EMD MAINTENANCE INSTRUCTION

AUXILIARY GENERATORS 10 KW AND 18 KW

DESCRIPTION

This bulletin covers the 10 KW and 18 KW auxiliary generators since both of these generators are very similar in construction, operation, and maintenance. Thus, unless specifically identified, the information presented will apply to both models.

The 10 KW auxiliary generator, illustrated in Fig. 1, is the current design and is identified by the model designation A-7159, A-7159A1, A-7159A3, A-7159M2, and A-7159A4. They are either vee-belt driven from a pulley at the rear of the generator or driven by a flexible coupling and shaft extension from the diesel engine.

The Model A-7159 generator replaced previously used Models A-3001 and A-3001R. The letter "R" indicated a change over the original Model A-3001 to incorporate new interpole coils and machining on the fan end of the frame to clear the engine blower for certain applications, and is interchangeable with the Model A-7159 series. The Model A-7159 was the original auxiliary generator in this series with the armature bearing clamped on the commutator end. The Model A-7159A1 is the same as the A-7159 except the bearing is clamped on the fan end or opposite the commutator end. Model A-7159A2 is the same as A-7159A1 except in addition it contains constant pressure brush holders. Model A-7159A3 is the same as A-7159A2 except, in addition it contains new hex socket screws for the bearing housing, and the shaft runout is held to within .003 total indicator reading. The present production Model A-7159A4 is the same as Model A-7159A3 except

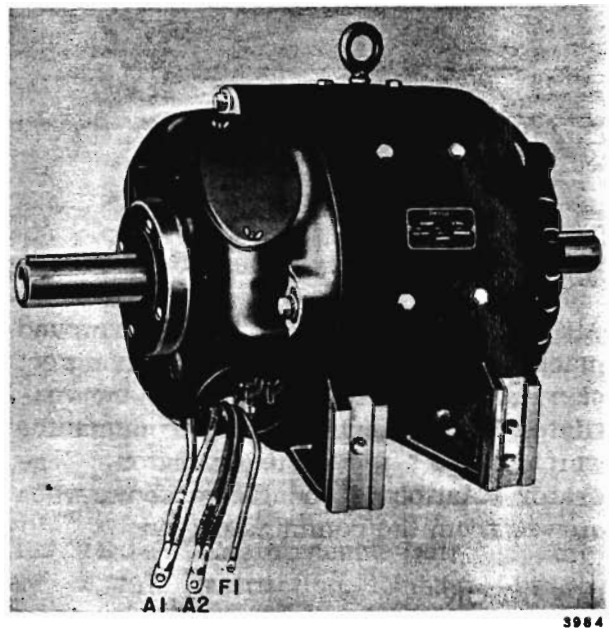

Fig. 1 — Auxiliary Generator A-7159

for a different armature shaft, bearing housings, bearing covers, and new keys and bearing collars. The A-7159M2 and A-7159A4 models are both interchangeable with all previous models.

The 18 KW auxiliary generator is identified as Model A-8102 and is illustrated in Fig. 2. The revised Model A-8102A1 has the free bearing opposite the engine driven end. Models A-8102 and A-8102A1 are converted to A-8102A2 which, in addition, has the armature bearing locked on the fan end or opposite the commutator end and has constant pressure brush holders.

The A-8102A3, same as A-8102A2 except, in addition it contains new hex socket cap screws for bearing housing, and the shaft runout is held to within .003 inches total indicator reading.

* This bulletin is revised and supersedes previous issues of this number.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION • LA GRANGE, ILLINOIS, U. S. A.
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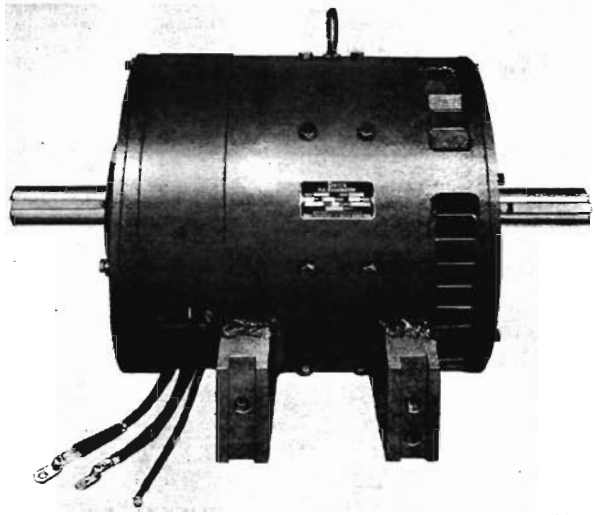

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Fig. 2 — Auxiliary Generator A-8102

All auxiliary generators are shunt wound machines and produce 80 volts direct current at 800-2400 RPM. They are ventilated by a fan mounted on the armature which draws air into the generator. Generator rotation is counterclockwise when viewed from the commutator end.

OPERATION

Applied to locomotives, these generators provide direct current for excitation of DC main generators, charge storage batteries, supply control circuits, lighting and miscellaneous other low voltage current needs.

Residual magnetism furnishes excitation after which the machine becomes self-excited from its field windings. Since these generators will be operating at varying speeds, voltage regulators are used to control the field excitation through the external lead connections provided.

MAINTENANCE

The auxiliary generators are designed and manufactured to provide excellent service for a long period of time. As with any machine, a certain amount of attention is required in the form of inspections and periodic maintenance to insure continued satisfying performance. The applicable Scheduled Maintenance Program should be consulted for the recommended intervals at which these generators should be given attention.

Cleaning

It is essential that the auxiliary generator be kept clean at all times. It should be blown out with clean dry compressed air as outlined in the applicable Scheduled Maintenance Program. The brush holder ring insulator should be wiped clean. Any accumulations of oil and dirt should be removed.

The electrical equipment must not be sprayed or cleaned with a liquid of any kind. Attempting to clean the coil and windings with a liquid cleaner will destroy the protective coating, causing it to peel or crack. Necessary maintenance requires dust and dirt removal with clean air periodically, using a LARGE VOLUME of air at reasonably LOW PRESSURE. If a high pressure from a nozzle is used, there is danger of loosening tape and cutting the protective coating on the various parts. Parts, such as brush holders and contacts, should be wiped with a clean dry cloth often enough to prevent any accumulations of dirt. If deposits of dirt are allowed to collect, they sometimes become caked, making them more difficult to remove.

In cases where there are heavy deposits of grease or dirt which cannot be removed with air and dry cloths, a stiff brush, soft wood or fibre scrapers may be required. In SEVERE cases, it may be necessary to DAMPEN a cloth in cleaner to remove oxidized grease or oil. However, every precaution should be taken to KEEP THE CLEANER OFF THE COMMUTATOR and copper parts. Cleaners should be used only when other methods will not remove the foreign material.

BRUSHES AND BRUSH HOLDERS

A periodic inspection of brushes and brush holders should be made, and the following points should be observed.

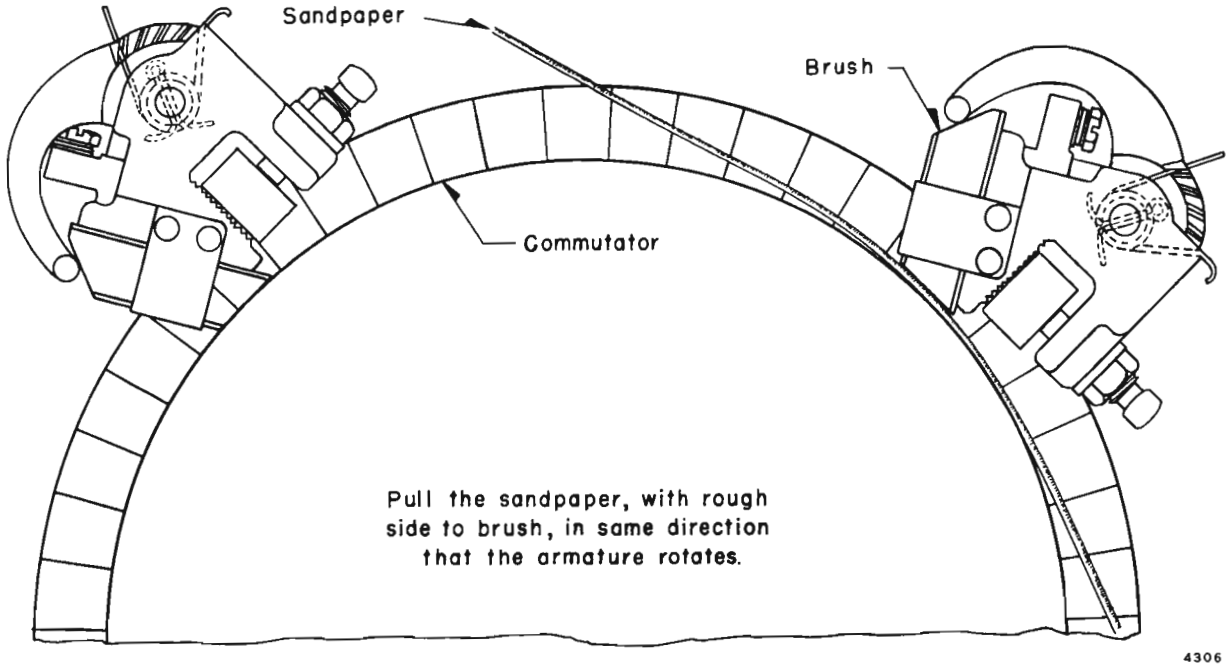

Fig. 3 — Fitting Brushes To Commutator

Brushes should move freely in the holders, and not be stuck with dirt or other foreign substance. Lift the springs, and raise and lower the brushes in the carbonways so as to release any dirt that may have accumulated. Care should be taken not to snap the springs as this may chip the brushes.

Replace any brushes that have been chipped or worn excessively with the same grade of brush or recommended replacement. This is especially necessary when only a partial replacement is made, as two different kinds of brushes on the same generator are likely to be detrimental to its successful operation. When the new brushes are installed they should be "sanded-in" one at a time as shown in Fig. 3, by placing a piece of #00 grade sandpaper under the brush with the sand side contacting the brush and moving the sandpaper in the direction of rotation. Lift the brush when moving the paper back, and keep the paper close to the commutator to avoid rounding the edges of the brush.

NOTE: DO NOT USE EMERY CLOTH OR EMERY PAPER FOR "SANDING-IN" BRUSHES.

Proper brush pressure of 1-1/2 to 2-1/2 pounds should be maintained as specified under "Maintenance Data" at the end of this instruction. Unequal brush pressure may cause unequal current distribution to the brushes. Refer to Fig. 4 for method of measuring and adjusting brush pressure. Auxiliary generators Models A-7159A2, A-7159A3, A-7159M2, A-7159A4, A-8102A2, and A-8102A3 have constant pressure brush holders requiring no adjustment.

Maintain 1/8" clearance between the bottom of each brush holder and the commutator. The brush holder assembly is arranged in such a way that the brush holder may be moved toward the commutator by loosening the check nut and the set screw on the brush arm. Brush holders should be rigidly bolted in place. The carbon brush shunts should be so arranged that they will clear the parts of the frame that are at ground potential.

COMMUTATOR

The commutator should present a polished surface entirely free from pitting. In the event the commutator becomes pitted it should be cleaned with a fine commutator stone.

NOTE: Do not use carborundum, emery cloth, or emery paper on the commutator.

When cleaning the commutator with a stone, extreme caution must be taken to keep copper dust from the windings. The air openings in the end frame on the fan end should be covered to prevent the fan from drawing dust into the windings. After cleaning the commutator, blow out windings carefully with clean dry compressed air at reduced pressure.

If the commutator has high and low spots or signs of burning, the armature should be placed in a lathe and the commutator turned just enough to give it a uniform surface.

Do not apply lubricant to the commutator because it is detrimental to successful operation. If the commutator is not kept clean and free from grease and oil, carbon dust will collect in the grooves between the segments and may cause a short circuit.

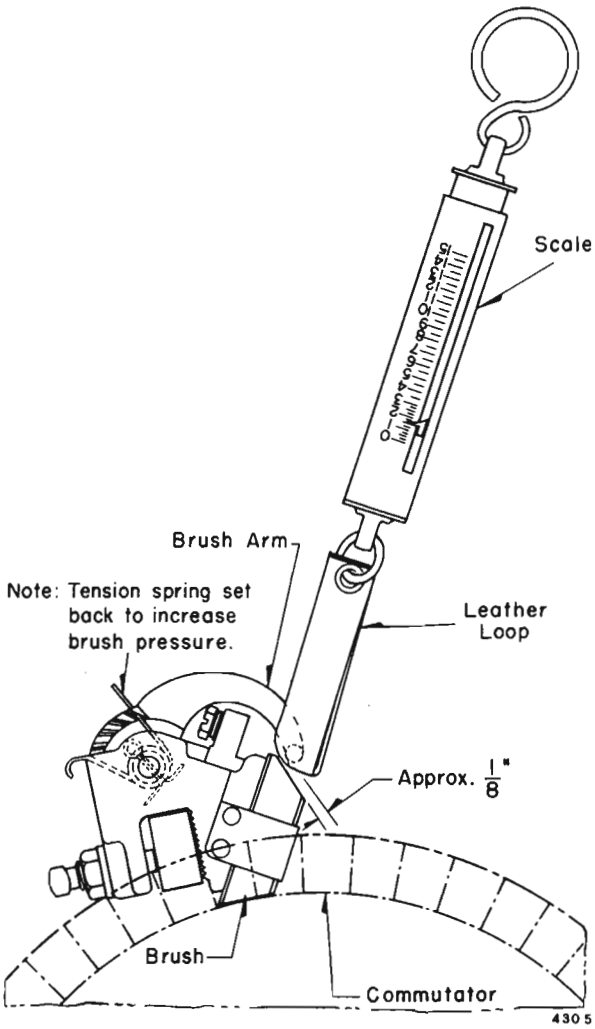

Fig. 4 — Measuring Brush Pressure

On Models A-3001 and A-3001R, Fig. 5, the commutator (when rotating) enters into the heel and out of the toe of the brush. On Models A-7159, Fig. 6, and 8102 Series, Fig. 7, the commutator enters into the toe and out of the heel of the brush. On Model A-8102 Series, Fig. 7, the brushes ride at right angles to the commutator.

NOTE: On some of the earlier Model A-7159 generators, the brush holders were arranged in the same relative position as found on Model A-3001.

The brushes on both models commutate in the same zone and the brush holders on both models are interchangeable.

CAUTION: The brush holders must not be rearranged with regard to the toe and heel of the brush as related to direction of commutator rotation, but must be assembled as originally found, otherwise commutation difficulty will result. Before removing brush holder from stud, be sure to observe its position on the stud.

The commutator end frames on the different models are not interchangeable.

ARMATURE DISASSEMBLY

Removal Of Armature From Stator

1. Remove sheaves (where used) with sheave puller and remove keys from the shaft.
2. Before removing the end frames on the fan and commutator end, mark the end frame and stator assembly with a prick punch. This is done so that the brushes will not be shifted away from the electrical neutral when reassembling the commutator end frame.

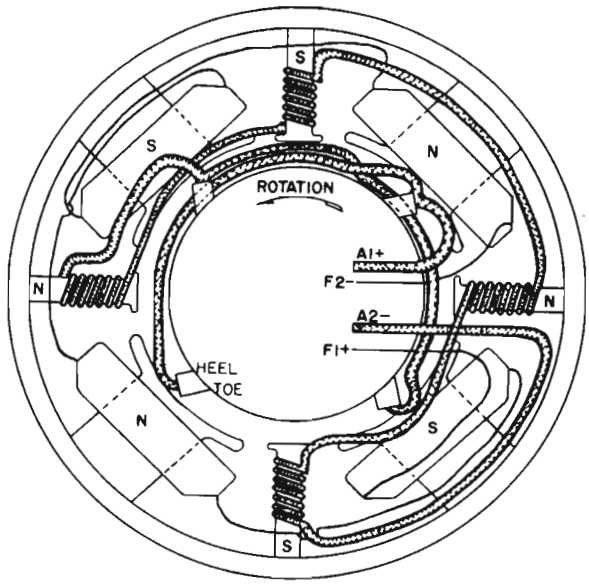

Fig. 5 — Connection Diagram
Models A-3001 And A-3001R

3. Remove the brushes from the commutator and cover the commutator with a protective fish paper covering.

4. Disconnect the connection from brush holder to interpole field coils and remove the clamps holding stator leads to housing.

5. Remove cap screw nuts from the commutator and fan end frames.

6. Remove screws, bearing cap to housing, and remove pipe plug and nipple from both ends, if used.

7. Place a protector over shaft and apply a piece of pipe over the shaft extension. Support the free end of the pipe with blocks and loosen the commutator end bearing frame by tapping on frame using a brass or copper bar. When the commutator end frame is moved away from the stator, place fish paper between armature and pole piece at the bottom of the armature. Remove commutator end frame. Remove the fan end frame by tapping on the frame; the frame can then be slipped over the bearing assembly. The fish paper under the armature will protect the armature from dropping.

8. To remove the generator armature entirely, a heavy rope should be placed around the ends of the armature shaft and the complete armature

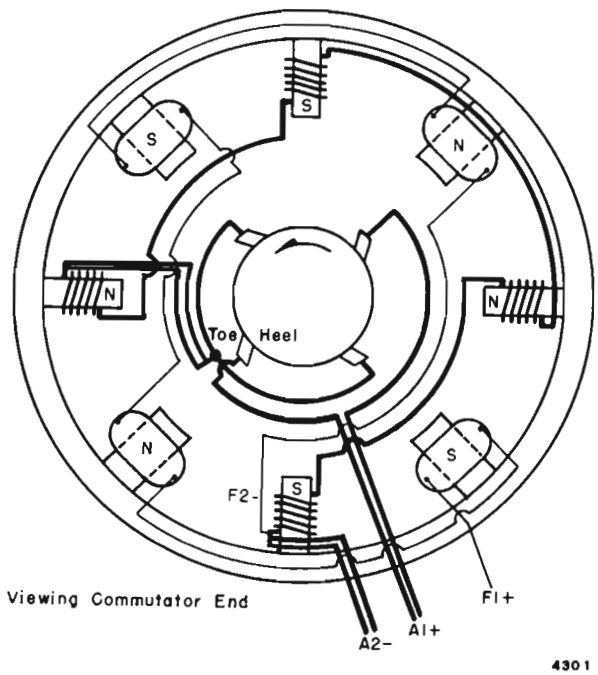

Fig. 6 — Connection Diagram A-7159 Series

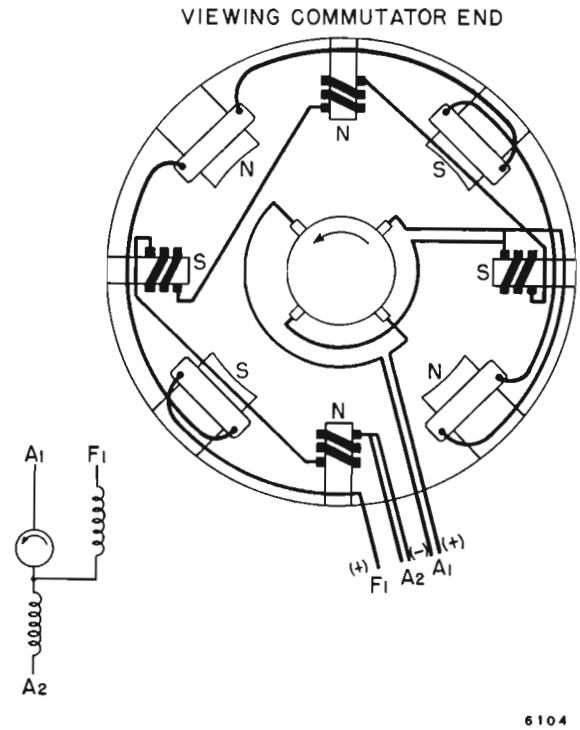

Fig. 7 — Connection Diagram A-8102 Series

lifted enough to clear the pole pieces. Ease the armature out of the frame toward the fan end. Care must be exercised not to injure the laminations and windings during this process. An extension pipe may be required over the shaft at the commutator end, so that the armature may be projected far enough out of the frame to be handled.

CAUTION: Before using an extension pipe, protect the threaded portion of shaft and the shaft itself. Support the armature on wooden blocks after removal. Never lift the weight of the armature with rope around the commutator.

Removing Armature Bearings

1. Remove bearing covers from commutator end and fan end by tapping cover with soft metal hammer and pry open with a screw driver. A retainer pin holds the bearing housing covers on both bearing assemblies.

2. Remove bearing retainer lock nut from both ends of bearing assemblies.

CAUTION: Keep commutator end bearing assembly parts separated from the fan end bearing assembly parts. Mixing the bearing parts will cause the armature to bind and run hot due to improper end play.

3. Remove remaining bearing assembly on shaft by tapping the bearing housing lightly and evenly with a rawhide mallet or soft metal hammer. The remaining bearing parts on shaft are as follows:

   a. Ball bearing
   b. Spacer between bearing and shaft
   c. Bearing housing

NOTE: A new bearing must be installed and the old bearing discarded.

4. Remove the armature fan. The fan is of one piece construction bolted to the armature spider. By removing the bolts, the fan can be slipped off the shaft. Care should be taken to reassemble the fan in the same position, if the balance has not been disturbed.

Armature Inspection And Cleaning

Before the armature can be properly checked and its electrical qualifications met, it must be thoroughly clean and dry. When cleaning the armature, first blow out all carbon dust, using clean dry compressed air. A large volume of air at reasonably low pressure should be used to prevent damage to the insulation.

After the carbon dust has been blown out of the armature, the armature may be cleaned using petroleum solvent Apco #42 (Stoddard solvent - flash point 115° F.). Wipe the outside of the armature with a cloth well saturated with the solvent to remove external grease and dirt. Dry the armature using low pressure air, making sure the air is blown into the pockets and through the openings in the armature, to remove internal accumulation of dirt. After the armature has been satisfactorily cleaned, it should be set aside to allow the solvent to evaporate before any electrical tests are made.

CAUTION: Use the usual safety precautions that apply to inflammable fluids. Provide adequate ventilation when any type of solvent is used.

The armature should be closely inspected for condition of bands, wedges, coils, insulation, commutator, and the general assembly. Armature bands and core wedges should be tight and secure. Soldering on the band should be intact. If the solder has been thrown, the cause should be determined and corrected and bands replaced. The coil insulation should be free of blisters, flakes, or cracked insulating varnish surfaces.

ARMATURE AND COMMUTATOR REPAIR

Armature Electrical Tests

Before applying a high potential test to the armature, make an insulation condition test with a megohmmeter. A reading of one megohm minimum should be recorded by applying 500 volts DC to the winding for one minute. If armature is free of insulation deterioration, moisture grounds, and the creepage surface is clean, a high megohm reading may be expected, usually from 100 megohms to infinity. When low megohm readings are found, the armature should be heated for 4 hours at 100° C. in a convection type oven. Recheck megohm readings after cooling armature to the temperature of the last test for a comparison value. If below 1 megohm, determine cause and correct.

When the armature passes the megohmmeter test, apply a high potential test at 600 volts AC, 60 cycles. The armatures that fail on high potential test should be stripped and rewound, unless the fault can be located and a permanent repair made.

When the armature passes the high potential test, apply a bar-to-bar resistance comparison test with a low resistance ohmmeter test set. Readings above normal may indicate poor solder joints; and readings below normal will indicate a short which must be eliminated or the armature stripped and rewound.

Armature Wire Bands

Armature band wire diameter is .040" and has a tension of 150 pounds. Duplicate the banding originally on the armature. Do not change width, diameter, position, or material of the band wire. Duplicate the insulation under the band wire to bring the wire band to proper level.

CAUTION: Failure to adhere to the above instructions may cause heavy circulating currents in band wire sufficient to overheat and melt the solder.

Solder band wire and clips with pure tin solder. Flux band before soldering. Return the armature to the manufacturer for extensive repair.

Armature Varnish Treatment

Armatures which have passed all electrical tests should be given a varnish treatment as follows:

1. Place armature, fan end down, in a convection oven and preheat so the core and winding temperature is between 120° C. and 130° C.
2. Keeping varnish away from the commutator surface, dip the armature in a varnish tank containing clear baking varnish 8160879 held to Ford Cup #4 viscosity between 40 and 55 seconds at 21.1° C. using Xylol 8117384 for thinning.
3. Remove the armature from the varnish, and hold over the varnish tank until excess varnish drains from the armature.
4. After dripping has stopped, place the armature in a convection oven and bake for 2 hours at 125° C.
5. After baking and while still hot, potential test at 800 volts for one minute.

After baking, and while armature is hot, check commutator nuts for tightness. Apply 360 inch-pounds torque to commutator nuts to test for tightness.

Commutator Machining

When the commutator is rough, burned, or eccentric, the armature should be placed in a lathe and the commutator turned. Before turning the commutator, a suitable head covering should be placed over the end windings to prevent the chips working into the armature. While turning, the peripheral speed of the commutator surface should be about 300 feet per minute. Use a carboloy tipped tool when cutting commutator surface. Round off the ends of the commutator segments to at least 1/32" radius with a mill file.

After commutator has been turned, the mica insulation between segment bars should be regrooved to a depth of 3/64". The width of mica insulation between commutator segments is .030", and the width of the mica under-cutting saw is to be .025". The sharp edges of the commutator bars should be removed with a hand scraper or a triangular file. Inspect grooves to see that no copper chips remain. Final polishing should be done with a fine grade commutator stone and crocus cloth.

Check commutator for eccentricity, maximum eccentricity .0005", or total indicator reading of .001"

Commutator Wear Limit

On Model A-8102 Series 18KW generators, the diameter of a new commutator is 7.750"-7.754", and the minimum serviceable commutator diameter is 7.125".

The commutators of Models A-3001, A-3001R and A-7159 Series, 10 KW, auxiliary generators are designed for 5/16" radial wear, and a condemning limit of 6-7/8" diameter.

ARMATURE BALANCE

Dynamic Balancing Of Armature

It is recommended that the armature be dynamically balanced after any of the following operations.

1. Armature rewound or coils repaired.
2. Armature rebanded.
3. Armature vacuum impregnated or dipped and baked.
4. Repairs to commutator other than tightening and turning.

NOTE: It is advisable that no repairs be made to the commutators of this generator, except tightening and turning. When conditions are such that the commutator needs expensive repair, return the generator to the manufacturer.

The auxiliary generator armature must be in dynamic balance within 1/2 inch-ounce.

STATOR REPAIR

Stator Assembly Cleaning

The method of cleaning the stator is similar to that used in cleaning the armature, taking care to remove all grease and dirt from around, under and between the field coils. The materials, solvent, and safety precautions are the same.

Stator Electrical Tests

Apply an insulation condition test with a megohmmeter; if low readings are found, dry out stator before applying high potential test.

After passing a megohmmeter test of not less than 3 megohms, make a 800 volt AC 60 cycle high potential test on field coils to stator frame.

Make a resistance check of field coil and interpole circuits, see Maintenance Data in this instruction. A polarity test, if necessary, can be made with the aid of a magnetized tip needle and by applying direct current to the field circuits.

End Frame And Brush Rigging Assembly

Inspect the brush holder assembly for damaged holders and springs. Remove all burrs that might have been caused by flashing. Fig. 8 shows the proper brush holder setting to be used when brush holders were removed for any reason from Model A-3001 generators. Fig. 9 is used for Model A-7159 Series, and Fig. 10 is used for Model A-8102 Series.

After the end frame brush rigging has been repaired, apply a high potential test of 800 volts for one minute.

If the end frame passes inspection, paint the inside with black air drying insulating varnish 8004439.

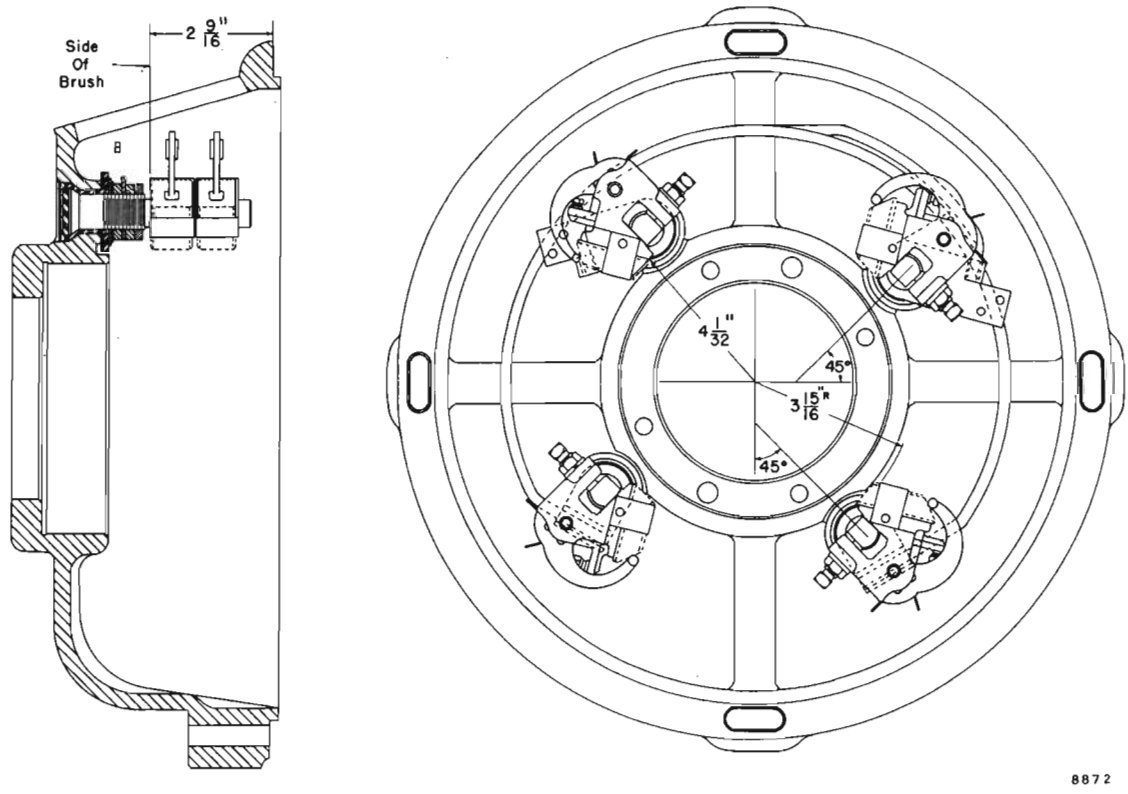

Fig. 8 — Model A-3001 Brush Holder Setting

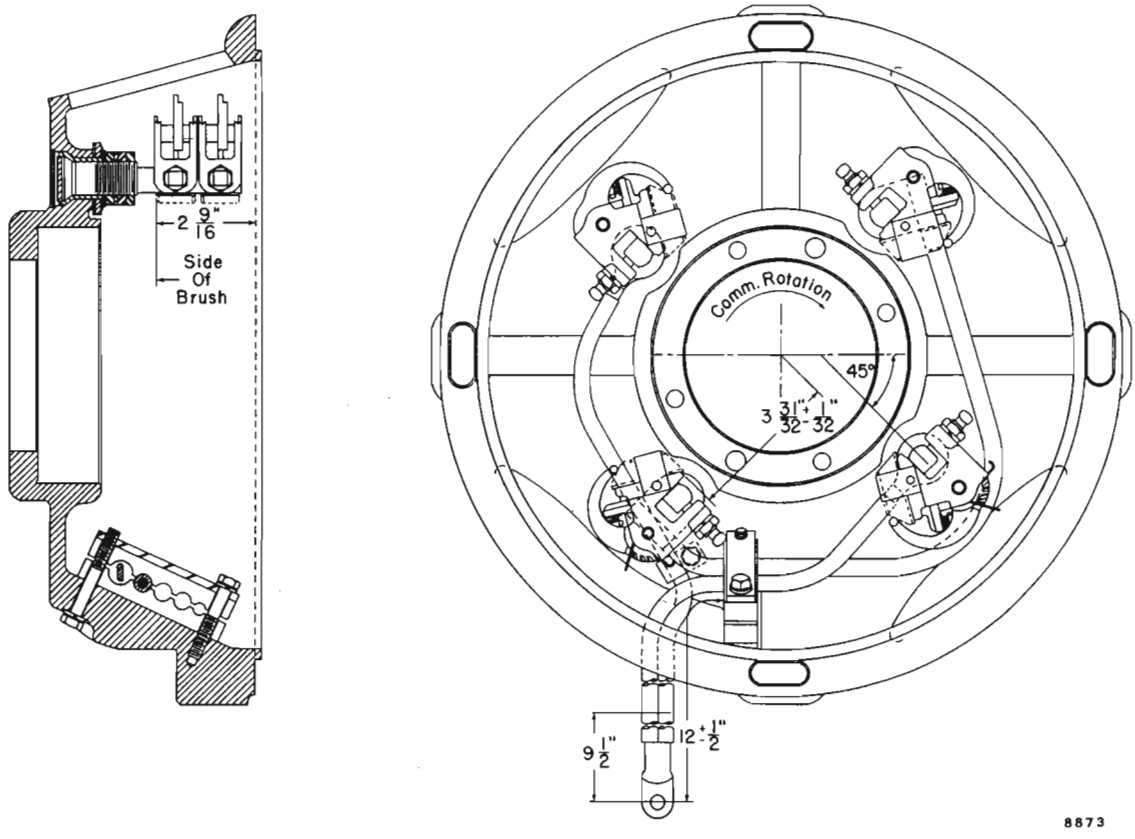

Fig. 9 — Model A-7159 Series Brush Holder Setting

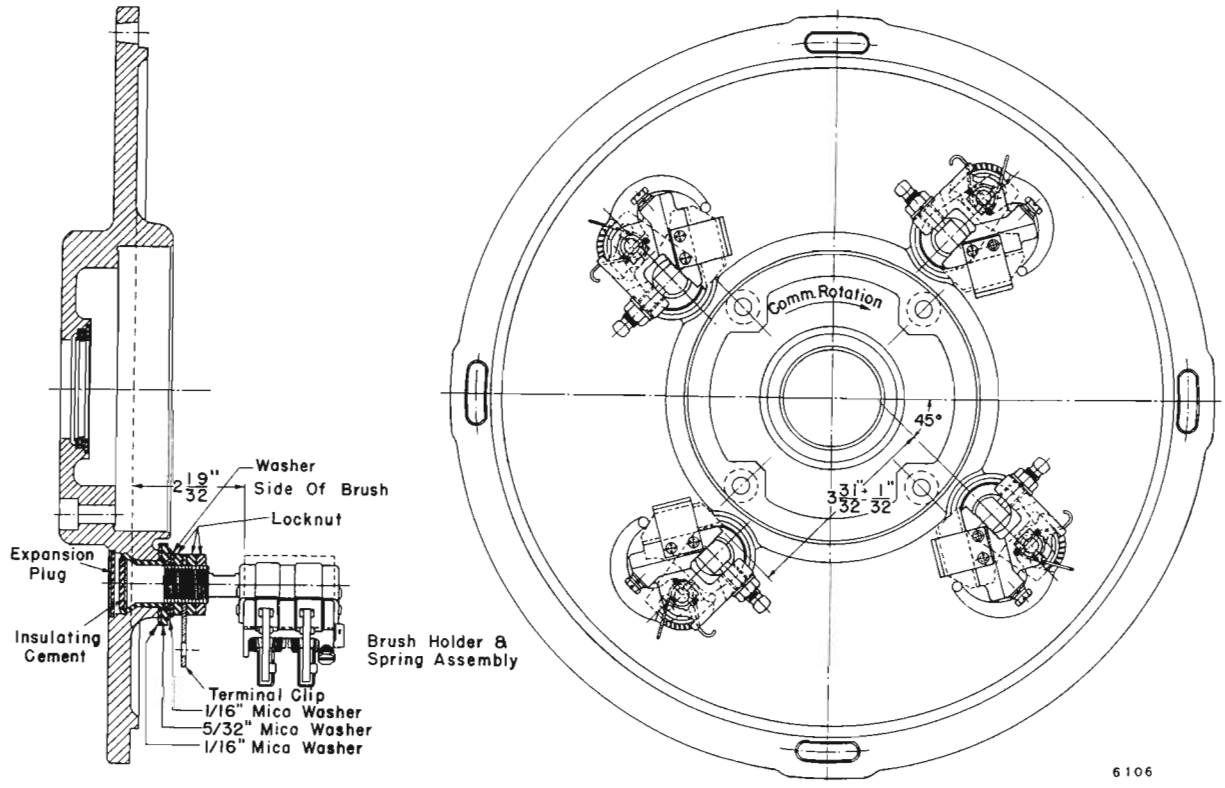

Fig. 10 — Model A-8102 Series Brush Holder Setting

Stator Field Coils

Connections and leads to coils should be examined to determine if they are mechanically and electrically satisfactory. Field coils, leads, and cable connections must be secured and all taping made intact. Check shunt and interpole fields for tightness.

STATOR VARNISH TREATMENT

Stators which have passed all electrical tests should be given a varnish treatment as follows:

1. Examine field coil insulation for cracks in insulation. If field coils are tight and insulation is in good condition, the stator may be varnished.
2. Protect contact surfaces of cables with surgical tape.
3. Preheat stator in a convection type oven so that the average pole and winding temperature is between 120° and 130° C.
4. Dip the stator assembly in clear baking varnish 8160879 for five minutes.
5. Clean housing fits with naptha.
6. Bake stator assembly for two hours in a convection type oven.
7. Remove stator assembly from oven and cool to room temperature.
8. Apply one coat of black air drying varnish 8004439 around inside of stator assembly.
9. Remove surgical tape from connections.
10. Retap holes in frame to remove varnish.

When necessary to remove field coils, provision should be made to keep each pole, coil, and shims together. Upon reassembly the parts should be placed back in their original position.

NOTE: The interpole coil should not be removed from the pole. If the interpole coil is in need of repair a new interpole and pole piece should be installed.

New field coils which are to be installed should first be kept for two hours in a 80°-100° C. oven. While hot, they should

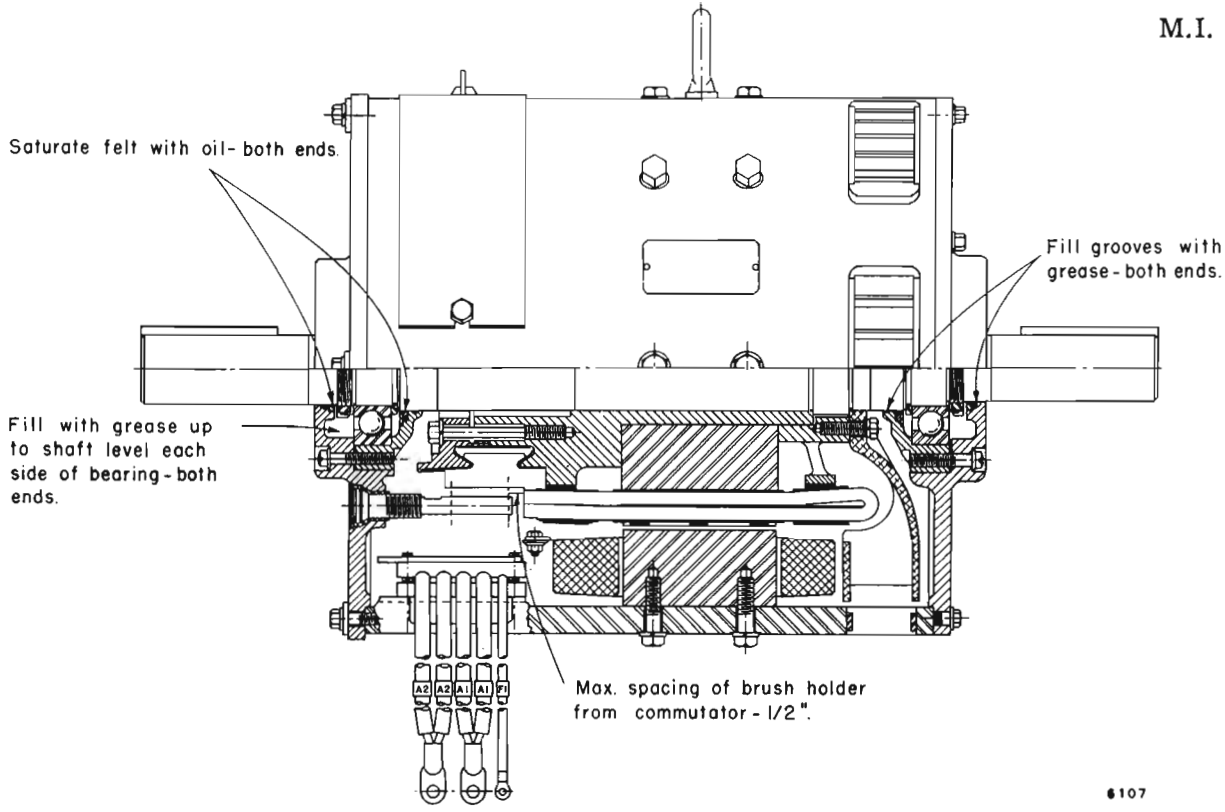

Fig. 11 — Sectional View Of Generator Outline

be assembled on poles and drawn up tightly in the generator frame.

Clean the contact surfaces for both solder and bolted connections. Make sure the bolted connections are tight before solder is applied to these connections.

ARMATURE BEARING ASSEMBLY

Bearing Lubrication

The ball bearings are the double-shielded type and are packed at the factory with a lubricant which does not become fluid except at temperatures higher than those reached under normal operation. Since the bearings are sealed on both sides they do not require additional lubrication. However, on overhaul, the bearings should be removed and replaced with new factory packed bearings.

Bearing Assembly

1. Clean out grease cavities in bearing housings and in end frames surrounding bearings.
2. Check seal retainer, felt washer, and expansion washer in bearing housing. If felt washer is defective, tap out old felt seal assembly and press or tap in new felt seal assembly. Saturate felt seal in both housings with oil.
3. Fill labyrinth grooves of the bearing housings with Calol grease. Refer to Fig. 11.
4. Place proper bearing housings on shaft, one on the commutator end and one on the other end. Be sure covers and housings are not mixed. If they are not properly assembled, the generator will be without end play resulting in overheating and bearing failure. By laying the bearing housing and cover side by side, it will be noted that one of the housings is slightly higher than the other and one of the cover mounting flanges is thicker than the other. For proper assembly the housing that is slightly higher should be assembled with the thinner cover. These two parts when assembled with a bearing will be the combination that gives the generator the end play needed for proper operation.

NOTE: End play of the generator can be on either end. Which end it should

be on is determined by the application in the locomotive. That is, if the auxiliary generator is to be driven directly from the engine rear gear train, the end play or free end must be on the fan end of the generator. If the generator is to be belt driven, the end play must be on the commutator end. It is important to remember the end play is always, and must be, opposite the end being driven.

5. Place bearing spacers on the shaft before assembling the bearings.
6. Place new ball bearings on the shaft and push into position.

NOTE: Never reuse old bearings that have been removed for overhaul of generator. Replace with new bearings. Do not cock bearings when starting bearings on the shaft. Bearing assemblies are a push fit on the shaft and do not require heating.

7. Place new lockwasher and lock nut on shaft. Tighten nut and lock in position on both bearing assemblies, Fig. 11.
8. Apply two ounces of Calol grease to each of the 10 KW covers and three ounces of Calol grease to the 18 KW end frames.
9. Apply two new gaskets to cover on 10 KW models and bolt in place. On the 18 KW models apply gaskets to the fan end bearing housing and assemble to armature. Apply gasket to the commutator end housing and assemble housing and brush holder rigging to the stator.
10. At this time if assembling a 10 KW generator, assemble the repaired brush holder end housing to the stator and bolt in place.
11. Assemble the generator in a horizontal position protecting the commutator with fish paper.
12. Place a pipe through the stator assembly and over the shaft extension on the commutator end of the armature.
13. Lift the armature with a rope around the pipe extension and rear extension of the armature shaft, and guide the armature into place. Care must be exercised so that the armature and the pole assemblies are not damaged during assembly.
14. Remove rope and pipe from shaft, and place end frames over bearing assemblies.
15. Lift until the end frames fit the stator and bolt in place.
16. Torque the end housing bolts to the frame to 50-55 ft-lbs.
17. Replace the slotted screws in the end frame with socket head screws 138245 and torque to 20-25 ft-lbs.
18. Insert the pipe nipple and the pipe plug in the threaded opening in the bearing end frame to permanently seal the bearing.
19. Clamp external leads in position, Fig. 11.
20. Assemble brushes to brush holder and seat brushes to commutator. Adjust spring tension on brush holder pressure arm to 1-1/2 lbs. to 2-1/2 lbs. Blow out carbon dust.
21. Insert key in each generator shaft extension and tape in place.

BEARING MODIFICATION

The conversion of auxiliary generators of the Model A-3001 Series and Model A-7159 Series to the A-7159M2 or A-7159A4 necessitates the following:

1. Locking the armature bearing on the fan end of the armature shaft to prevent bearing failure when the main generator and traction motor blower wheels are mounted directly on the extension shaft of the auxiliary generator. If the bearing is not properly locked, unwanted rotation of the outer bearing race caused by possible unbalance of the blower wheels will occur causing failure.
2. Installing constant pressure spring brush holders to insure longer brush.

3. The bearing housings will be held in place with socket head cap screws for easier and more secure clamping to the end frames.

4. Installing bearing locking collars on both extensions which provide a positive shoulder for seating applied drive hubs and blower wheels.

5. Installing longer keys in both shaft extensions which will seat axially against the shaft collar preventing any motion of the key while pressing hubs or wheels.

Converting any previous model to a Model A-7159M2 or A-7159A4 should be performed as the generator is reassembled according to the following procedure:

1. Inspect the armature shaft for nicks or burrs. Damage to the shaft will necessitate immediate repair. If the shaft cannot be repaired, and the old style shaft 5327757 is no longer available, then procure armature shaft 3181207 and designate the generator assembly A-7159A4.

NOTE: If shaft 3181207 is used, be sure to use new bearing housings 3181205 and 3181206, collar 3181232, and key 3181141.

2. Clean grease cavities in bearing housings and in end frames surrounding bearings.

3. Check seal retainer, felt washer, and expansion plug in bearing housing, Fig. 12. If felt washer is defective, remove felt seal assembly and install a new felt seal assembly. Saturate the felt seal in both housings with oil. Do not use grease.

4. Pack each side of the bearing.

5. Place bearing housings in their proper locations on the armature shaft. If the bearing housings are not in good condition or if shaft 3181207 is used they should be replaced with new bearing housings 3181205 on the fan end and 3181206 on the commutator end. Be sure covers and housings are not mixed. If the housings and covers are not properly assembled, generator end play will be eliminated causing overheating and bearing failure. Comparison of bearing housings, and covers placed adjacent to one another, will reveal that one of the housings is slightly higher than the other and one of the mounting flanges is thicker than the other. By assembling the housing that is slightly higher with the thinner cover and bearing, the correct combination for proper generator end play will result.

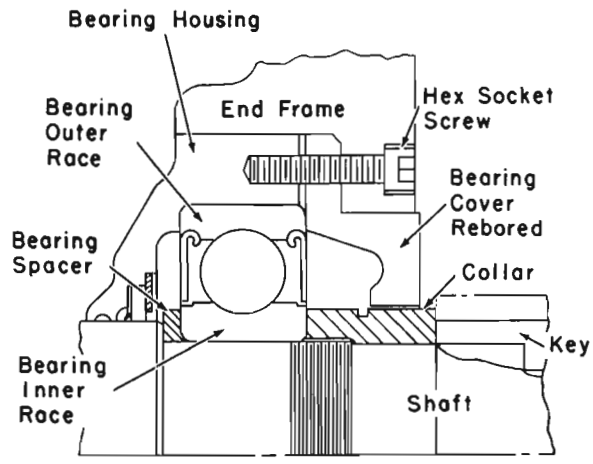

Fig. 12 — Sectional View Of Bearing Assembly Conversion To Model A-7159M2

NOTE: End play of the generator can be on either end according to the application of the generator in the locomotive. If the auxiliary generator is to be driven directly from the engine rear gear train, the end play or free end must be on the fan end of the generator. If the generator is to be belt driven, the end play must be on the commutator end. The end play must always be opposite the end being driven.

6. Place bearing spacers 5312203 on the shaft before assembling the bearings.

7. Slide new ball bearings 907467 over the shaft and against bearing spacers.

NOTE: Never reuse old bearings that have been removed for generator overhaul. Always replace with new bearing assemblies.

8. Apply "Locktite" sealant 8305894 over the armature shaft threads and one inch forward of the thread area.

9. Slide collar 3179020, Fig. 12, over the armature shaft and against the inner bearing race. The collar locks the inner race of the bearing to the shaft and provides a positive shoulder for seating applied drive hubs and blower wheels. To facilitate removal of a sealed collar, heating to 500° may be required.

NOTE: If shaft 3181207 is used, be sure to use collar 3181232.

10. Remove excess sealant around the collar before hardening occurs.

NOTE: If bearing housing covers are in good condition they are to be reworked per drawing 8329304 (fan end) and 8329404 (commutator end). If these covers are not in good condition they should be replaced with covers 3181201 (fan end) and 3181202 (commutator end).

11. Apply two ounces of Calol grease to each of the generator bearing housing covers.

12. Apply two new gaskets to bearing housing covers and place covers against their respective housings being careful to align pin retainer to cover.

NOTE: Bearing housing cover has to be rebored as shown in Fig. 12 or new covers 3181201 and 3181202 can be purchased from manufacturer.

13. Assemble the brush holder end housing to the stator frame and bolt in place.

14. Protect the armature with fish paper for assembly of the generator in a horizontal position.

15. Place a pipe through the stator assembly and over the shaft extension on the commutator end of the armature.

16. Lift the armature with a rope around the pipe extension and the rear extension of the armature shaft, and guide the armature into place. Care must be exercised so that the armature and the pole assemblies are not damaged during assembly.

17. Remove rope and pipe from the shaft, and place the end frames over the bearing assemblies.

18. Lift the armature until the end frames fit the stator and bolt in place. Torque end housing bolts to frame to 50-55 ft-lbs.

NOTE: Align the commutator end frame with the chisel mark on the stator frame.

19. Align the grease inlet from the end frame to the grease inlet in the bearing housing cover before tightening into position.

20. Replace the slotted cover to bearing housing screws with socket head screws 138245 and torque to 20-25 ft-lbs.

21. Apply the pipe nipple and pipe plug in the threaded opening in the bearing end frame to permanently seal the bearing.

22. Clamp the external leads in position.

23. Assemble brushes to the brush holder and seat the brushes to the commutator. Blow out carbon dust. Constant pressure brush holders should be installed to properly up date the generator to this model. If original brush holders are used, adjust spring tension on the brush holder pressure arm to 1-1/2 to 2-1/2 lbs.

24. Insert long step keys 3179022 in each generator shaft extension and tape in position to prevent loss of the key.

NOTE: If shaft 3181207 is used, be sure to use key 3181141.