo.

PONTIAC CONFUSION
Looks Can Be Deceiving

BY GENE KAISER

This article was prompted by a phone call that I received nearly two years ago. It came from ERA member Lynn Gross, owner of Churubusco Auto Electric, someone I've known for a few years. He had an alternator off a 2008 Pontiac G8 with a 6.0L engine that was not charging.

The unit OE number was A3TG4181. Lester numbered this alternator 11418, but listed no information in parts. At the time, Lynn could find no regulator information for this alternator at all, anywhere. This happened two days before Thanksgiving and the owner needed to drive the car home for the four-day weekend to be with his family.

Lynn told me that there seemed to be some confusion and no clear information on this particular year, make and model's alternator. He asked me if I knew any more than what he had been able to find. The customer had already attempted to fix the vehicle himself. This is what I learned while helping Lynn and his customer.

The owner's original problem was a malfunctioning charging system – not charging and warning lamp on. He removed the alternator himself and took it to an auto parts store to have it tested. It checked bad, so he bought a new one and installed it. The new alternator did not charge either and the charge warning light was still on. He removed the new alternator and took the it back to the parts store. Luck was with him that day. The parts store still had his original unit. Then he took that alternator to Lynn.

This vehicle calls for an RVC test lead, which would not activate this alternator. Lynn also knew that GM's RVC regulators should self-excite, without any input. This is when Lynn called me to ask for my help.

From our research we could verify by vehicle wiring diagram that this alternator was RVC and needed an RVC regulator. Lynn bought and installed a Regitar VRH2009-172, which is for GM RVC controlled Mitsubishi alternators. The correct regulator was shipped Next Day UPS. It fixed the Pontiac and the customer made it home for Thanksgiving. That was a happy ending for the customer but what was wrong with the alternator he bought from the parts store? Was it defective out of the box or did it have the wrong regulator in it?

When I do research to help a customer, I use Google, Lester and a couple of other websites that match alternators to vehicles. I also use ALLDATA for wiring diagrams. What I found was that three Mitsubishi alternators for similar Pontiac applications look almost identical. In addition to that, there was conflicting or a lack of information in multiple locations on all of them. These three units all fit Pontiacs with the same 6.0L engines.

The first is Mitsubishi A3TG1581 or Lester number 11097 – application 2005-06 GTO with 6.0L engine. The second is Mitsubishi A3TG4181 or Lester 11418 – used on 2008 G8 with 6.0L engine. The third is Mitsubishi A3TG6491 or Lester 11421 (*see Figures 1, 2 and 3*). The application is 2009 G8 with 6.0L and 6.2L engines. At a glance the only difference is the pulley which is solid on the 11421 but clutch type on the first two. Down to the B+ post, regulator plug and the identification tag plug code "FR-L", they all look exactly alike except for the pulleys. One source even said that two of them were "identical except for the pulley".

However the biggest difference is that although both regulators share the same housings (*see Figures 4 and 5*), they use two different circuits to operate with totally different charging systems.

The 11097 has a clutch pulley and an early FR-L plug that uses PCM activation on the L terminal. That dates back to early 1997 on some GM vehicles. using a 5 Volt reference to activate the charging systems. The "FR" is a field monitor reading the charging system's mechanical load on the engine.

Figure 1 – Mitsubishi alternator used on the 2009 Pontiac G8 with RVC charging system.

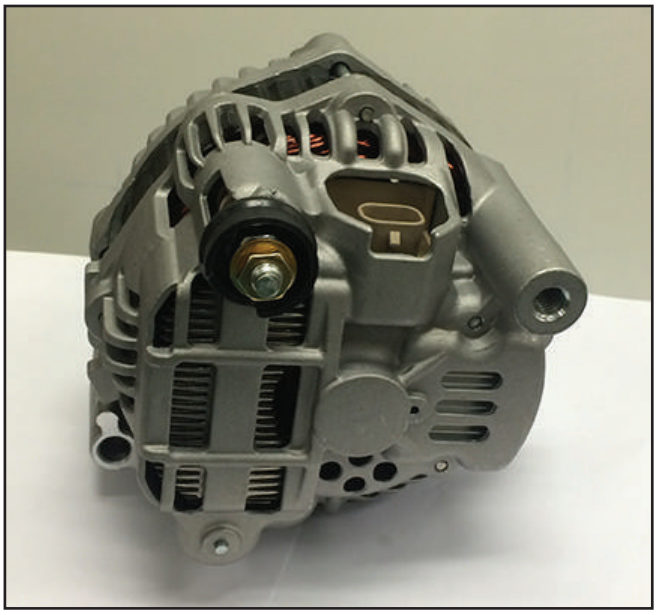


Figure 2 – From the rear, all three Mitsubishi Pontiac alternators look exactly alike.

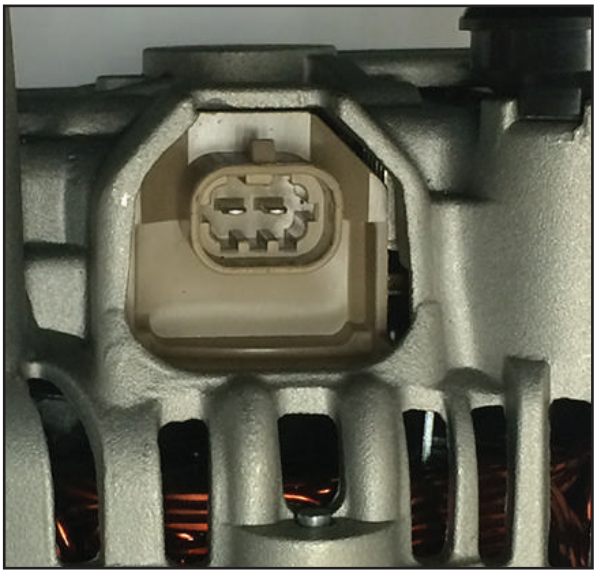


Figure 3 – All three alternators also share identical regulator plugs.

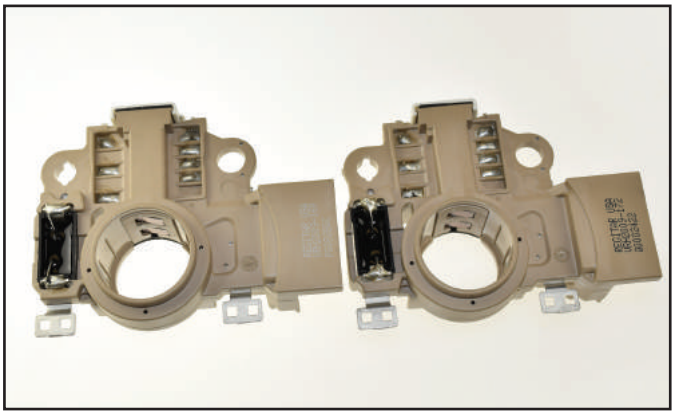


Figure 4 – Both regulators are identical in appearance.

The 11418 (*see Figure 5*) has the same clutch pulley and a plug tag that shares the same lettering "FR-L". But this "L" is not the same circuit. This "L" is a **regulated voltage control** (RVC) signal from the PCM. We covered RVC in last month's Exchange. You have probably tested the most popular GM vehicles that use RVC: the pickups, vans and SUV's with Delco, Bosch, Valeo, and Denso RVC regulators. Now you see it in a Mitsubishi alternator on a Pontiac.

The 11421 has a solid multi-groove pulley as you could see in the first photos. It has identical dimensions as the clutch pulley used on the other two. Beware of substituting the solid pulley on the earlier alternators. In all probability the belt tensions and tensioners are different. This alternator also has the RVC regulator.

The real proof can always be found in the wiring diagram of the vehicle (*see Figure 6*). You will notice that the system used by Lynn's customer's car has a battery monitor sensor around the negative battery cable. This sensor is always on the negative cable and is usually visible if you look for it near the battery. It is a dead giveaway that the charging system is RVC. It verifies that this unit and charging system is using RVC with the PCM controlling the Vset.

PONTIAC CONFUSION

Do your research, ask the important questions to your customer, and get to know him and his vehicle. Your customers depend upon on their vehicles and they depend upon you to fix them right. I would like to add that in all my years I have never trusted using one information resource for my work. When verifying information I find errors on a regular basis. Many times an error spreads from one database to another because information is often shared or copied. If you are not using Google in your business you are making a big mistake like Lynn's customer did. It cost him valuable time, labor, money and frustration. If not for Lynn, it would have cost him a holiday weekend with his family.

Today, technologies are changing more rapidly than ever before. Vehicles are constantly being pushed to last longer and save fuel. We, the aftermarket, have to keep up with those changes. The OE manufactures like to challenge us to protect what they see as their own personal market. We cannot depend on them for any help. We must help one another.

Oh…and to end this confusion, the Pontiac customer came back to Lynn after the holiday, and told him that the charging system and car worked perfectly the whole trip. Lynn reported back to me after the return visit to say that the customer thanked us both. Know what you are testing and don't always go by looks. Looks can be deceiving.

Gene Kaiser is Quality Control and Technical Manager for Regitar-USA in Montgomery, AL.

Special thanks to Lynn Gross, owner of Churubusco Auto Electric in Churubusco, IN for his meticulous documentation and help with this article.

Figure 5 – Mitsubishi alternator used on the 2008 Pontiac G8 with RVC uses a clutch pulley.

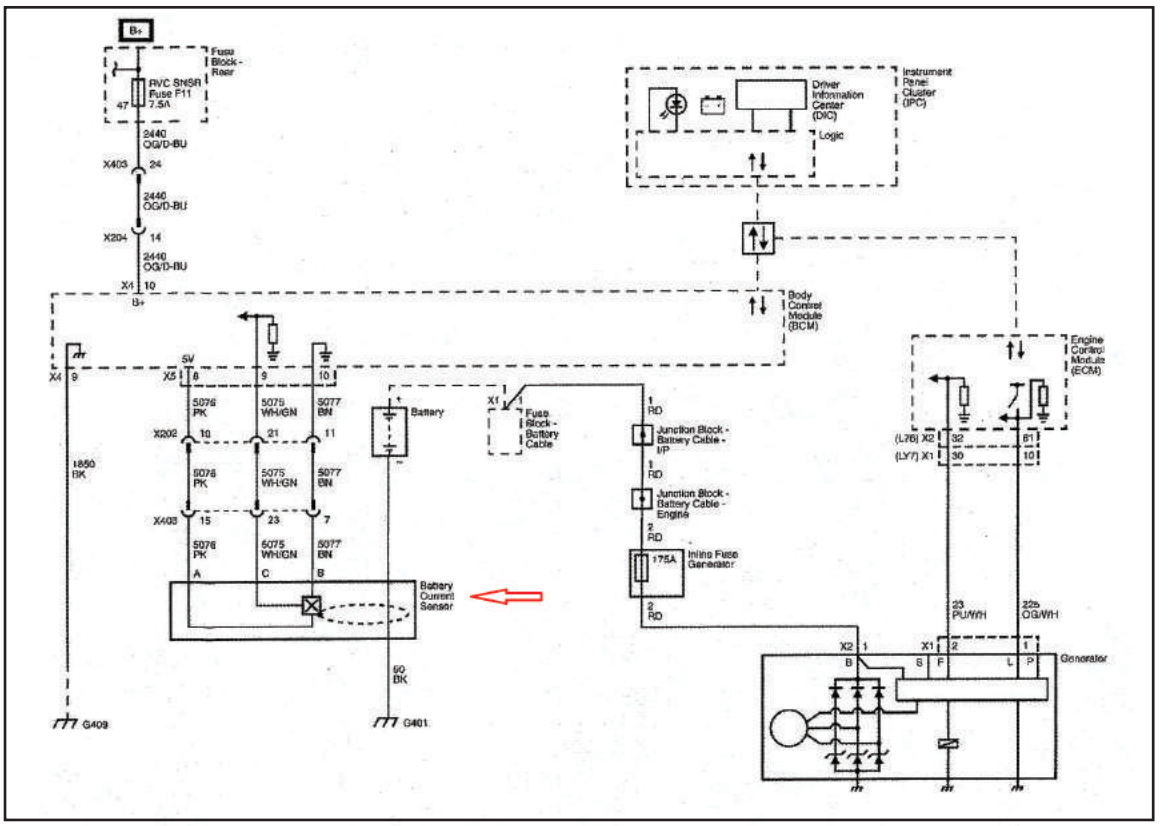


Figure 6 – Charging system diagram of the 2008 Pontiac G8 showing the battery current sensor by the red arrow.

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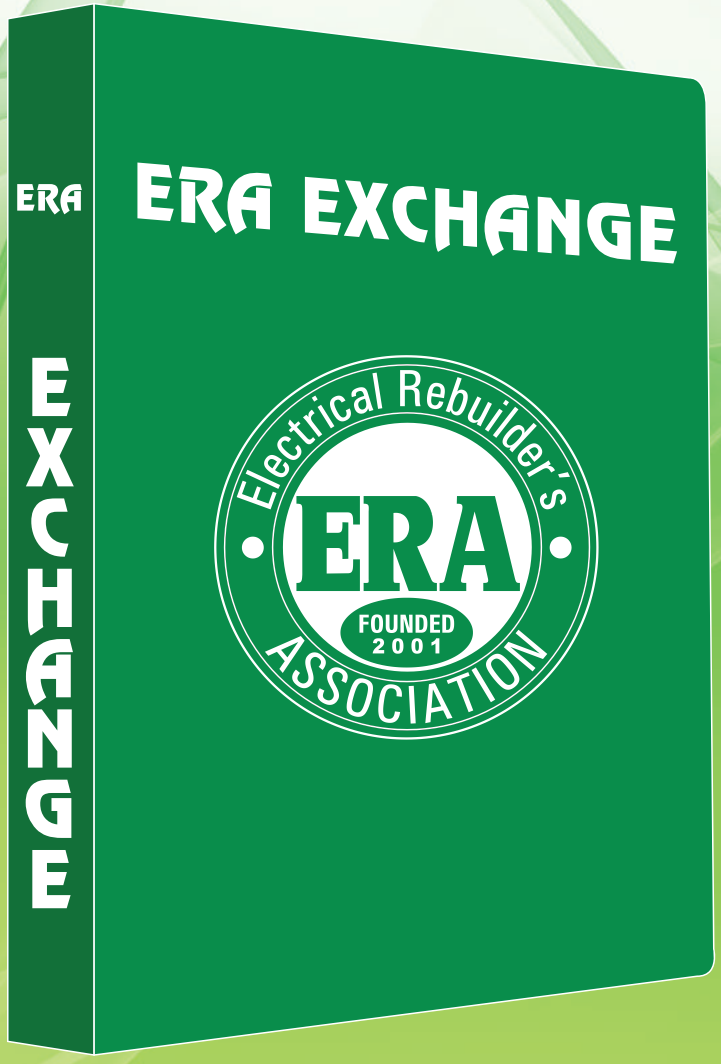

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