TM 55-6115-498-40

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

GS MAINTENANCE MANUAL

DIRECT CURRENT GENERATOR

PART NO. 30B37-37-A

(BENDIX)

HEADQUARTERS, DEPARTMENT OF THE ARMY, WASHINGTON, D. C.

AUGUST 1969

WARNING

PRECAUTIONARY DATA

Personnel performing instructions involving operations, procedures. and practices which are included in this technical manual shall observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury, death, or an aborted mission.

CLEANING SOLVENT

Use solvent (in a well-ventilated area. Avoid inhaling solvent fumes. Do not allow solvent to contact skin as burns may occur.

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No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *11 October 1975*

GS Maintenance Manual

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TM 55-6115-498-40, 8 August 1969, is changed as follows:

Page 2-2. Add the following to table 2-3 as item 18: Solder QQS571SN5WRAP3.

Page 3-10. The following is added to paragraph 3-4*c*(7):

Armatures with balancing rings installed, balance statically and dynamically to .020 in. ounces, by applying solder (Item 18, table 2-3), to inside of balancing rings. Solder may not extend beyond lips of rings.

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:
PAUL T. SMITH
Major General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, Direct and General Support Maintenance Requirements for UH-1B, UH-1C/M, UH-1D/H aircraft.

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TECHNICAL MANUAL

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GS Maintenance Manual

DIRECT CURRENT GENERATOR

PART NO. 30B37-37-A

(BENDIX)

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SECTION I

INTRODUCTION

1-1. GENERAL INFORMATION.

a. This technical manual comprises overhaul instruction for DC Generator, Part No. 30B37-37A (figure 1-1). This equipment is manufactured by The Bendix Corportion, Electric power Division (Federal Code 83298), Eatontown, New Jersey 07724. Sections I through IV of this technical manual contain instructions for the basic type.

b. Report of errors, missions, and recommendations for improving this publication by the individual user is encouraged. Reports should should submitted on DA Form 2028 (Recommended Changes DA Publications) and forwarded directly to: Commanding General, U. S. Army Aviation Systems Command, ATTN: AMSAV-R-M, P. 0. Box 209, St. Louis, Missouri 63166.

1–2. PURPOSE OF EQUIPMENT.

The dc generator is used to generate the electrical power required for 28-volt aircraft electrical systems.

1-3 EQUIPMENT RECORDS.

The Army equipment record system and procedures established in TM 38–750 apply to this equipment. The applicable forms as required by TM 38–750 shall be used.

1–4. DESCRIPTION.

The dc generator is a brush-type rotating machine capable of delivering 30 volts dc at a rated current of 300 amperes, when driven at its rated speed (5000 rpm). The unit is self-cooled by means of an integral fan rotating with out put shaft. A terminal board is mounted on the housing to facilitate external connections. Slotted mounting holdes are provided for ease of instal lation on the engine.

1-5. LEADING PARTICULARS.

Refer to table 1-1 for leading particulars of the dc generator.

Table 1-1. Leading Particuars

ITEM	CHARACTERISTICS
Rated Voltage	30 V
Rated Current	300 amp
Rated Speed	5000 rpm
Minimum Speed for Regulation	5000 rpm
Maximum Speed for Regulation	10,000 rpm
Cooling Air	40°C (max)
Weight	47 lb (max)
Diameter (Housing)	6–9/16 in.
Length (Housing)	11–54/64 in.
Output Spline	16 teeth
Mounting Bolt Circle Diameter	5.000 in.
No. of Mounting Slots	6
Rotation (Viewing Drive End)	Counterclockwise

1-6 PAINTING REQUIREMENTS

Repainting or retouching surfaces, if required shall be done in accordance with talbe 1-2.

Table 1–2. Painting Requirements

Item name	Fig. No.	Index No.	Paint type and specification	Method of application	No. of coats	Notes
END Bell Cover Assembly	3–1	12	MIL–P–15328, Primer TT–E–485	Wash	1	Apply primer
			Enamel, color olive drab (MIL–E–5556, X34087)	Brush	2	Paint entire assy

1-7. PRESERVATION, PACKAGING, PACKING AND MARKING REQUIREMENTS.

Preservation, Packaging, Paking and Marking sha!l be in accordance with figure 1-2.

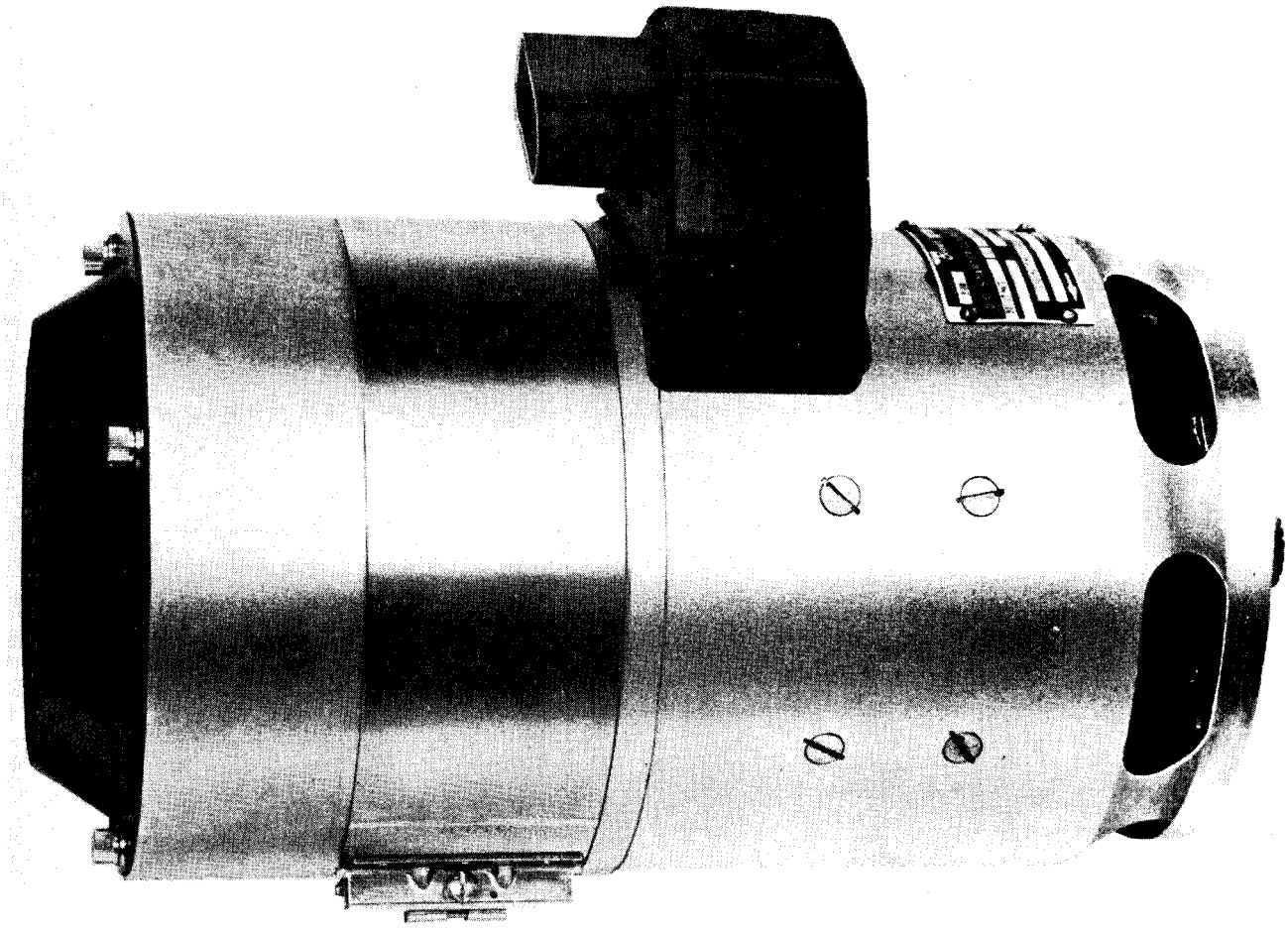

Figure 1-1. Three-quarter view, DC Generator Part No. 30B37-37-A.

PRESERVATION, PACKAGING, PACKING AND MARKING REQUIREMENTS

NOMENCLATURE	STOCK NUMBER		
Generator, Direct Current	6115-942-2094		
	PART NUMBER		
	30B37-37A		
NET WEIGHT	DIMENSIONS	GROSS WEIGHT	CUBIC FEET
47 lbs		104 lbs	11

All specifications and standards applicable to the requirements herein shall be the issue in effect on date of invitation for bids.

PACKAGING

☒ LEVEL A ☐ LEVEL C

☒ PACKAGING SHALL BE IN ACCORDANCE WITH SPECIFICATION MIL-P-116, THE FOLLOWING DETAILED REQUIREMENTS SHALL APPLY:

UNIT PKG QTY	METHOD	PRESERVATIVE	WRAP	DUNNAGE	CONTAINER
1	IId	----------	MIL-B-121 Grade A or Polyethylene	MIL-C-7769 of PPP-C-850 or MIL-P-26514	See Packing

PACKING

☒ LEVEL A ☐ LEVEL C

☒ ITEMS SHALL BE PACKED IN CONTAINERS CONFORMING TO SPECIFICATION NO. MIL-D-6054

~~PLYWOOD USED SHALL BE STANDARD GRADE WITH EXTERIOR GLUE OF U.S. PRODUCT STANDARD PS1-66. THIS PLYWOOD SHALL HAVE THE GRADE STAMPED ON IT BY AN APPROVED TESTING AGENCY. NAILING OF WOOD SHALL BE AS SPECIFIED HEREIN IN ACCORDANCE WITH SPECIFICATION TT-W-572. WOOD CLEATED PLYWOOD CONTAINERS SHALL BE CONSTRUCTED WITH TOP INVERTED AND ARE TO INCLUDE A FLUSH TOP SURFACE FOR WATER RUNOFF.~~

☐ ITEMS SHALL BE PACKED IN A MANNER TO INSURE CARRIER ACCEPTANCE AND SAFE DELIVERY AT DESTINATION. CONTAINERS SHALL BE IN ACCORDANCE WITH UNIFORM FREIGHT CLASSIFICATION RULES OR REGULATIONS OF OTHER CARRIERS APPLICABLE TO THE MODE OF TRANSPORTATION.

MARKING

☒ a. IN ADDITION TO ANY SPECIAL MARKING REQUIRED BY THE CONTRACT OR ORDER, SHIPMENT SHALL BE MARKED IN ACCORDANCE WITH STANDARD MIL-STD-129D, WITH CHANGE NOTICE 1 THRU 9, "MARKING FOR SHIPMENT AND STORAGE," DATED 28 DECEMBER 1964 THE SERIAL NUMBER AND THE CONTROL NUMBER OF DA FORM 2410 SHALL BE MARKED ON THE UNIT CONTAINER

☒ b. ADDITIONAL MARKING REQUIREMENTS. EACH INTERIOR PACKAGE SHALL BE MARKED ON AT LEAST TWO (2) SIDES WITH A SILHOUETTE OF THE AIRCRAFT. (WHERE THE SIZE OF THE UNIT CONTAINER IS TOO SMALL TO PERMIT THE APPLICATION OF TWO (2) LABELS, A SINGLE LABEL SHALL BE APPLIED. IF THE PACKAGE IS TOO SMALL FOR ONE (1), NONE WILL BE REQUIRED.) WHEN THE UNIT CONTAINER IS THE SHIPPING CONTAINER AND THE ITEM IS PACKED "LEVEL A", EACH CONTAINER SHALL BE MARKED ON TWO (2) SIDES, TOP AND ONE (1) END WITH A SILHOUETTE OF THE AIRCRAFT. THE SIZE OF THE SILHOUETTE MAY VARY, BUT WILL BE LARGE ENOUGH TO FACILITATE EASY VISUAL IDENTIFICATION WITHOUT OBSCURING OTHER MARKINGS. THE CONTRACTING OFFICER WILL SUPPLY LABELS ON REQUEST. THE NOMENCLATURE OF THE MAJOR COMPONENTS SHALL BE EXTENDED TO INDICATE THE END ITEM APPLICATION AND THE POSITION OF THE PART; e.g., GEAR BOX, MAIN FOR (APPLICABLE AIRCRAFT); WING ASSEMBLY, RIGHT, FOR (APPLICABLE AIRCRAFT).

☐ c. MATERIEL CONDITION MARKING SHALL BE APPLIED IN ACCORDANCE WITH PARAGRAPH 5.5.17 OF MIL-STD-129. A MATERIEL CONDITION TAG OF THE APPLICABLE TYPE WILL BE SECURELY ATTACHED DIRECTLY TO ALL UNINSTALLED OR STORED AERONAUTICAL OR AIR DELIVERY ITEMS. WHEN SUCH ITEMS ARE PLACED OR STORED IN CARTONS, PACKAGES, CRATES OR METAL SHIPPING CONTAINERS, A DUPLICATE MATERIEL CONDITION TAG OR LABEL WILL BE SECURELY ATTACHED TO THE EXTERIOR OF THE PACKAGE OR CONTAINER IN SUCH A MANNER THAT WILL AFFORD MAXIMUM PROTECTION FROM HANDLING AND WEATHER. TAGS WILL BE COMPLETED EITHER BY TYPEWRITTEN OR PRINTED BLACK LEAD PENCIL ENTRIES. ITEMS OF A COMMON OR NONTECHNICAL NATURE (i.e., COMMON HARDWARE, BULK MATERIALS, ETC.) THE SERVICEABILITY OF WHICH IS OBVIOUS, AND THE IDENTITY AND INSPECTION REQUIREMENTS ADEQUATELY INDICATED BY COMMERCIAL TAGS, LABELS OR MARKINGS, MAY BE RECEIVED, STORED, ISSUED OR SHIPPED WITHOUT MATERIEL CONDITION TAGS.

APPROVED BY	ORGANIZATION	DATE
E. Lowman	AMSAV-R-MK	17 February 1969

Figure 1-2. Preservation, Packaging, Packing and Marking Requirements.

SECTION II

TEST, EQUIPMENT, SPECIAL TOOLS, AND MATERIALS

2-1. TEST EQUIPMENT.

Refer to table 2-1 for 2-1 for a list of test equipment required to perform the procedures described in this manual.

Table 2-1. Test Equipment Required

Part, model or mil des	Fmc	Nomenclature	Technical description
Model 40B	06365	Balancing Machine	Used to balance armature assy
1001	60998	Dial Indicating Gage	Used to measure spring compression length
1650A	24655	Capacitance Bridge	Used to check capacitor values
13700-1C	19315	Insulation Breakdown Test Set	Used to perform insulation breakdown tests
7085-5	99664	Electrical Test Stand	Used to provide load conditions for performance testing
7199-1	99664	Aircraft Generator Test Stand	Used for performance testing of starter generator
	45598	Steam Dispenser	Used to steam clean armature assembly and generator stator

NOTE. Equivalent test equipment may be used.

2-2. SPECIAL TOOLS.

Refer to table 2-2 for a list special tools required to perform the procedures described in this manual.

Table 2-2. Special & Tools Required

Part, model or mil des	Fmc	Nomenclature
QB80004-3	83298	Spring Scale
QB80059-3	83298	Generator Shaft Holding Wrench
QB80277-1	83298	Brush Spring Hook
QB80338-1	83298	Puller

Table 2-2. Special Tools Required-Continued

Part, model or mil des	Fmc	Nomenclature
1106038	83298	Bearing Puller
1106187	83298	Generator Stand
1106207	83298	Generator Interface
1106208	83298	Brush Box Aligner
1106209	83298	Pilot Holder
1106210	83298	Armature Stand

NOTE. Equivalent tools may be used.

2-3. CONSUMBLE MATERIALS.

Refer to table 2-3 for a list of all consumable materials required to perform the procedures described

Table 2-3. Consumable Materials Required.

Item No.	Nomenclature	Specification number	Title
1	Trichlorethylene	MIL-T-7003	Trichlorethylene, Stabilized Degreasing
2	Solvent	P-D-680	Dry Cleaning Solvent
3	Lint-free cloth	CCC-C-440	Cloth, Cotton, Cheesecloth, Bleached and Unbleached
4	Cleaner	PC437-125LBDR	Cleaning Compound for Steam Cleaner
5	Lubricating oil	MIL-L-7870	Lubricating Oil, General Purpose, Low Temperature

Table 2-3.. Consumable Matetials Required-Continued

Item No.	Nomenclature	Specification number	Title
6	Corrosion preventive	MIL-C-4339	Corrosion Preventive, Soluble Oil
7	Shellac	TT–S–271	Shellac, Dry
8	Denatured alcohol	MIL-A-6091	Alcohol, Ethyl, Specially Denatured, Aircraft
9	Soft solder	QQ-5-571	Solder, Tin Alloy
10	Brazing alloy	MIL-B-15395, Grade 3	Silver Brazing Alloy
11	Spline lubricant	Pioneer No. 31 FMC 83298	
12	High temperature lubricating grease (Alternate for item 11)	MIL-G–3545	Lubricating Grease, High Temperature
13	Red Glyptal lacquer	No. 1201 FMC 04314	
14	Sealant, grade A	MIL-S-22473	Sealing, Locking and Retaining Compounds, Single Component
15	LockWire	MS20995C32-8	
16	Lockwire	MS20995C20-4	
17	Molybdenum coatiing	MIL-L-8937, FORMA	

SECTION III

GENERAL SUPPORT MAINTENANCE

3-1. DISASSEMBLY.

a. *General.*

(1) Disassemble the dc generator to the extent necessary for repair by using the illustrated parts breaksowns and the exploded views (figures 3-1 through 3-3), as described in paragraphs *b* through *d* below. To remove screws that are treated with sealant, hold a heat gun hating a maxium temperature of 177°C (350° F) against head of screw until compound softens and screws can be removed.

(2) The index numbers are assigned in the order of disassebly, except that attaching parts are listed immediately following the parts they attach.

b. DC Generator

(1) Secure the dc generator to generator interface 1106207 (table 2-2) and mount on generator stand 1106187 (table 2-2).

(2) Remove terminal block cover (1, figure 3-1) and protective cap (20), if they are installed.

(3) Cut and discard lockwire from screw (6) on brush access (7) and bolts (13) in end bell cover assembly (12).

(4) Loosen screw (6) enough to spread brush access cover (7), and slide the brush acces cover off the fan end of end bell assembly (38).

NOTE

The last two threads of screw (6) have been distorted to captivate nut (5).

(5) Remove eight cap screws (9), eight lock (10), and eight washers (11) that secure the brush teminals. Using brush spring hook QB80277-1 (table 2-2), lift up the brush spings and remove eight electrical contact brushes (8). Discard the brushes.

(6) Remove four bolts (13), four lock washers (14), four washers (15), and end bell rover assembly (12).

(7) Hold the spline of drive shaft assembly (21) with shaft holding wrench QB80059-3 (table 2-2), use a suitable socket wrench to remove self-locking nut (16). Remove flat washer (17), and impression spring (18). Remove drive shaft assembly (21) and front plate (22 If necessary, remove fan (19).

(8) Remove two screws (23), two loc washers (24), and two flat washers (25) to free the capacitor leads and terminals (29). Remove four screws (26), four lock washers (27), four washers (28), and the capacitor assembly from end bell assembly (38).

NOTE

Removing screws (26) also release bearing retainer (40).

(9) Remove four screws (33) to free bear ing retainer (44). Remove outer race bearing retainer (32).

(10) Using retaining ring pliers, remov lock rings (36 and 41). Remove outer dirt slingers (37 and 42).

(11) Using puller Q1380338-1 (table 2-2), remove end bell assembly (38). Refer to pan graph c below for disassembly procedures of the end bell assembly.

(12) Press armature assembly (45), with ball bearings attached, out of open end of generator stator (48).

(13) Using bearing puller 1106038 (table 2-2), remove ball bearings (39 and 43) from shaft of armature assembly (45). Discard the ball bearings at each overhaul.

(14) Remove inner dirt slingers (37 and 42 and bearing retainers (40 and 44). Remove four bushings (34) from housing of stator generator (48).

(15) If necessary, remove four screws (47 and identification plate (46).

(16) Refer to paragraph d below for disassembly procedures of the generator stator.

c. End Bell Assembly.

(1) Do not disassemble end bell assembly (38, figure 3-1) unless replacement of damaged parts or bearing bore metallizings is required.

(2) Do not remove four electrical contac holders (1, figure 3-2) unless damage is visible Remove four cap screws (2), four lock washer (3), four flat washers (4), sixteen insulating washers (5), and four insulating tubes (6) from end bell (7).

CAUTION

Do not remove cast-in bearing liner from end bell (7).

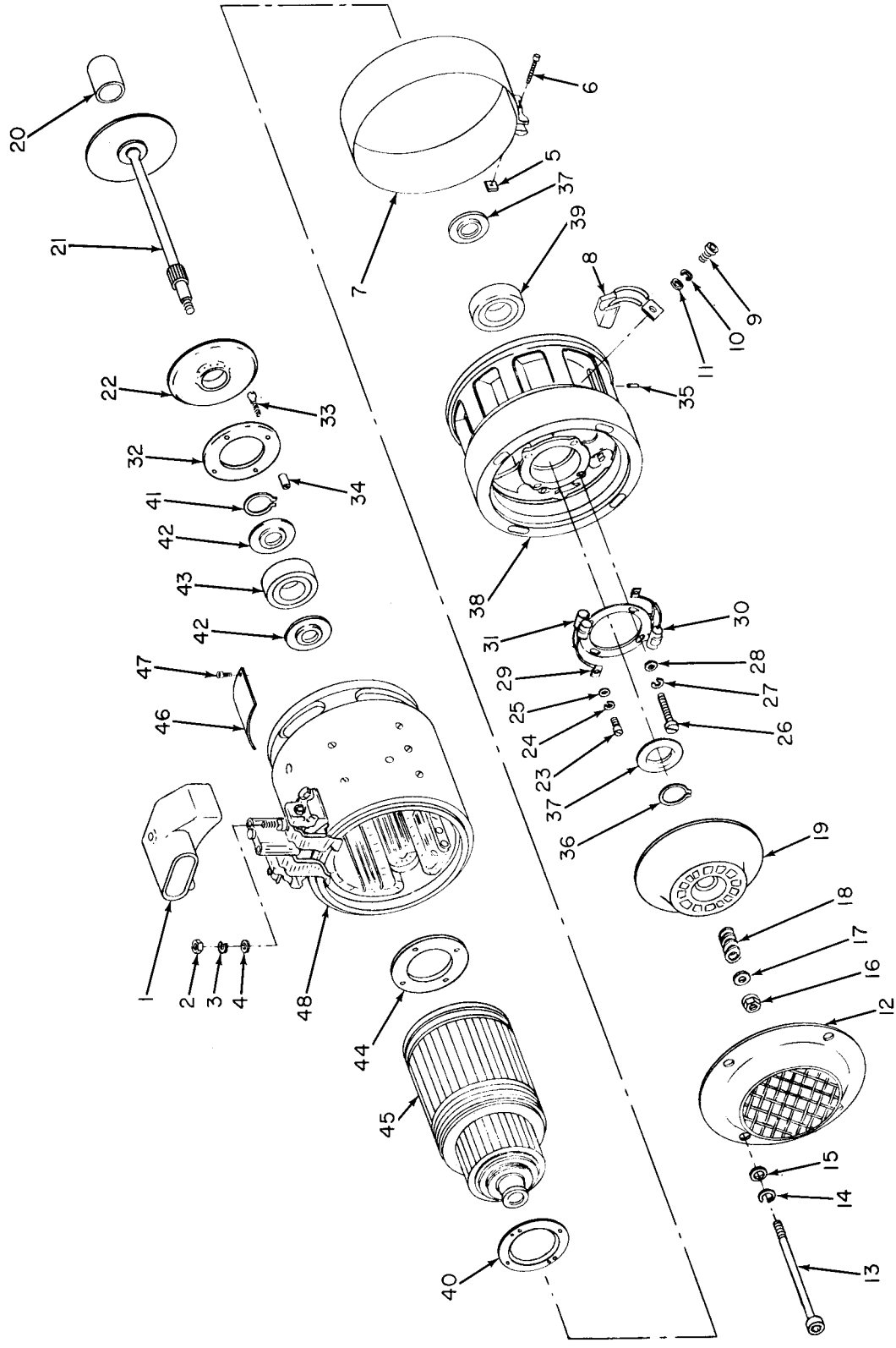

Figure 3–1. DC Generator, Exploded View

Legend For Figure 3-1:

Index No.	Part number	Description	Qty per assy
3–1–	30B37–37–A	. GENERATOR, Direct current	1
–1	1111055	. COVER, Terminal block	1
–2	MS20365–624A	. NUT, Self-locking	2
–3	MS35338–46	. WASHER, Lock	2
–4	AN960–616	. WASHER	2
	1532119	. COVER ASSY, Brush access	1
–5	833656	.. NUT, Plain square, cad. pl stl, No. 10–32 thd x 1/8 in. thk	1
–6	AN501A10–20	. SCREW	1
–7	1108811	. COVER, Brush access	1
–8	1108139	. BRUSH, Electrical contact (ATTACHING PARTS)	8
–9	890065–2	. SCREW, Cap, sch, cad. pl brz, 1/4–28 thd x 1/2 in. lg	8
–10	MS35338–44	. WASHER, Lock	8
–11	AN960–416	. WASHER	8
		---*---	
–12	1544572	. COVER ASSY, End bell (ATTACHING PARTS)	1
–13	1546947–121	. BOLT, Drilled, hex hd, cad. pl stl, 1/4–20 thd x 5–1/4 in. lg	4
–14	MS35338–82	. WASHER, Lock	4
–15	AN960C416L	. WASHER	4
		---*---	
–16	AN363C524	. NUT, Self-locking	1
–17	1320032	. WASHER, Flat, cad. pl stl, 21/64 id x 23/32 od x 3/32 in. thk	1
–18	1320031	. SPRING, Compression	1
–19	1107926	. FAN	1
–20	843–7/8 I.L.	. CAP, Protective (15819) (83298 part No. 1549704–1)	1
–21	1544668	.SHAFT ASSY, Drive	1
–22	1111791	. PLATE, Front	1
	1546898–1	. CAPACITOR ASSY (ATTACHING PARTS)	1
–23	819006–008	. SCREW, Fil h, sst, No. 6–32 thd x 1/4 in. lg	2
–24	819001–016	. WASHER, Lock, sst, for No. 6 screw	2
–25	819092–006	. WASHER, Flat, sst, for No. 6 screw	2
–26	MS35275–49	. SCREW	4
–27	MS35338–42	. WASHER, Lock	4
–28	AN960C8L	. WASHER	4
		---*---	
–29	19437	.. TERMINAL	2
–30	1111235	.. NIPPLE, Cable	4
–31	1113897	.. CAPACITOR SUBASSY	1
–32	1322942	. RETAINER, Bearing, outer race (ATTACHING PARTS)	1
–33	1322944	. SCREW, Flat hd, cad. pl stl, No. 8–32 thd x 15/16 in. lg	4
		---*---	
–34	1325794–3	. BUSHING	4
–35	MS171434	. PIN, Roll	1
–36	MS16624–1098	. RING, Lock	1
–37	844923	. SLINGER, Dirt	2
–38	1544529	. END BELL ASSY (See fig. 3-2)	1
–39	890659–5	. BEARING, Ball	1
–40	1329018	. RETAINER, Bearing	1
–41	MS16624–1098	. RING, Lock	1
–42	844923	. SLINGER, Dirt	2
–43	890659–5	. BEARING, Ball	1
–44	1329018	. RETAINER, Bearing	1
–45	1544645	. ARMATURE ASSY	1
–46	1544747	. PLATE, Identification (ATTACHING PARTS)	1
–47	22996–16	. SCREW, Self-tapping, rd hd, stl, No. 4 thd x 3/8 in. lg	4
		---*---	
–48	1544612	. STATOR, Generator (See fig. 3-3)	1

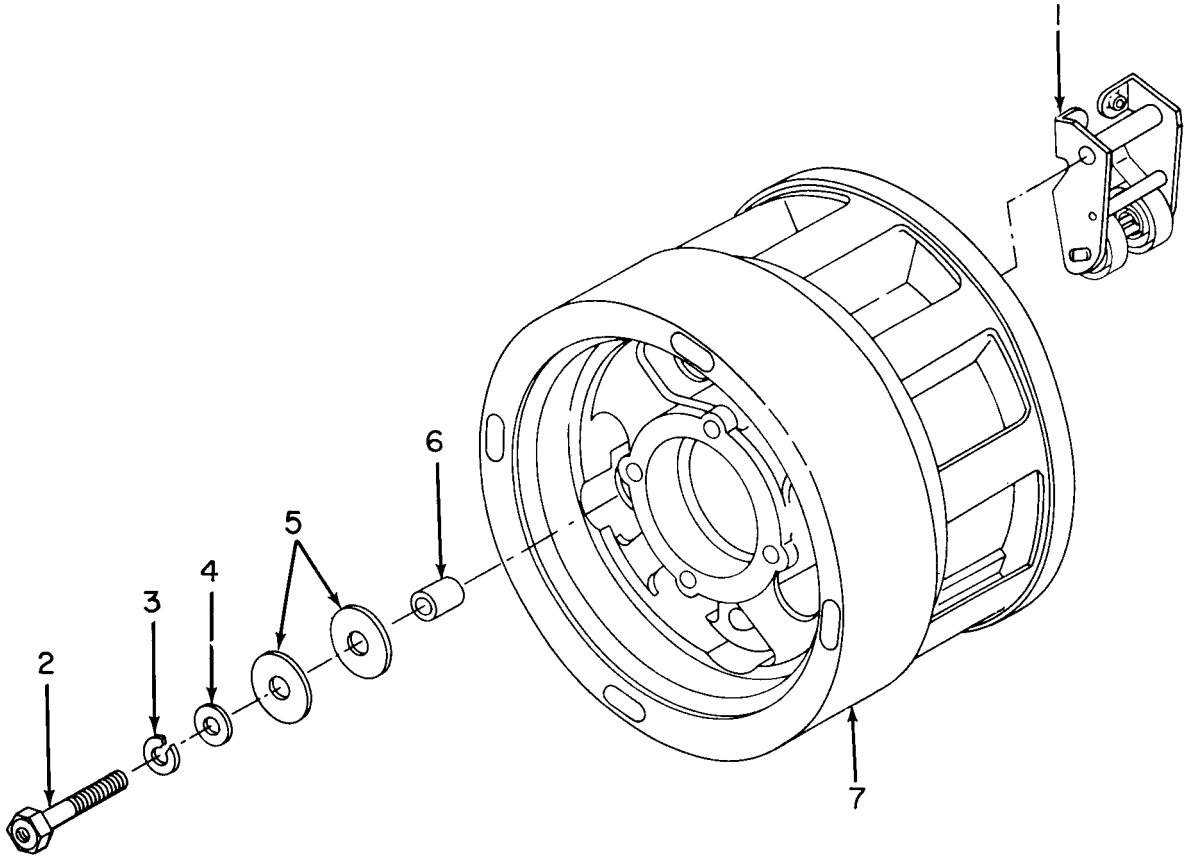

Figure 3–2. *End Bell Assembly, Exploded View.*

Legend For Figure 3–2:

Index No.	Part number	Description	Qty per assy
3–2-	1544529	END BELL ASSY (See item 38, fig. 3–1 for nha)	Ref
-1	1544527	. HOLDER, Electrical contact (ATTACHING PARTS)	4
-2	1543503	. SCREW, Cap, hex hd. 5/16-18 thd x 1-1/8 in. lg	4
-3	MS35338-45	. WASHER, Lock	4
-4	867491	. WASHER, Flat, cad. pl stl, for 5/16 in. screw	4
-5	1543622	. WAS HE R, Insulating	16
-6	1328928	. TUBE, Insulating	4
-7	1544432-1	. BELL, End	1

d. Generator Stator.

(1) Do not disassemble generator stator (48, figure 3-1) unless replacement of damaged parts or bearing bore metallizing is required.

(2) Remove two self-locking nuts (2, figure 3-1), two lock washers (3), and two washers [4) from the E and B terminal studs, if not renoved previously.

(3) Remove terminal plates (5 and 6, figure 3-3) and disconnect electrical lead (18) and terminal lug (19) from the E and B terminal lugs, respectively.

(4) Remove two self-locking nuts (2), two lock washers (3), two washers (4), and two terminals (5 and 6), and disconnect the stator leads from the A and D terminal studs.

(5) Remove one bolt (7), one washer (8), two bolts (10), two washers (11), terminal board (9), and terminal board insulator (12).

(6) If removal of winding and pole shoe assembly (14) is required, use a suitable screwdriver press and screwdriver remove stake screws (13). Push out winding and pole shoe assembly (14) through opening in housing (22).

(7) If required, remove stator insulation (17).

3-2. INSPECTION REQUIREMENTS.

a. Refer to table 3-1 for detail inspection requirements for components of the dc generator

Table 3-1. Detail Inspection Requirements

Fig. No.	Index No.	Nomenclature	Inspection category	Methods of inspection	Remarks
3-1	31	Capacitor Subassembly (four capacitors)	Cracks, leaks, damaged insulation	Visual	Refer to parts list for values.
			Electrical rating—1.0 uf ±20%, 200 VDCW		
3-1	18	Compression Spring	Cracks, distortion	Visual	
			Load at compressed length of 0.875 in. to be 180 to 200 lb		
3-1	21	Drive Shaft Assy	Cracks	Magnetic particle (Specification MIL-I-6868)	Para 3-2*b*(1)
3-1	45	Armature Assy	Commutator undercut to 0.030 in. wide by 1/32 in. deep	Visual	Para 3-4*c*
			Commutator contact surface	Visual	Para 3-2*c*
			Cracks, damaged insulation, damaged conductors	Visual	Para 3-4*b*
			Insulation breakdown—300 volts, 60 Hz for 1 sec between commutator bars and shaft (ground)	13700-1C	Para 3-4*b*(5)
			Static and dynamic balance within 0.020 oz in.	Model 40B	Para 3-4*c*(7)
			Bearing surfaces		Table 7
3-1	48	Generator Stator (housing and stator)	Cracks, damaged insulation	Visual	
			Bearing bore worn		Para 3-2*d*
			Insulation breakdown—300 volts, 60 Hz for 1 sec between any winding and housing (ground)	13700-1C	
3-2	1	Electrical Contact Holder	Cracks, distorted springs	Visual	
			Spring pressure to be 46 to 52 oz when spring is just lifted beyond brush position	1106140-3	Table 4
3-2	6	Insulating Tube	Cracks	Visual	
3-2	7	End Bell	Cracks, damaged threads	Visual	
			Bearing bore worn		Para 3-2*d*

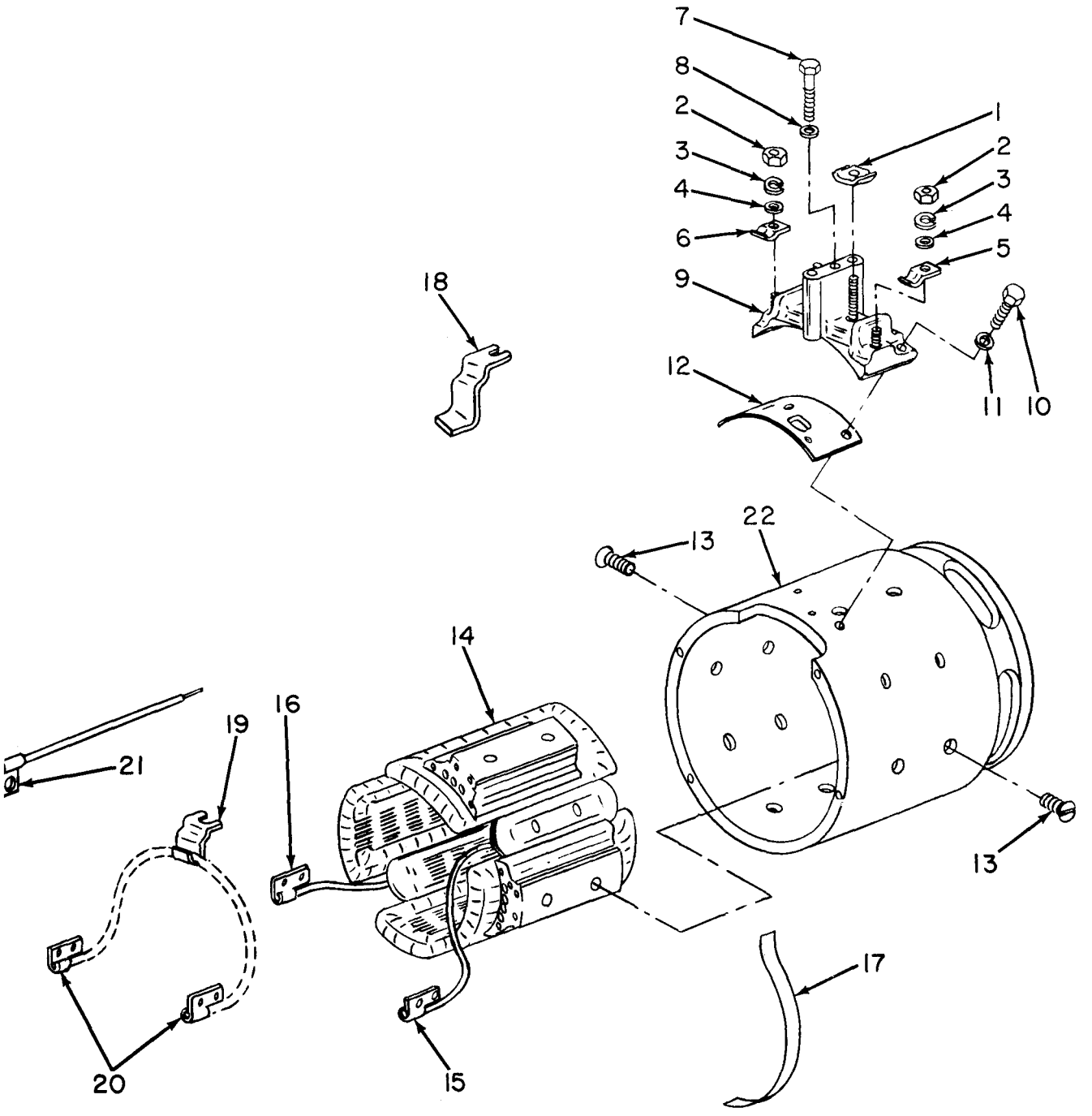

Figure 3–3. Generator Stator, Exploded View.

Legend For Figure 3–3:

Index No.	Part number	Description	Qty per assy
3-3-	1544612	STATOR, Generator (see item 48, fig. 3–1 for nha)	Ref
-1	1109458	. PLATE, Terminal	2
-2	MS20365-1032A	. NUT, Self-locking	2
-3	MS35337-43	. WASHER, Lock	2
-4	AN960-10L	. WASHER	2
-5	1101570	. TERMINAL	1

Legend For Figure 8-9:-Continued

Index No.	Part number	Description	Qty per assy
3–3–6	1101569	M	1
–7	NK3–23	.BOLT, Machine, self-locking, cad. pl stl, No. 10–32 thd x 2–13/32 in. lg (02615) (83298 part No. 890662–23)	1
–8	AN960–10	.WASHER	1
–9	1109452	.BOARD, Terminal (ATTACHING PARTS)	1
–10	NK3–6	.BOLT,. Machine, self-locking, cad. pl stl, No. 10–32 thd x 25/32 in lg (02615) (83298 part No. 890662–6)	2
–11	AN960–10	.WASHER	2
		---*---	
–12	1109569	.INSULATOR, Terminal board	1
–13	828998–4	.SCREW, Flat hd, cad. pl stl, No. 10–24 thd x 29/16 in. lg	16
–14	1544604	.SHOE ASSY, Winding and pole	1
	1544594–1	..LEAD ASSY, Electrical	1
–15	1544578	...LUG, Terminal	1
	1544594–2	. LEAD ASSY, Electrical	1
–16	1544578	. . . LUG, Terminal	1
–17	1100850–3	.INSULATION, Stator	1
–18	1544593	.LEAD, Electrical	1
	1544580	.LEAD ASSY, Electrical	1
–19	1545983	..LUG, Terminal	1
–20	1544578	..LUG, Terminal	2
	1329845	.LEAD ASSY	1
–21	1329221	..TERMINAL	1
–22	1544457	.HOUSING	1

b. Drive shaft and amature shaft inspection:

(1) Check the drive shaft assembiy (21, figure 3-1) splines for wear. The "top land" dimension of new spline teeth are 0.029 inch minimum for the 16-tooth spline and 0.039 inch minimm for the 12-tooth spline. Replace the drive shaft assembly when the “top land” dimension of a spline reaches zero.

(2) Closely examine the spline inside the shaft of amatum assembly (45) for wear. The degree of spline war may be determined by visual inspection. Make certain to check the entire length of tie spline for wear. Replace the amture assemmbly when the “top land” dimension of the spline reaches zero.

NOTE

The spline is safe down to a “top land” dimension of zero, but if service records indicate “top land” dimension may reach zero during the next service period, the drive shaft assembly or armature assembly should be replaced.

CAUTION

Spline wear rate will increase rapidly after reaching the zero "top land" dimention Contition.

(3) Inspect the drive shaft assembly for indication of overheating. Bear in mind that although discoloration may indicate a weakened shaft, this condition can be present in a sound shaft. Disregard uniform discoloration **along the** pencil section of the shaft; if, however, localized or blotchy discoloration is noted, overheating may be indicated.

(4) If slight bluing is observed, the drive shaft assembly may still be serviceable, provide a magnetic particle inspection (Specification MILP6868) reveals no surface cracks.

(5) If black discoloration is observed, dis card the drive shaft assembly. Check for the cause of this condition, such as overload or excessive vibration.

c. Inspection the commutator of armature assemMy (45). The brush contact surface should be even, highly burnished, and dark brown or almost black in color. If the contact surface is rough, pitted, burned, or covered by a **hardened** film of carbon or oil which cleaning does not remove, resurface the commutator as described in paragraph 3-4b.

d. Refer to table 3-2 for fits and clearances of component parts. If the inside diameter end bell (34, figure 3-2) or stator (22, figure 3-3) of housing bearing bone is worn beyond 2.0475 inches, when measured with an air gage, air probe, and a 2.0475-inch setting ring, metallize the worn surface as described in paragraph 3-4d.

Table 3-2. Fits and Clearances

Part No.	Nomenclature	Service dimensions (inches)	Mating parts part No.	Nomenclature	Service dimensions (inches)	Service tolerance (inches)
1544645	Armature Assy shaft bearing surfaces)	0.9843 OD	890659-5	Ball Bearing	0.9843 ID	0.0000 L/L
154443-1	End Bell (bearing bore)	2.0475 ID	890659-5	Ball Bearing	2.0470 OD	0.0005 L
1544457	Stator Housing (bearing bore)	2.0475 ID	890659–5	Ball Bearing	2.0470 OD	0.0005 L

3-3. CLEANING.

a. General. Clean all parts of the dc generator with trichlorethylene (item 1, table 2-3) or dry cleaning solvent (item 2, table 2-3). Do not dip pants into the solvent. Use a stiff, nylon brush to scrub the parts throughly,

WARNING

Use solvent in a well-ventilated area. Avoid inhaling solvent fumes. Do not allow solvent to contact the skin as burns may occur.

NOTE

Refer to paragraph 3-3b for steam cleaning procedures for armature assembly (45, figure 3-1) and generator Water (48).

(1) Ultrasonic cleaning equipment may be used, if available. Consult the manufacturer of this equipment for proper cleaning solutions and methods to be used.

(2) Dry parts with a clean, lint-free cloth (item 3, table 2-3).

b. Armature Assembly and Generator Stator. Steam clean armature assembly (45, figure 3-1) and enerator stator (48) 'to remove any carbon, copper particles embedded, or any other foreign matter between the commutator bars and stator windings, as described in following steps (1) through (6).

WARNING

Goggles, rubber gloves, and other protective clothing should be worn.

(1) Prepare a quantity of detergent, using approximately 7 1/2 pounds of cleaner (item 4, table 2-3) per 100 gallons of water. The solution should be heated and thoroughly agitated by placing the steam nozzle of steam dispenser (table 3) in the mixing tank.

NOTE

The strength of the solution can be varied to suit conditions.

(2) Use approximately 140 psi of steam and regulate the pressure at the boiler rather than at the nozzle to avoid pressurizing the hose line.

(3) Using a spray booth with adequate ventilation and exhaust fans, thoroughly clean the genenator stator and armature assembly with the mixture of steam and detergent until all caked grease and carbon are removed. The proportion of detergent to steam can be varied depending upon the condition of Ithe generator stator and armature assembly.

(4) Shut off the detergent and continue blasting with steam until all traces of detergent are removed.

(5) With an oven capable of maintaining 149° C (300°F), bake the generator stator and armature assembly at 121° C (250° F) for 4 hours to thoroughly dry the parts.

(6) After baking, apply a light film of lubricating oil (item 5, table 2-3) or corrosion preventive (item 6, table 2-3) to all ferrous metal surfaces to prevent rusting.

CAUTION

Do not apply oil to the commutator surface.

3-4. REPAIR OR REPLACEMENT.

NOTE

Paragraphs *b* through *f* below list and describe procedures for repairable parts only.

a.. General.

(1) Replace all parts that are worn or dam-

(2) Relace electrical contact brushes (8, figure 3-1) and ball bearings (39 and 43) at each overhaul.

(3) Replace all wiring having burned, discolored or cracked insulation, or broken or corroded terinals.

b. Armature Assembly. Replace armature assembly (45, figure 3-1) if any of the following renditions exist:

(1) If the shaft diameter is less than 0.9843 inch.

(2) If the commutator has badly burned bars, because such a conditon is usually the result of open-circuited armature coils.

(3) If commutator bars are loose or out of alignment.

(4) If resurfaciing the commutator (paragraph c blow) would reduce the outside diameter below the specified minimum of 2.800 inches. This diameter is indicated by a step cut into the edge of the commutator.

(5) If the insulation breakdown test (table 3-1) between bars and shaft (ground) shows indication of insulation breakdown.

CAUTION

When performing insulation breakdown test, keep test probes outside brush" path to avoid damaging commutator contact surface.

c. Resurfacing ***the Commutator.***

(1) To remove oil or carbon film, mount amatire assemby (39, figure 3-1) in a lathe and take a single light cut across the face of the commutator at a speed of approximately 600 surface feet per minute. If the contact surface is scored, rough, or pitted, take a series of light cuts at approximately 200 surface feet per minute. A dimond-tipped cutting tool (figure 3-4) is recommended. The point of the cutting tool must be held on the centerline of the armature shaft. (See figure 3-5.) If a Carboloy-tipped cutting tool (figure 3-6) is used, the point of the cutting tool must be held 0.031 inch below the centerline of the armature shaft. The minimum diameter to which the commutator may be turned down is 2.800 inches. This limit is indicated by a step cut into the commutator. If necessary to remove metal beyond this point, replace the amature assembly.

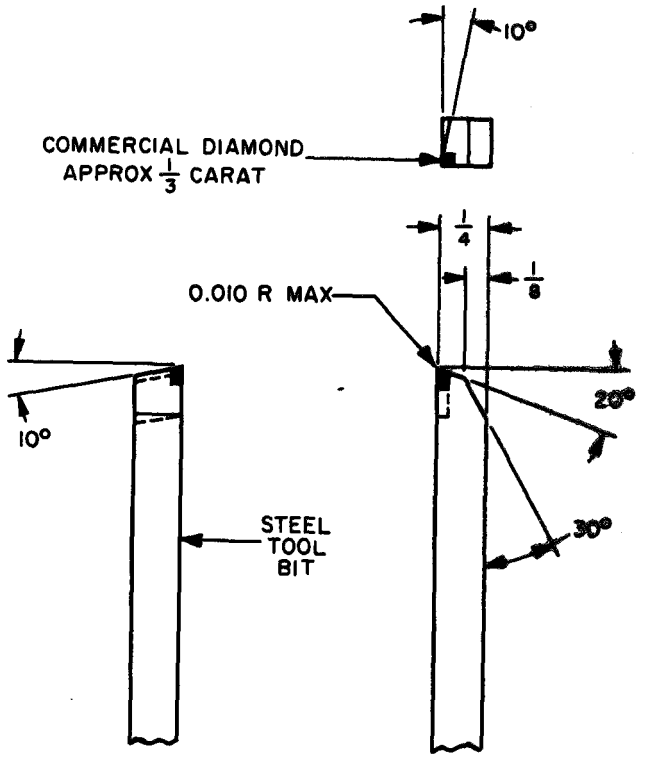

Figure 3-4. Fabrication of Diamond-tipped Cutting Tool.

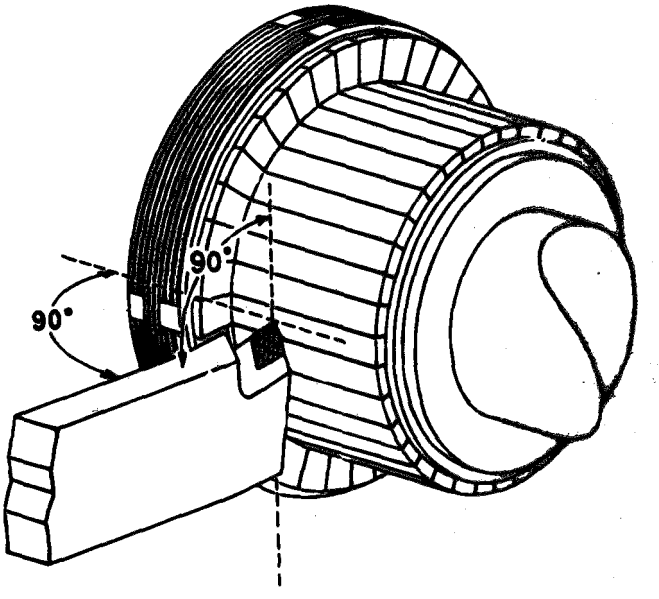

Figure 3-5. Mounting of Commutator Cutting Tool.

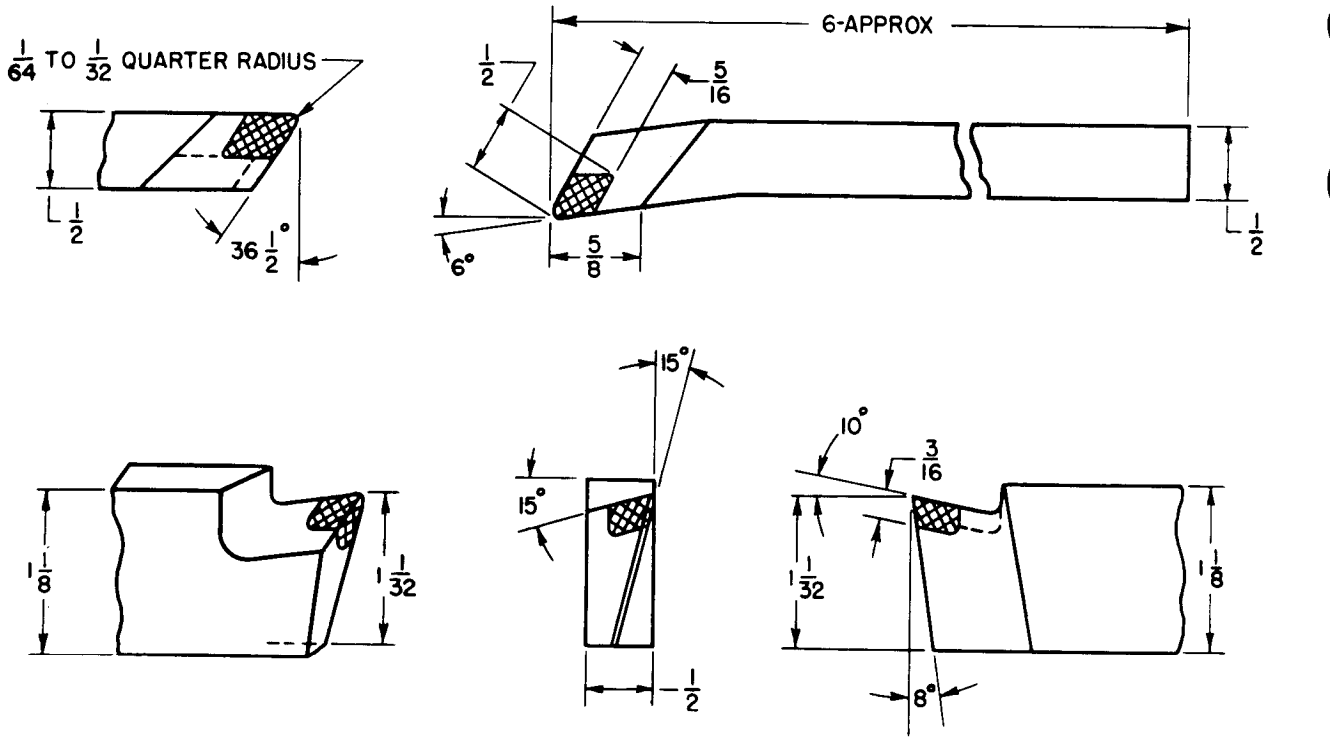

Figure 3-6. Fabrication *of Carboloy-tipped Cutting Tool.*

(2) After the commutator has been turned down, measure the depth of undercutting between commutator bars. If the depth is less than 0.031 inch, undercut the mica to this depth and to a width of 0.030 inch.

(3) After undercutting, take a final light cut of not more than 0.001 inch across the face of the commutator to remove burrs. If a diamond-tipped cutting tool (figure 3-4) is not available, make the final cut with a freshly honed carboloy-tipped tool (figure 3-6). Cutting speed should be approximately 600 surface feet per minute with either type tool. Do not use polishing abrasives. After the final cut, remove burrs between oommutator bars witih a strip of fiber.

(4) Check that the commutator is concentric with the bearing surfaces of the armature shaft within 0.0005 inch, full indicator reading.

(5) Check that centerline of commutator slot is aligned within 0.010 inch with centerline of commutator mica.

(6) After resurfacing, clean the commutator to remove all traces of oil, grease, and metal chips, as specified in paragraph 3-3b.

(7) Check the armature assembly for static and dynamic balanoe, using balancing machine, Model 40B (table 2-1). If out of balance by more than 0.020 ounce-inch, rebalance by inserting leaded epoxy material inside and under winding (core) openings, as required.

d. Metallizing Bearing Bores. If the bearing bore of end bell (7, figure 3-2) or stator housing (22, figure 3-3) is worn beyond 2.0475 inch, metallize the bore as described in following steps (1) through (9), below.

(1) Degrease the face of the bore and adjacent areas from which contaminants might be introduced, using a solvent specified in paragraph 3-3.

(2) Mask the area adjacent to the face of the bearing bore with shellac (item 7, table 2-3) to prevent adherence of the sprayed metal to these surfaces. Any shellac on the face of the bore will be removed by boring (step (3)).

(3) Using a, feed which will provide a suitable base for metal!izing, rough bore the bearing surface to correot any taper or out-of-round condition. Remove at least 0.006 inch, but do not exceed the original dimension by more than 0.015 inch on the radius.

(4) Insert the end bell or stator housing in a lathe, and rotate it at a speed of approximately 60 rpm.

CAUTION

The area to be metallized must be absolutely clean.

(5) To prevent condensation of moisture, make several rapid passes over the work with the flame only, immediately before applying the molybdenum coating (item 17, table 2-3). Should the bore be so impregnated with grease as to prevent metallizing, replace the end bell or stator housing.

(6) Make several passes over the bearing bore to deposit a thin coat of molybdenum.

(7) Complete the metallizing with molybdenum or 0.80 percent carbon steel wire to a thickness of 0.006 inch on top of the finished diameter (finished diameter minus 0.012 inch).

(8) Rough bore the surface to 0.010 inch under the finished diameter. Finish the surface by grinding to an inside diameter of 2.0472, plus 0.0003, minus 0.0000 inches. The concentricity between the inside diameter of the bearing bore and both the outermost (4.122-inch) diameter of the stator housing, and the largest inside (6.125-inch) diameter of the end bell must be within 0.002 inch, full indicator reading.

(9) Remove masking shellac and grinding residue with denatured alcohol (item 8, table 2-3) .

e. Soldering.

(1) If terminals (29, figure 3-1) were replaced, use a rosin core solder composed of 100 percent tin (item 9, table 2-3) to solder the terminals to the capacitor leads. This solder has a melting point of 232° C (450° F).

CAUTION

Do not use an acid solder or an acid flux, Do not burn insulation when soldering.

(2) For all other soldering operations, use silver brazing alloy (item 10, table 2-3) composed of 15 percent silver, 80 percent copper, and 5 percent phosphorous. This solder has a melting range between 650° C and 705° C (1200° F and 1300° F).

(3) All soft soldering must be done in accordance with Specification MIL-S-6872B. All silver brazing must be done in accordance with Specification MIL-B-7883B.

(4) After soldering or brazing, clean all joints with denatured alcohol (item 7, table 2-3) to remove all traces of rosin and other foreign matter.

f. Sleeving Replacement. If it is necessary to replace sleeving on capacitor leads, use vinyl-flex fiberglass tubing. The sleeving replacement. should have a black color, an inside diameter of between 0.040 inch and 0.049 inch, and a length of 1 3/4 inches.

3-5. LUBRICATION.

The only lubrication required for the dc generator is after assembly, coat the drive shaft spline with a light film of spline lubricant (item 11, table 2-3). If this lubricant is not available, use high-temperature lubricating grease (item 12, table 2-3)

NOTE

Use of sealing compounds is specified throughout the reassembly paragraphs.

3-6. REASSEMBLY.

Reassembly is basically the reverse of disassembly. Follow the exploded views (figures 3-1, 3-2, and 3-3), the schematic diagram (figure 3-7) and the detailed procedures as described in paragraphs 3-6 *a, b* and *c* for reassembly instructions.

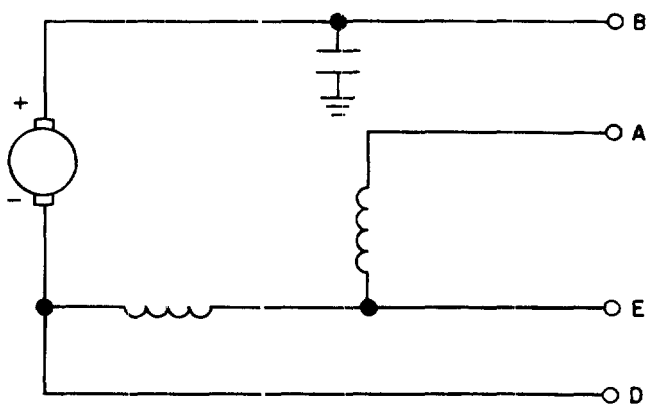

Figure 3–7. DC Generator, Schematic Diagram.

a. Generator Stator.

(1) If any terminals were removed or replaced, braze terminals to leads as specified in paragraph 3-4e.

(2) Place stator insulation (17, figure 3-3) behind each compensating winding and main pole of winding and pole shoe assembly (14).

(3) Install and align winding and pole shoe assembly (14) in housing (22) and secure with sixteen screws (13). Tighten screws (13) to a torque of 40 pound-inches and check that the minimum gage clearance between opposite pole shoes is 4.273 inches. Stake each screw in two places.

(4) In(stall) terminal board insulator (12) and terminal board (9) on housing (22) and secure with bolts (7 and 10) and washers (8 and 11).

(5) Make certain terminal lug (19) is connected to the B terminal post.

(6) Make certain electrical lead (18) is connected to the E terminal post and brazed to the compensating winding.

(7) Make certain terminal (6) is connected to the A terminal post and terminal (5) is connected to the D terminal post.

(8) Tighten bolts (10 and 11) in terminal board (9) to a torque of 35 pound-inches.

b. End Bell Assembly.

(1) Using brush box aligner 1106208 (table 4) and pilot holder 1106209 (table 4), secure electrical contact holders (1, figure 3-2) to end bell (7) with four screws (2), four lock washers (3), four flat washers (4), sixteen insulating washers (5), and four insulating tubes (6).

(2) Coat the area between the insulating washers and the electrical contact holder bosses with red Glyptal lacquer (item 13, table 2-3).

(3) Bake the assembled parts in an oven at 177° C (350° F) for two hours.

(4) Retighten screws (2) to a torque of 75 to 80 pound-inches after baking.

c. *DC Generator.*

(1) Mount bearing retainer (44, figure 3-1) and one dirt slinger (42) on the drive end of armature assembly (45).

(2) Mount bearing retainer (40) and cme dirt slinger (37) with flange toward bearing, on the commutator end of armature assembly (45).

(3) Stand armature assembly (45) on stand 1106210 (table 4). Heat ball bearings (39 and 43) to 250°F (121°C) and install on shaft of armature assembly (45), making sure that the dirt Slingers are properly positioned.

(4) Install the remaining dirt slingers (37 and 42) with flange toward bearing, and lock rings (36 and 41), using retaining ring pliers.

(5) Insert armature assembly (45) into generator stator (48), seating ball bearing (43) in the bore of the housing.

(6) Mount end bell assembly (38) on ball bearing (39), making sure that mounting holes are aligned. If roll pin (35) is installed in the stator housing, align notch in the end bell with roll pin (35).

(7) Secure the stator housing to generator interface 1106207 (table 2-2) and mount on generator stand 1106187 (table 2-2).

(8) Align bearing retainer (44) with the four holes in the stator housing. Apply sealing campound (item 14, table 2-3) to the threads of four screws (33). Install bushings (34) and outer race bearing retainer (32), and secure with four screws (33).

(9) Align bearing retainer (40) with the four holes in end bell assembly (38). Apply sealing compound (item 14, table 2-3) to the threads of four screws (26). Install and align the capacitor assembly with terminals (29) adscent to the two positive contact holder threaded screws. Secure the capacitor assembly to end bell assembly (38) and bearing retainer (40) with four screws (26), four lock washers (27), and four washers (28).

(10) Apply sealing compound (item 14, table 2-3) to the threads of two screws (23). Connect two terminals (29) of capacitor subassembly (31) to the two positive contact holder threaded screws and secure with two screws (23), two lock washers (24), and two washers (25).

(11) Mount front plate (22) on drive shaft assembly (21), and insert the drive shaft assembly through the shaft of armature assembly (45) at drive end.

(12) Install fan (19) between drive shaft assembly (21) and the shaft of armature assembly (45).

(13) Install a new compression spring (18) and flat washer (17). Use shaft holding wrench QB80059-3 (table 2-2) to keep the drive shaft from turning. Place a flat ring plate on top of shaft and mount dial setting gage 1001 (table 3) so that the stem rests on flat washer (17), and dial is set on zero. Take the free length of the compassion spring (1-5/32 inch) and subtraot the compression spring assembled length (7/8 inch) from it. Install and tighten self-locking nut (16) until the dial setting gage (table 2-1) reads the difference between the two valves (9/32 inch). The compression spring assembled length should be 0.875 inch and the load on the spring should be between 180 and 200 pounds.

CAUTION

The dial setting gage (table 2-1) shall be used to avoid any damage and/or incorrect readings. Do not use a torque wrench to adjust the compression spring.

(14) Apply sealing compound (item 14, table 2–3) to the threads of four bolts (13). Install end bell cover assembly (12) and secure with four bolts (13), four lock washers (14), and four washers (15).

(15) Using brush spring hook QB80277–1 (table 2–2) to lift up brush springs, install eight electrical contact brushes (8) in brush holders and secure brush terminals with eight screws (9), eight lock washers (10), and eight washers (11). Tighten the screws to a torque of 35 pound-inches.

(16) Slide brush access cover (7) over end bell assembly (38), and tighten screw (6) and square nut (5).

(17) After the dc generator has been tested satisfactorily, safety-wire the four mounting bolts (13) with lock wire (item 15, table 2-3). Secure drilled head screw (6) to brush access cover assembly (7) with lock wire (item 16, table 2-3) in accordance with Military Standard MS 33540 (ASG).

(18) After the final test procedure has established optimum position of brushes, lock the end bell assembly in position. Using the notch in the end bell for location, press in roll in (35) flush to the Astor housing. If there is no drilled hole in the stator housing, refer to step (19).

(19) If required because either winding and shoe pole assembly (14, figure 3-3) or stator housing (22) was replaced, or as a result of testing, drill a 0.062, plus 0.003, minus 0.000 inch diameter hole through the stator housing, using the notch in the end bell for location. Then press in roll pin (35, figure 3-1) flush to the stator housing.

SECTION IV

FINAL TEST PROCEDURES

4–1. GENERAL.

If the dc generator fails to meet any of the test requirements and visual inspection does not disclose the cause of the trouble, refer to troubleshooting table 4-1, disassemble, and repeat inspection procedures as outlined in Section III. After reassembling. repeat the test procedure from the beginning. Test conditions are as described in paragraph through *i* below.

Table 4–1. Troubleshooting

Item	Trouble	Probable cause	Remedy
1	Short brush life or excessive sparking	Worn, improperly seated, or loose fitting brushes	Replace, service, and/or readjust brushes as necessary.
		Low brush spring tension	Readjust and/or replace spring.
		Dirty commutator	Service commutator.
		Scored, pitted, or out-of-round commutator	Resurface commutator.
		Short, grounded, or open armature	Replace armature.
		Ball bearings worn	Replace ball bearings.
		Shorted compensating winding	Replace yoke assembly.
2	Generator noisy	Faulty condensers	Replace condensers.
		Discharged battery	Replace battery.
		Excessive sparking at generator brushes	See Item 1.
3	Output voltage low or no reading	Shorted or open rotor or exciter and/or shorted or open diodes	Test; if faulty, replace rotor and/or diodes.
		Control panel faulty	Replace control panel.
		Shorted and/or open output winding:	Test; replace housing if necessary.
		Drive inoperative	Check drive.
4	Output voltage indicates high	Control panel faulty	Replace control panel.
		Worn or faulty connections between generator and control panel	Make proper connections and/or tighten connections.
5	Output voltage erratic or fluctuates	Faulty control panel	Replace control panel.
		High resistance, internal or external connection in the dc connection of generator	Clean and/or tighten connections.
		Intermittently shorted, grounded, or open ac rotor and/or stator.	Test; replace rotor and/or housing if necessary.
6	Output phase sequence incorrect with generator rotation correct	External wiring not properly connected	Check external wiring. Make proper connections. Refer to wiring diagran (figure 3-7).
7	System meters indicate zero, low, or fluctuating readings (output voltage satisfactory)	External wiring not properly connected	Check external wiring. Make proper connections and tighten.
		Improper adjustment of voltage regulator	Check adjustments. Make proper adjustments.
8	System meters read off scale in wrong direction, with generator connected to load	Generator field magnetized in wrong direction	Flash field in proper direction.
		External wiring not properly connected	Refer to wiring diagram (figure 3-7). Check all wiring connections. All connections should be clean and tight.
9	Equipment operating unsatisfactorily although no load voltage is at proper value	Faulty control panel	Replace control panel.
		Improper frequency	Check drive.
10	Generator overheats	Excessive load	Check and reduce load, if necessary.

a. Temperature. Since the dc generator is self-cooled, no cooling air is required. Check that the ambient temperature is77± 27°F (25 ± 15°C).

b. Direction of Rotation. Drive the dc generator in a counterclockwise direction, as viewed from the drive end, during all tests.

c. *Plastic Windows.* It is recommended that a transparent plastic window strap be used during the brush seating procedure, so that the commutator end brushes will be visible. A spare brush access cover can be modified in the shop by cutting out squares, and riveting transparent nomflammable plastic window panes in place on the cover.

CAUTION

Do not operate the dc generator without the brush access cover in place, as overheating may occur.

d. Mounting. The dc generator should be mounted on aircraft generator test stand 7199-1 (table 2-1) or an equivalent test stand capable of driving the generator at speeds form 5000 to 11,000 rpm. The longitudinal axis of the generator should be horizontal.

e. *Excitation.* The dc genernator should be self-excited and controlled by a suitable variable resistance in series with the shunt f ield.

NOTE

The shunt field current should not be considered as part of the dc generator load current.

f. Load Location. The load for the dc generator should be located so that it will not affect the ambient or blast cooling air temperature.

g. Warm-Up. The dc generator should be operated at a continuous operating speed, delivering the rated load at the rated voltage to obtain a constant temperature.

h. Output Voltage Measurements. Measure output voltages between terminals E and B.

i. Shunt Field Voltage. Measure the voltage drop across the shunt field between terminals A and E. (See figure 3-7.)

4-2. FLASHING THE FIELD.

To be sure that the dc magnetic circuit retains enough residual residual, to allow the dc generator voltage to build up properly, flash the field as described in steps a through d, below.

a. Connect the positive terminal of a 12-volt battery through a single-pole, single-throw knife switch to terminal A on terminal board (9, figure 3-3).

b. Connect the negative terminal of the battely to terminal E on the terminal board.

c. Apply battely current to the shunt field for 5 seconds by closing the knife switch.

d. Repeat the operation several times to be sure that the field is properly flashed.

CAUTION

Use a knife switch when flashing the field. Opening the circuit at the starter generator or battery terminals can result in severe damage to the terminals or explosion of the battery.

4-3. BRUSH SEATING.

Remove the brush access cover and replace it with the plastic window strap. (Refer to paragraph 4-1a(3). The brush "run-in" can now be observed.

b. Operate the de generator at 5000 rpm until the face of each brush contacts the commutator 100 percent in the direction of rotation and for at least 75 percent of brush dimension parallel to the shaft. (See figure 4-1.) There must be no evidence of excessive grooving or other surface damage to the face of the brush.

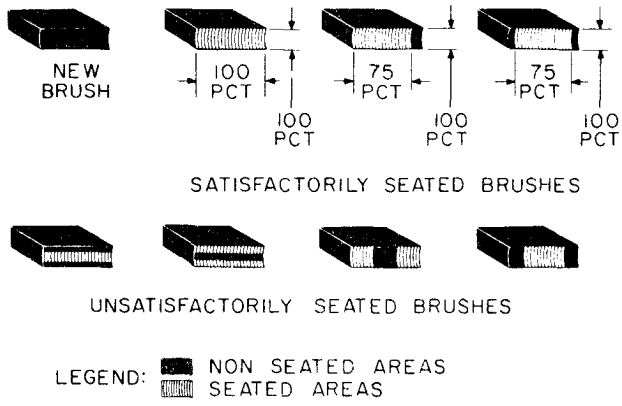

Figure 4-1. Typical Brush Seating.

c. There must be no sparking except for fine pinpoint sparking at the generator brushes. Brushes should be removed from their brush holders for periodic inspection.

NOTE

If the brushes are removed from the brush holders, be sure to return each brush to the holder from which it was removed.

d. When brush seating is completed, remove, load and stop the dc generator. Allow the unit to cool before proceeding.

4-4. FINAL TESTS.

a. General. Mount the dc generator on the test stand as described in paragraph 4–1*a*(4).

b. Maximum Speed for Regulation.

NOTE

The dc generator must not be given an operation warm-up prior to this test .

(1) Turn on the test stand controls and increase the drive motor speed to 10,000 rpm.

(2) Adjust the regulator until the output voltage is 30 volts.

(3) Record the field voltage (Ef) and field current (If).

(4) Calculate the external resistance (Rx) in the field circuit by dividing the field voltage by the field current.

(5) The external resistance in the shunt field must not exceed 35 ohms.

c. Heating, Commutation, Minimum Speed, and Equalizing Voltage.

(1) For heating, commutation, minimum speed, and equalizing voltage tests, the following is considered as a continuous operating condition: While the dc generator is cold, the resistance and temperature of the shunt field must be determined for use in calculating the average field temperature rise during continuous operation at full load. The dc generator is considered to have reached its continuous operating condition when the rate of rise of the shunt field temperature does not increase more than 2°F (1°C) during a five-minute period.

(2) Start the blower and drive motor. Increase the drive motor speed to operate the dc generator at 8000 rpm. Close suitable switches of the load bank to apply 300 amperes dc load. When the dc generator reaches its continuous operating condition as described in paragraph *c*(1),, proceed as follows:

(*a*) Check the readings of the instruments. During the heat run, readings must be limited to those shown in table 4–2.

Table 4–2. Heating Test Readings

Shunt Field	8 amperes (max)
Load Ammeter	300 amperes
Line Voltage	30 volts

(*b*) Measure the equalizing voltage across terminals D and E on terminal board (9, figure 3-3. The voltage must be between 1.9 and 2.1 volts.

(3) After completing the previous test, decrease the speed of the motor until the minimum rated of 5000 rpm is measured on the tachometer. Adjust the voltage regulator until a 26-volt reading is obtained. The starter generator must deliver rated current of 300 amperes, as read on the ammeter.

NOTE

At no time during the above heat runs should the required resistance external to the shunt field be less than 1.25 ohms. Refer to paragraph b (5) above to calculate the external shunt field resistance.

(4) Readjust the regulator until a 30-volt reading is obtained.

d. Commutation. Immediately following the previous heat runs, and with the dc generator hot, observe the commutation of the dc generator over the speed range 5000 to 8000 rpm for no load (all load switches off), half load (suitable load switches turned on give 150 amperes), and rated load bud (suitable switches turned on to give 300 amperes). Table 4-3 lists the various conditions. There should be no sparking except for the fine pinpoint sparking at the generator brushes.

NOTE

For any speed within the speed range, the field current must increase with increases in load.

e. Overspeed.

(1) Perform this test while the dc generator is hot as a result of testing.

(2) Open all load switches and the field switch. (Operaite the generator at no load

(3) Increase the speed of the driving motor 11,000 rpm. The generator must operate at this speed for five minutes without mechanical failure, the throwing of varnish, or impairment of electrical performance.

Table 4-3.. *Commutation Test Readings*

Speed (rpm)	Line voltage	Load (amperes)
5000	30	0
5000	30	150
5000	30	300
6500	30	0
6500	30	150
6500	30	300
8000	30	0
8000	30	150
8000	30	300

(4) At the end of the five-minute overspeed run, reduce the speed to 6500 rpm. Apply rated load of 300 amperes.

(5) Operate the dc generator for one minute and check the electrical performance. The results should compare with those observed in paragraph 4-4c,

f. Dielectric Strength.

(1) Perform this test while the dc generator is hat as a result of previous tests.

(2) Remove all external connections from dc generator terminal board, and disconnect terminals (29, figure 3-1) of capacitor subassembly (31).

(3) Using insulation breakdown test set 13700-1C, apply 300 volts ac (60 Hz) for one second between the frame (ground) and each terminal (A, B, D, and E) in turn. There must be no evidence of insulation breakdown or leakage current in excess of 2 milliamperes.

(4) Reconnect capacitor terminals.

g. Polarity Check.

(1) Operate the dc generator at rated speed and load conditions. Connect the voltmeter leads to stanter genenator terminals B and E, observing proper polarity.

(2) If the voltmeter connections must be reversed to obtain a reading, the polarity of the dc generator is reversed. In this case, flash the field in the proper direction as described in paragraph 4-2.

SECTION V

DIFFERENCE DATA SHEETS

NOT applicable

SECTION VI

FEDERAL MANUFACTURERS' CODES

Code	Manufacturer and Location
04314	General Electric Co., Appliance Control Dept., Bridgeport, Conn.
06365	Bear Manufacturing Co., 2016 5th Ave., Rock Island, Ill. 61202
19315	Bendix Corporation, Eclipse Pioneer Div., Teterboro, N.J. 07608
24655	General Radio Co., Cambridge, Mass.
45598	Pantex Div., AMETEK, Inc., Pawtucket ,R.I.
60998	Tubular Micrometer Co., St. James, Minn.
83298	Bendix Corporation, Electric Power Div., Eatontown, N.J. 07724
99664	United Manufacturing Div., UMC Electronics Co., North Haven, Conn. 06473

APPENDIX A

REFERENCES

MS33540 (ASG)	Safe Wiring and Cotter Pinning, General Practices for
MIL–B–7883B	Brazing of Steels, Copper, Copper Alloys, Nickel Alloys, Aluminum and Aluminum Alloys
MIL–I–6868	Magnetic Particle Inspection
MIL–S–6872B	Soldering Process, General Specification for
TM 38–750	Army Equipment Record Procedures
TM 55–405–10	Ground Handling and Service Equipment

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General

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