AUTO ELECTRIC CORNER —
A 32 Volt 40-MT and One-Wire 10SI Woes



BY MOHAMMAD SAMII

The new ERA label that was introduced during the last ERA Show is a unique and useful product that can give your rebuilt units a professional look. A part number can be very useful for units that lack one, which in turn can help the next rebuilder with identification. You can also use your own number or any other part number for your own identification purposes in the future.

The price is a very reasonable $11.00 per sheet of 18 (cost is less if you buy more), which comes to a mere 60 cents for each label. Once you try it, you will like the professional look that it brings to your products, not to mention the help it can give you or another colleague down the road later (*see Figure 1*).



Figure 1 – ERA ID Tag on an early type rebuilt starter.

32V 40-MT Starter…!

A lot of 40-MT starters have been replaced by a 42-MT or with the later 39-MT along with a variety of other reduction gear starters, but there is no denial that the 40's were very robust and solidly built. A good reman 40-MT with a quality armature, field coils, solenoid and Posi-Tork drive would last a long time if not abused by an operator, exposed to mediocre batteries, or poor cable connections.

There are still a lot of them around, especially on older machinery and farm trucks where the owners prefer to have the original rebuilt rather than something newer that looks unfamiliar to them.

There are other specialized applications where rebuilding the original is the only option. One such case was a pair of 32V 40-MT starters that we rebuilt a couple of weeks ago, brought to us by a good mobile technician/customer who strictly works on HD and large Ag/Industrial machinery. We were told that the starters fit a small locomotive that is used as a switch engine to shuffle railroad cars at a railroad yard about 40 miles away. The second starter was an identical spare to be kept on-hand for emergencies.

The armatures used in these starters were the common 1945500 (2023) 24/32V, however the field coils had a pronounced difference as compared to familiar 40-MT coils. They had a thin shunt coil wrapped into two opposing coils to make the fields a peculiar series-parallel arrangement. The shunt works as a sort of speed limiter, which I believe is exclusive to these and/or higher voltage starters such the 64V or other such units (*see Figure 2*).

The higher operating voltage does not allow for much recovery of parts as the field coils, armature, brush holder and solenoid contacts are not reusable if the starter has been subject to abuse, arcing, low battery condition or over-cranking. One of the field coils that did not look burned and seemed to be usable was put in its field case, but under a hi-voltage test (we use our own home-made 110 volt test fixture), it started arcing, then a little smoking (*see Figure 3*), and then the oil residue soaked up by the coils caught on fire! (*see Figure 4*)



Figure 2 – The 32V (1951048, J&N's 261-12112) field coil.



Figure 3 – Developed smoke under Hi-Voltage testing.

An ERA Publication. ©2018, Electrical Rebuilder's Association. All rights reserved. No portion of the guide may be reproduced in any way, or stored in any electronic retrieval system without the prior written consent of the Electrical Rebuilder's Association.

AUTO ELECTRIC CORNER

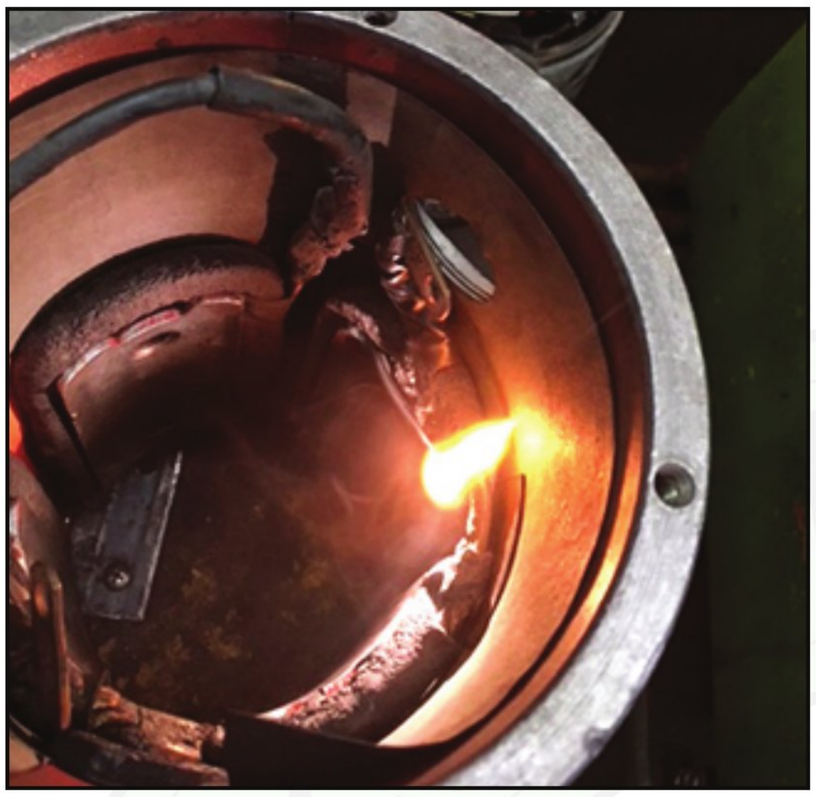

Figure 4 – Flames when the oil and solvent residue caught on fire!

Needless to say a new field coil (Delco 1951048, J&N's 261-12112) is not inexpensive but had to be used. The 32V (1115560) solenoids used on these units were also destroyed and were replaced by a pair of 245-12073, J&N's premium solenoids. For testing the unit we used our 24V power supply pack (two 12V batteries in series) and added the 6V battery that we use for generator testing to come up with a total of 30V which was close enough for a free-run test and pinion adjustment.

One point that is often ignored is to consider that pricing such work must go beyond the price of parts and labor. A 32V 40-MT starter with all new components used for a locomotive is not something that can be easily purchased at an auto parts or web store Thus the pricing should reflect the value of the unit in the market, and not merely the sum of parts, mark-up, and labor involved.

Self-exiting alternators…!

I am not a big fan of making self-exciting one-wire alternators. I know they have their place in our field and sometimes are a practical fit or a necessity for older machinery that is kept outside and their wiring deteriorated by age and weather. Having said so, I refuse to make single-wire alternators for cars and trucks that can be driven to our shop and be repaired properly. I cringe by the calls on the ERA Help-Line when asked for the SE regulators to modify a PCM-driven Ford 6-G, a CS-130D, or a Denso alternator, just because the owner does not want to spend the money to have it done right, but I also do understand the exceptional cases. Here I share the details of two such alternators that happened to be 10-SI, that are the most common candidate for single wire modification:

1 - This shinny chrome 10-SI alternator that was purchased off Ebay and was brought in because it did not last more than a week, according to the customer. It was used on some sort of racing car, which I was never told the type. I am not a fan of car racing at all. If you are one, more power to you!

The voltage regulator was blown, and I mean it literally! The high-voltage spike that was generated was so strong that it blew out the electronic circuit to where you could see the traces of soot and smoke generated on the face of the regulator (*see Figure 5*).

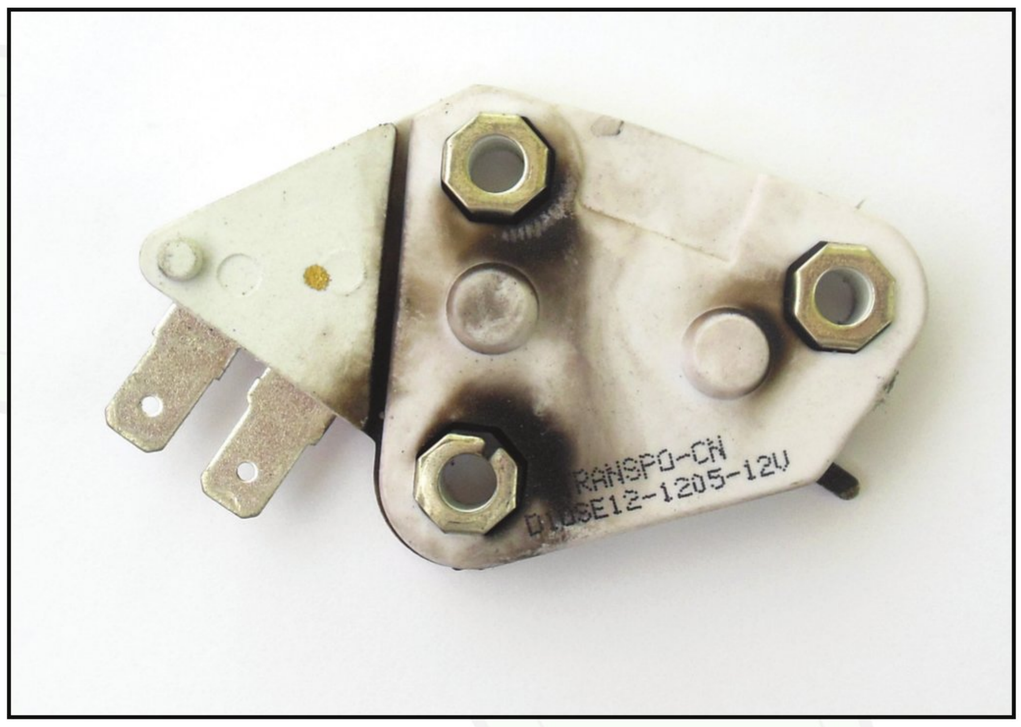

Figure 5 – A regulator destroyed by a severe load-dump.

I believe that according to some racing rules, these cars must have a master battery disconnect switch accessible from outside the car, where a rescue crew can reach and disconnect it in the case of an accident or emergency. At times, the drivers and/or technicians used this switch as a kind of quick engine shut-down. Disconnecting a running and charging alternator from its power source (**+B**) creates a serious load-dump. The resulting high voltage spikes that creates can burn holes in the regulator chip. It will be analogues to running over a tube of toothpaste with a car…! That was exactly what happened to our customer's alternator with repeated disconnections. He was not aware that this procedure is a no-no and he should never try it again. A lesson that he could not have learned from Ebay...!

2 - The second 10-SI was used on an older farm tractor that the owner said had replaced the original generator - also a single wire alternator. We were told that it charged fine when running but after being parked overnight or even for a few hours, the battery would go completely dead and had to be recharged to start the tractor. This was a problem that he obviously did not have with the old generator.

Upon tear-down, we noticed that the single wire modification consisted of using a regular 10-SI regulator, a wire soldered to connect the two pins, and attaching it to the battery post internally by an eyelet! The reason for the battery being discharged completely is obviously not a surprise to you now…! (*see Figure 6*)

I just wish that I knew the rebuilder who did this, were able to bring him onboard, and let him learn from our amazing resources of people and information that we have in our association. A half-hearted attempt to

An ERA Publication. ©2018, Electrical Rebuilder's Association. All rights reserved. No portion of the guide may be reproduced in any way, or stored in any electronic retrieval system without the prior written consent of the Electrical Rebuilder's Association.

AUTO ELECTRIC CORNER

replace a generator with an alternator that is not right has a negative effect on all of us who try to do a professional job.

That's all for this issue. Until I see you again, keep up the good work. sammyselectric@sbcglobal.net

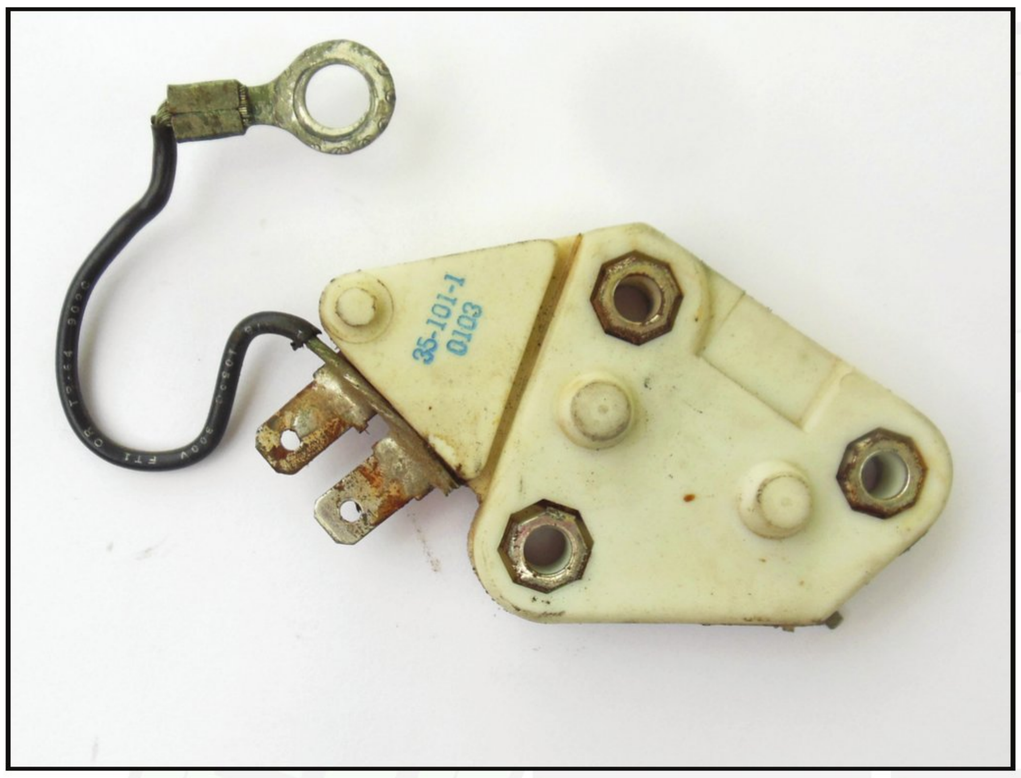

Figure 6 – A sub-par effort to make self-exciting 10-SI regulator…!

An ERA Publication. ©2018, Electrical Rebuilder's Association. All rights reserved. No portion of the guide may be reproduced in any way, or stored in any electronic retrieval system without the prior written consent of the Electrical Rebuilder's Association.