THE HISTORY OF THE FORD-FERGUSON 9N TRACTOR GENERATOR

This article was compiled by several individuals, many members of the N-Tractor Club web site and a few belonging to the Ford-Fordson Collectors Association as well, who offered research, data, pictures, opinions, as well as their personal time and sacrifices to put into print the information on the various 9N generators starting with the early 9N-10000 and its Voltage Regulator, part number 9N-10505 and concluding with the 2N-10000 generator. There is also some information on the later 8N and NAA generators for reference purposes and each will be put out in more detailed, separate articles respectively, in the future.

All research here is based on original blueprints (when available), actual parts and tractors from current owners, and discussions among the group of persons noted at the end of the article. For reference purposes **FIG. 1** is taken from the earliest Ford 9N Tractor Master Parts Catalog dated March 15, 1940. Be aware that every effort has been made to ensure that the information contained herein is correct to our knowledge and to be error free. In the future it is possible new information will be made available and we will amend this document if needed. Please also note that no 9N's, Generators, Voltage Regulators, or Cut-Out Circuits were harmed in this research as far as we know.

Before we begin, let's consider a few things about charging systems. Automobile manufacturers required something to supply the current needed in order to spark the ignition systems into starting their engines. Electricity had been around for a while, long before cars, so the need for electrical power in automobiles was a subject that several individuals began to research and experiment with. An electro-magnetic charge, generated by a rotating field of wound wires was called a dynamo, first discovered in the 1800's. Brilliant scientists like Faraday, Siemens, and Kelvin, and later on Westinghouse, Edison, and Tesla kept experimenting with electricity generating devices and eventually came up with the magneto, generator, and later on, the alternator. Moving ahead close to the mid 20th century in Dearborn, Michigan, to the Ford Rouge Plant, Building B, the Blue Room, puts us in the middle of the 9N tractor design stages. As we all know, Henry Ford was frugal and economical as possible when it came to production parts. If parts could be crossed over from other modules, he took advantage of that fact, insisting that this practical theory of cutting overhead costs be applied wherever possible. Many of us have pondered the question why on earth did Mr. Harold Brock and his team of Ford Tractor Engineers design a special generator and a special voltage regulator when they could have used parts already in the pipeline for cars and trucks? Well, they did, sort of. The Ford Tractor engineering team did not consider that the tractor could be used at night if it had lights. They did not, at first anyway, offer lights and designed the generator to only have an output of 7 amps which would be sufficient for the engine ignition system. In an early photo of the experimental 9N prototype, it appears that an earlier Ford generator was used as there is a round can cutout piggybacked on top of the generator. Engineering elected to design a whole new unit exclusive to the new 9N tractor rather than use a V8 car or truck generator which had an overkill amperage output. The engineers did consider the fact that the unit would be exposed to the elements and thus designed it so it was enclosed. Though cutouts had been in use for some time, Ford experimented with and used voltage regulators on some products at the same time. Early V8 production model cars and trucks saw Ford use a square voltage regulator supplied by the RBM company beginning in 1937, and later in 1938 modified and produced by Ford to show terminal identification as "ARM"; "FLD"; and "BAT" stamped in the zinc plate square cover. The 1939 Ford Deluxe car and some '39 and '40 Mercury cars also used this voltage regulator. The 9N-10505 Voltage Regulator appears to have been adapted from this unit.

The facts are that the 9N generator had three revisions through its lifetime, with the A, B, and C letter suffixes added after the part number when a revision was made and each of the four pulleys as well had revisions marked either with an A, B, C, or D suffix. The 9N-10505 voltage regulator changed to the round-can cut-out circuit with the 9N-10000-B generator and became part number 9N-10505-A and the round-can cut-out became 9N-10505-B. It was discovered before the end of 1939 that a lot of farmers wanted lights on their tractors and began installing the big truck lamps on them. The weak output of the generator wasn't sufficient to keep the battery charged when lights were used. This necessitated the first revision by introducing the 9N-10000-B generator. Additionally, the generator electrical circuits themselves are designated as either an 'A' circuit or a 'B' circuit, but it is important *not* to confuse all the nomenclature which is one purpose of this article. We'll get into all the details shortly.

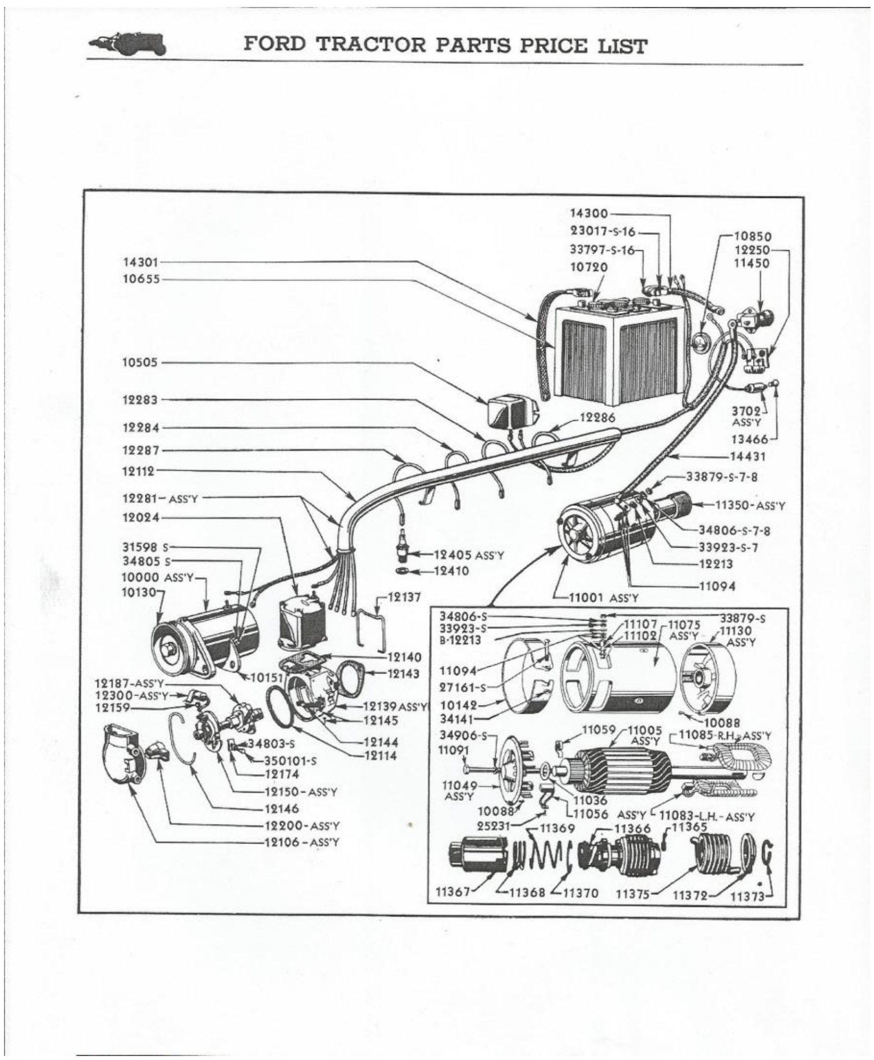


FIG. 1 –March 15, 1940 Master Parts Catalog, page 34, shows detailed drawing of electrical wiring. Note the square-case voltage regulator, 9N-10505.

Defining "A" Circuit and "B" Circuit Generators

To avoid confusion, we must first understand that the 'A' and 'B' ***circuit*** designs discussed here are *not* the same as the 'A' or 'B' suffixes after part numbers. When a part number displays a letter suffix, it defines an engineering change as an additional release for that part. The internal electrical circuit of the generator itself is simply designated as either an 'A' circuit or a 'B' circuit.

'A' and 'B' circuit nomenclature may better be applied based on where the field is sourced, not whether it is internally or externally grounded. In **FIG. 2**, only the lower two examples are used for 9N generators. Of the four examples shown, only one has an externally sourced field, an example of the B-circuit, and is shown in the lower left. Note that the 3rd brush type with no field terminal ***has to be*** internally sourced -there's no place to source the field from the outside without a terminal and is an example of the 'A' circuit. The B-circuit is the ***only*** type with an external Field terminal by which the Field receives its power from the regulator and is, therefore, externally sourced. The two examples shown in the upper left and right with field terminals are A-circuit –the Field is internally sourced from the armature inside the generator and receives its ground via the Field terminal wired to the regulator. In simpler terms, the Field Circuit is either grounded internally or externally.

POLARIZING THE EARLY 9N-10000 GENERATOR

It is also very important when polarizing an 'A' circuit (like those used on our 8Ns) and polarizing the early 'B' circuit system as used on the early 9N-10000 generator with 9N-101505 Voltage Regulator. If you don't follow the exact procedure, you will fry your voltage regulator. On a 'B' circuit set up, disconnect the FIELD wire connection from the Voltage Regulator and momentarily touch the BAT terminal on the Voltage Regulator. NEVER short the terminals on the VR itself as this will result in destroying your voltage regulator. Also, note that the NAA (Jubilee) Tractor uses the 'B' circuit design too.

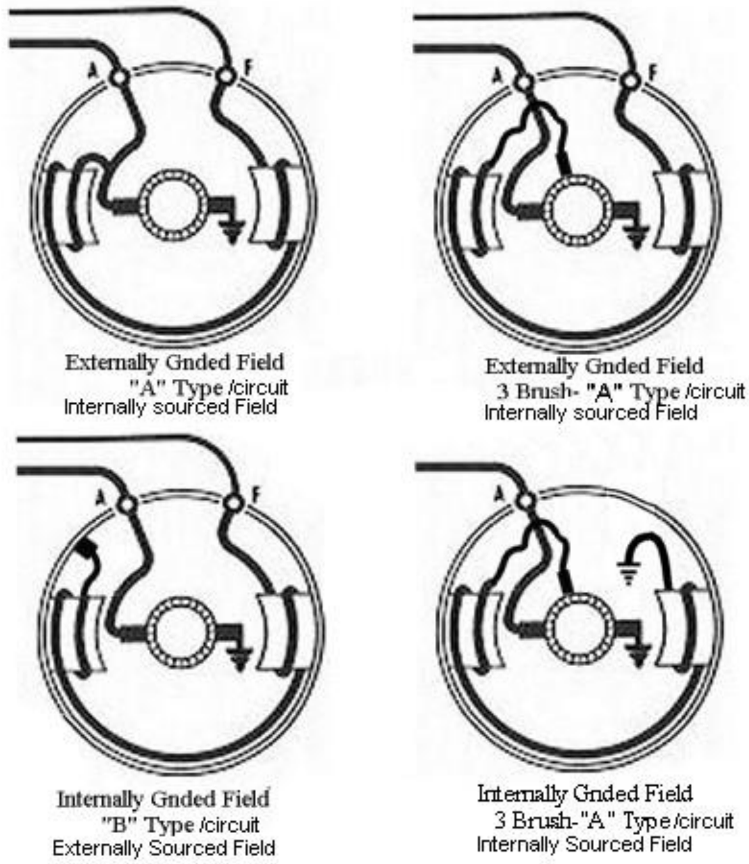


FIG. 2 –Generator 'A' and 'B' electrical circuits defined.

The Ford-Ferguson 9N Tractor Generators

The first 9N generator, Ford part number 9N-10000, released on 04/20/1939, is shown in **FIG. 3**. Its output was rated at 7 amperes maximum at a constant 7.5 volts. To determine if you have the 'A' style generator, wrap a tape measure around the barrel of the generator and the unit circumference should measure about 11-1/2". The actual diameter of the barrel is 3-5/8". The 9N-10000 generator is a two-wire, two-brush unit using the 'B' circuit construction referenced in **FIG. 2**, lower left. Attached to the front of the generator is the pulley –see **FIG. 5** and listed as Ford part number 9N-10130. Made of cast iron, the Major OD measures 3-11/16" and the ID is bored at .59" [15mm] with a 1/8" keyway broached thru. The pulley is fastened by a special nut and lockwasher as the armature shaft end is threaded at .59-20. The barrel of the generator will have a date code stamp of when the unit was manufactured. For example, 'T12' would designate December 1939 as when it was made. Ford used an alpha-numeric marking system for starters and generators which they began with the Model A. The letter designation simply stood for the year and the numeral represented the month. 1939 was the letter 'T' and '12' was December. See **FIG. 4**.

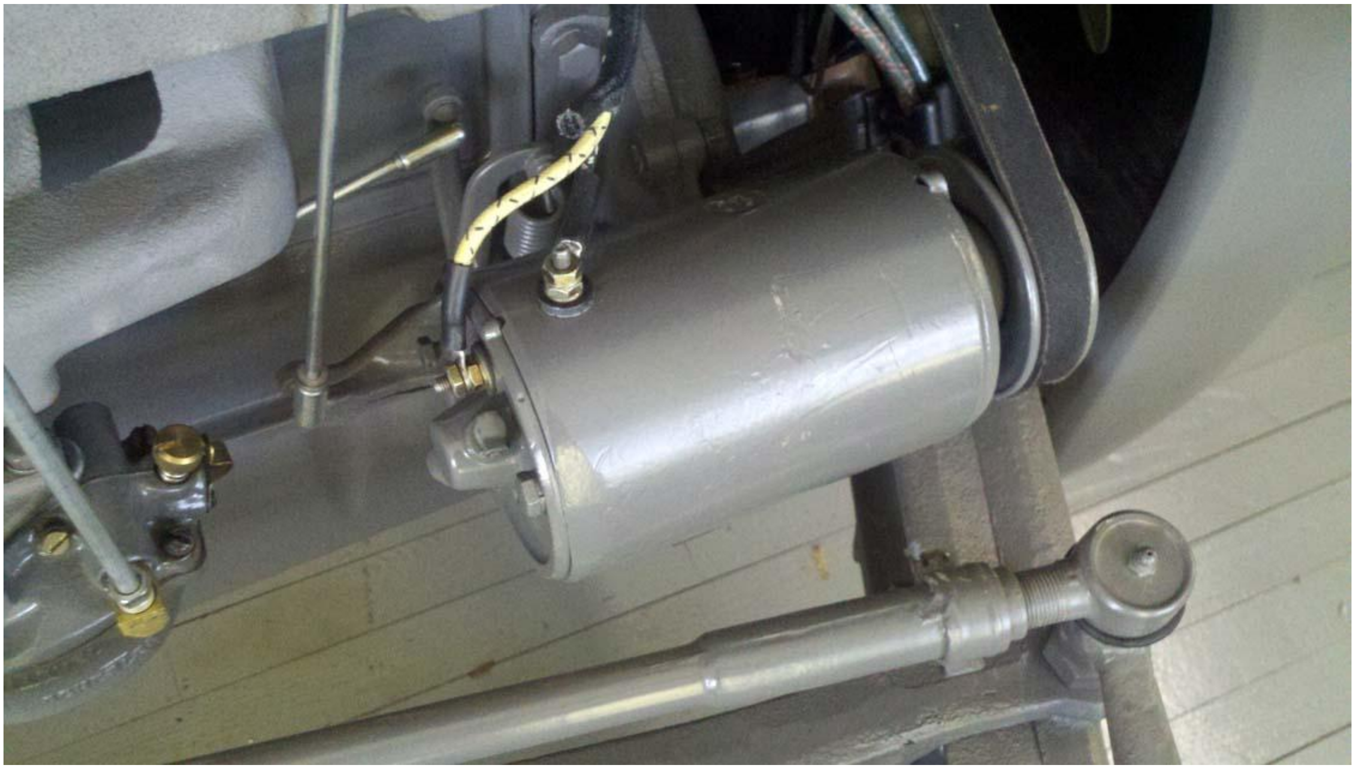


FIG. 3 –Early 9N-10000 Generator -a 2-wire/2-brush, B-Circuit design. Output rated at 7 amps maximum at 7.5 volts constant. After the 9N-10000-B generator was released, the original was designated with the 'A' suffix.

FIG. 4 –The Date Code stamp on a 9N-10000-A Generator. T12 denotes December 1939 which identifies when the unit was built.

FIG. 5 -The 9N-10130-A Pulley. The cast iron unit featured a 3-11/16" major Diameter, 3-1/2" Effective Diameter; .59" [15mm] bored ID with a 1/8" keyway broached thru, and part number cast in recessed characters. The armature end was threaded at .59-20 and fastened with a lockwasher and special hex nut.

The 9N-10000-A Generator used a Voltage Regulator, part number 9N-10505-A and shown in **FIG. 6**. This was a square, steel case, cad or zinc plated device that had three terminal tabs marked

ARM, FIELD, and BAT and included a separate copper braided ground wire. There's evidence of voltage regulators with the word 'TRACTOR' stamped on the case, but no print is available to verify this. In all likelihood they were probably later aftermarket devices. Most all original voltage regulators seen have no markings other than ARM, FIELD, and BAT. Polarizing the system requires the FIELD connection on the regulator to be removed then touch this wire to the BAT terminal on the regulator for a few seconds. NEVER short between the two terminals on the voltage regulator itself as this will result in immediate frying of the voltage regulator.

Two wires coming from the voltage regulator Field and Armature tabs connect to screw posts on the generator –the Field Connection on the top of the barrel, near the back end, and the Armature Connection on the back end plate itself. There was no locking device to prevent the generator from loosening itself up –only the pivot bolt kept it tight. Many an old farmer will testify that they had to stop the tractor every few hours and check the generator tension, reset the fan belt, and tighten up the pivot bolt if they didn't want to be stranded at the end of the day with a dead battery. Visually, the generator and pulley appear to be the same diameter. The Voltage Regulator bolted to the back side of the lower aluminum steering box –see **FIG. 7**. The early 9N-10000-A generator can only use the 9N-10505-A voltage regulator because of their 'B' circuit design. The later NAA FAG10505 VR will work but mounting requires modification.

FIG. 6 -9N-10505-A Voltage Regulator. The 9N-10000-A Generator will not function without it. Why? Their 'B' circuit design. Polarizing is special too.

FIG. 7 –An original 9N-101505 Voltage Regulator mounted correctly. The cast aluminum lower steering box provided two bosses drilled and tapped 5/16-18 NC for hex bolts to secure the unit. Note the downward pointing position of connection tabs. The copper-braided ground strap is secured with the hex bolt on the top left.

9N-10000-B -The First Revision

As stated earlier, 9N owners began experiencing charging problems when they started to install lights on their tractors. Ford engineers rushed to design a better generator, released as 9N-10000-B, on 10/30/1939, and to replace any 'A' generator whose owner brought his tractor in for service, though tractors were still built with 'A' generators up into early 1940. This new generator now had three brushes and used the 'A' circuit design with only a single armature pole connection at the rear. The 'B' generator was designed to work with the new round-can cutout circuit, part number 9N-10505-B, and shown in **FIG. 9-A**, with both generator and cutout being released simultaneously. A voltage regulator would not be seen again until the introduction of the 1948 8N tractor. Ford offered a kit, with p/n 9N-10597-B that was basically a flat bar of steel with holes drilled and tapped to allow the round-can cutout to be fastened to then bolted to the steering box bosses where the voltage regulator previously bolted to. The kit also included two 5/16 flat-head screws that replaced the hex bolts so the new cutout could be fastened without interference. Many farmers opted to just rig the cutout to one of the bosses and forego the extra cost of the kit. Parts Catalogs from '41 and '42 list the bracket as standard. The steering box then was changed to cast iron and the bosses moved to accept the cutout and eliminate the bracket.

The circumference of the 'B' generator barrel was still at 11-1/2 inches with a 3-5/8" diameter –the same as the 'A' generator. Maximum output stayed the same at 7 amperes only now with the back end plate of the generator incorporating a HI-LO position slider button which allowed movement of the third brush position on the armature to raise or lower the field strength and current output – see **FIG. 8**. It was advised to set to maximum charging rate when using the lights but backing off when not in use to prevent overcharging the battery.

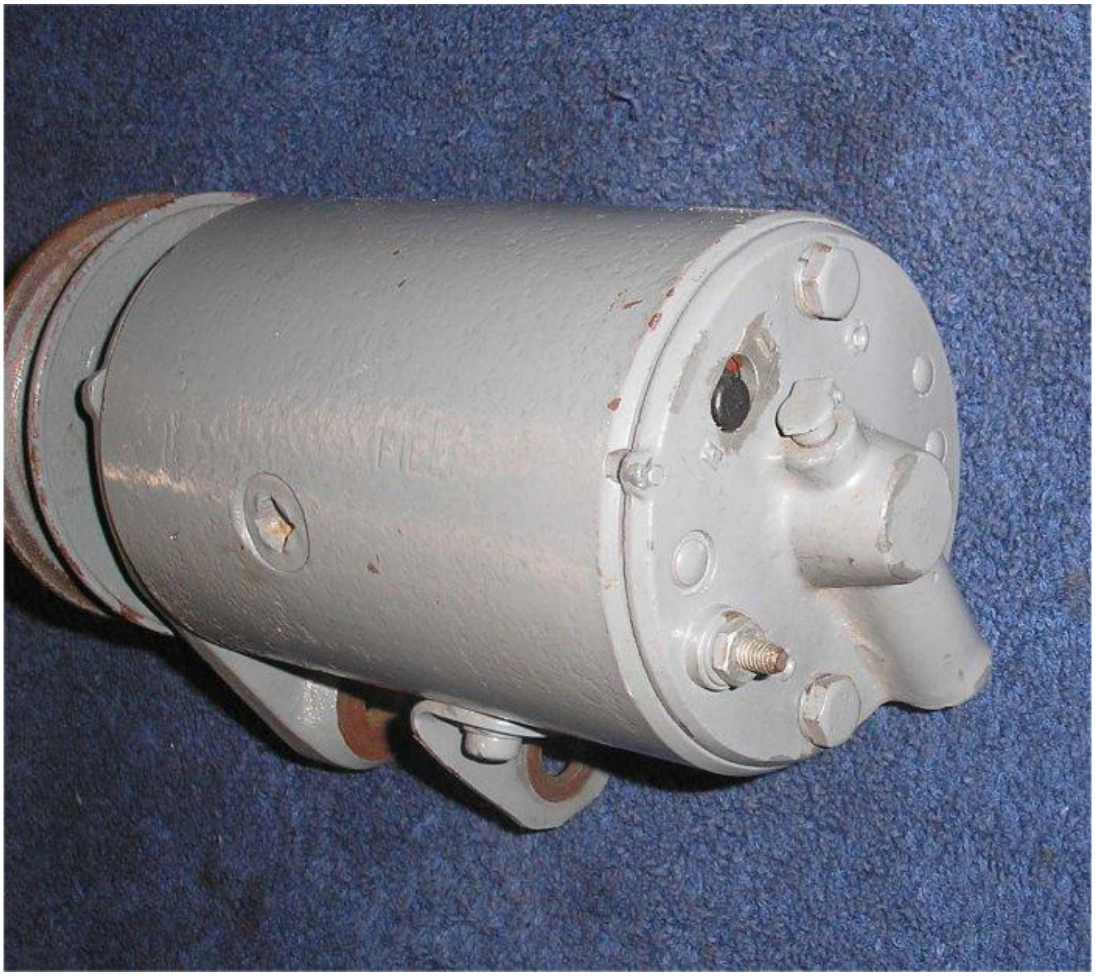


FIG. 8 –The 9N-10000-B Generator, a 3-brush, 1-wire design. Rated current output was 7 amps at 7.5 volts. Note black HI-LO 3rd brush adjustment button.

Other features on the new 9N-10000-B generator were that the armature and pulley were changed as well. The pulley now had a threaded ID and simply screwed onto the armature shaft end. The thread size was .59-20, which is a bastard size because .59 is 15mm in Metric conversion and yet 20 TPI (threads per inch) is standard inch format. A 20 TPI, or pitch, converts to .050" which is the distance between thread crests. 1 divided by 20 equals .050. The closest Metric size would be 1.25mm, or, .049" when converted to inches. Now even a 15mm x 1.25mm size is bastard, or 'special' in Metric as 15mm is not a nominal fastener size. Why is all this so? Engineering the armature was designed around bearings having metric sizes-see **Fig.19**. Ford used metric bearings in all their vehicle generators as did most all US car makers. Therefore the threads had to have major diameters in metric. Why the special thread pitch in inch format though? Engine lathes in the US of the period had no metric thread pitch settings, but mass production special machines would have been built and used to thread roll armature shafts and hex nuts. There were machines called 'thread mills' that were basically special lathes exclusively for thread cutting. See **FIG. 9** with the 9N-10130-B pulley. Dimensionally, it was identical in all aspects to the 'A' pulley except the ID was now threaded instead of bored and keyed. You won't find 'special' or bastard sizes of threads in the engineer's and machinist's bible, *Machinery's Handbook* either, nor any other machinist pocket guides or drill and tap charts. Later, in late 8N generators, Ford went to a 17mm armature and thus bearing IDs were at 17mm and hex nuts changed to threads having a .669-20 special size.

FIG. 9 -9N-10130-B Pulley. Threaded with .59-20 thread –not an industry standard nominal size. It is a Metric/Inch hybrid but system was used on cars and trucks as well, not just the tractors.

FIG. 9-A –The original 9N-10000-B Generator with the smaller 9N-10130-D Pulley and an original 9N-10505-B Cutout.

In April, 1940, Ford released Service Bulletin 71 which covered the change from the 9N-10000-A generator to the 9N-10000-B generator –see **FIG's 9-B** and **9-C**. The details describe the installation of the new 9N-10505-B cut-out required with the 'B' generator while discarding the 'A' generator and the 'A' voltage regulator. The Bulletin also covers the installation of the 9N-10850-B Ammeter, the induction type 'loop style' 30/30 amp gauge released at or around serial number 4000 to replace the 9N-10850-A 20/20 amp gauge. The main wiring harness was also changed then too.

Ford also began offering lighting kits for the 9N Ford-Ferguson tractor sometime in late 1939/early 1940 as well. Lighting kits consisted of two headlights supplied by the C.M. Hall Lamp Co. of Detroit, Michigan; a taillight supplied by the TAURUS lamp company; two fender brackets; wiring; light switch; license plate bracket; cast iron headlight medallions or 'wings' with steel backing plates; and all the special clips needed to install the lighting kit. License plates were required by some states when operating the tractor on main highways. Light kits were never factory installed –they were an accessory sold by the dealer. No special worklight was used. Ford did not release a separate Implement Lamp [worklight] until the 8N, in early 1949, as p/n 8N-15500. The 'new' worklight could also be installed on any prior 9N or 2N tractor as well. Lighting kits up until then recommended one to remove the right side headlight and mount it on the right rear fender light bracket if one desired a worklight. Using Ohm's Law, you can do the math and see that the three lights plus the amps required to run the ignition system were already taxing the generator output on the early 9N charging systems.

Ohm's Law:

I = Amps (Current)
R = Resistance (Ohms)
E = Volts
P = Power (Watts)

E = I x R to find Volts
I = E/R to find Amps
R = E/I to find Ohms
P = I x E to find Watts

The constant is 7.5 volts at 7 amps max that the generator puts out.

The ignition system pulls 2 amps

Three lights - (2 headlights at 35 watts each, and 1 taillight at 3 watts) =38 watts

38w ÷ 7.5v = 5.066 amps

5.066 + 2 (ignition draw) = 7.066 amps

The total draw on the system exceeds 7.0 amps if using the three lights.

Aug 08 08 02:32p Derek Barkley 704-482-9914 p.1

Ford Tractor FERGUSON SYSTEM WHEEL-LESS IMPLEMENTS

SERVICE BULLETIN

3 pages to bulletin.

How to replace 9N10000A generator and regulator with 9N10000B generator and cut out.

NUMBER 71

Ferguson-Sherman MANUFACTURING CORPORATION

DATE April 30, 1940

DEARBORN, MICHIGAN

referenced on Page 35 in 1940 Parts book

Harry Ferguson's company

TO ALL DISTRIBUTORS, DEALERS AND FIELD ENGINEERS:

2 terminal 2 Brush 9N10000A

SUBJECT: INSTALLATION OF 3-BRUSH TYPE GENERATOR IN TRACTORS EQUIPPED WITH 2-BRUSH TYPE GENERATOR.

INSTALLATION OF #9N-10505-B CUT-OUT ASSEMBLY ON TRACTORS EQUIPPED WITH #9N-10505-A GENERATOR VOLTAGE REGULATOR.

INSTALLATION OF #9N-10850-B AMMETER ASSEMBLY IN PLACE OF #9N-10850-A AMMETER ASSEMBLY. B is loop

terminals

THE 2-BRUSH TYPE GENERATOR IS NO LONGER SUPPLIED FOR SERVICE. WHEN NECESSARY TO MAKE REPLACEMENT OF THE COMPLETE GENERATOR, THE 3-BRUSH TYPE GENERATOR, PART #9N-10000-B, MAY BE INSTALLED BY FOLLOWING THE PROCEDURE INCORPORATED IN THE ATTACHED SKETCH. FIRST, INSTALL THE GENERATOR; THEN CUT OFF THE BLACK WIRE WITH THE WHITE TRACER THAT LEADS TO THE GENERATOR. THIS SHOULD BE CUT CLOSE TO THE LOOM TO AVOID POSSIBLE CONTACT WITH ANY OTHER METAL. FLD

ON TRACTORS WHERE THE 2-BRUSH TYPE GENERATOR HAS BEEN REPLACED BY THE 3-BRUSH TYPE, AND IT IS LATER FOUND NECESSARY TO REPLACE THE VOLTAGE REGULATOR #9N-10505-A, THE CUT-OUT ASSEMBLY #9N-10505-B MAY BE INSTALLED BY USING A SMALL ADAPTOR PLATE #9N-10597, ALONG WITH (2) #33798-S7 NUTS, (2) #84806-S7 LOCK WASHERS, AND (2) #20311-S7 BOLTS. TO MAKE THE NECESSARY HOOK-UP, CUT THE BLACK WIRE WITH THE WHITE TRACING AT THE CUT-OUT END NEAR THE LOOM, CONNECTING THE REMAINING TWO WIRES IN ACCORDANCE WITH THE SKETCH. FLD

PART #9N-10850-A AMMETER ASSEMBLY, WITH WHICH THE FIRST 4000 TRACTORS WERE EQUIPPED, IS NO LONGER SUPPLIED IN SERVICE, AND WHERE REPLACEMENT OF SUCH ASSEMBLY IS NECESSARY, PART #9N-10850-B AMMETER ASSEMBLY MAY BE INSTALLED BY FOLLOWING THE PROCEDURE INCORPORATED IN THE ATTACHED SKETCH.

AS THERE ARE NO TERMINAL POSTS ON THE BACK OF THE "B" TYPE AMMETER, IT IS NECESSARY THAT THE YELLOW WIRE, AND BLACK WITH YELLOW TRACER, BE LOOPED THROUGH THE "U" SHAPED BRACKET ON THE BACK OF THE AMMETER AND CONNECTING THESE TWO WIRES WITH ONE EACH OF PART #27058-S7 BOLT, #34803-S7 WASHER, AND #34079-S7 NUT. THEN TAPE THE TERMINAL WELL WITH FRICTION TAPE TO AVOID ANY POSSIBLE CONTACT WITH OTHER METAL SURFACES.

YOURS VERY TRULY,

FERGUSON-SHERMAN MFG. CORP.

C C Wright

C. C. WRIGHT
SERVICE & PARTS MGR.

CCW:ERP

FIG. 9-B –Service Bulletin 71 details the changeover to the 9N-10000-B generator, the 9N-10505-B Cut-Out, and if needed, the 9N10850-B Ammeter.

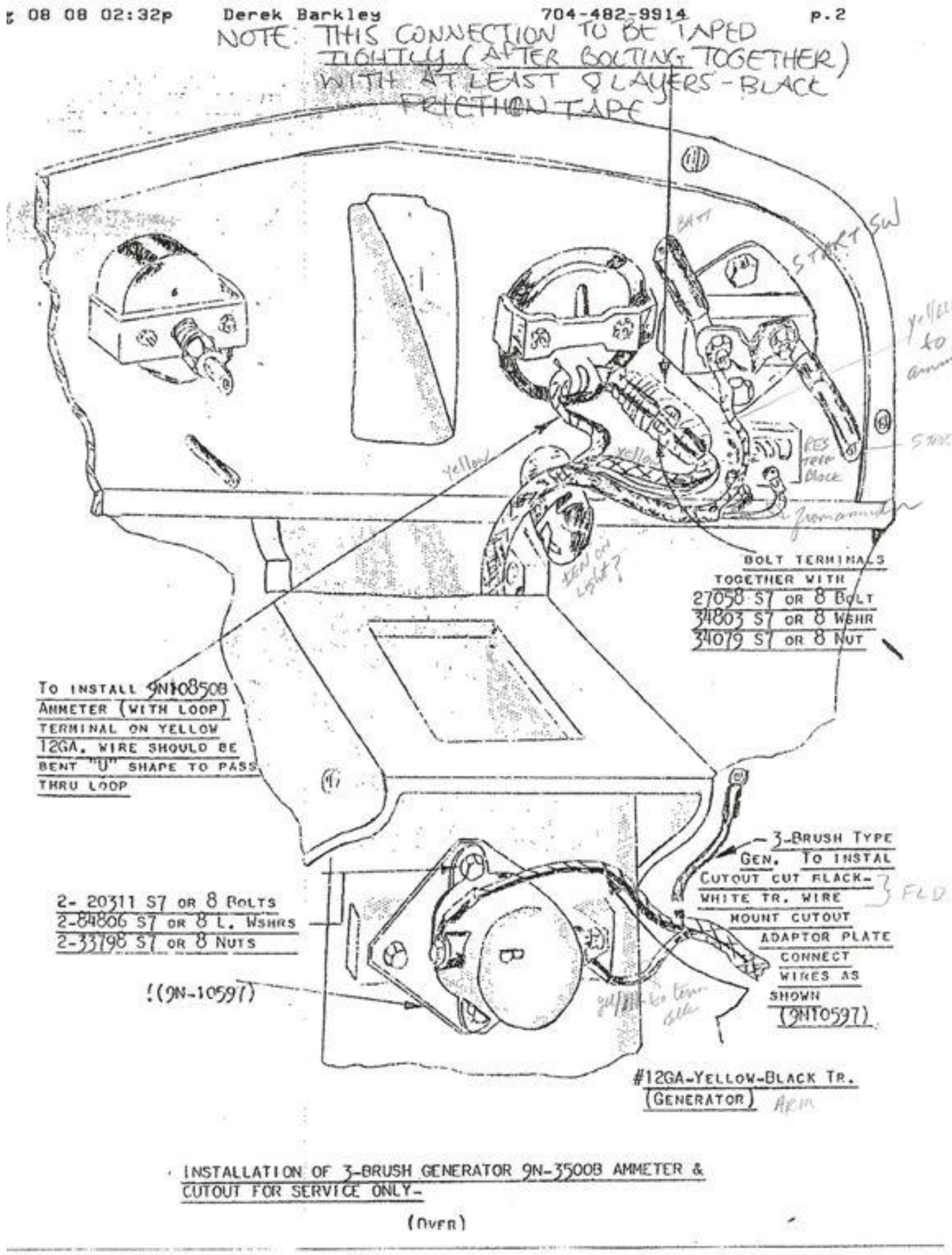


FIG. 9-C –Detailed drawing of 9N-10505-B Cut-Out and 9N-10850-B Ammeter connections.

<u>Charging Issues Continue –FORD Tries A Smaller Pulley</u>

The new 9N-10000-B generator did not solve the charging issues as hoped. Thus the FORD engineers designed a smaller pulley anticipating that it would spin faster and thus increase the charging rate. For the 'B' generator, the 9N-10130-D pulley was released which had a smaller Major OD at 3-3/16" and therefore a smaller Over-The-Roll Effective Diameter. The ID remained the same with the .59-20 threaded bore. The 9N-10130-C pulley was also released to replace the 9N-10130-A pulley on the earlier 9N-10000-A generator for those with the early generator still on their tractors. The 'C' pulley also had a 3-3/16" Major OD with the .59 smooth bore keyed at 1/8" with everything else being the same. Owners who had lights or were considering adding them now would be able to purchase the 'C' pulley or the 'D' pulley for their corresponding generators and have no more charging issues. **FIG. 10** shows the 9N-10130-C and the 9N-10130-D pulleys.

FIG. 10 –The smaller 9N-10130-C and 9N-10130-D Pulleys. Designed with a smaller Major OD at 3-3/16" and therefore a smaller Over-The Roll* dimension. Note the 'C' is keyed and replaced the 'A' pulley and the 'D' is threaded which replaced the 'B' pulley.

Still, another revision – The 9N-10000-C Generator is released.

The smaller pulleys, however, did not fix the charging issues. On 08/20/1940 Ford released the 9N-10000-C generator used around tractor serial number 9N18000, about mid-year production, – see **FIG's. 11** and **FIG. 12**. It used the 9N-10130-B pulley and now with a larger barrel, used a new, larger armature, and the output increased to 11.5 amperes. The larger barrel had a 14-1/4 inch circumference and used one wire with three brushes. The third brush adjustment device on the back end plate was changed to a screw with a small internal spur gear attached and by turning it moved the third brush holder, to increase or lower the field strength rather than a simple HI-LO slider button as used on the 'B' generator. It was a mechanical device, not an active electronic type component. The slotted screw made for easier adjustment, and it was recommended the operator use a coin to turn it. The 'C' generator continued to use the round-can cutout, 9N-10505-B. There's an original Ford Service Manual, a lime-green covered publication from 1943 which describes the charging system as having the output adjustable from 4-16 amps. The higher output claim is unlikely and very questionable.

FIG. 11 -9N-10000-C Generator with the 9N-10130-B, threaded pulley. 1- wire, 3-brush style, rated output at 11.5 amperes. Shown with tensioning bracket kit assembly.

The mid-forties saw yet another change to the generator. On 01/15/1945 the 2N-10000 generator replaced the 9N-10000-C generator. It was basically the same as the 9N-10000-C generator with an identical barrel diameter, armature, 11.5 amp output, and utilizing the 9N-10130-B threaded pulley. The only change was it had two drilled and ¼-28 tapped holes on the barrel to accommodate the new tensioning bracket –see **FIG's. 13, 14,** and **15**. Part number 2N-10181-B was released at the same time as a Service Kit for those with a 9N-10000-C generator wishing to add the tensioning device –see **FIG.12**. This generator used the 9N-10505-B round-can cutout and was utilized up until the introduction of the new 8N Tractor in 1947 which used a three wire, three brush style generator and a voltage regulator.

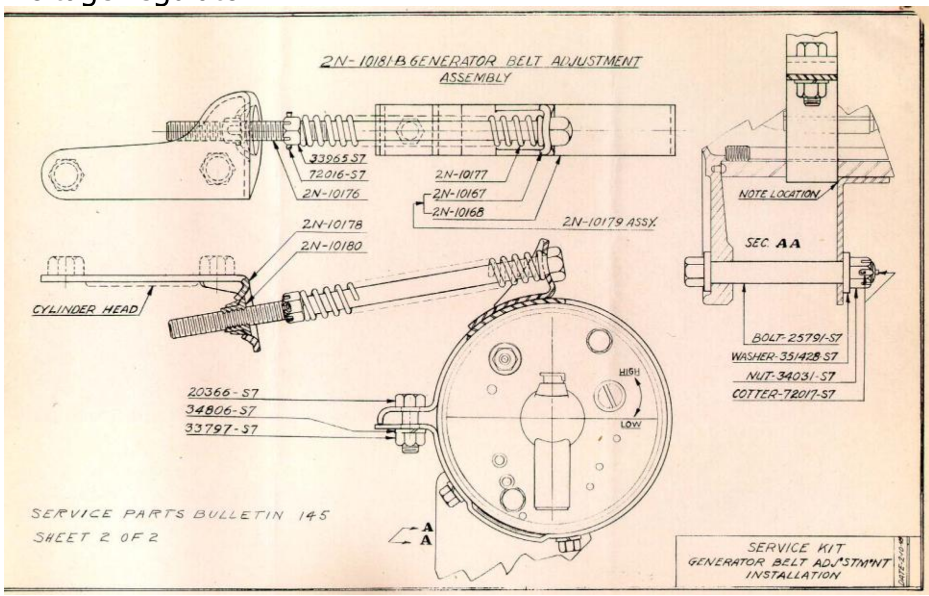


FIG. 12 –Original drawing for the belt tensioning kit. This was a Service Item sold by dealers and fit the 9N-10000-C Generator.

FIG. 13 –The 2N-10000 Generator & Tensioning Bracket Assembly. Left Side view.

FIG. 14 –The 2N-10000 Generator & Tensioning Bracket Assembly. Back view.

FIG. 15 –The 2N-10000 Generator & Tensioning Bracket Assembly. Front view.

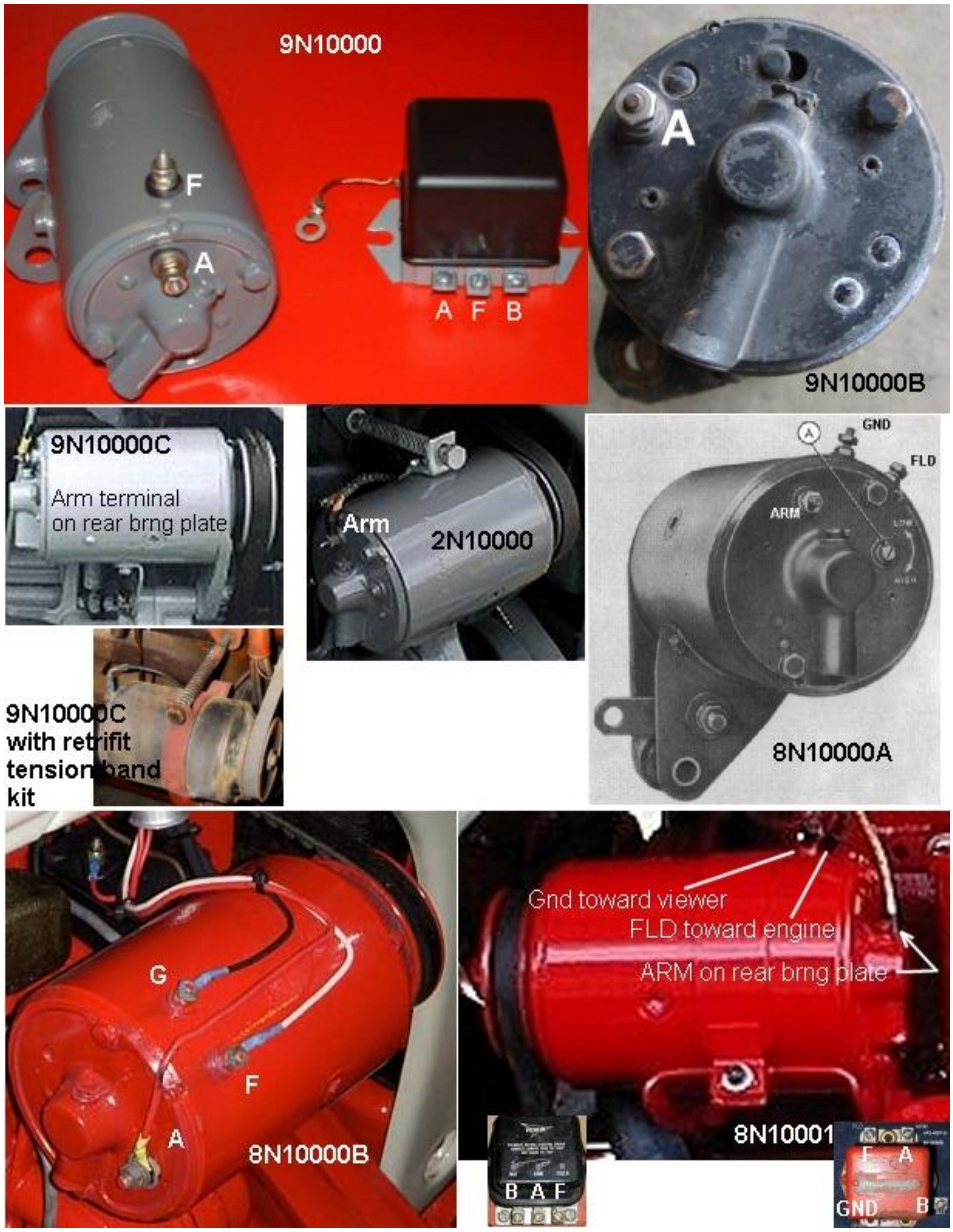


FIG. 15–Visual Aid –all the 9N and 2N generators with the 8N models shown.

Lastly, there was a Service Bulletin issued which detailed the procedure to install an 8N-10000-B 3-brush generator on 2N and 9N tractors. It contained a hand-drawn sketch with instruction notes and showing connections to the 8N-10505-B Voltage Regulator.

Technical Info

*In the Engineering and Machining world, Vee-Grooves are designed so the V-Belt functions at an 'effective diameter' and are drawn with an 'Over-The–Roll' dimension. This essentially is shown as a diameter measured over two equal precision steel balls, or precision steel gage pins set in the Vee itself each being 180° apart. This is the calculated diameter that the Vee-Groove needs to be in order to function correctly using the pulley diameter, speed, and belt width as factors. It is the only way to accurately measure the ***depth*** or ***height*** a vee-groove needs to be. It's almost the same as using thread wires to measure threads. By using a typical thread as an example, if you tried to measure from one crest of a thread to the bottom you'd find it difficult to accomplish without a comparator, or, shadow graph. By using thread wires it is easy to measure over the pins and get an accurate measurement of the thread pitch. Turning bolt threads on a lathe require the Major OD be first machined, i.e. a 5/8 thread would mean the Major OD is at .625". The thread size is accurately found by feeding the tool deeper into the cut (X-axis) until nominal size is met and is easily checked with the thread wires or a thread gage.

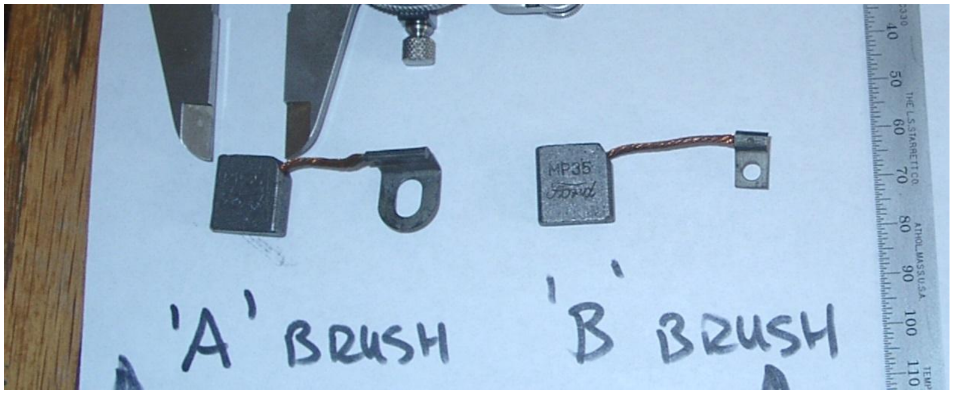
It is also noteworthy that the fan belt used is the correct one too. The early 9N-10000-A and 9N-10000-B generators use the belt number 9N-8620-A and it measures approximately 11/16" wide by 43-1/2" long new –see **FIG'S. 16** and **17**.

FIG. 16 –NOS Ford fan belts 9N-8620-A. This is the correct belt to use with the early small 'A' and 'B' generators.

FIG. 17 –The length of a new 9N-8620-A fan belt is measured at 43-1/2 inches around the outside. Width of belt is 11/16” measured at the outside. Bear in mind a new belt will have stretched so this is not the best method to determine belt length.

Armatures, Field Coils, & Brushes

Armatures and field coils are not easy to come by for the early generators. The armature will also have a date code on it similar to the barrel but won’t always match if the unit was serviced at some point in its life. Most brushes are readily available, early assemblies not so much. The 9N-A generator uses two 9N-10069 assemblies, that is, the graphite brush with the mounting tab and copper wire attached. The actual wafer is p/n 40-10069. The 9N-B and 9N-C generators use two 9N-10069-B assemblies with the same 40-10069 wafers but different mounting tabs, and a larger 40-10070 wafer for the 3rd Brush adjustment. See **FIG. 18**.



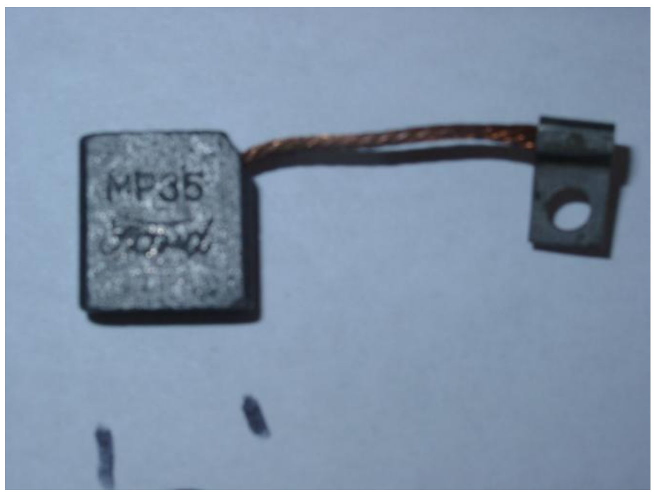


FIG. 18 –Ford assembly numbers shown are 9N-10069-A and 9N-10069-B. Note tab sizes. The third brush wafer used on 9N-B and 9N-C generators is much larger.

Fig. 19 – Generator bearing 9N-10094 as shown with the ID measuring .59" which is equivalent to 15mm. Bearings were in metric, thus the armature shafts and their fasteners were as well.

Acknowledgments

Special thanks, listed alphabetically, to these people who contributed their time, research, data, pictures, explanations, and comments to help produce this article:

Don Barkley
Steve Dabrowski
Scott Deppen
Jim Guarino
Jason Grooms
Robert Johnston II (aka Paladin)
Kelly Jewell
Jesse Morris (aka JMOR)
Randy Sierk