

TM 9-6115-202-14

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

H6-018

OPERATOR, ORGANIZATIONAL, AND
FIELD MAINTENANCE MANUAL

FOR

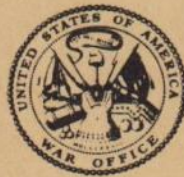
GENERATOR SET, GASOLINE ENGINE DRIVEN
4.2 KW, 150 AMP, 28V, DC
(MODEL DC 4.2-ORD/28)
(6115-857-1397)

COMPOSED OF:

STARTER, GENERATOR
(JACK AND HEINTZ MODEL 23041-001)

AND

ENGINE
(MILITARY STANDARD MODEL 4A032-1)



HEADQUARTERS, DEPARTMENT OF THE ARMY
JANUARY 1963

IdO Secte B G

WARNING:

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, DEADLY POISONOUS gas which, when breathed, deprives the body of oxygen and causes SUFFOCATION. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, coma. Permanent BRAIN DAMAGE or DEATH can result from severe exposure.

It occurs in the exhaust fumes of internal-combustion engines and becomes DANGEROUSLY CONCENTRATED under conditions of INADEQUATE VENTILATION. The following precautions MUST be observed to insure the safety of personnel whenever the auxiliary engine is operated for maintenance purposes or tactical use.

- a. DO NOT operate engine in an enclosed area unless it is ADEQUATELY VENTILATED.
- b. DO NOT run engine for long periods without maintaining ADEQUATE VENTILATION in personnel compartments.
- c. BE ALERT at all times during engine operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected personnel and treat as follows: expose to fresh air; keep warm: DO NOT PERMIT PHYSICAL EXERCISE; if necessary, administer artificial respiration.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

TM9-6115-202-14, januari 1963

GENERATOR, AGGREGAAT, NSN 6115-00-857-1397
BENZINEMOTOR: 4.2 kw, 150 Amp.,
28 V., DC (Model DC-4.2-Ord/28).

T O E L I C H T I N G

1. Deze TM dient als technische handleiding voor bediening en onderhoud (1e t/m 4e echelon) van bovenvermelde generator.
2. Materieelrelatie: Commando Carrier M577A1.
3. Het gestelde op pag. 16 inzake Special Tools dient slechts als informatie. Terzake zullen nader richtlijnen worden bekendgesteld.
4. Voor de tot deze GENERATOR behorende MOTOR, BENZINE: Militair Standaard, Model 4A032-1, (NSN 2805-00-776-0483) gelden afzonderlijke publicaties:
SK9-948 (vertaling van I05-2805-203-14, thans nog in bewerking)
TM5-2805-203-14, april '65
TM5-2805-203-24P, jan. '64
5. Alle in deze TM vermelde Federal Stocknummers dienen te worden gelezen als NATO Stocknummers door toevoeging van het landenkengetal "00" tussen het "Groeps- en Klassennummer" en het "Artikel-Identificatienummer".
B.v. 6115-857-1397 wordt gelezen 6115-00-857-1397.
6. Referentiegegeven: G 312 B.
7. Alle nadere informaties, deze TM betreffende, kunnen rechtstreeks tot de Inspectie Technische Dienst worden gericht.

OPERATOR , ORGANIZATIONAL AND FIELD MAINTENANCE MANUAL

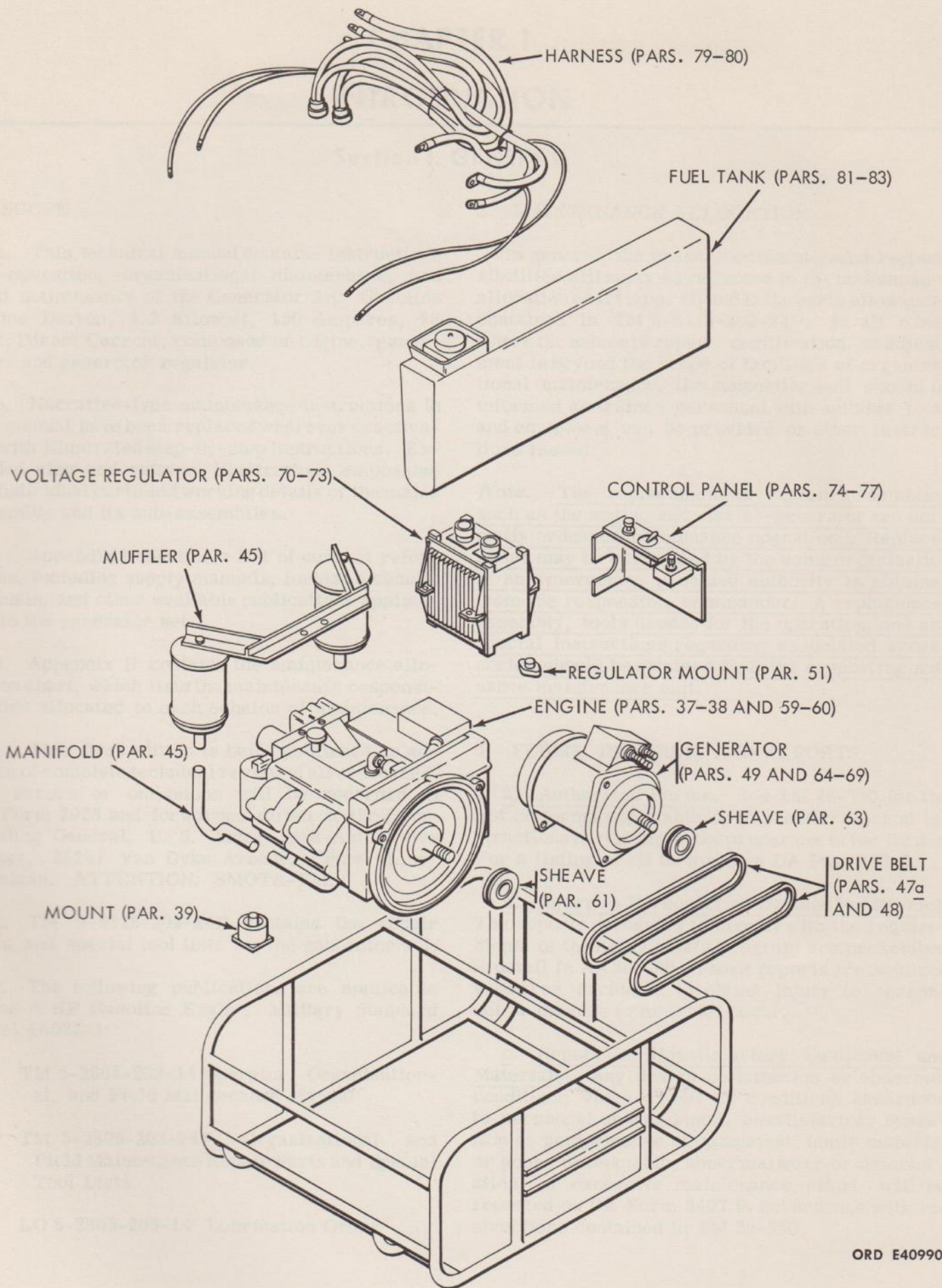
GENERATOR SET: GASOLINE ENGINE DRIVEN, 4.2 KW, 150 AMP, 28 V, DC

(MODEL DC 4.2-ORD / 28) (6115-857-1397)

**COMPOSED OF: STARTER-GENERATOR (JACK AND HEINTZ MODEL 23041-001)
AND ENGINE (MILITARY STANDARD MODEL 4A032-1)**

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ORD E40990

FIGURE 1. VISUAL GUIDE TO CONTENTS.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. SCOPE

a. This technical manual contains instructions for operation, organizational maintenance, and field maintenance of the Generator Set: Gasoline Engine Driven, 4.2 Kilowatt, 150 Amperes, 28 Volt, Direct Current, composed of engine, generator, and generator regulator.

b. Narrative-type maintenance instructions in this manual have been replaced wherever practicable with illustrated step-by-step instructions. Exploded view and cutaway illustrations emphasize the individual parts and working details of the major assembly and its sub-assemblies.

c. Appendix I contains a list of current references, including supply manuals, forms, technical manuals, and other available publications applicable to the generator set.

d. Appendix II contains the maintenance allocation chart, which lists the maintenance responsibilities allocated to each echelon of maintenance.

e. This first edition is being published in advance of complete technical review of all concerned. Any errors or omissions will be recorded on DA Form 2028 and forwarded direct to the Commanding General, U. S. Army Tank-Automotive Center, 28251 Van Dyke Avenue, Center Line, Michigan. ATTENTION: SMOTA-FM.

f. TM 9-6115-202-24P contains the repair parts and special tool lists for the generator set.

g. The following publications are applicable to the 6 HP Gasoline Engine, Military Standard Model 4A032-1:

TM 5-2805-203-14 Operator, Organizational, and Field Maintenance Manual

TM 5-2805-203-24P Organizational and Field Maintenance Repair Parts and Special Tool Lists

LO 5-2805-203-14 Lubrication Order

2. MAINTENANCE ALLOCATION

In general, the prescribed maintenance responsibilities will apply as reflected in the maintenance allocation chart (app. II) and in the parts allowances contained in TM 9-6115-202-24P. In all cases where the nature of repair, modification, or adjustment is beyond the scope of facilities of organizational maintenance, the supporting unit should be informed so trained personnel with suitable tools and equipment can be provided or other instructions issued.

Note. The replacement of certain assemblies such as the engine and starter-generator are normally ordnance maintenance operations. Replacements may be performed by the using organization in an emergency, provided authority is obtained from the responsible commander. A replacement assembly, tools needed for the operation, and any special instructions regarding associated accessories should be obtained from the supporting ordnance maintenance unit.

3. FORMS, RECORDS, AND REPORTS

a. Authorized Forms. See TM 38-750 for the list of forms applicable to this materiel, and instructions pertaining to the proper use of the forms. For a listing of all forms, see DA Pam 310-2.

b. Injury to Personnel or Damage to Materiel. The reports necessary to comply with the requirements of the Army safety program are prescribed in detail in AR 385-40. These reports are required whenever accidents involving injury to personnel or damage to materiel occur.

c. Report of Unsatisfactory Equipment and Materials. Any design deficiencies or abnormal conditions which result in conditions hazardous to personnel or equipment, unsatisfactory operation or performance of equipment, faulty materiel or poor workmanship, abnormal wear or deterioration, or excessive maintenance effort, will be reported on DA Form 2407 in accordance with instructions contained in TM 38-750.

Section II. DESCRIPTION AND DATA

4. DESCRIPTION

a. General. The generator set (figs. 2-4) consists of a gasoline engine driving a direct current generator regulated by a carbon pile voltage regulator. The set is self-contained and can be started with a starting rope or an outside 24 volt battery source. The engine, generator, and regulator mount on an inner frame, which is mounted to an outer frame with the fuel tank and control panel. The outside battery power source connects to the set through either of two power receptacles.

b. Definition of Locational Terms. The terms "left," "right," "front," and "rear" are used in this manual to designate areas of the generator set as viewed while standing at the control panel facing the set. The fuel tank is located on the left side of the set, the engine on the front side, the regulator on the right side, and the control panel on the rear side.

c. Engine. The engine is a four-cylinder, air-cooled, horizontally opposed, overhead valve, gasoline engine capable of operating in temperate, desert, arctic, and tropic environments.

d. Starter-Generator. The starter-generator

is a 28-volt, 8.4-kilowatt, 300-ampere, direct-current unit. For this application, the generator develops an output of 150 amperes, 4.2 kilowatts, at 4,330 generator rpm. Bearings support the armature shaft, which is belt driven from the drive end of the shaft by a pulley. The outer end of the shaft mounts a fan for self-air cooling of the generator.

e. Generator Regulator. The carbon-pile-type generator regulator is rated at 150 to 400 amperes, 24 to 28 volts, direct current, and consists of two main components: a carbon pile voltage regulator and a cutout relay assembly, both housed in a watertight box. The box also contains relays, coils, and fixed and variable resistors.

f. Fuel System. The fuel system consists of a fuel tank, fuel hoses, fuel pump, fuel shutoff valve, and carburetor. The fuel shutoff valve switches the fuel off or changes the source of the fuel to the tank or an outside source.

g. Control Panel Assembly. The control panel is the mounting bracket for the engine STOP-RUN switch, ENGINE START switch, voltage adjusting rheostat, starting relay, and receptacles for connecting the battery power source and generator output load.

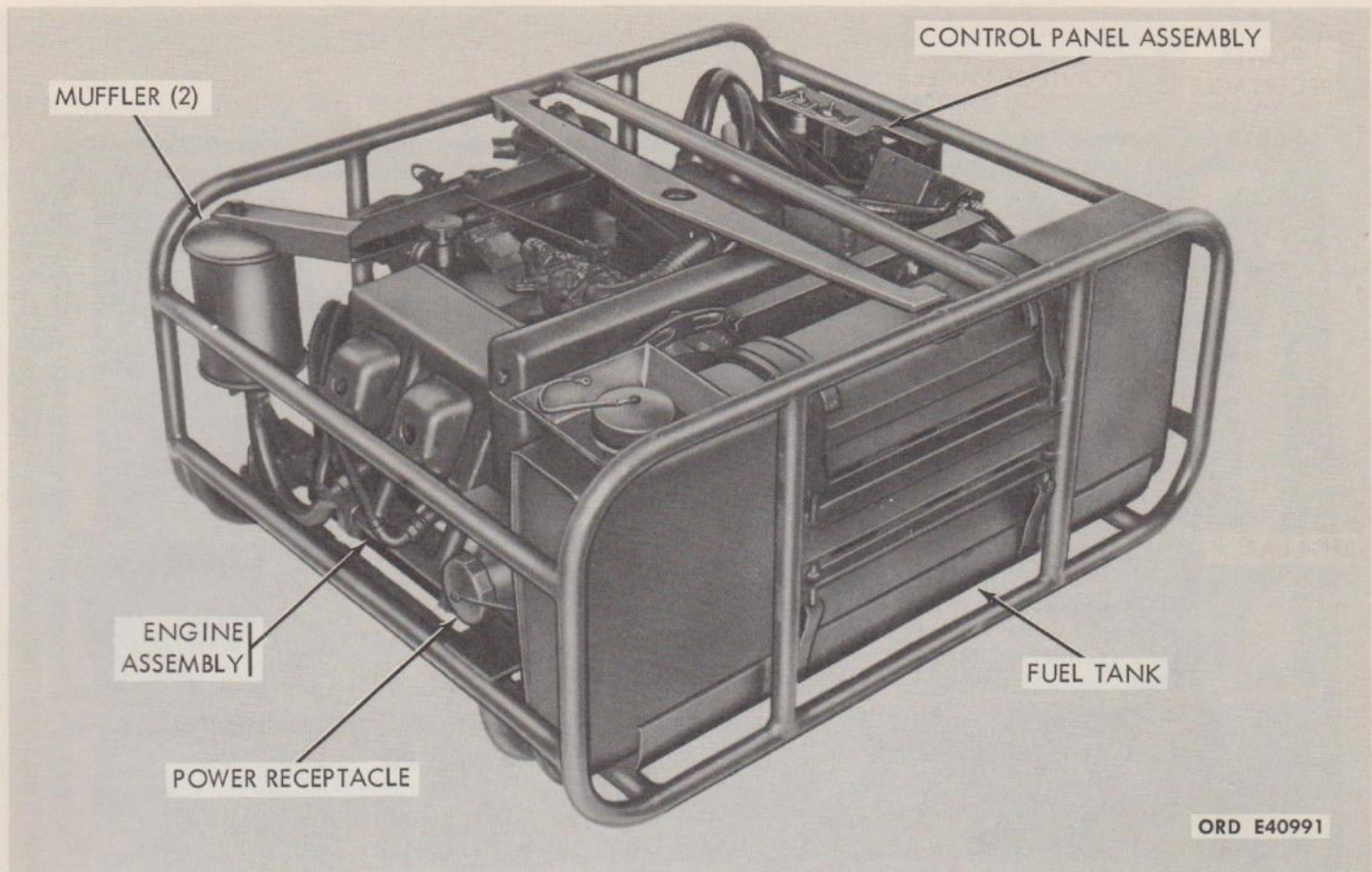


FIGURE 2. GENERATOR SET: GASOLINE ENGINE DRIVEN, 4.2 KW, 28 V, DC - LEFT FRONT VIEW.

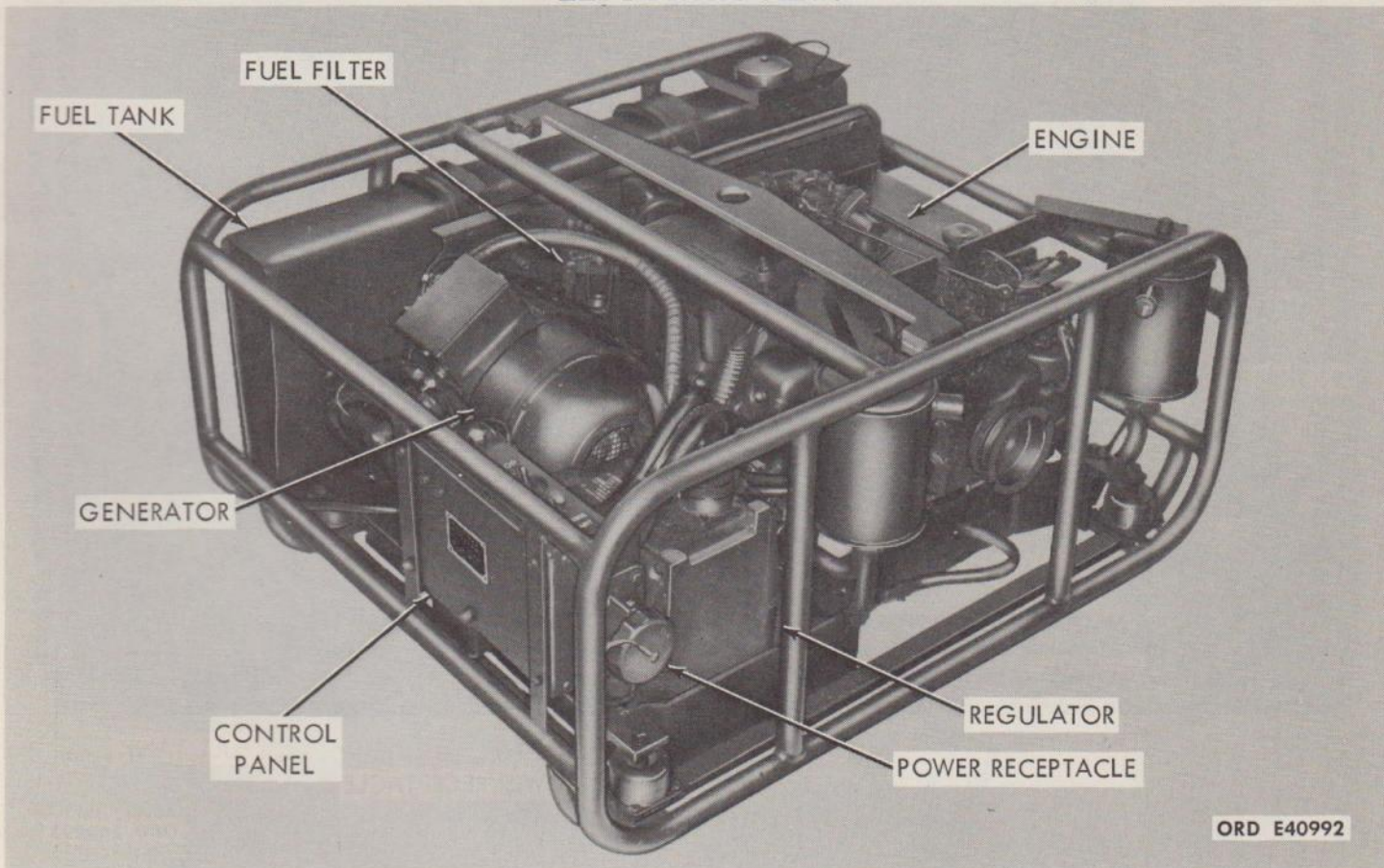


FIGURE 3. GENERATOR SET: GASOLINE ENGINE DRIVEN, 4.2 KW, 28 V, DC - RIGHT REAR VIEW.

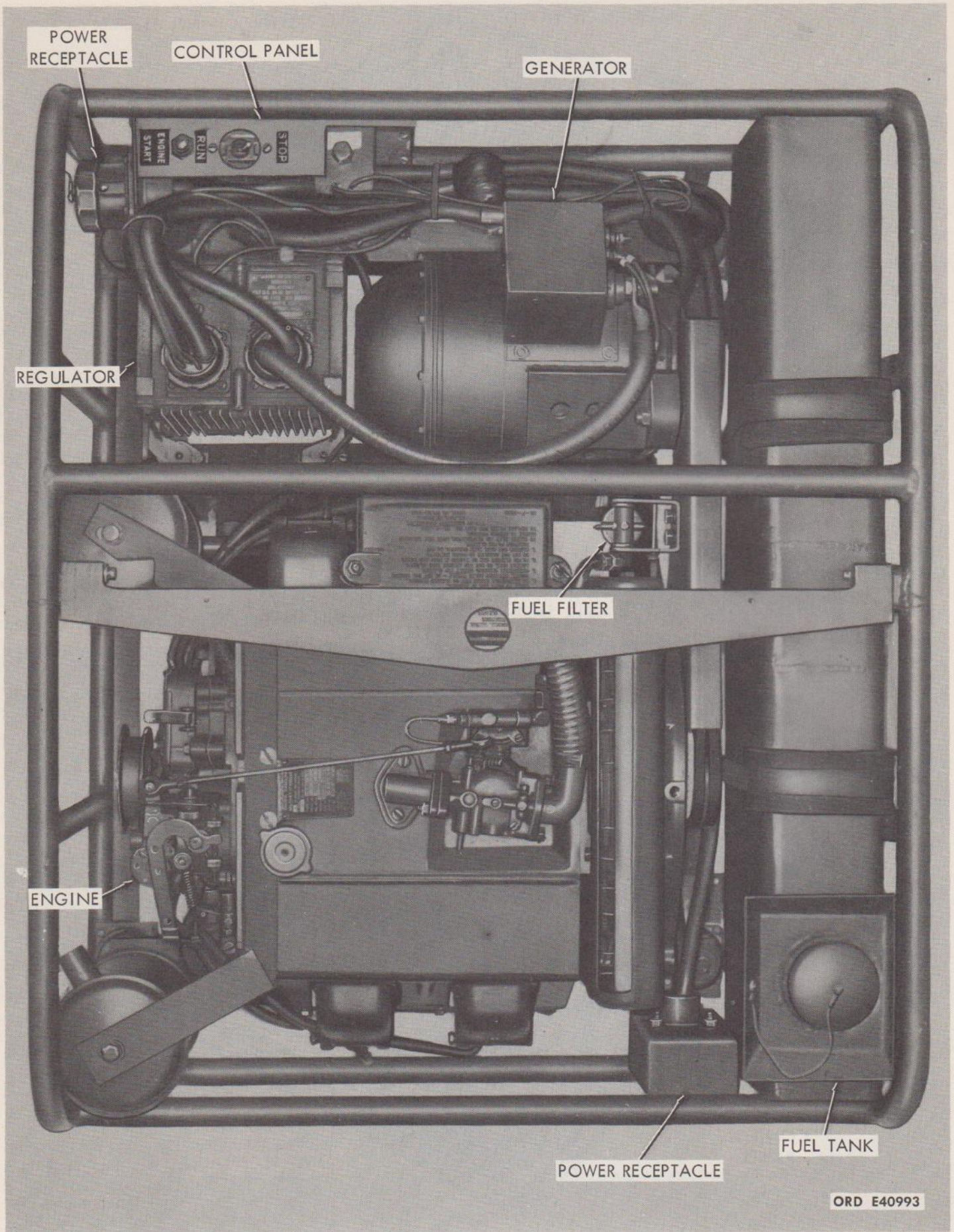


FIGURE 4. GENERATOR SET: GASOLINE ENGINE DRIVEN, 4.2 KW, 28 V, DC - TOP VIEW.

5. IDENTIFICATION PLATES AND SIGNS

See figure 5 for location and details of data, identification, and instruction plates and signs.

6. TABULATED DATA

a. General.

Manufacturer ----- Continental Motors Corp
Model ----- DC 4, 2-ORD/28
Weight (without fuel) ----- 225 lb
Length ----- 36 in.
Height ----- 16 in.
Width ----- 29 in.

b. Performance.

Engine governed speed ----- 3, 600 rpm
Generator speed (at engine
governed speed) ----- 4, 330 rpm
Generator output (at engine
governed speed) ----- 150 amp
Operating time (at 150-amp
load) ----- 8 hr

c. Capacities.

Engine crankcase ----- 2-1/8 qt
Filter ----- 1/2 qt
Fuel tank ----- 8 gal.
Fuel type:
Motor method ----- 83 octane
Research method ----- 91 octane

d. Engine.

Military standard:
Model ----- 4A032-1
Type ----- 4-cycle, gasoline, overhead
valve, air cooled
Number of cylinders ----- 4

Firing order (by cylinders) ----- 1-4-2-3
Cylinder numbering (viewed from
starter rope pulley):
Left bank ----- 1-3
Right bank ----- 2-4
Bore ----- 2.250 in.
Stroke ----- 2.0 in.
Piston displacement ----- 31.80 cu in.
Compression ratio ----- 6.0 to 1
Horsepower (at governed
speed, 3, 600 rpm) ----- 6
Rated horsepower for continuous
duty ----- 6.0 hp
Maximum horsepower for intermittent
duty ----- 10.4 hp
Compression pressure ----- 90-100 psig
Spark plugs ----- MS 51009-1
Gap ----- 0.025 in.
Valve lash clearance - hot ----- 0.014 in.
Magneto point gap ----- 0.018 in.
Weight (dry) ----- 75 lb

e. Generator.

Manufacturer ----- Jack and Heintz
Model ----- 23041-001
Rated kilowatts ----- 8.4 kw
Load (continuous amperes at 4, 500
to 6, 500 rpm generator speed) ----- 300 amp
Voltage (direct current) ----- 24-30 v
Terminal designation:
Positive ----- B
Negative ----- E
Equalizer winding ----- D
Field positive ----- A
Weight ----- 52 lb

f. Voltage Regulator.

Model ----- MS 51005-1
Type ----- Carbon pile
Rated volts ----- 24v-28v
Rated amperes ----- 150-400 amp

CONTROL PANEL

GENERATOR CONTROL ASSEMBLY
 ORD-8723894
 VOLT D.C. 24-28 RATING 400A.
 MFRS. NO. 1715 SER. []
 RAY WHYTE ELECT.,
 EAST DETROIT, MICH.

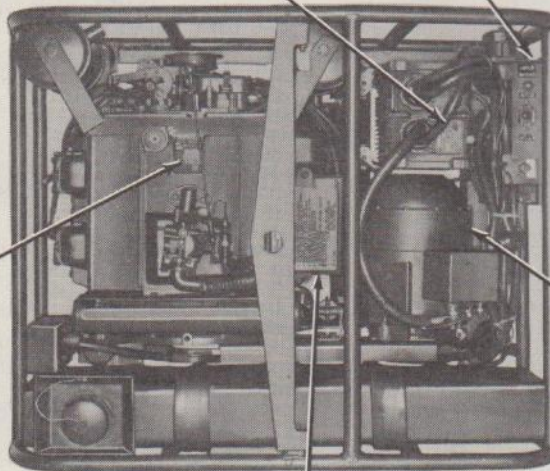
REGULATOR



SET IDENTIFICATION

U. S. ARMY ORDNANCE CORPS
 NOM GENERATOR SET, GASOLINE ENGINE

MAKE	CONTINENTAL MOTORS CORP.		
MOD	DC 4, 2-ORD 28		
SER		NO. OF WIRES	2
VOLT	28 D. C.	AMPS	150
KW	4.2	KVA	P. E. %
CYCLES		RPM	ENG-3600, GEN-4500
MFD		PH	



ENGINE, GASOLINE,
 MILITARY STANDARD

4	CYLINDER, AIR COOLED
4	CYCLE OVERHEAD VALVE
32	CU. IN. DISPLACEMENT
STOCK NO.	FSN-2805-776-0483
SERIAL NO.	
MIL. MODEL	4A0321
MANUAL	TMS-2805-203
MFD. BY	CONTINENTAL MOTORS CORP.
DATE MFD.	
P.O. NO.	TR-PH-42638 JI
DEVELOPMENT AGENCY	CORPS OF ENGINEERS, U.S. ARMY

ENGINE

D.C. STARTER-GENERATOR

STOCK NO.	WT. LBS.		
VOLTS	AMPS	ROTATION	SPEED RPM
MODEL NO.		DATE OF MFR	
FAA TECH ST'D ORDER		ORDER NO.	
INSP.	SERIAL NO.		

JACK & HEINTZ - INC.

GENERATOR

CONSULT TECHNICAL MANUAL FOR DETAILED CLEANING INSTRUCTIONS

- TO SERVICE AIR CLEANER -
- LOOSEN RETAINING BOLTS.
- REMOVE INSIDE OF ELEMENT HOUSING.
- TO CLEAN FILTER ELEMENT BLOW OFF ELEMENT WITH COMPRESSED AIR - FROM CLEAN TO DIRTY SIDE OF ELEMENT.
- TO REASSEMBLE INSERT NEW OR CLEANED ELEMENT. TIGHTEN RETAINING BOLTS EVENLY - DO NOT USE WRENCH.
- CONDUCT CLEANING GENTLY TAP ELEMENT, AGAINST HAND, DO NOT TAP AGAINST HARD OBJECTS.
- FILTER ELEMENT CAN BE WASHED IN SOAP AND WATER. DO NOT USE KEROSENE OR OTHER SOLVENTS.
- EXERCISE CARE WHEN CLEANING. DO NOT INJURE FILTER ELEMENT.
- WHEN WILET AIR TEMPERATURE, MOVE WIRE SELECTOR HANDLE TO "SERVED POSITION".
- FOR WILET FILTER USE PART NO. TR-F-588

MFD. BY C. VALDEON COMPANY, INC.
 ST. PAUL, MINNESOTA

AIR CLEANER

ORD E40994

FIGURE 5. IDENTIFICATION PLATES AND SIGNS.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

7. GENERAL

a. Scope. This section contains instructions for preliminary and break-in services on the generator set.

b. Receipt. When new, used, or reconditioned materiel is first received by the using organization, it is the responsibility of the officer-in-charge to determine whether the materiel has been properly prepared for service by the supplying organization and to be sure it is in condition to perform its function.

c. Inspection. Inspect all assemblies, sub-assemblies, and accessories to be sure they are properly assembled, secured, cleaned, correctly adjusted, and lubricated. The operator or user will assist organizational maintenance personnel in these services and those designated in paragraph 8.

8. BREAK-IN SERVICES

a. Before the generator set is operated for the

first time, service the entire unit. To prepare the generator set for servicing, remove all corrosion-preventive materials.

b. Service as follows:

- (1) Remove spark plugs, clean with dry-cleaning solvent, and replace.
- (2) Check all lubricating points to see if generator and engine are adequately lubricated. Lubricate as required (pars. 27-28).
- (3) Check all electrical connections, particularly at engine magneto, at generator regulator, and in control panel for proper connection.
- (4) Securely tighten any loose nuts or cap screws, and make certain there are no loose or leaking fuel lines.

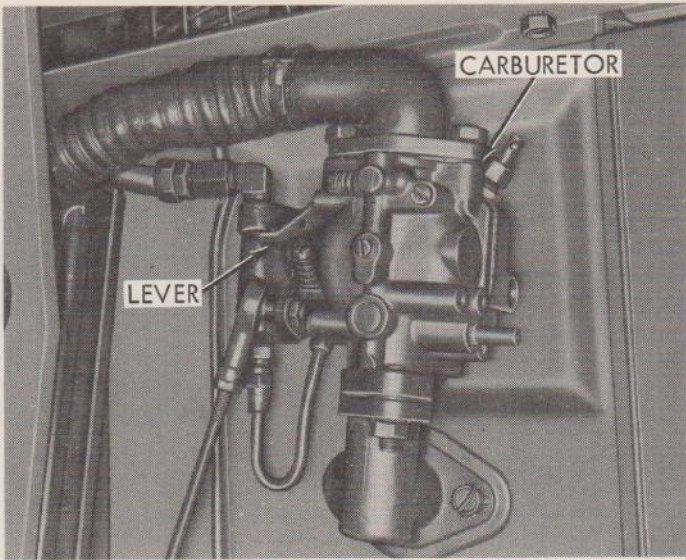
Section II. CONTROLS

9. GENERAL

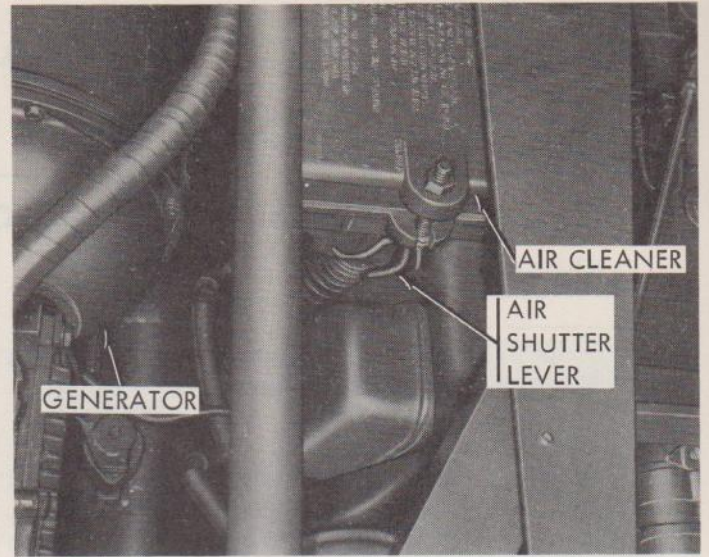
This section locates and illustrates the various controls for operating the generator set.

10. OPERATING CONTROLS

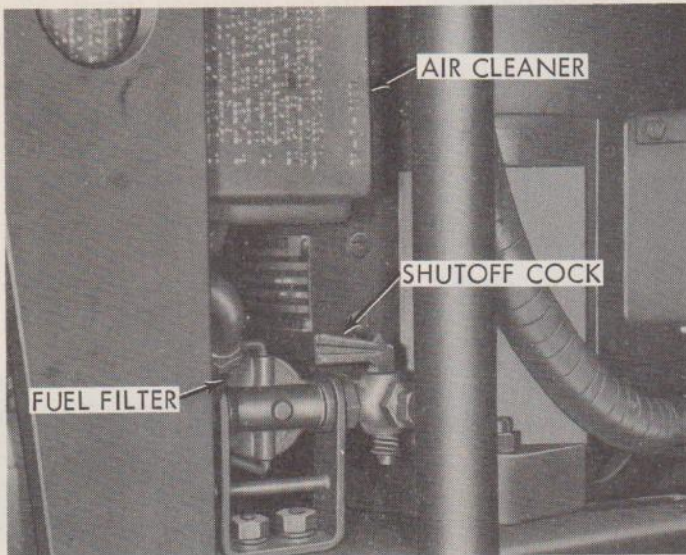
See figure 6.



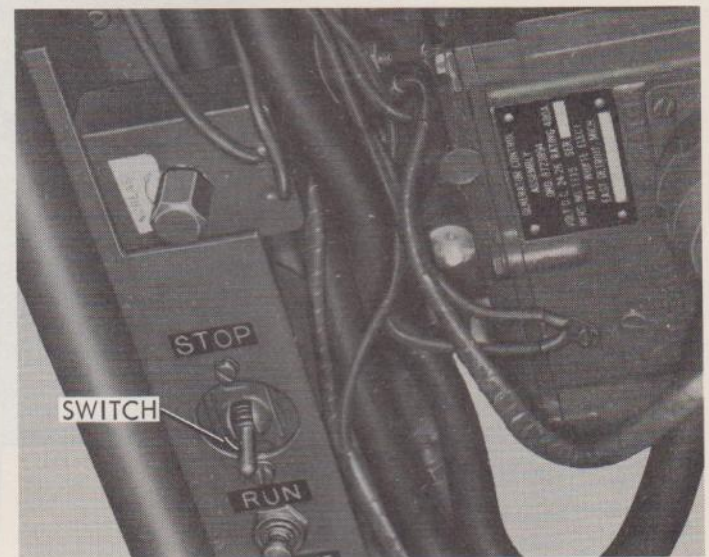
A. Choke control lever.



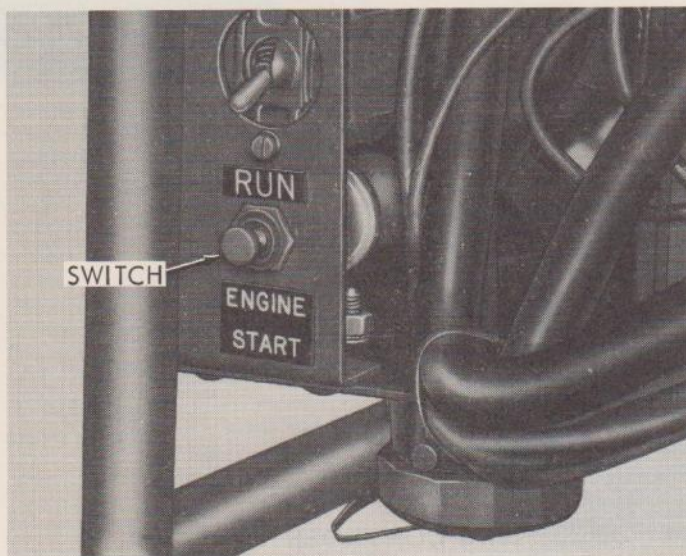
B. Air intake shutter lever.



C. Fuel shutoff cock.



D. STOP-RUN switch.



E. ENGINE START switch.



F. Voltage adjusting rheostat.

ORD E40995

FIGURE 6. GENERATOR SET CONTROLS.

Section III. OPERATION UNDER USUAL CONDITIONS

11. GENERAL

This section contains instructions for operating the generator set under conditions of moderate temperature and humidity. For operation under unusual conditions, see paragraphs 17 through 21.

12. BEFORE-OPERATION SERVICES

a. Before starting the generator set, perform the before-operation services prescribed in paragraph 31.

NOTE. The instructional arrows, coupled with the text that appears in or below each illustration, provide the sequence and procedure for each maintenance operation. Follow numbered arrows consecutively, starting with No. 1, depending on which procedure is desired.

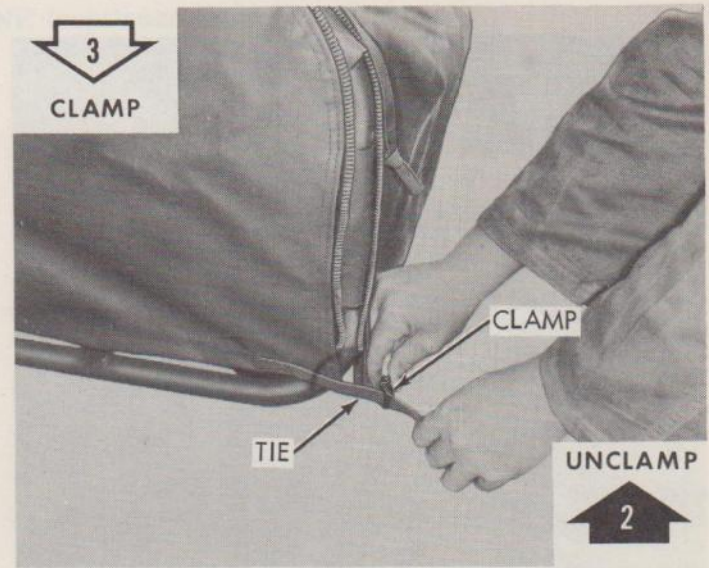
b. If the generator set is to be operated under usual conditions or for a long period of time, remove the cover to maintain moderate operating temperatures. Removal and installation of the generator set cover are shown in figure 7.

13. STARTING ENGINE

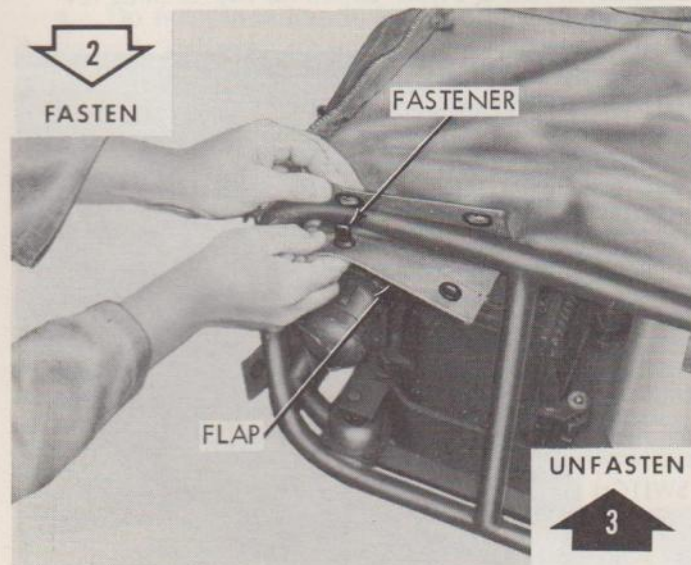
See figures 8 and 9. If trouble is encountered in starting or operating the engine, notify organizational maintenance personnel.



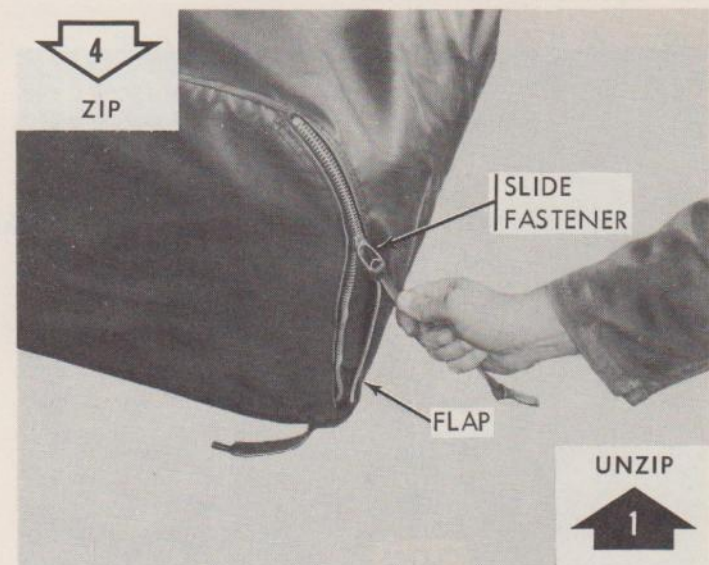
A. Cover at left side.



C. Base ties (two places).



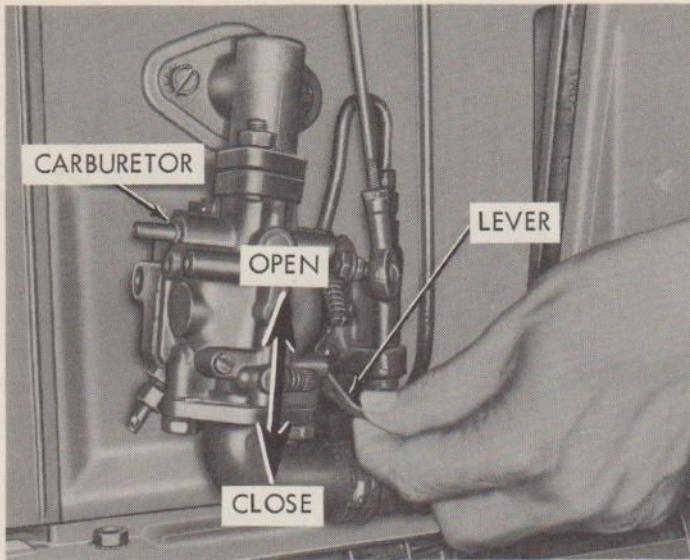
B. Fastener flaps at right side (six places).



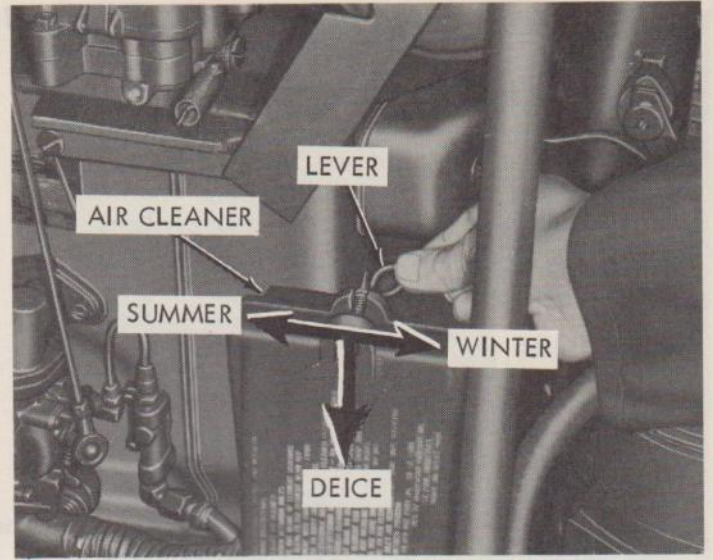
D. Right side flap (two places).

ORD E40996

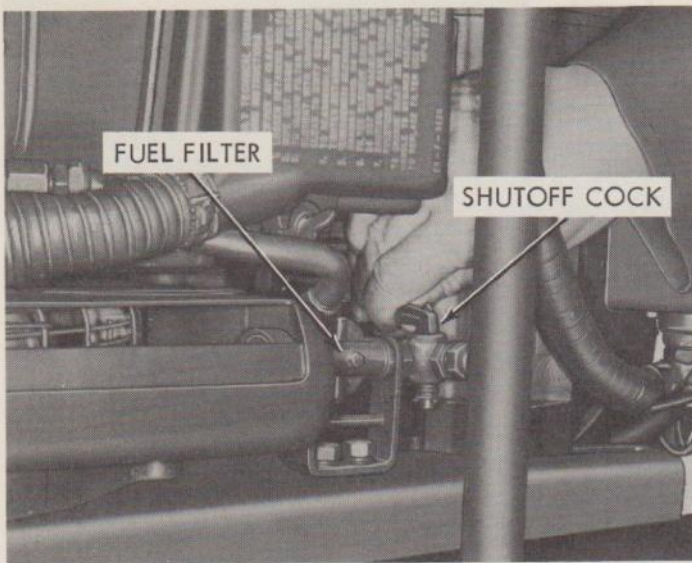
FIGURE 7. INSTALLING OR REMOVING GENERATOR SET COVER.



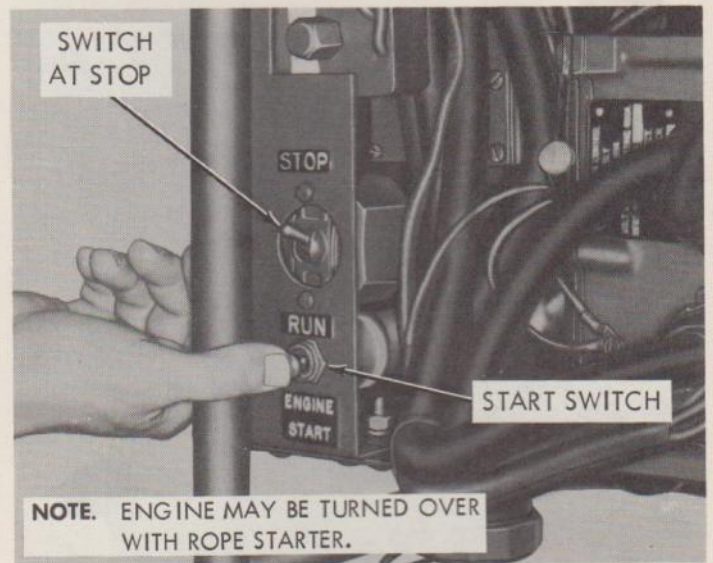
A. Throw choke lever to closed position.



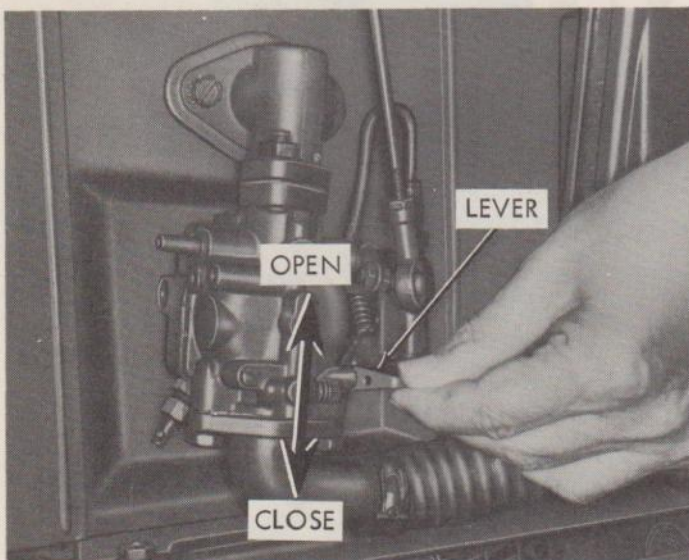
B. Throw air intake shutter lever to summer position.



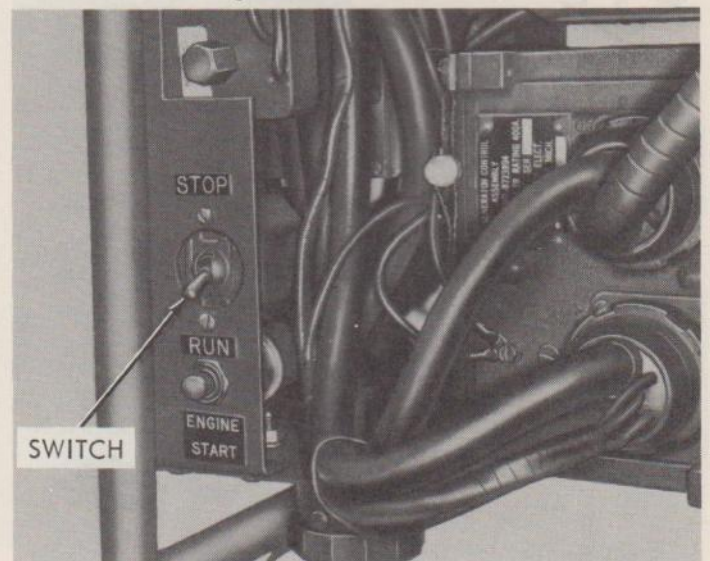
C. Open fuel shutoff valve.



D. Push ENGINE START switch for two or three revolutions of engine.



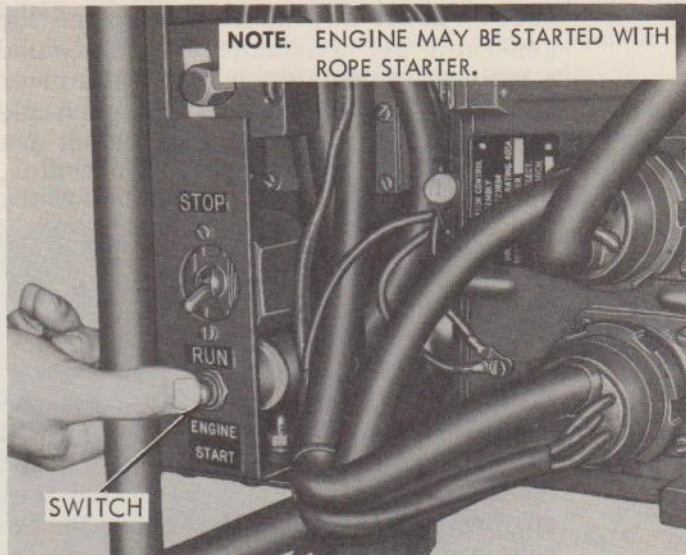
E. Open choke lever to half-closed position.



F. Throw STOP-RUN switch to RUN.

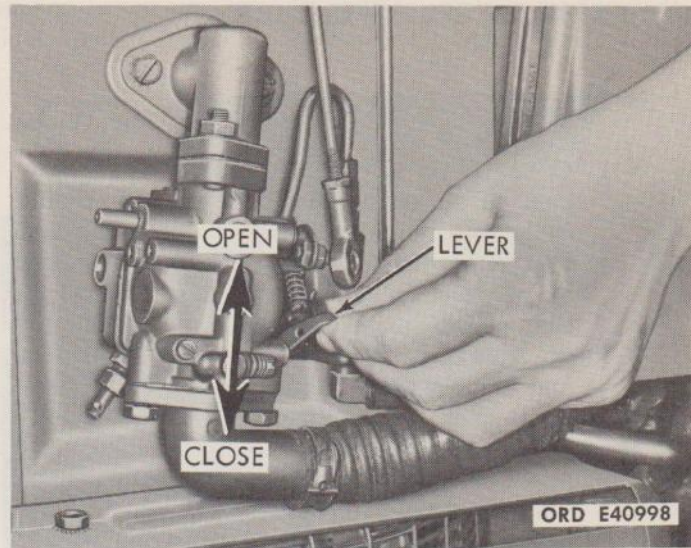
ORD E40997

FIGURE 8. STARTING ENGINE (continued to fig. 9).



G. Press ENGINE START switch to start engine.

FIGURE 9. STARTING ENGINE (continued from fig. 8).



H. Move choke lever to open as engine warms up.

14. APPLYING GENERATOR LOAD

When possible, do not apply the load on the generator until the engine warms up and runs smoothly without benefit of the choke. Five minutes is normally sufficient for warmup. Adjust carburetor, if necessary, to obtain smooth operation. Adjust governor, if necessary, to maintain correct engine speed. See TM 5-2805-203-14 for adjusting the carburetor and governor.

15. OPERATING PRECAUTIONS

Warning: To avoid injury to personnel, read and follow the CARBON MONOXIDE GAS warning on the inside front cover of this manual.

a. Do not place hands in vicinity of generator drive belt, pulleys, or engine flywheel while engine is operating.

b. Use caution when filling fuel tank. Do not

fill fuel tank while engine is running. Use clean, fresh gasoline that is free of oil, dirt, and water.

c. Do not permit dirt to accumulate on engine. Dirt restricts the circulation of cooling air and will cause overheating.

d. Never operate generator set with engine governor disconnected or inoperative. Over-speeding will damage generator and engine.

16. STOPPING ENGINE

a. Remove electrical load from generator.

b. Allow generator set to run with no load for 3 minutes.

c. Stop engine by throwing STOP-RUN switch to STOP (D, fig. 8).

d. Shut off fuel at fuel shutoff valve.

Section IV. OPERATION AND MAINTENANCE UNDER UNUSUAL CONDITIONS

17. GENERAL

a. Scope. This section contains instructions for operating and servicing the generator set in extreme cold or hot weather, dust, high altitude, and after being subjected to water.

b. Special Maintenance. In addition to normal preventive-maintenance service, special care in cleaning and lubrication must be observed where extremes of temperature, humidity, and special atmospheric conditions are present or anticipated.

Proper cleaning, lubrication, and storage and handling of fuels and lubricants not only insure proper operation and functioning, but also guard against excessive wear of the working parts and deterioration of the generator set. See paragraphs 28 and 29 for lubrication under unusual conditions.

c. Generator Set Cover. See figures 10 and 11 for preparation of the generator set cover for operation.

d. Report. When chronic failure of material results from subjection to extreme conditions, report the condition on DA Form 2407, in accordance with TM 38-70.

18. EXTREME COLD WEATHER

a. General.

- (1) Operation problems. Extensive preparation of materiel for operation in extreme cold weather is necessary. Generally, extreme cold causes lubricants to thicken or congeal, freezes batteries or prevents them from furnishing enough current for cold-weather starting, cracks insulation and causes electrical short circuits, prevents fuel from vaporizing and properly combining with air to form a combustible mixture for starting, and causes the various construction materials to become hard, brittle, and easily damaged or broken. For description of operation in extreme cold, see FM 31-70, FM 31-71, and TM 9-207.
- (2) Maintenance problems. The importance of maintenance must be impressed on all concerned. Maintenance of mechanical equipment in extreme cold is exceptionally difficult in the field. Even shop maintenance cannot be completed with normal speed, because the equipment must be allowed to thaw out and warm up before the mechanic can make satisfactory repairs, and maintenance frequently requires up to five times the normal amount of time. Bare hands stick to cold metal. Fuel in contact with the hands supercools by evaporation, and a hand can be painfully frozen in a matter of minutes. Engine oils, except subzero grades, are unpourable at temperatures below -40°F . Sets in poor mechanical condition probably will not start at all, or only after many hours of laborious maintenance and heating. Complete winterization, diligent maintenance, and well-trained crews are the key to efficient arctic-winter operations. For general information on extreme cold-weather maintenance procedures, see TM 9-207.
- (3) Winterization equipment. A special torch is provided to start the generator set when operation is required in extreme cold weather (-25° to -65°F). See figure 12.

b. Before-Operation.

- (1) Provide some type of shelter to protect the generator set from wind and blowing

snow. Erect a windbreak or place the generator set in a sheltered area behind a building, a vehicle, or a natural barrier such as rocks or snowdrifts. A good rule to follow: operate the generator set in a location that also shelters the operator, thus permitting easier engine servicing and better engine performance.

- (2) Prepare the generator set cover for operation as shown in figures 10 and 11.
- (3) Do not use a torch to thaw out iced generator set components. The water will only accumulate in another location and freeze again. If the generator set ices up, provide additional protection for the engine to raise the operating temperature: scrape or chip the ice away; dissolve the ice with alcohol; or, if possible, take the generator set into a heated enclosure and melt the ice. When ice is melted from the engine, the crankcase oil becomes diluted and must be changed before continuing engine operation.

c. Starting.

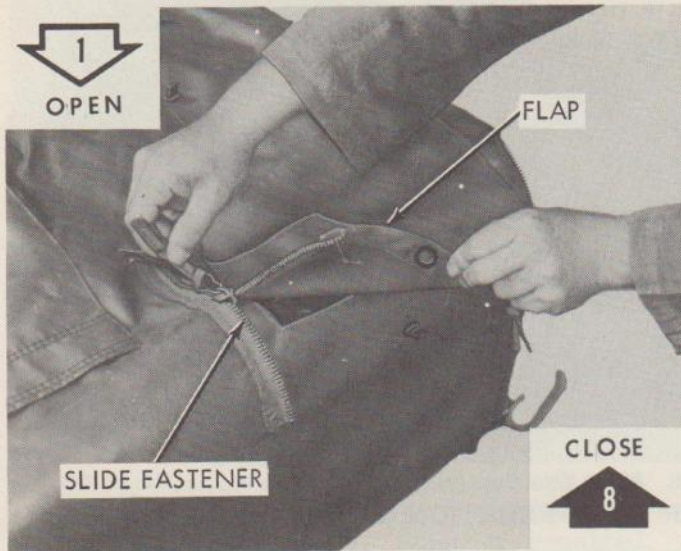
- (1) Play the flame of blowtorch (A, fig. 12) back and forth over air intake preheater for 1 or 2 minutes.

Caution: Use caution to avoid damage from overheating. The blowtorch produces an extremely hot flame, and heat generated can melt parts and burn rubber insulation. Do not hold heat on metal part for more than 30 seconds. Do not direct heat at spark plug cables or resilient mounts. The correct heating procedure is to "play" the flame back and forth over the engine components to be warmed.

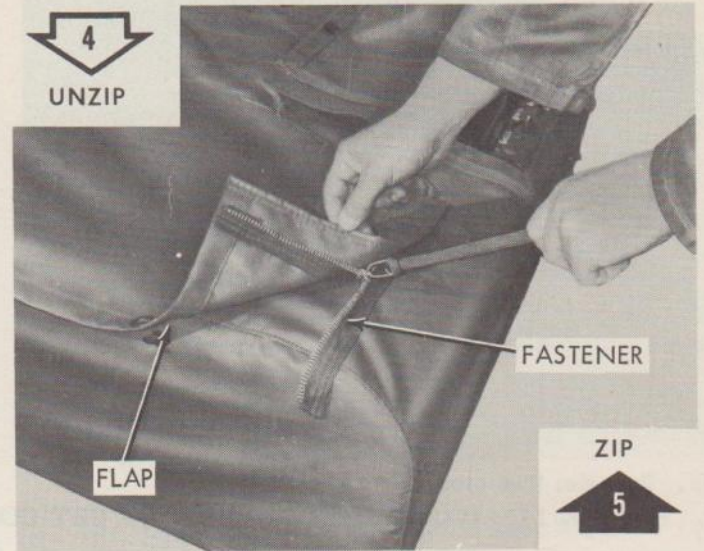
- (2) Start engine as prescribed in figures 8 and 9, except throw air shutter lever to winter position (C, fig. 12).
- (3) If engine fails to start after three tries, apply heat to exposed surface of air cleaner body (B, fig. 12), and repeat steps (1) and (2) above.

d. Operation. Avoid operating engine for short periods of time. A minimum of 30 minutes is required to evaporate the water vapor formed during the heating of cold metal parts. If the engine is operated less than 30 minutes, the water formed will mix with the lubricating oil, and freeze or congeal the oil after shutdown.

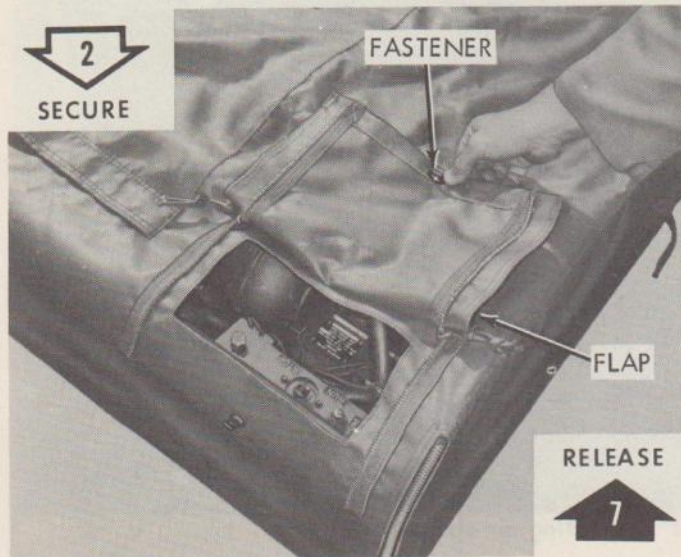
NOTE. The instructional arrows, coupled with the text that appears in or below each illustration, provide the sequence and procedure for each maintenance operation. Follow numbered arrows consecutively, starting with No. 1, depending on which procedure is desired.



A. Control panel flap.



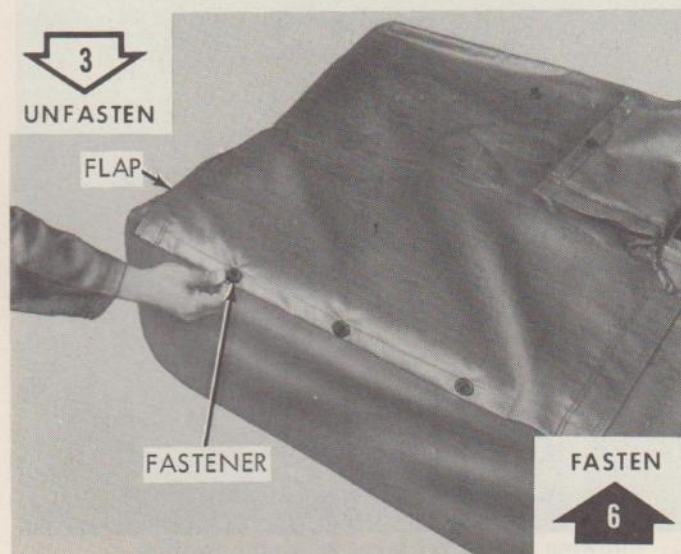
D. Top flap (two places).



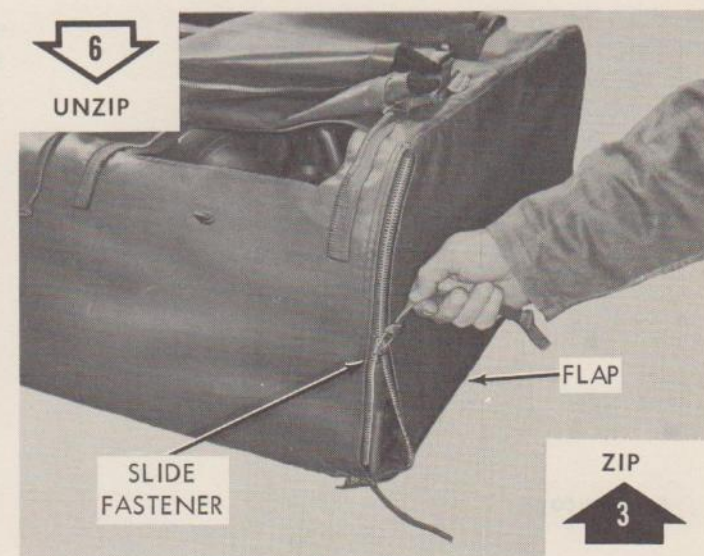
B. Control panel flap.



E. Top flap.



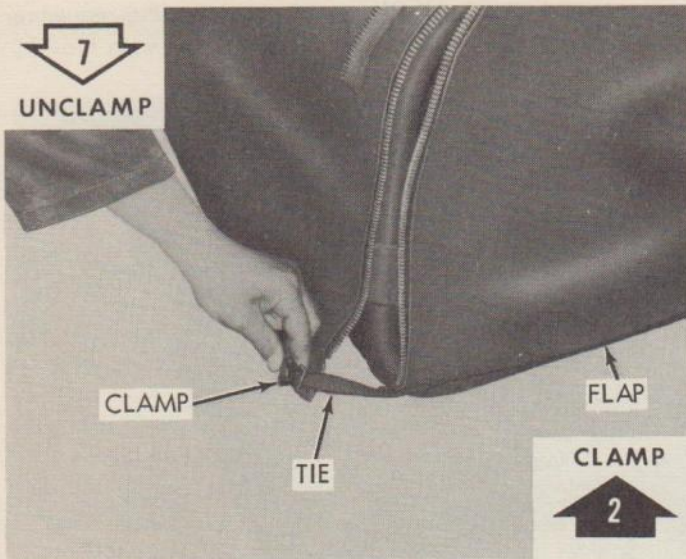
C. Top flap fasteners (three places).



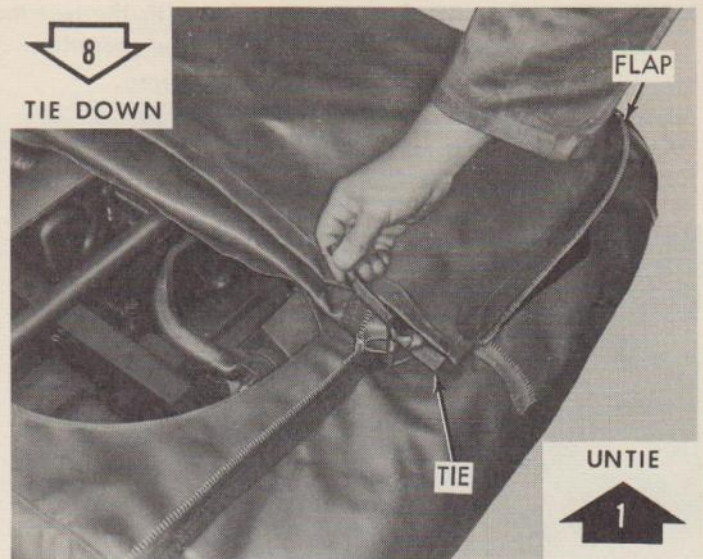
F. Right side flap (two places).

ORD E40999

FIGURE 10. PREPARING GENERATOR SET COVER FOR OPERATION (continued to fig. 11).



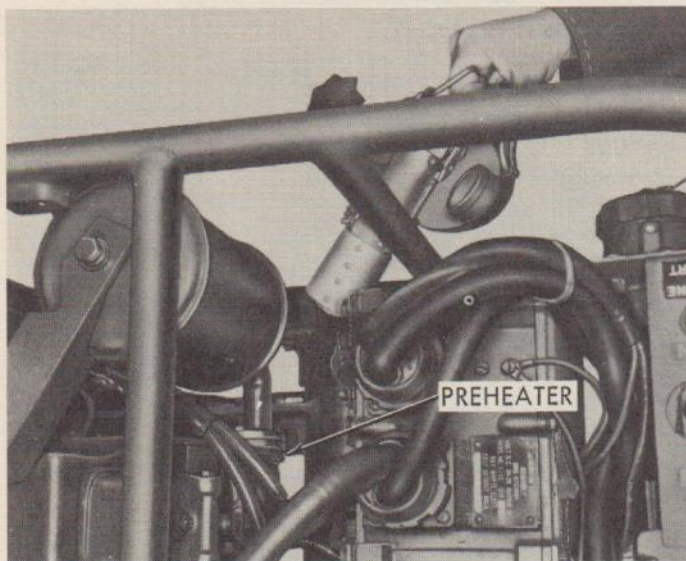
G. Base ties (two places).



H. Right side flap (two places).

ORD E41000

FIGURE 11. PREPARING GENERATOR SET COVER FOR OPERATION (continued from fig. 10).



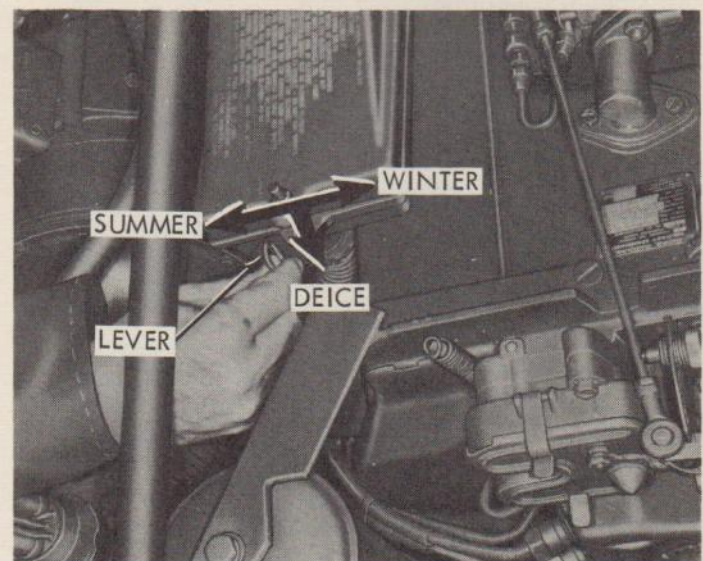
A. Heating preheater.



B. Preheating air cleaner.

CAUTION: Do not apply heat from torch to spark plug cables, fuel lines, fuel tank, carburetor, or electrical components.

ORD E41001



C. Throwing air shutter lever to winter position.

FIGURE 12. ADDITIONAL ENGINE STARTING STEPS FOR EXTREME COLD WEATHER OPERATION.

19. EXTREME HOT WEATHER OR DUST

a. General. High ambient temperatures alone are not detrimental to the generator set, but dirt, dust, or sand in the fuel and oil can lead to erratic engine operation, and shorten the life of mechanical parts very rapidly. Accumulation of dirt on the engine or generator can insulate the cooling system, reduce its efficiency, and cause excessively high engine operating temperatures. High atmospheric temperatures often deteriorate fuel by forming gum and varnish which can plug the fuel system components.

b. Operation and Maintenance.

- (1) If possible, operate engine away from dust or dust-creating activities.
- (2) Under extremely dusty conditions, service air cleaner frequently. Remove element daily, clean if required, and reinstall. Change crankcase oil and oil filter element as often as necessary to insure clean oil.
- (3) Use clean containers when adding fuel or lubricants to engine.
- (4) Keep fuel filler screen in place.
- (5) Check fuel filter and sediment bowl daily, and clean as required.
- (6) Keep engine and generator cooling systems components clean and free of accumulated dirt, oil, and obstructions.
- (7) Use only clean, fresh fuels and lubricants.
- (8) Keep entire generator set free of accumulated dirt, oil, and dust.

20. EXTREME ALTITUDE

a. General. Operation at altitudes above 5,000 feet is not detrimental to the engine, but

because of lower air density the engine cannot develop full rated power. Available power decreases as altitude increases.

b. Operation and Maintenance.

- (1) Keep engine spark plugs, magneto, breaker points, and carburetor properly adjusted for maximum performance.
- (2) If the air is relatively free of dust and dirt, the engine can be operated without the air cleaner. This increases power output somewhat by decreasing air flow losses through the air induction system.

21. MAINTENANCE AFTER SUBJECTION TO WATER

a. General. The generator set should be protected from water during rain or transport over water. If the generator set is exposed to water in excessive amounts or for extended periods of time, water may enter the engine crankcase and generator housing. The following precautions should be taken as soon as possible, and must be taken before starting the engine or operating the generator set.

b. Maintenance.

- (1) Clean all surfaces exposed to water, and touch up with paint where necessary. Coat unpainted external metal parts with preservative lubricating oil (PE).
- (2) Check lubricant in engine. If water has contaminated the lubricant, drain, flush, and refill as prescribed in paragraph 29.
- (3) Remove band from generator, and dry interior with compressed air.
- (4) Check fuel for water. If water has contaminated fuel, drain off water or drain fuel, and refill with clean fuel.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL PREVENTIVE- MAINTENANCE AND TROUBLESHOOTING

Section I. PARTS, TOOLS, AND EQUIPMENT

22. GENERAL

This section contains information on the repair parts, tools, and equipment issued to the operator and organizational maintenance personnel for operating and maintaining the generator set. Tools and equipment should not be used for purposes other than prescribed and, when not in use, should be properly stored.

23. REPAIR PARTS

Repair parts are supplied to first- and second-echelon personnel for replacement of those parts that become worn, broken, or otherwise unserviceable, providing replacement of these parts is within the scope of first and second echelons. Repair parts supplied for the generator set are listed in

TM 9-6115-202-24P and for the engine TM 5-2805-203-24P, which are the authority for requisitioning replacements.

24. COMMON TOOLS AND EQUIPMENT

Standard and commonly used tools and equipment having general application to the generator set are authorized for issue by tables of allowances and tables of organization and equipment.

25. SPECIAL TOOLS AND EQUIPMENT

Special tools required to perform organizational maintenance on the engine are listed in TM 5-2805-203-24P. No other special tools and equipment are required for the generator set.

Section II. LUBRICATION

26. GENERAL

a. Scope. This section contains information on lubrication of the generator set. Also see LO 5-2805-203-14 for lubrication information pertaining to the engine.

b. Reference. See figure 13 for location of the engine drain hose, and LO 5-2805-203-14 for engine lubrication instructions.

c. Responsibility. In general, daily lubrication services are performed by the operator of the generator set; quarterly lubrication services are performed by organizational maintenance personnel assisted by the operator. Check engine oil level when fuel is added.

27. LUBRICATION UNDER USUAL CONDITIONS

a. Service Intervals. Service intervals shown on the engine lubrication order, LO 5-2805-203-14, are for normal operation and for moderate temperature, humidity, and atmospheric conditions.

b. Special Instructions. Special lubricating instructions required for specific items requiring one-time lubrication are covered in installation or repair instructions throughout this manual.

c. General Procedures.

- (1) Clean fittings or filler openings before lubricating. Use cloth dampened with mineral spirits paint thinner (TPM) or dry-cleaning solvent (SD). Dry before lubricating.
- (2) Observe lubricant level closely and replenish when necessary. See paragraph 6c for capacities. The maintenance officer and sergeant judge whether to lubricate at the quarterly service or separately, guided by the hourly accumulation and interval on the lubrication order.

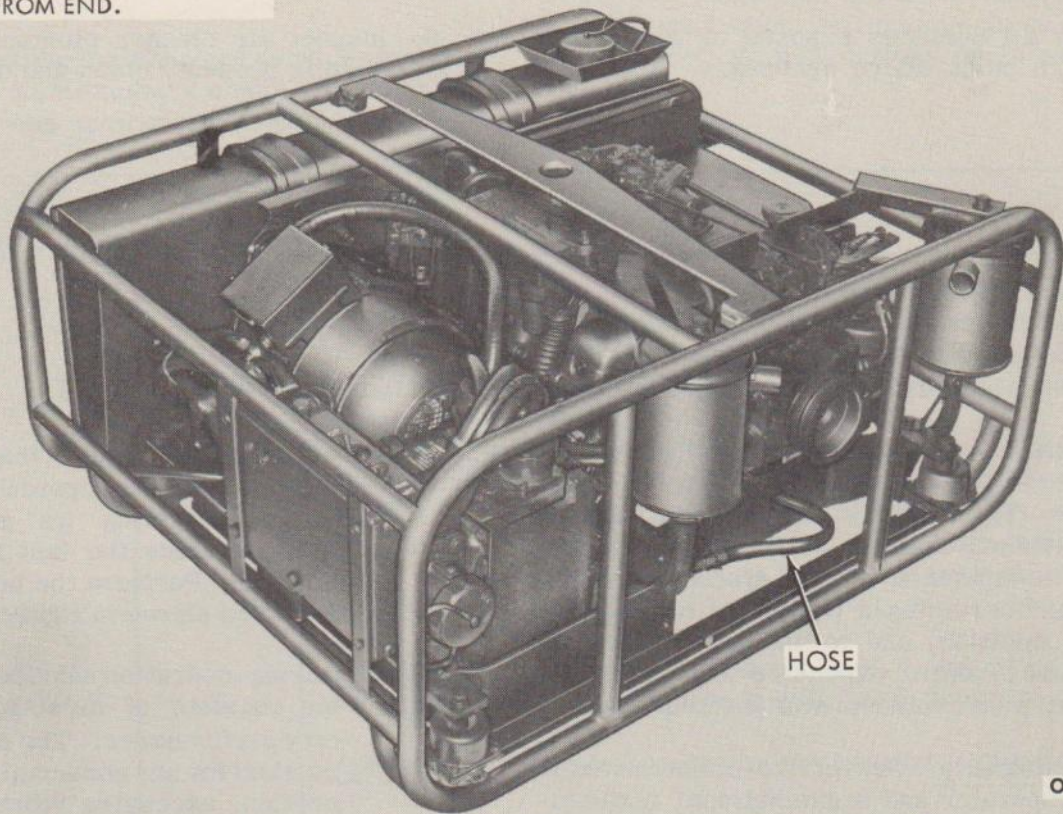
d. Records and Reports.

- (1) Report unsatisfactory performance of prescribed petroleum fuels, lubricants, or preserving materials, using DA Form 2407, Maintenance Request, as instructed in TM 38-750.
- (2) Maintain a record of lubrication on DA Form 2408-2, Equipment Lubrication Record, in accordance with TM 38-750.

e. Oil Can Points.

- (1) As required, lubricate adjusting pivot

NOTE. UNCLIP HOSE, AND REMOVE PLUG FROM END.



ORD E41002

FIGURE 13. ENGINE OIL DRAIN.

points, governor control linkage pivot points, and exposed threads on adjusting points.

- (2) Use general purpose lubricating oil (PL), and wipe off excess.

28. LUBRICATION UNDER UNUSUAL CONDITIONS

a. Service Intervals. Reduce service intervals specified in this lubrication order when operating the equipment under unusual conditions; lubricate oftener to compensate for abnormal or extreme conditions such as high or low temperature, continued operation in sand or dust, immersion in water, or exposure to moisture. Any one of these operations or conditions may cause contamination and quickly destroy the protective qualities of the lubricant. Lubrication can be less frequent during inactive periods if adequate preservation is maintained.

b. Expected Temperatures Key. Lubricate as prescribed under "expected temperatures key" in LO 5-2805-203-14 for the three temperature ranges: above 32°F., from 40°F. to -10°F., and from 0°F. to -65°F. Change the lubricant whenever weather forecasts indicate that the air temperature

range will hold in the next higher or lower temperature range. No change in grade will be made for a temporary rise in temperature. See TM 9-207 for necessary special preliminary lubrication on the generator set.

c. Continued Operation Below 0°F. See TM 9-207 for special lubrication on the generator set under continued extreme-cold operation.

Caution: Do not operate set with subzero lubrication oil (OES) when temperature is above 0°F.

d. Proper Lubrication Levels. Observe lubricant levels closely and replenish when necessary to maintain proper levels. See paragraph 6c for refill capacities.

Caution: Do not overfill.

29. LUBRICATION AFTER SUBJECTION TO WATER

a. Check lubricant in engine. If water has contaminated the lubricant, drain lubricant, remove filter, flush, install new filter element, and refill.

b. Check fuel in tank. If water has contaminated the fuel, drain off water or drain fuel, drain

sediment bowl, clean filter, and refill with clean fuel.

c. Clean all surfaces exposed to water, and touch up with paint where necessary. Coat un-

painted external metal parts with preservative lubricating oil (PE).

d. Inspect air cleaner element for moisture. If moisture is present, clean and dry element.

Section III. PREVENTIVE-MAINTENANCE SERVICES

30. GENERAL

a. Scope. This section contains instructions for preventive-maintenance of the generator set. Preventive-maintenance means systematic care, inspection, and servicing of equipment to maintain it in sound condition, and to find and correct beginning failures before expensive and time-consuming repairs or replacements are required.

b. Responsibility. Preventive-maintenance is done by the operator and organizational maintenance personnel. Proper operation and use of equipment is just as important a part of preventive-maintenance as are the preventive-maintenance inspections and services prescribed in this section. For description of Army preventive-maintenance and its organization, see TM 38-750.

c. Intervals.

(1) General. The chief guide for the frequency of preventive-maintenance services is the number of hours the generator set is operated, although operation under adverse conditions such as extreme temperatures, dust, water, or mud, may require more frequent preventive-maintenance services. Both daily and quarterly preventive-maintenance services are required to insure that important parts of the equipment are checked regularly.

(2) Daily Preventive-Maintenance Services. Each generator set will be inspected and serviced by its assigned operator each day it is operated. This daily service is divided into "before-operation services," "during-operation services," and "after-operation services," as defined in (a), (b), and (c) below.

(a) Before-operation services. This is a

brief service to see that the generator set is ready for operation, and if conditions affecting its readiness have changed since the last after-operation service. Perform the before-operation services shown in figure 14.

(b) During-operation services. This service consists of detecting unsatisfactory performance. The operator should be alert for any abnormal or unusual operation, excessive vibration or noises, or excessive engine smoke, indicating unsatisfactory performance.

(c) After-operation service. This is the basic service for the generator set in a tactical situation, and consists of correcting, insofar as possible, any operating deficiencies. Thus, the generator set is prepared to operate upon a moment's notice. The service is particularly important because at this time the operator inspects the unit thoroughly to find any deficiencies that may have developed during operation, and corrects them. All defects the operator is not authorized to repair must be reported to the squad, section, or platoon leader, or other designated individuals. Perform the after-operation services shown in figure 15 and keep the generator set ready to operate on a moment's notice. Always perform the before-operation services (fig. 14) in addition to the after-operation services.

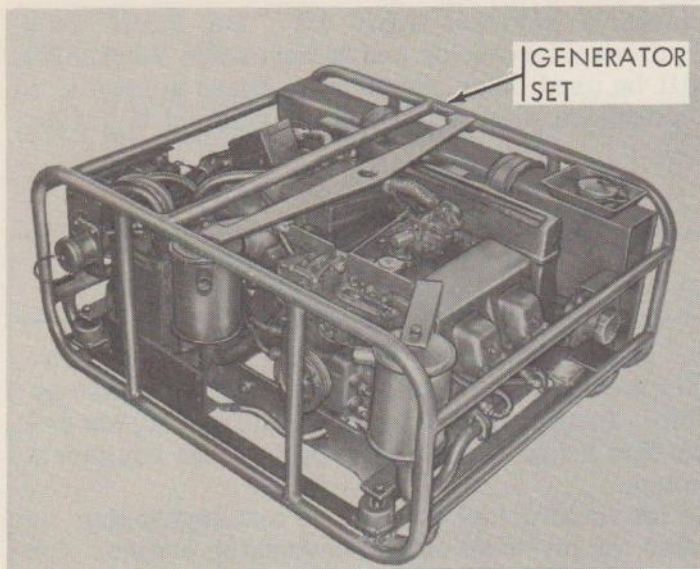
(3) Quarterly Preventive-Maintenance Services. Quarterly services are performed every 3 months by organizational maintenance personnel assisted by the operator. Commanders are authorized to reduce the intervals between preventive-maintenance services whenever conditions indicate the need.

31. DAILY PREVENTIVE-MAINTENANCE SERVICES

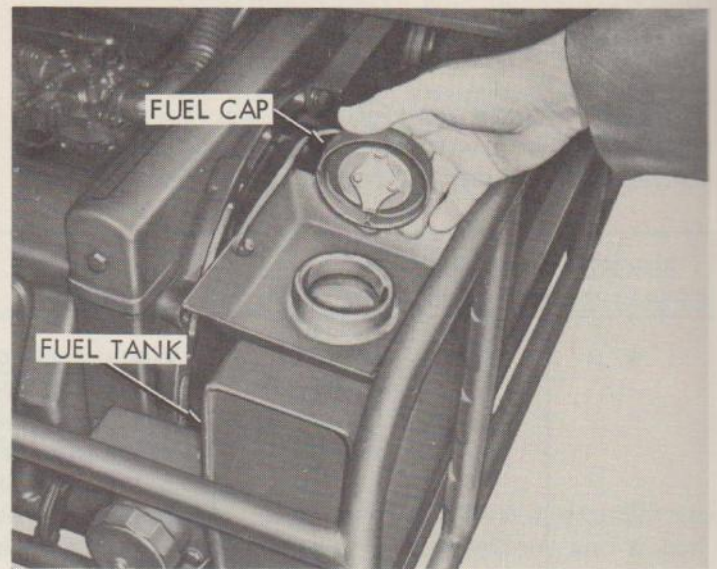
Daily preventive-maintenance services are listed below. The item numbers shown correspond to similar operations or procedures contained in the

quarterly services (par. 33). DA Form 2404, Equipment Inspection and Maintenance Worksheet, will be used when performing these services, in accordance with instructions contained in TM 38-750.

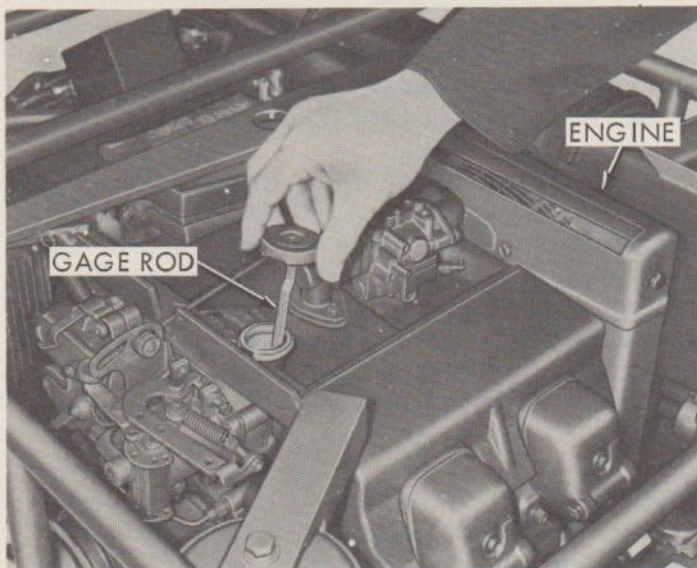
BEFORE OPERATION	DURING OPERATION	AFTER OPERATION	PROCEDURE
1	1	1	<u>Visual inspection.</u> Inspect to insure engine and starter-generator are securely mounted and that the generator set is set as level as possible. Inspect for loose or missing bolts, screws, and any damage that might have occurred since the equipment was last inspected.
1	1	1	Inspect the engine for leaking fuel supply line and supply line connections, also for oil leaks on and around the engine. Correct any leakage or report it to organizational maintenance.
1			Inspect generator set to see whether it has been tampered with or damaged. Do not operate the engine until all deficiencies have been corrected.
2		2	<u>Lubrication.</u> Check crankcase oil level. Add oil as necessary.
2		2	<u>Lubricate engine</u> in accordance with LO 5-2805-203-14.
3		3	<u>Appearance.</u> Inspect generator set for dirt. Clean as necessary.
	4		<u>Unusual operation and noises.</u> Investigate any abnormal or unusual operation, such as too much vibration of the starter-generator or in the engine flywheel fan housing area, excessive exhaust smoke or unusual engine noise. If odd noises or other irregularities are noted, stop the engine at once and correct the condition or report it to organizational maintenance.
5		5	<u>Publications.</u> Check that a copy of this manual, TM 5-2805-203-14, LO 5-2805-203-14, and DA Form 285 (Accident Report) are on or with the equipment and in serviceable condition.
		14	<u>Fuel filter.</u> Clean fuel filter sediment bowl (par. 41).
15			<u>Air cleaner.</u> Service air cleaner (TM 5-2805-203-14).
22			<u>Drive belts.</u> Inspect drive belts for breaks and frayed covering. Check belt tension (par. 47a).
23			<u>Wiring harness cables and leads.</u> Inspect wiring for broken, frayed, or damaged insulation.



A. Position generator set as level as possible.



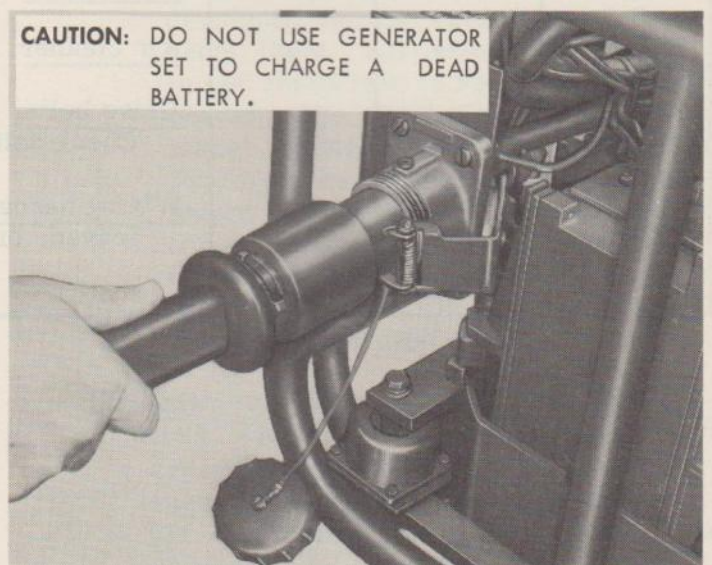
B. Check fuel level.



C. Check oil level.

NOTE. Check drive belt tension (par. 47a) before operating generator set.

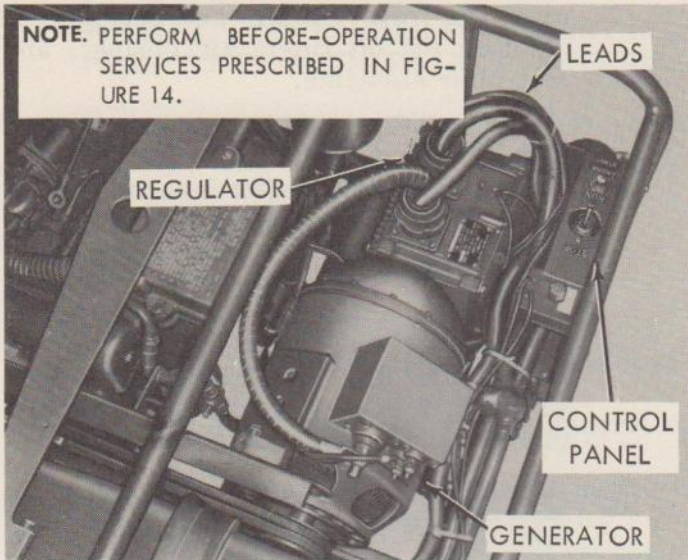
NOTE. Lubricate engine in accordance with LO 5-2805-203-14.



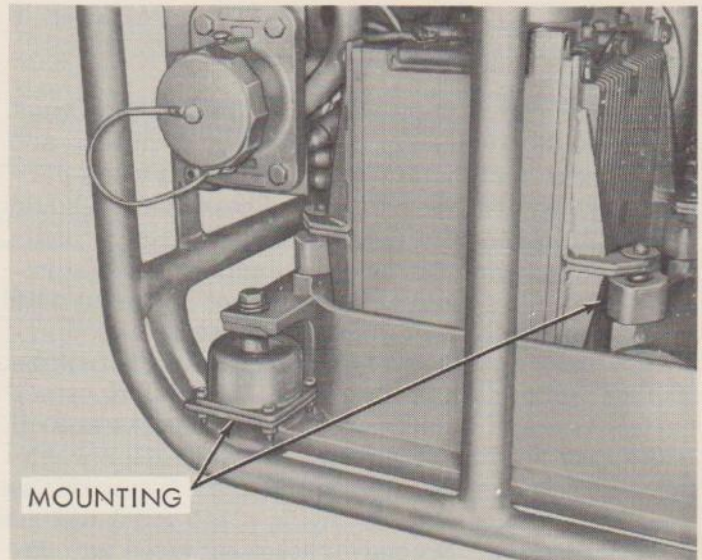
D. Connect generator set to 24-volt battery source.

ORD E41003

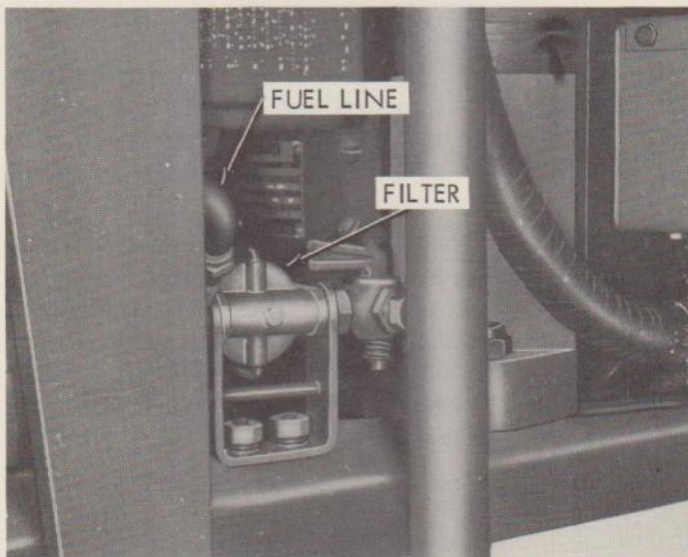
FIGURE 14. BEFORE-OPERATION SERVICES.



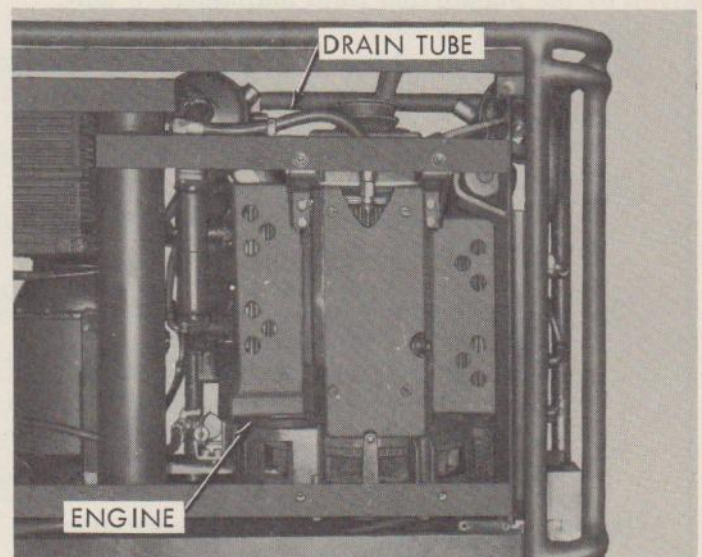
A. Inspect wiring for broken, frayed, or damaged insulation.



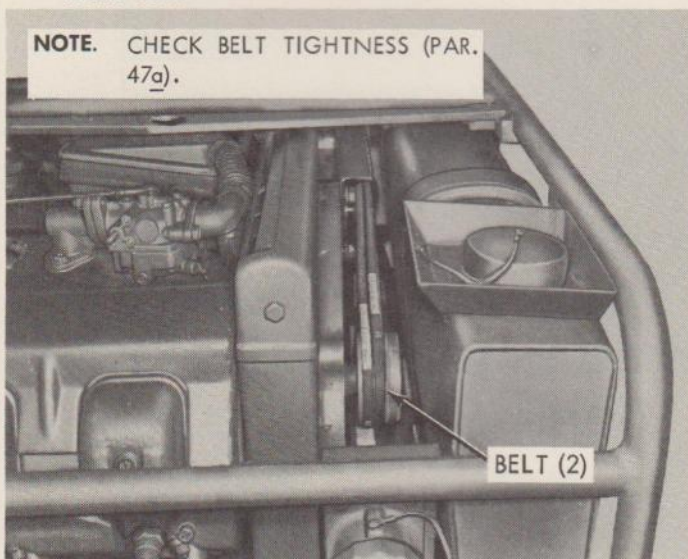
B. Inspect mountings for loose cap screws.



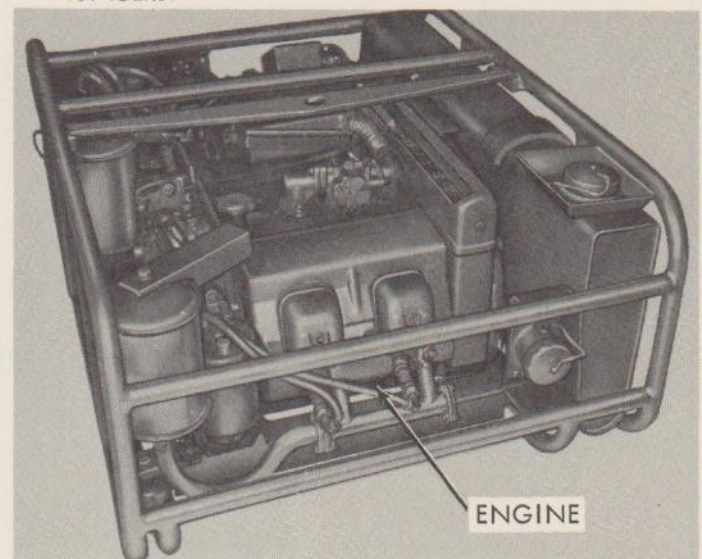
C. Inspect fuel lines for leaks, and clean fuel filter sediment bowl.



D. Check under engine for oil leaks and inspect oil filter for leaks.



E. Inspect drive belts for breaks and frayed covering.



F. Check engine and generator for excessive vibration and unusual noises.

ORD E41004

FIGURE 15. AFTER-OPERATION SERVICES.

32. GENERAL PROCEDURES FOR QUARTERLY PREVENTIVE-MAINTENANCE SERVICES

a. General. Organizational mechanics must be thoroughly trained in the operator's duties, and apply them automatically at all times when performing organizational duties. The operator should present the generator set in reasonably clean condition for a scheduled preventive-maintenance service. The unit should be dry and not so caked with mud as to seriously hamper inspection and services. However, the generator set should not be washed immediately prior to inspection, since certain types of defects such as loose parts and oil leaks may not be evident immediately after washing.

b. Services. Second-echelon services are defined by, and restricted to, the following general procedures unless approval for change has been given by the supporting field maintenance unit.

- (1) Adjusting. Make all necessary adjustments as instructed in this technical manual.
- (2) Cleaning. Clean unit as required to remove old lubricant, dirt, and other foreign material.
- (3) Special lubricating. Perform all special lubrication. This applies either to lubrication instructions that do not appear on the lubrication order, or to items that do appear but should be performed with the maintenance services.
- (4) Special servicing. Perform special services, such as draining and refilling

generator set with oil, and changing or cleaning the oil filter, air cleaner, and fuel filter elements.

- (5) Tightening. Perform all tightening with enough wrench torque (force on the wrench handle) to tighten parts according to good mechanical practice. Use a torque-indicating wrench where specified. Do not overtighten; this may strip threads or cause distortion. Tightening will always include the correct installation of lock washers, lock nuts, lock wire, or cotter pins to secure the tightened nut or bolt.
- (6) Checking modification work orders. At least every 6 months, check to see that all modification work orders have been applied. A list of current modification work orders is published in DA Pam 310-4. If a modification has not been applied, promptly notify the local field maintenance officer. No alteration or modification, which will affect the moving parts, will be made by organizational personnel, except as authorized by official publications.

c. Special Conditions. When conditions make it difficult to perform the complete preventive-maintenance services at one time, they can sometimes be handled in sections. Plan to complete all services within the week, if possible. All available time at-halts and in-bivouac must be utilized, if necessary, to assure that maintenance services are completed.

33. SPECIFIC PROCEDURES FOR QUARTERLY PREVENTIVE-MAINTENANCE SERVICES

listed below. DA Form 2404, Equipment Inspection and Maintenance Worksheet, will be used when performing these services, in accordance with instructions contained in TM 38-750.

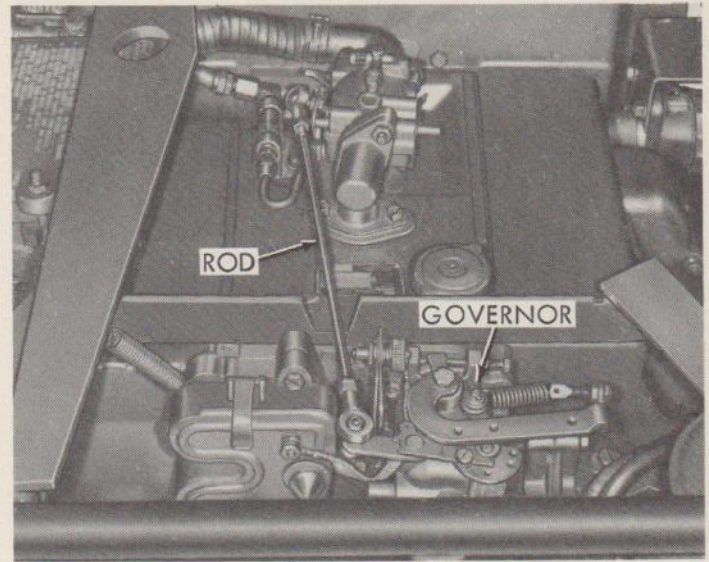
Quarterly preventive-maintenance services are

ITEM NO.	PROCEDURE
<u>GENERAL</u>	
1	<u>Visual inspection.</u> Perform visual inspection services listed in daily before-operation services (item 1, par. 31).
1	Tighten mounting hardware of generator set components.
2	<u>Lubrication.</u> Inspect the entire engine for indications of insufficient lubrication. Check crankcase oil level. Inspect for lubricant leaks from drain plugs, oil pan gasket, rocker arm covers, and crankshaft oil seals.
2	Report leaking oil seals or oil pan gasket to field maintenance (third echelon). Lubricate as specified in current LO 5-2805-203-14.
3	<u>Appearance.</u> Inspect general appearance of the generator set, paying special attention to dirt, illegibility of identification markings, and poor condition of paint.
3	Clean if necessary. Report deficiencies to field maintenance.
4	<u>Unusual operation and noises.</u> Refer to item 4, paragraph 31.
5	<u>Publications.</u> Check for presence of publications (refer to item 5, par. 31).
<u>ENGINE</u>	
(Refer to TM 5-2805-203-14 for "Q" PM services applicable to items 6-19 below)	
6	<u>Compression test.</u>
7	<u>Cylinder heads, exhaust manifolds, and intake manifold.</u>
8	<u>Valve rocker assembly.</u>
9	<u>Crankcase breathers.</u>
10	<u>Oil filter.</u>
11	<u>Governor and control rod.</u>
12	<u>Fuel pump.</u>
13	<u>Carburetor.</u>
14	<u>Fuel filter.</u>
15	<u>Air cleaner, air cleaner hoses, and preheater.</u>
16	<u>Fuel line, fuel pump-to-carburetor.</u>
17	<u>Spark plugs.</u>
18	<u>High tension cables.</u>
19	<u>Contacts, capacitors, cam follower.</u>

ITEM NO.	PROCEDURE
<u>STARTER-GENERATOR</u>	
20	<u>Brushes.</u> Inspect brushes for wear. If brushes are worn to groove, notify field maintenance.
21	<u>Generator output voltage.</u> Check and adjust output voltage (par. 47b).
22	<u>Drive belts.</u> Inspect for breaks and frayed covering. Check drive belt tension. Adjust belts showing improper tension (par. 47a).
23	<u>Wiring harness cables and leads.</u> Inspect wiring harness cables and leads for worn, cracked, or broken insulation.
<u>MODIFICATION WORK ORDERS</u>	
24	<u>Modification.</u> See that all modification work orders applying to the generator set and the military standard engine have been completed and recorded on DA Form 2408-5 (Equipment Modification Record), DA Form 2408-8 (Equipment Acceptance Record), and DA Form 2408-7 (Equipment Transfer Record), as applicable.

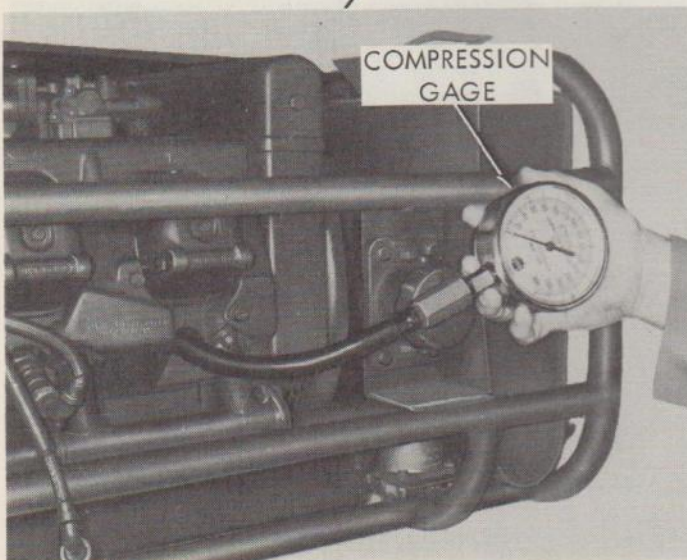
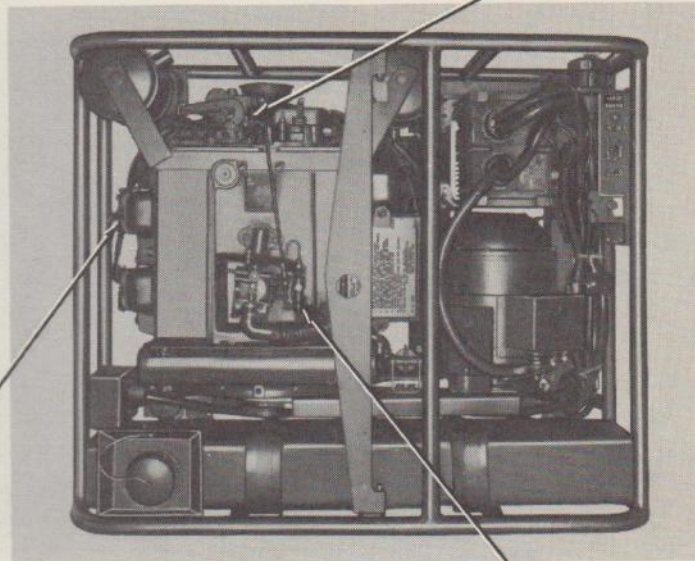
NOTE. See TM 5-2805-203-14 for instructions covering the five check points below:

- Cylinder head nuts.
- Exhaust and intake manifolds.
- Rocker assembly.
- Crankcase ventilation system.
- Spark plug gaps and magneto breaker points.

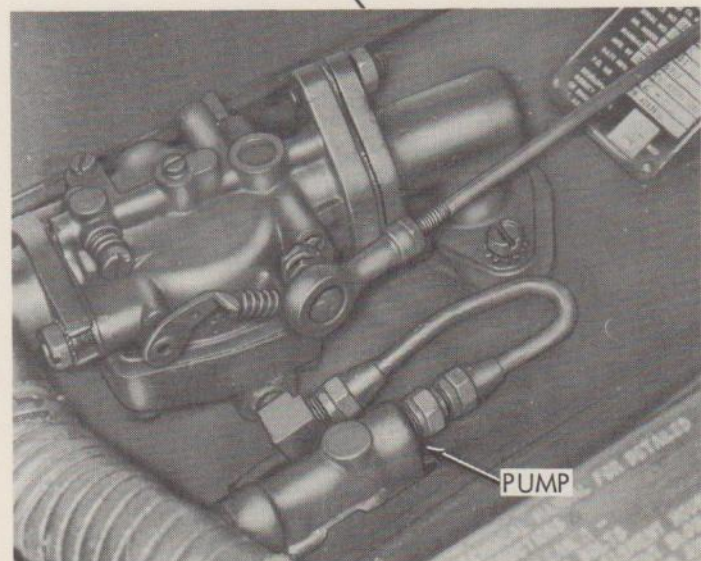


A. Check governor and control rod for freedom of operation.

NOTE. Perform operator's daily service (figs. 14-15 and par. 31).



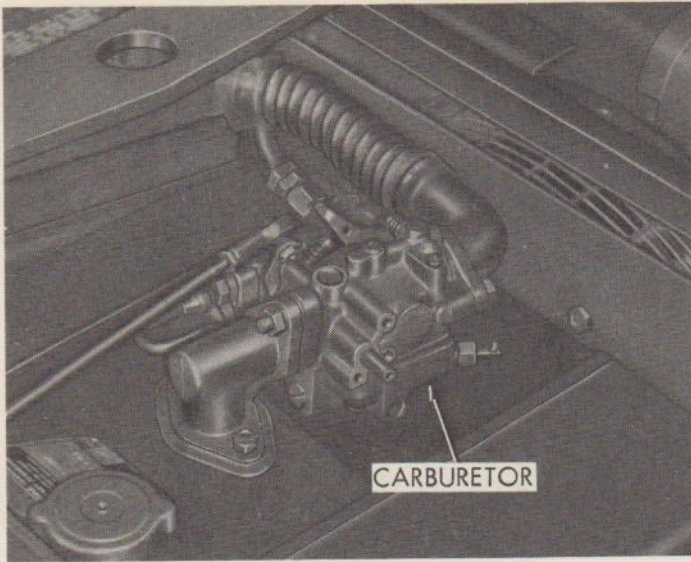
B. Check cylinder compression (90-100 lb).



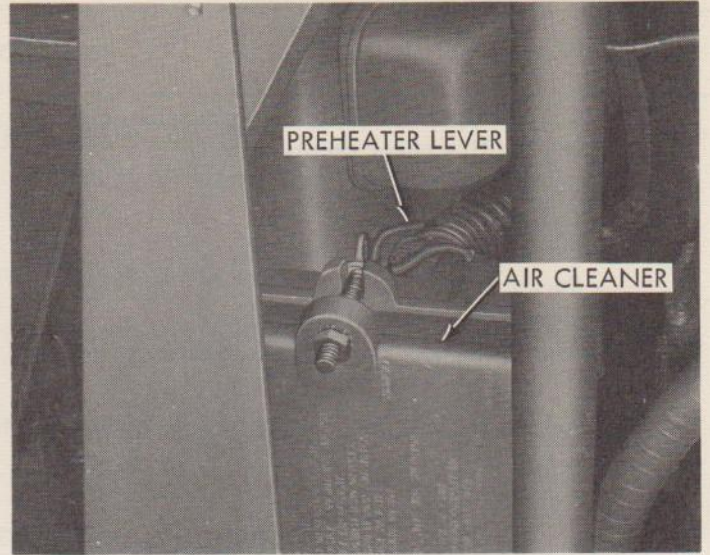
C. Inspect fuel system for leaks.

ORD E41005

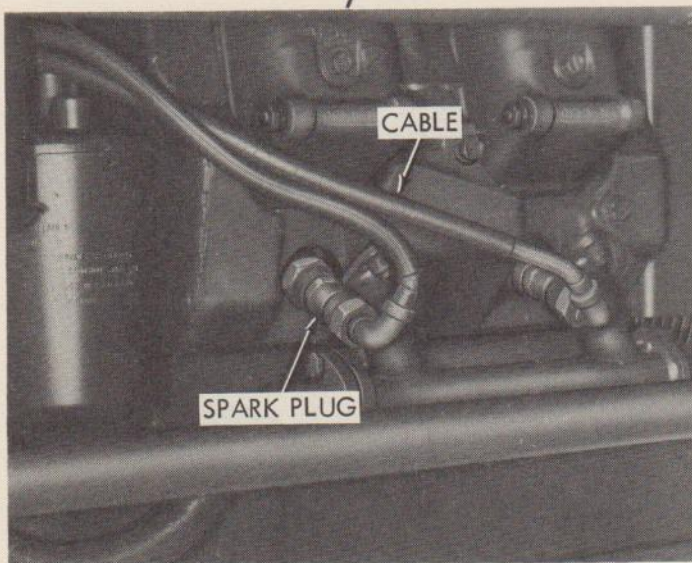
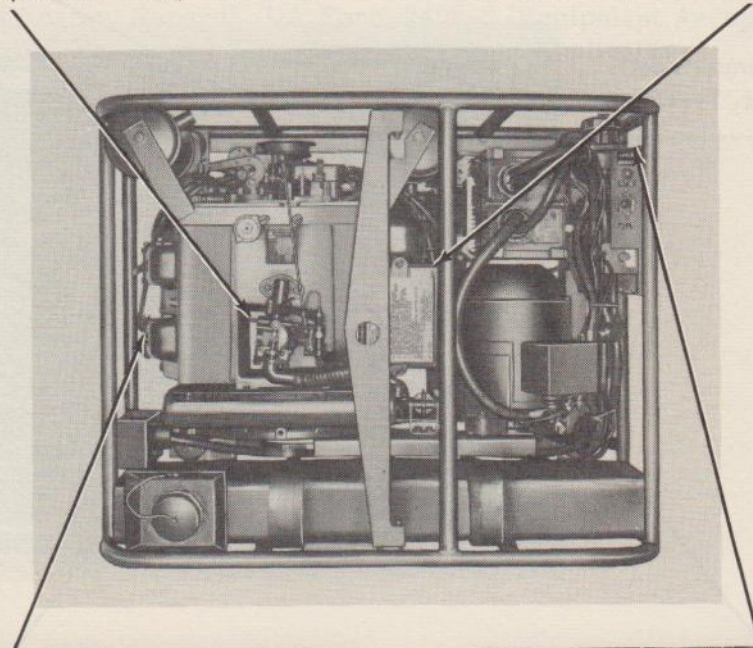
FIGURE 16. QUARTERLY PREVENTIVE-MAINTENANCE SERVICES (continued to fig. 17).



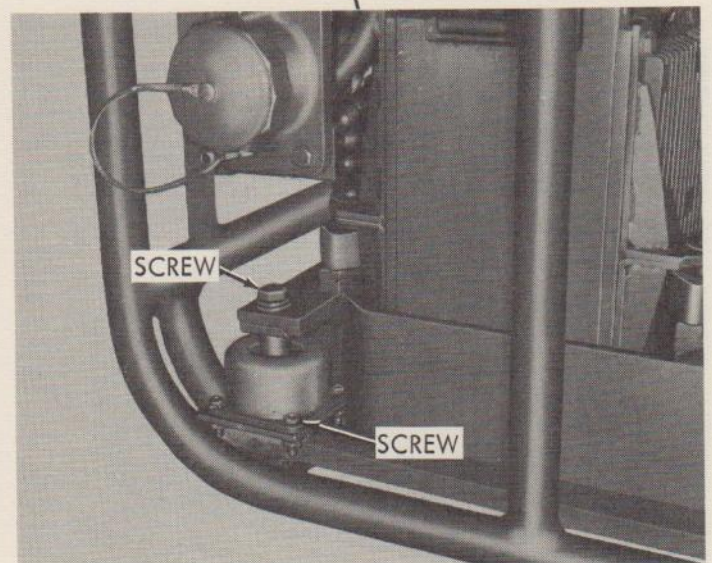
D. Inspect for carburetor and gasket leaks. Tighten mounting hardware. Inspect for faulty operation.



E. Inspect air cleaner and preheater for leaks and damage. Tighten mounting hardware.



F. Inspect spark plugs and cables for broken insulation. Set gap to 0.025 inch.

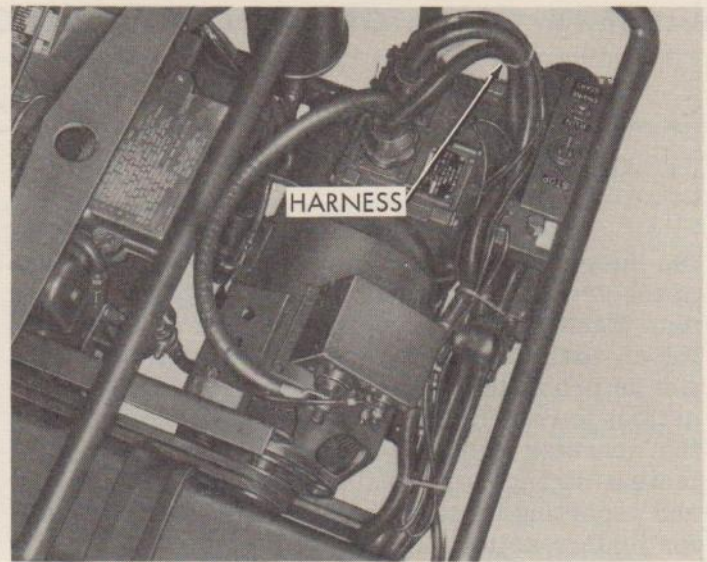


G. Tighten mounting hardware. Make certain all components are secure.

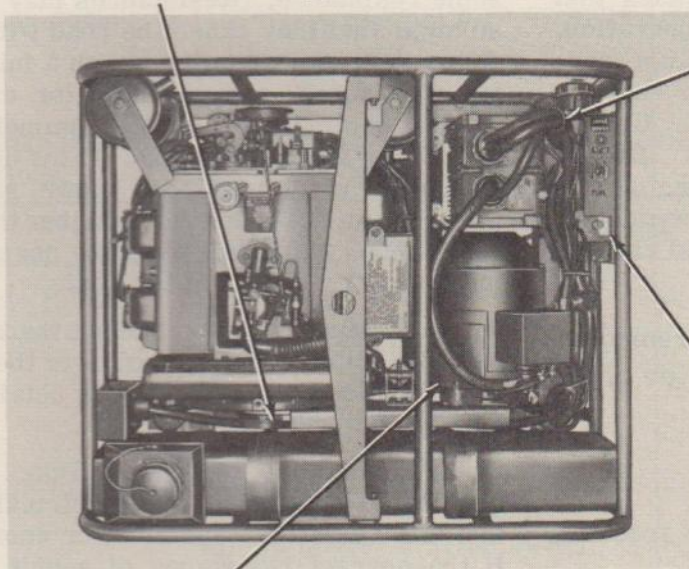
FIGURE 17. QUARTERLY PREVENTIVE-MAINTENANCE SERVICES (continued to fig. 18).



H. Check drive belt tension. Adjust belts showing improper tension. See paragraph 47a.



I. Inspect wiring harness cables and leads for worn, cracked, or broken insulation.



NOTE. Lubricate set as prescribed in paragraphs 26 and 27.



NOTE. BRUSH HAS WEAR LIMIT GROOVE ON SIDE.

J. Inspect generator brushes for wear. If brushes are worn to groove, notify field maintenance unit.



K. Check and adjust generator output voltage. See paragraph 47b. ORD E41007

FIGURE 18. QUARTERLY PREVENTIVE-MAINTENANCE SERVICES (continued from fig. 17).

Section IV. OPERATOR AND ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING

34. GENERAL

a. Scope. This section contains troubleshooting information for locating and correcting some of the troubles that may develop in the generator set. Each malfunction or symptom of trouble given for an individual unit or system is followed by a list of probable causes or tests, and corrective actions to remedy the malfunction. In many cases, the operator can only note the symptoms by detecting strange or unusual noises or conditions, and reporting these to organizational maintenance for further action.

b. Method. This technical manual cannot cover all possible troubles and deficiencies that may occur under the many conditions of operation. If a specific trouble, test, or remedy is not covered, isolate the system in which the trouble occurs, and then locate the defective component. Use all senses to observe and locate troubles. Do not neglect to use any test instruments that are available, such as an ohmmeter, voltmeter, ammeter, test lamp, hydrometer, and pressure and vacuum gages.

c. Maintenance Level. The tests and remedies in this section are governed by the scope of the organizational level of maintenance.

35. TROUBLESHOOTING

a. See TM 5-2805-203-14 for engine troubleshooting.

b. Table I lists possible malfunctions (symptoms), probable causes (tests), and corrective action (remedies) that can be performed by organizational maintenance personnel. Probable causes are listed in their order of probability, and should be checked in that order when troubleshooting the generator set.

c. To troubleshoot the generator, disconnect leads at terminals A, B, D, and E, and run each of the four tests shown in figure 19, one test at a time.

36. OHMMETER METHOD OF ELECTRICAL TROUBLESHOOTING

a. General. The ohmmeter method of electrical troubleshooting uses continuity tests to determine if a continuous electrical flow of the proper resistance passes through the circuit or device being tested. The circuit or device is connected

between the two test points, and the ohmmeter indicates, on a calibrated scale, the ohms of resistance in the tested circuit or device. The ohmmeter is equipped with a power source (battery or hand generator) usually installed inside the case that houses the meter. Figure 19 illustrates ohmmeter troubleshooting the generator while still installed in the set.

Caution: Never attempt to make an ohmmeter test until all sources of power connected to the equipment tested are disconnected. The ohmmeter will be damaged if this procedure is not followed.

b. Equipment. All electrical circuits have some resistance. Resistances may be so low, or so high, that they cannot be read with an ordinary ohmmeter. An ohmmeter with a full-scale reading of about 10 ohms is best for measuring low resistances. Higher range ohmmeters are best for testing insulation leaks. If the normal resistance of the circuit tested is known, select an ohmmeter with a full-scale range higher than the normal resistance, which will place the normal reading in the lower two-thirds of the scale.

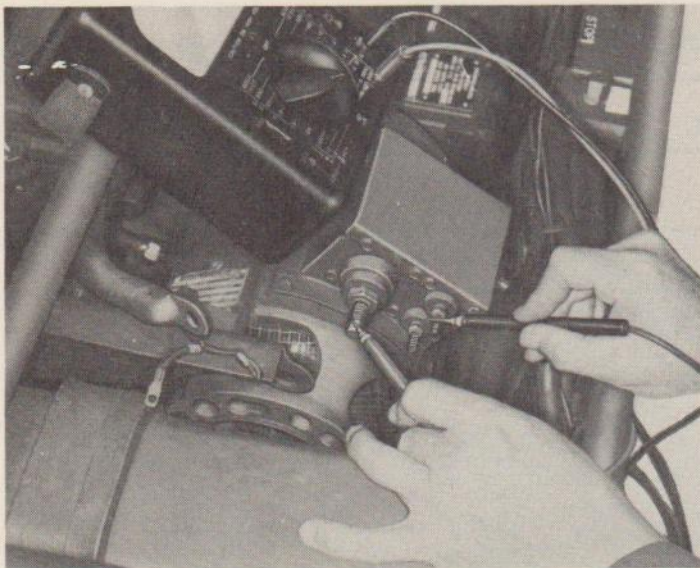
c. Continuity Tests. Place the two ohmmeter prods or clips on the end points of the circuit being tested. If a normal reading is obtained, the circuit has no breaks or openings.

d. Resistance Reading. Take a resistance reading to determine the electrical condition of the coil, resistor, capacitor, or complete circuit. If the correct resistance of a unit or circuit is known, the resistance test indicates when there is a defect in the circuit.

- (1) Infinity reading. An infinity reading indicates that no path exists for current flow in a component, or that an open circuit exists. The ohmmeter indicator does not move when infinite resistance exists, but remains at a point on the ohmmeter scale usually marked by the symbol "I" or the abbreviation "INF". An ohmmeter should always give an infinity reading when the test leads are disconnected.
- (2) Zero reading. A zero ohmmeter reading indicates a closed circuit with no measurable resistance. When a known resistance is specified, and a zero reading is obtained, a short circuit exists within the component or circuit being tested. An ohmmeter should always give a zero reading when the test leads are shorted together.

Table I. TROUBLESHOOTING

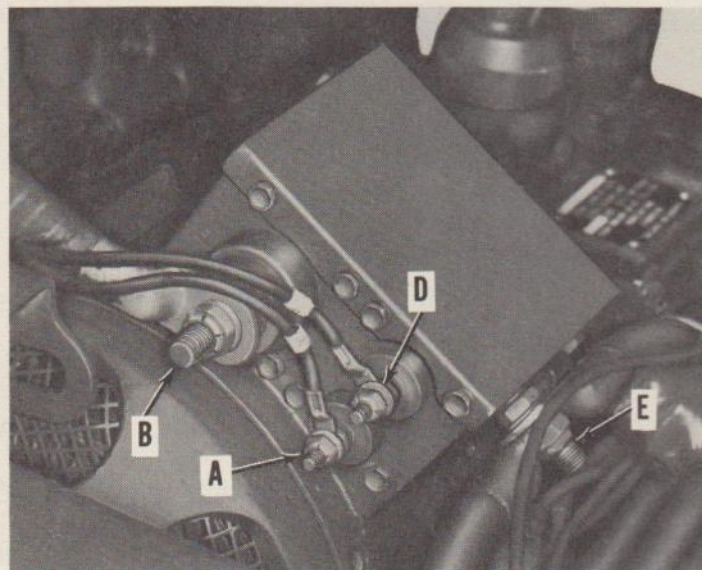
MALFUNCTION (symptoms)	PROBABLE CAUSES (tests)	CORRECTIVE ACTION (remedies)
ENGINE		
1. All engine malfunctions.	All probable causes.	See TM 5-2805-203-14.
FUEL, AIR INTAKE, EXHAUST		
2. Fuel in tank but fuel does not reach carburetor.	<u>a.</u> Fuel shutoff valve in wrong position. <u>b.</u> Faulty fuel pump. <u>c.</u> Air leak in fuel lines. <u>d.</u> Air leak in filter. <u>e.</u> Defective fuel shutoff valve.	<u>a.</u> Open fuel shutoff valve. <u>b.</u> See TM 5-2805-203-14. <u>c.</u> Inspect hoses and fittings for leaks. Tighten fittings. Replace defective hoses (par. 43). <u>d.</u> Replace sediment bowl gasket (TM 5-2805-203-14). <u>e.</u> Inspect fuel shutoff valve. Replace defective valve (par. 44).
3. Engine noise excessive.	Defective exhaust pipe or muffler.	Inspect muffler and exhaust pipe for leaks. Replace defective gasket, muffler, or manifold (par. 45).
4. All air intake system malfunctions.	All probable causes.	See TM 5-2805-203-14.
ELECTRICAL SYSTEM		
5. Engine fails to start when starter operates.	<u>a.</u> Defective engine electrical system. <u>b.</u> Defective STOP-RUN switch. <u>c.</u> Drive belts slipping.	<u>a.</u> See TM 5-2805-203-14. <u>b.</u> Notify field maintenance unit. <u>c.</u> Adjust drive belts (par. 47a).
6. Starter fails to start.	<u>a.</u> DC electrical source not connected. <u>b.</u> Defective starter switch. <u>c.</u> Defective starter relay. <u>d.</u> Defective generator. <u>e.</u> Defective wiring harness. <u>f.</u> Defective voltage regulator. <u>g.</u> Dead battery.	<u>a.</u> Connect dc electrical source. <u>b.</u> Notify field maintenance unit. <u>c.</u> Notify field maintenance unit. <u>d.</u> Check generator with ohmmeter (par. 36). Replace defective generator. <u>e.</u> Notify field maintenance unit. <u>f.</u> Notify field maintenance unit. <u>g.</u> Disconnect battery and start engine with rope.
7. Generator fails to produce full output voltage or current.	<u>a.</u> Rheostat out of adjustment. <u>b.</u> Engine not turning at 3,600 rpm. <u>c.</u> Drive belts slipping. <u>d.</u> Defective generator. <u>e.</u> Defective wiring harness. <u>f.</u> Defective voltage regulator. <u>g.</u> Defective rheostat. <u>h.</u> Worn brushes.	<u>a.</u> Adjust rheostat (par. 47b). <u>b.</u> See TM 5-2805-203-14. <u>c.</u> Adjust drive belts (par. 47a). <u>d.</u> Check generator with ohmmeter (par. 36). Replace defective generator. <u>e.</u> Notify field maintenance unit. <u>f.</u> Notify field maintenance unit. <u>g.</u> Notify field maintenance unit. <u>h.</u> Notify field maintenance unit.
8. Generator overheats.	<u>a.</u> Dirty generator. <u>b.</u> Defective generator.	<u>a.</u> Clean generator. <u>b.</u> Notify field maintenance unit.



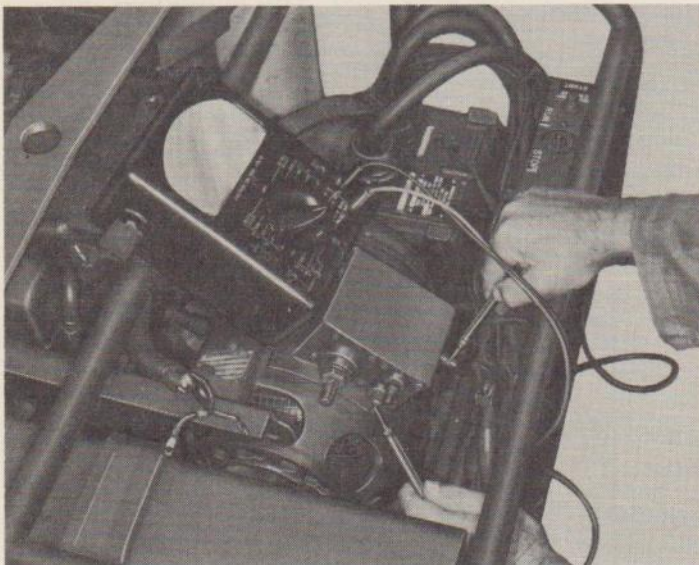
A. Place ohmmeter prods on terminals B and D. If ohmmeter reads zero or infinity, notify higher echelon.



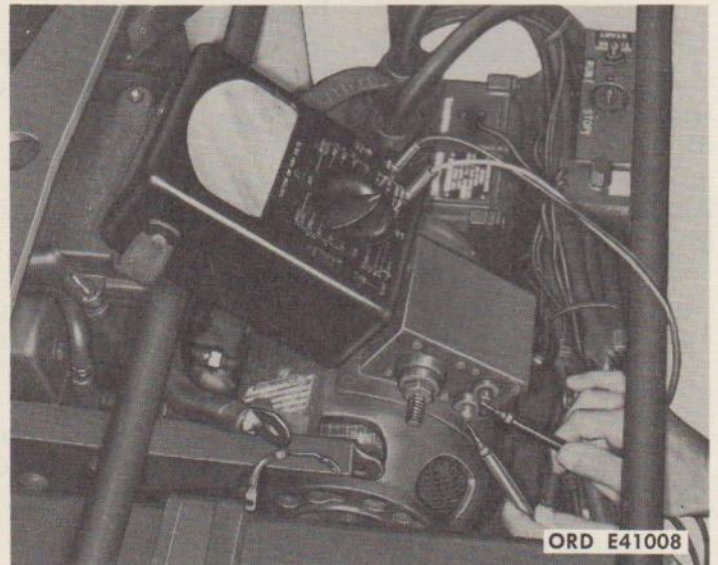
B. Place ohmmeter prods on terminals D and E. If ohmmeter reads zero or infinity, notify higher echelon.



NOTE. Take all readings with all terminal leads disconnected.



C. Place ohmmeter prods on terminals A and E. If ohmmeter reads zero or infinity, notify higher echelon.



D. Place ohmmeter prods on terminals A and D. If ohmmeter does not read 2 ohms, notify higher echelon.

FIGURE 19. TROUBLESHOOTING GENERATOR WITH AN OHMMETER.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. ENGINE

37. GENERAL

a. Scope. This section contains instructions for removal and installation of the engine and inner frame resilient mounts.

b. Reference. See TM 5-2805-203-14 for engine description, engine tuneup, and organizational maintenance covering the engine and engine components.

38. REMOVAL AND INSTALLATION OF ENGINE

a. Coordination with Field Maintenance Unit. Engine replacement must be coordinated with the supporting field maintenance unit (par. 2).

b. Removal. See figures 20, 21, and 22.

c. Inspection Before Installation. Check engine to make certain all components are securely mounted, including engine drive sheave.

d. Installation. See figures 22, 21, and 20. If replacement engine is installed, record in Equipment Log Book on DA Form 2408-3, in accordance with TM 38-750.

e. Inspection After Installation.

- (1) Check oil level in engine as prescribed in LO 5-2805-203-14.
- (2) Check electrical connections to make certain they are tight and secure.
- (3) Check for lubricant and fuel leaks. Make certain all connections are secure.

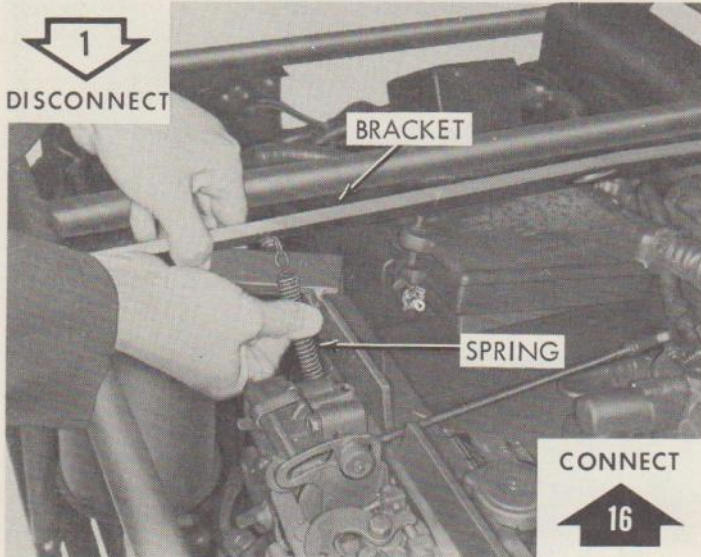
39. REMOVAL AND INSTALLATION OF INNER FRAME RESILIENT MOUNTS

a. Removal. See figure 23. Do not remove more than one mount at a time.

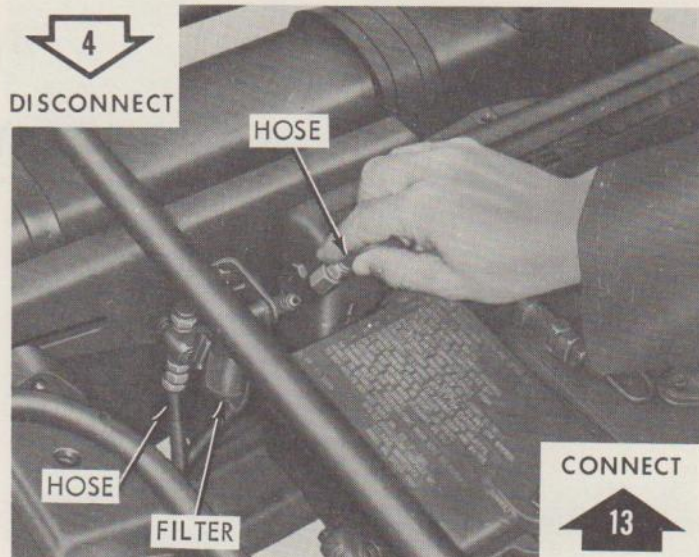
b. Inspection and Repair. Inspect resilient mounts for deep cracks, wear, and loss of resiliency. If any one of these defects shows, replace mounts.

c. Installation. See figure 23.

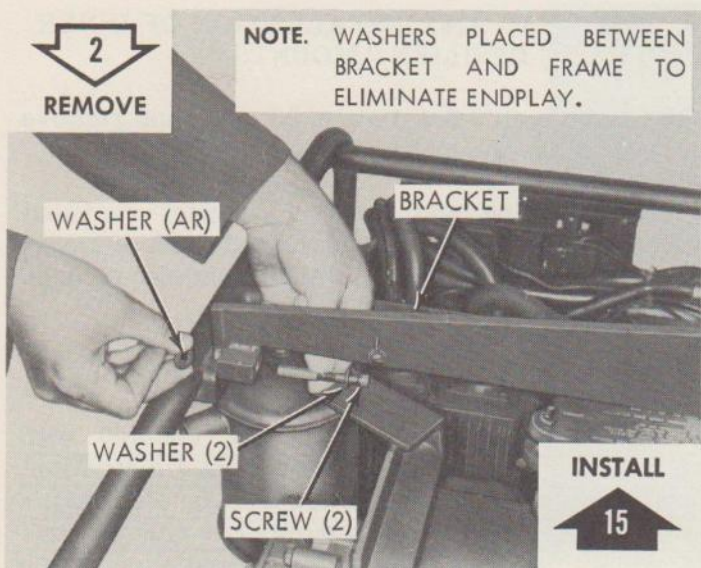
Note. The instructional arrows, coupled with the test that appears in or below each illustration, provide the sequence and procedure for each maintenance operation. Follow numbered arrows consecutively, starting with No. 1, depending on which procedure is desired.



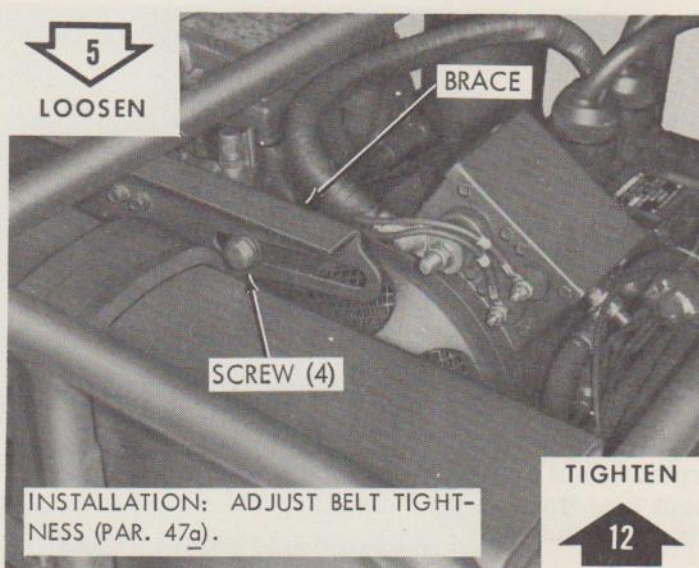
A. Lifting bracket return spring.



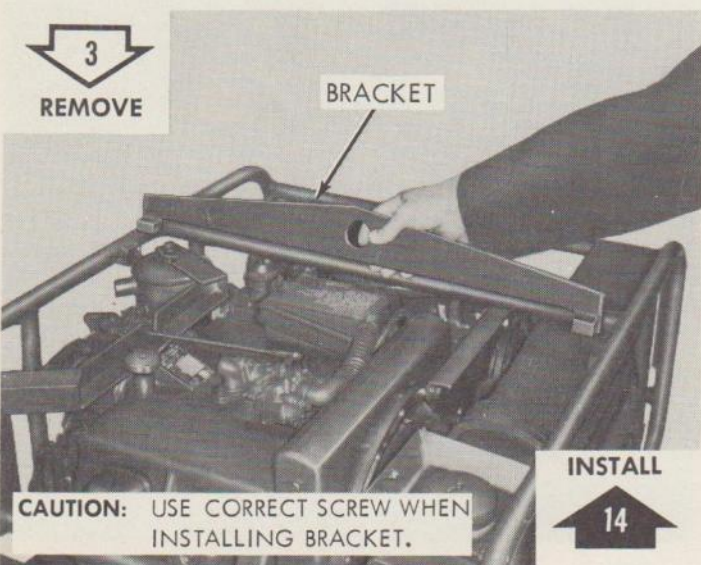
D. Both fuel hoses at fuel filter.



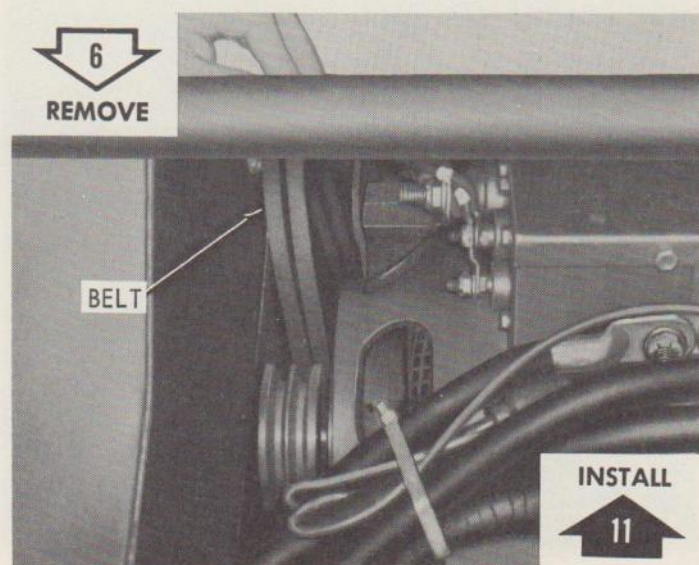
B. Lifting bracket screws and washers.



E. Drive belt tightness securing screws.



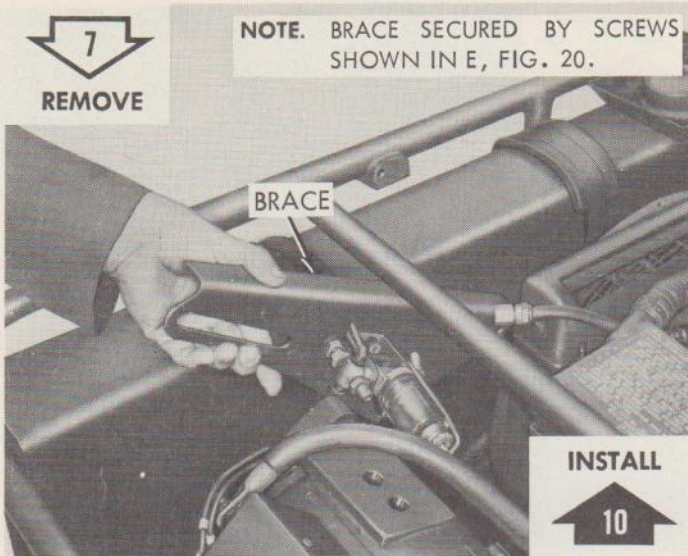
C. Lifting bracket.



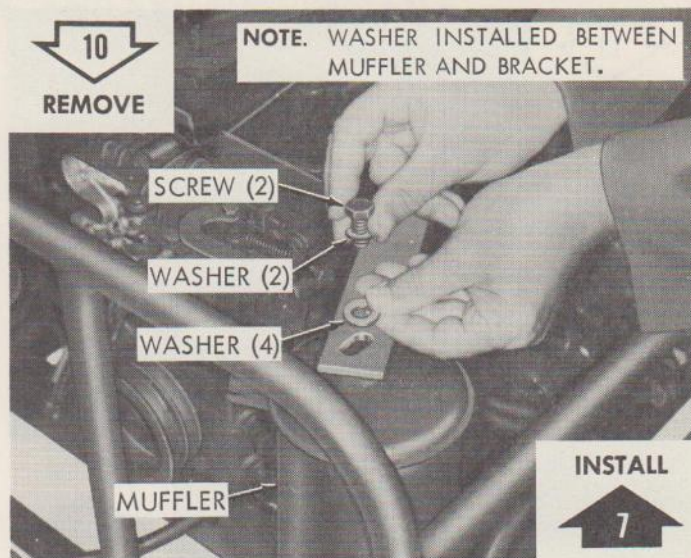
F. Drive belts.

ORD E41009

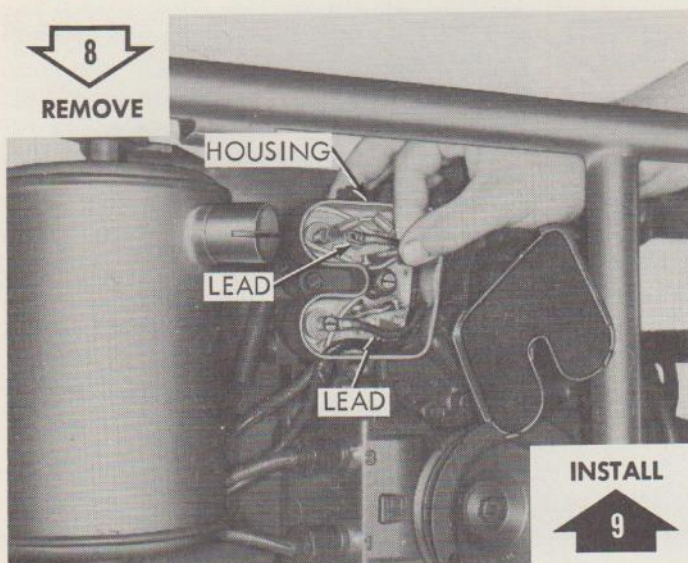
FIGURE 20. REMOVING OR INSTALLING ENGINE (continued to fig. 21).



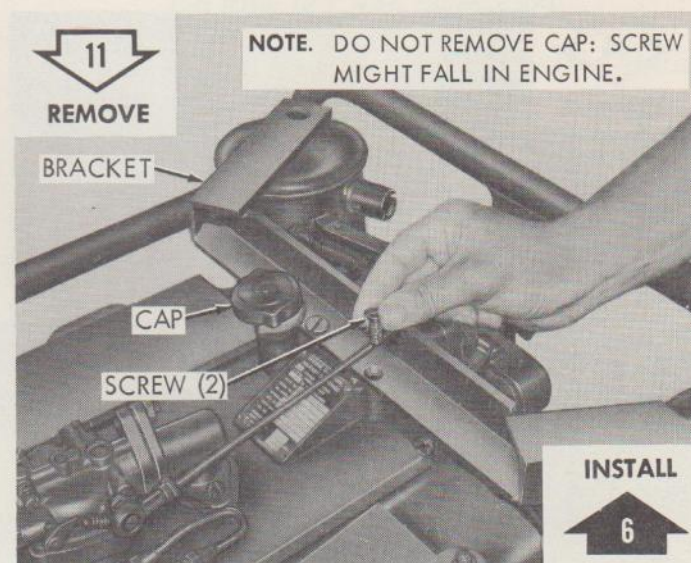
G. Drive belt tightening brace.



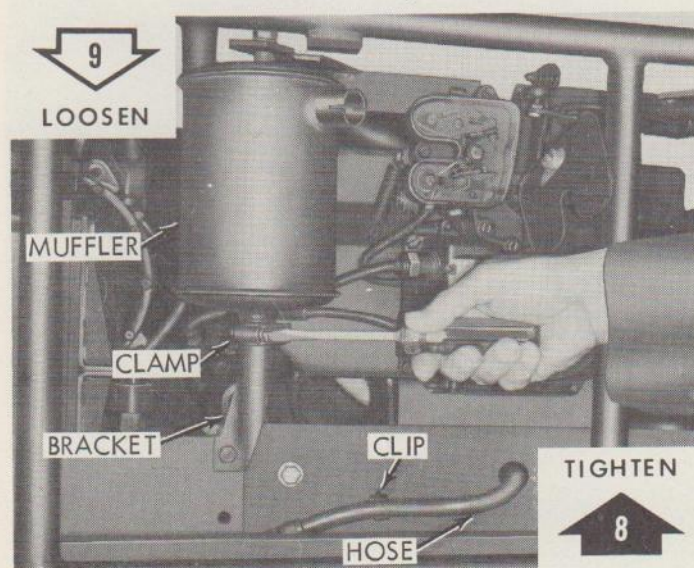
J. Muffler screws, and washers.



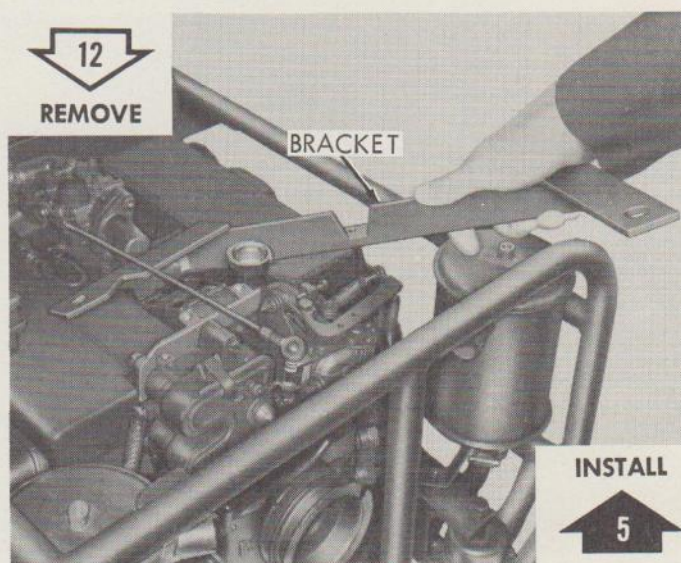
H. Leads from magneto housing.



K. Bracket screws.



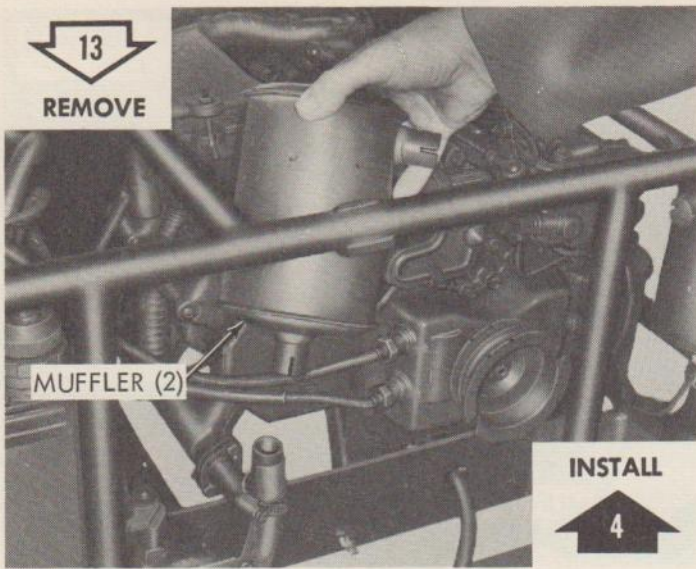
I. Muffler holding clamps, and hose at clip.



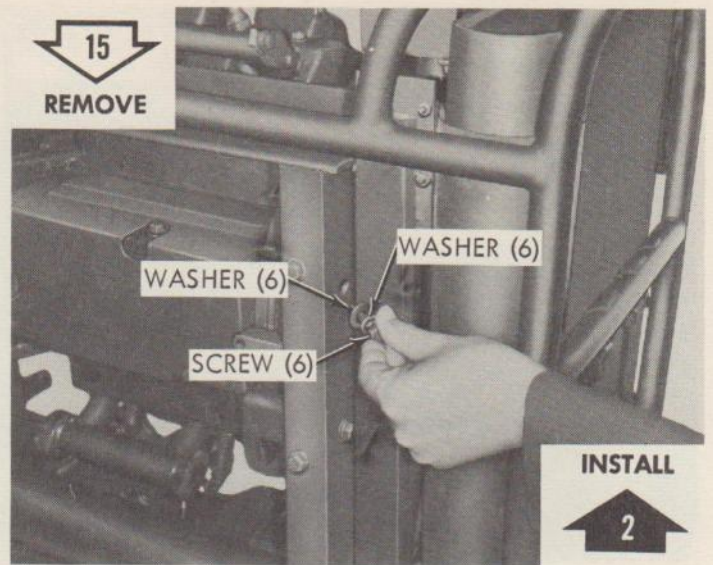
L. Muffler bracket.

ORD E41010

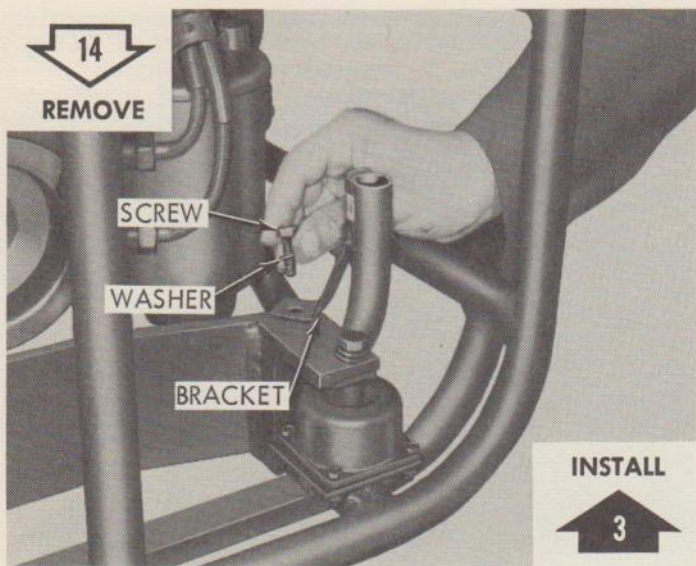
FIGURE 21. REMOVING OR INSTALLING ENGINE (continued to fig. 22).



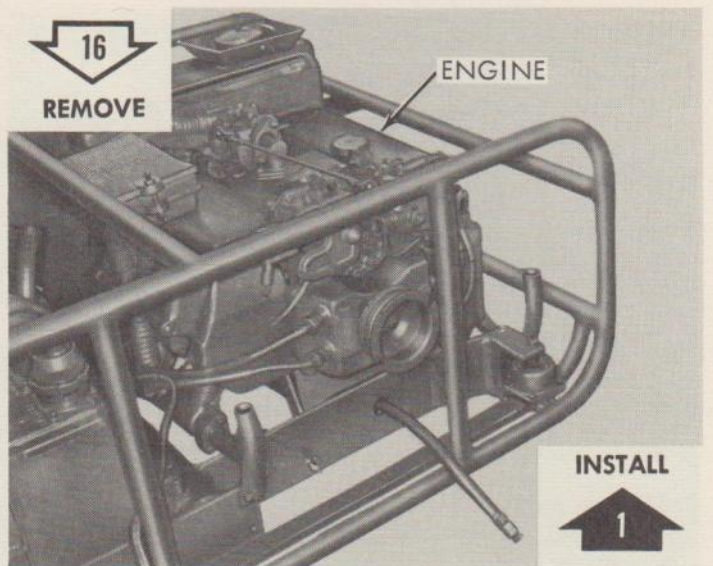
M. Mufflers.



O. Engine screws and washers.



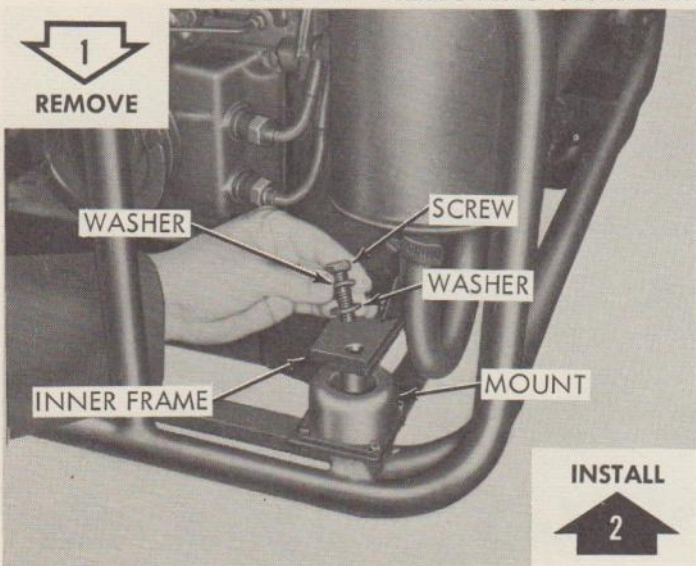
N. Screw, washer, and bracket.



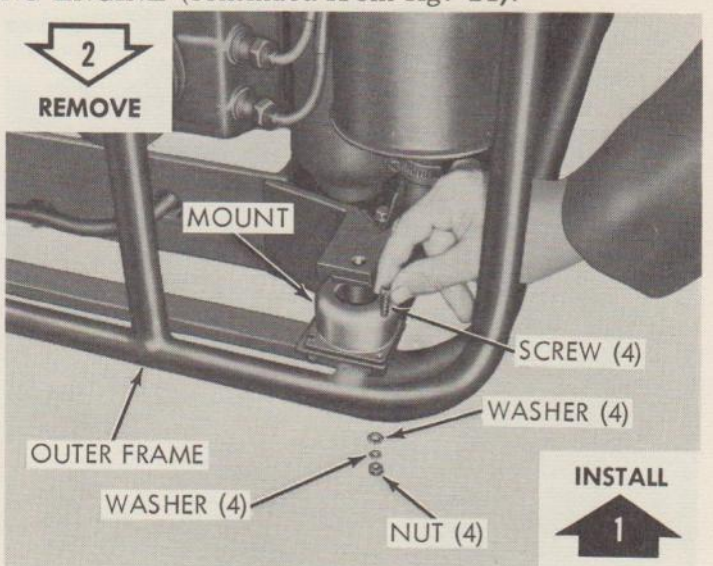
P. Engine.

ORD E41011

FIGURE 22. REMOVING OR INSTALLING ENGINE (continued from fig. 21).



A. Mount-to-frame screws and washers.



B. Mount-to-outer frame screws, washers and nuts, and mount.

ORD E41012

FIGURE 23. REMOVING OR INSTALLING INNER FRAME RESILIENT MOUNT.

Section II. FUEL , AIR INTAKE, AND EXHAUST SYSTEMS

40. GENERAL

a. Scope. This section contains instructions for organizational maintenance of components of the fuel, air intake, and exhaust systems.

b. Reference. See TM 5-2805-203-14 for maintenance instructions on the carburetor, fuel pump, air cleaner, preheater, and exhaust manifolds.

c. Description. The generator set incorporates a positive-feed pressure fuel system. Fuel taken from the fuel tank is drawn through the fuel filter by the fuel pump and forced under pressure to the carburetor. The carburetor mixes the fuel with air drawn through the air cleaner, air cleaner hose, and preheater (in cold weather operation) for the air intake system. The air intake preheater eliminates carburetor icing and preheats intake air during extreme cold-weather operation by utilizing heat radiated from the hot exhaust manifold. The combusted gases leave the cylinder cavities through the head, pass through the exhaust manifold and out through the mufflers, which dampen the sound.

41. SERVICE AND ADJUSTMENT

a. Servicing Fuel Filter.

- (1) Stop engine.
- (2) Turn fuel shutoff valve to OFF position.
- (3) Disconnect cable to battery source.
- (4) Remove and install sediment bowl (See TM 5-2805-203-14):
 - (a) Loosen nut, and swing bail aside.
 - (b) Pull bowl and gasket from filter body.
 - (c) Clean bowl with dry-cleaning solvent, and wipe dry with clean cloth.
 - (d) Inspect gasket, and if defective install new gasket.
 - (e) Install bowl.
 - (f) Swing bail in position, and tighten nut.
- (5) Turn fuel on, start engine, and check filter for leaks.

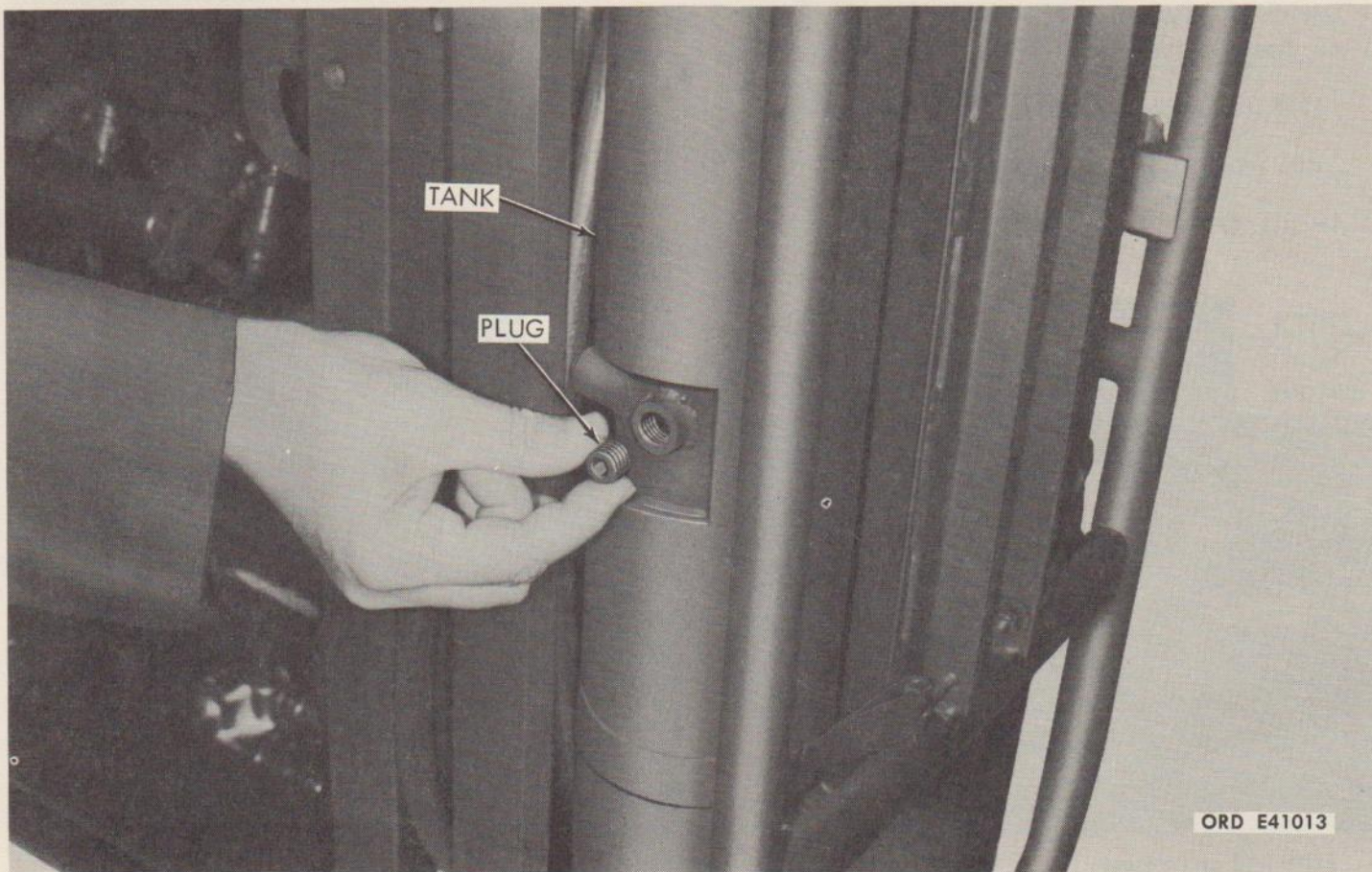


FIGURE 24. DRAINING FUEL TANK.

b. Draining Fuel Tank.

- (1) Raise generator set from ground, and place suitable container under drain.
- (2) Remove plug, and drain tank (fig. 24).

NOTE. To completely drain tank, generator set must be level.

c. Servicing Air Cleaner. See TM 5-2805-203-14.

42. REMOVAL AND INSTALLATION OF FUEL FILTER

a. Removal.

- (1) Drain fuel below level of filter.
- (2) Disconnect fuel hoses at filter (fig. 26).
- (3) Secure fuel hose end above fuel level.
- (4) Remove filter as shown in figure 25.

b. Inspection and Repair. Inspect filter for cracked or warped body, and fitting bores for stripped threads. If either of these defects shows, replace filter.

c. Installation.

- (1) If inspection shows filter should be replaced, remove shutoff valve (fig. 27), and install on new filter.

(2) Install filter as shown in figure 25.

(3) Connect fuel hoses at filter (fig. 26).

(4) Fill tank, start engine, and check for leaks.

43. REMOVAL AND INSTALLATION OF FUEL HOSES

a. Removal.

- (1) If tank-to-filter hose is to be removed, drain fuel tank (par. 41b).
- (2) If only filter-to-pump hose is to be removed, shut fuel off at fuel shutoff valve.
- (3) Disconnect fuel hoses at components as shown in figure 26.

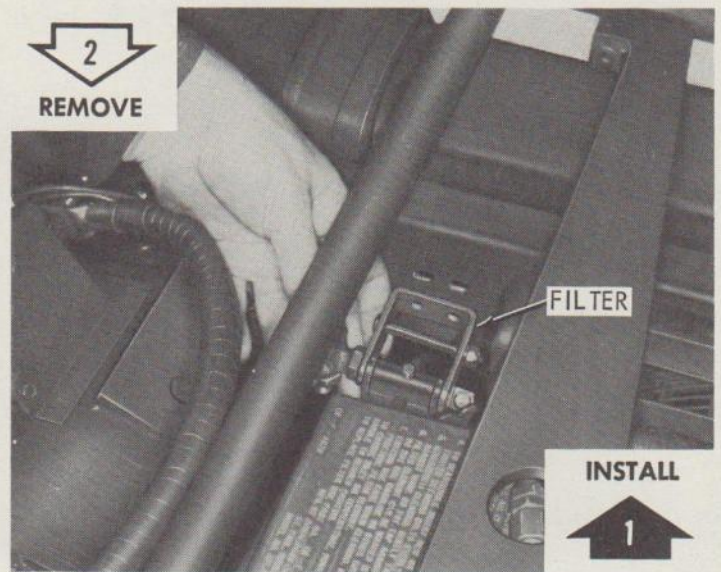
b. Inspection and Repair. Inspect hoses for wear, kinks, and any damage that may cause hose to leak. If any one of these defects shows, replace hoses.

c. Installation.

- (1) Connect fuel hoses at components as shown in figure 26.
- (2) Fill tank, start engine, and check for leaks.

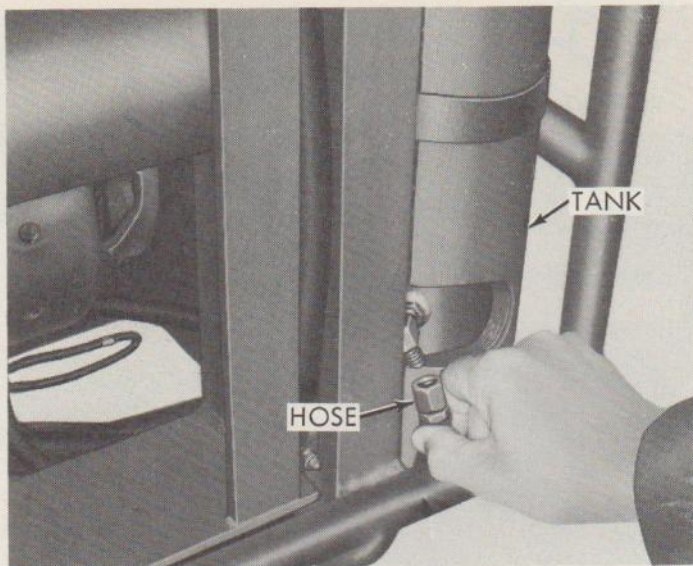


A. Filter nut and washer.

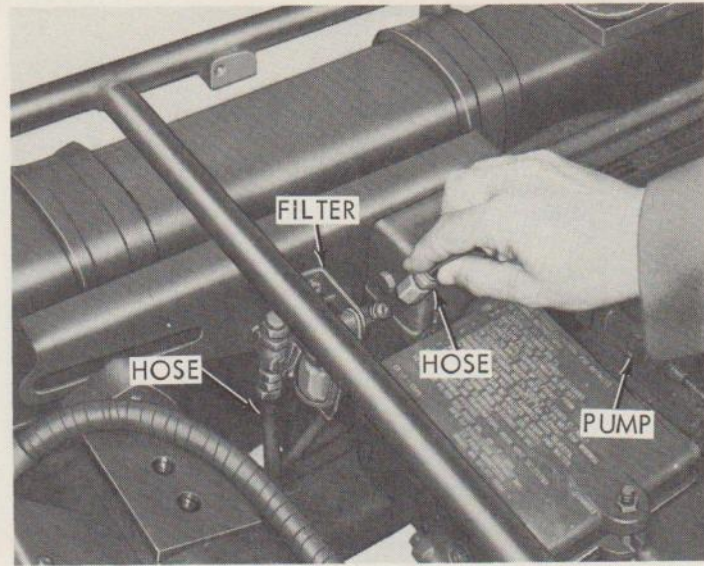


B. Fuel filter.

FIGURE 25. REMOVING OR INSTALLING FUEL FILTER.



A. Fuel hose at tank.



B. Fuel hoses at filter and pump.

ORD E41015

FIGURE 26. REMOVING OR INSTALLING FUEL HOSES.

44. REMOVAL AND INSTALLATION OF FUEL SHUTOFF VALVE

a. Removal.

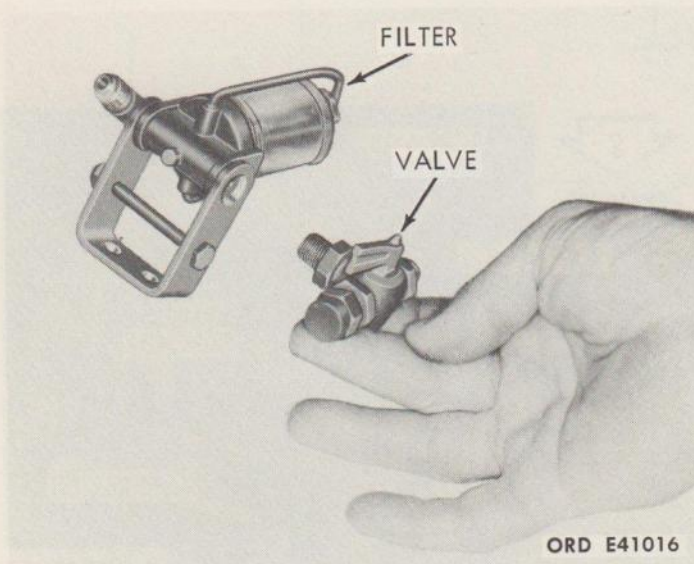
- (1) Drain fuel (par. 41b).
- (2) Disconnect fuel lines at filter (fig. 26).
- (3) Remove fuel filter (fig. 25).

- (4) Remove fuel shutoff valve as shown in figure 27.

b. Inspection and Repair. Inspect valve for leaks and damaged threads. If either of these defects shows, replace valve.

c. Installation.

- (1) Install fuel shutoff valve on filter as shown in figure 27.
- (2) Install fuel filter on brace (fig. 25).
- (3) Connect fuel lines at filter (fig. 26).
- (4) Fill tank, start engine, and check for leaks.



ORD E41016

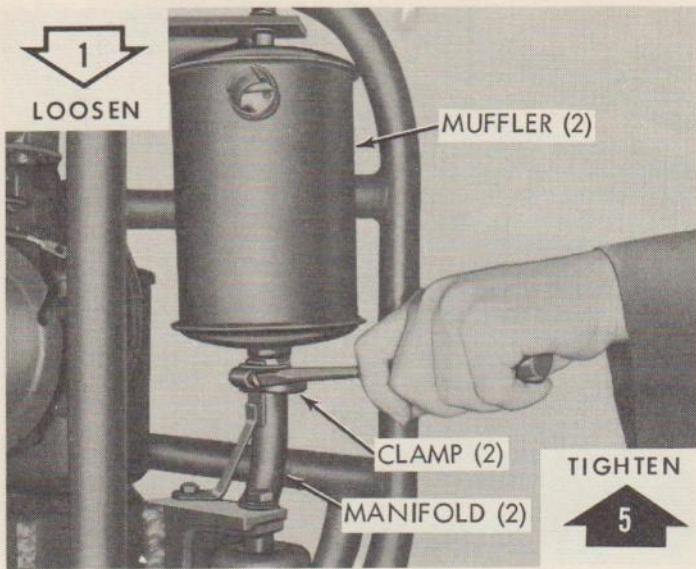
FIGURE 27. REMOVING OR INSTALLING FUEL SHUTOFF VALVE.

45. REMOVAL AND INSTALLATION OF MUFFLERS AND ELBOW MANIFOLDS.

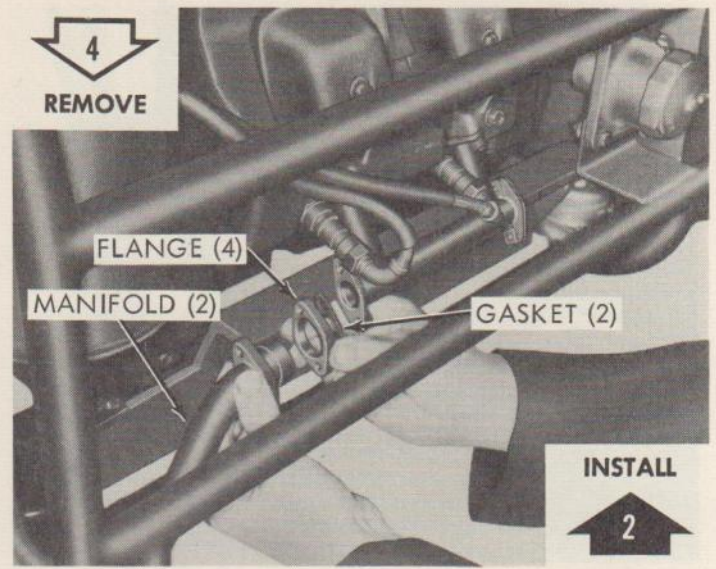
a. Removal and Installation. Remove or install mufflers and manifolds as shown in figure 28.

b. Inspection and Repair.

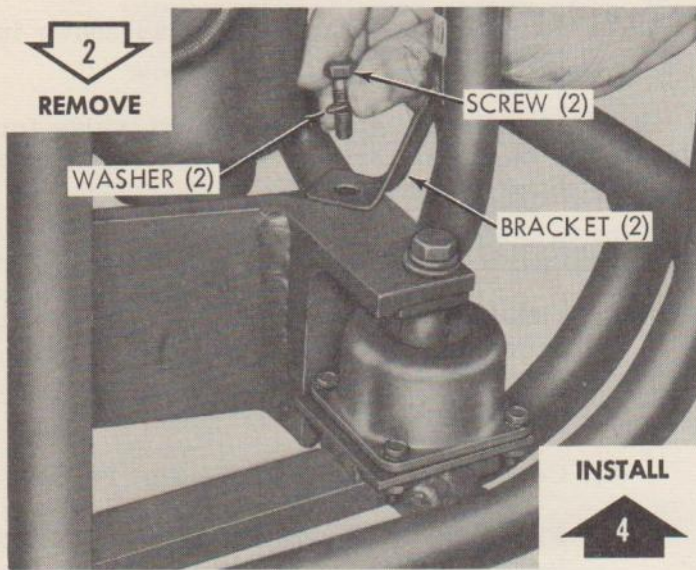
- (1) Inspect muffler for holes in case. If this defect shows, replace muffler.
- (2) Inspect manifold and flanges for evidence of leaks. If leaks exist, replace defective part(s).
- (3) Replace gasket: do not use gasket a second time.



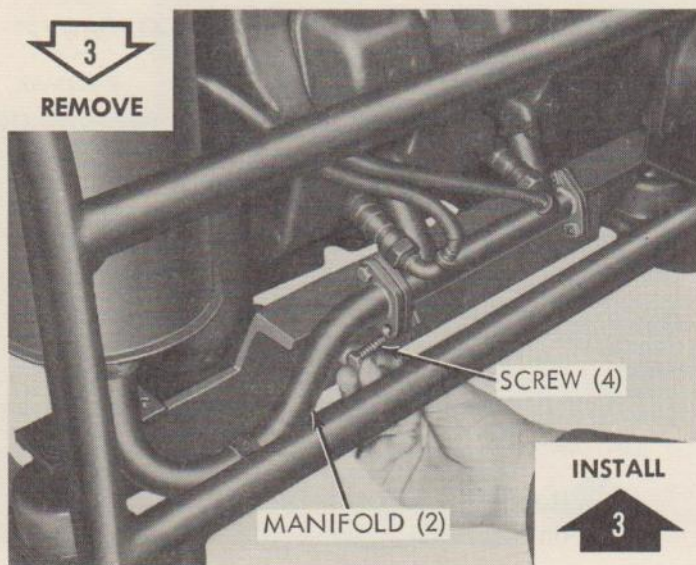
A. Muffler-to-manifold clamps.



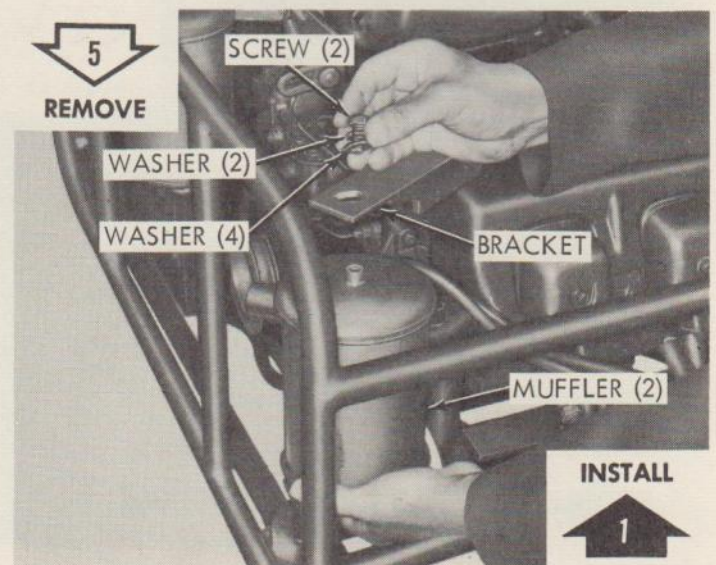
D. Manifolds, gaskets, and flanges.



B. Brackets, screws, and washers.



C. Manifold screws.



E. Screws, washers, and mufflers.

ORD E41017

FIGURE 28. REMOVING OR INSTALLING MUFFLERS AND EXHAUST ELBOW MANIFOLDS.

Section III. GENERATOR

46. GENERAL

a. Scope. This section contains instructions for adjustment of the voltage rheostat and drive belts, and organizational maintenance of the generator.

b. Description. The generator is mounted at two points on the inner frame of the set by two cap screws, which are loosened to allow the generator to pivot. Loosening the cap screws on the generator-to-engine brace and pivoting the generator away from the engine tightens the drive belts. Electrical continuity between the generator and generator connector on the regulator is shown in figure 29.

- (1) Loosen screws that secure brace to generator and engine.
- (2) Loosen screws that secure generator to inner frame.
- (3) Push generator away from engine until 1/4-inch deflection is obtained when 3 to 4-1/2 pounds force is applied to midpoint of belt span.
- (4) Tighten screws that secure brace to generator and engine.
- (5) Tighten screws that secure generator to inner frame.

47. MAINTENANCE AND ADJUSTMENT

a. Adjusting Generator Drive Belts (fig. 30).

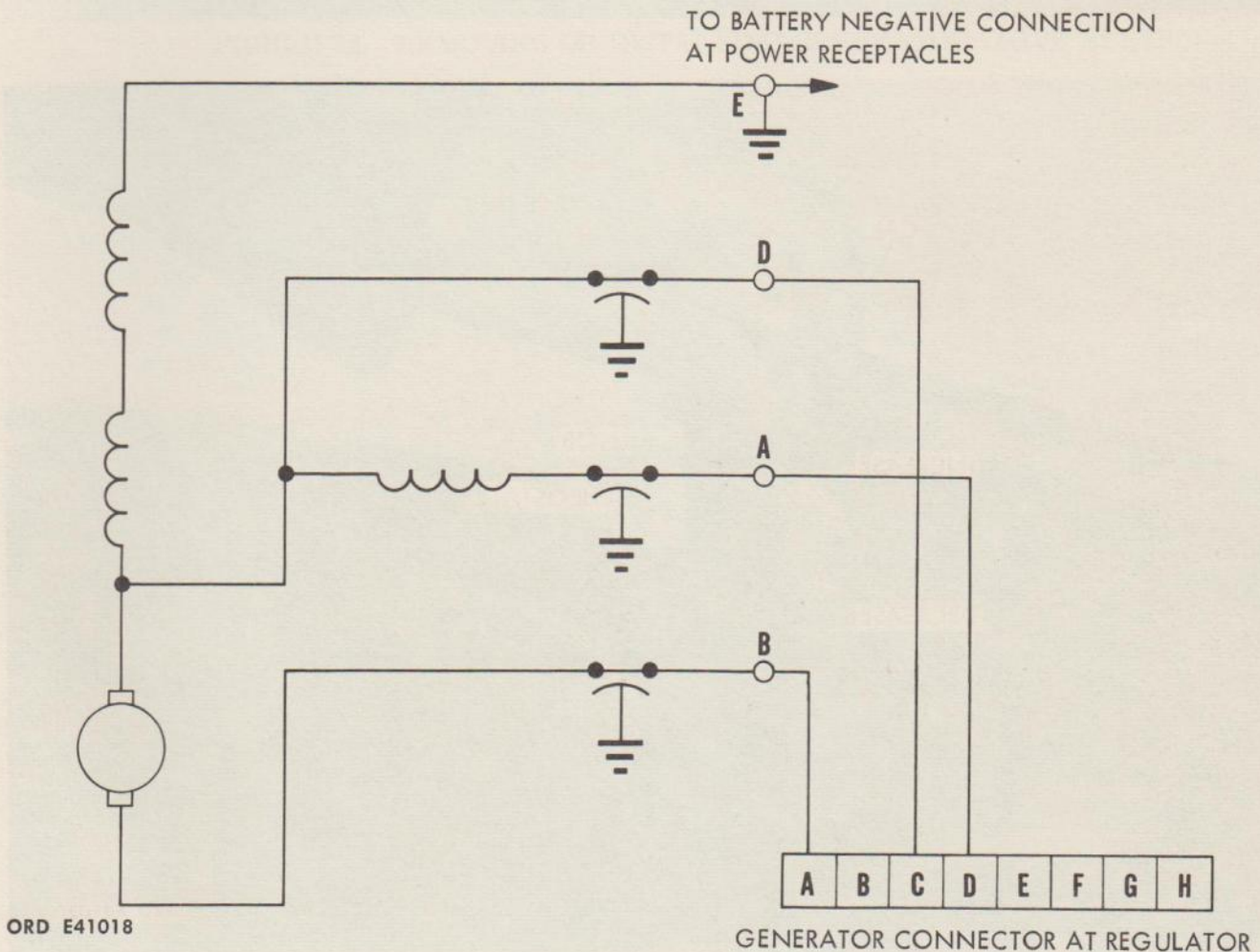
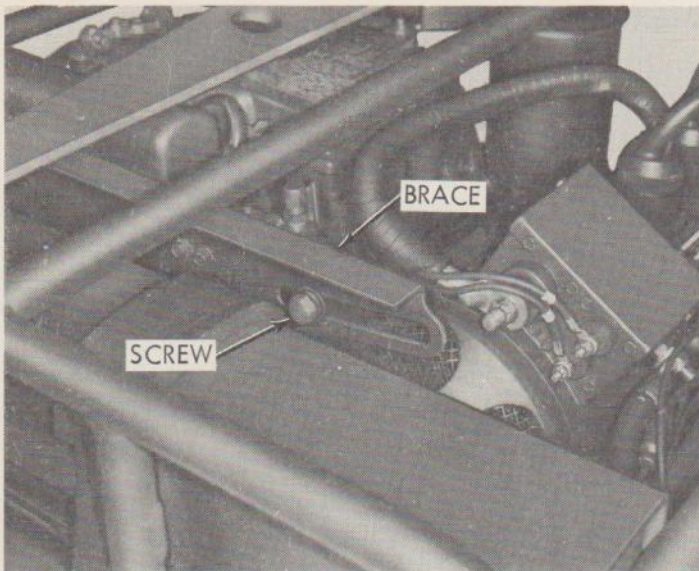
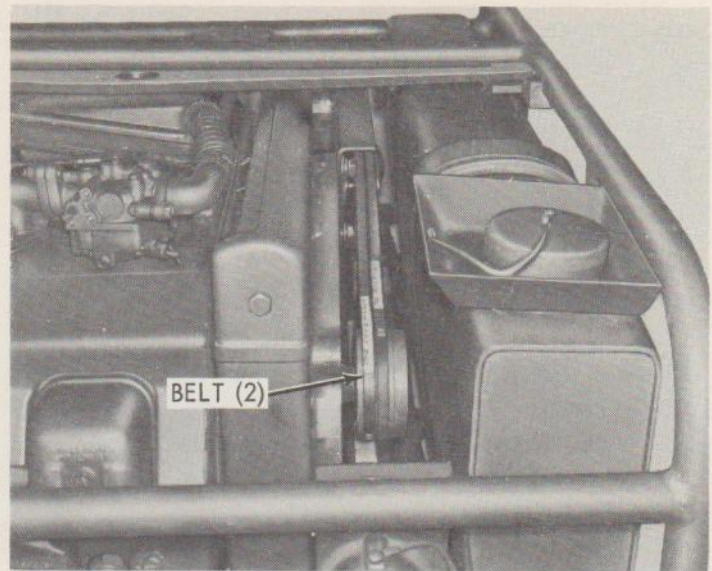


FIGURE 29. GENERATOR ELECTRICAL CONNECTIONS - SCHEMATIC DIAGRAM.



A. Drive belt adjusting brace.



B. Generator drive belts.

ORD E41019

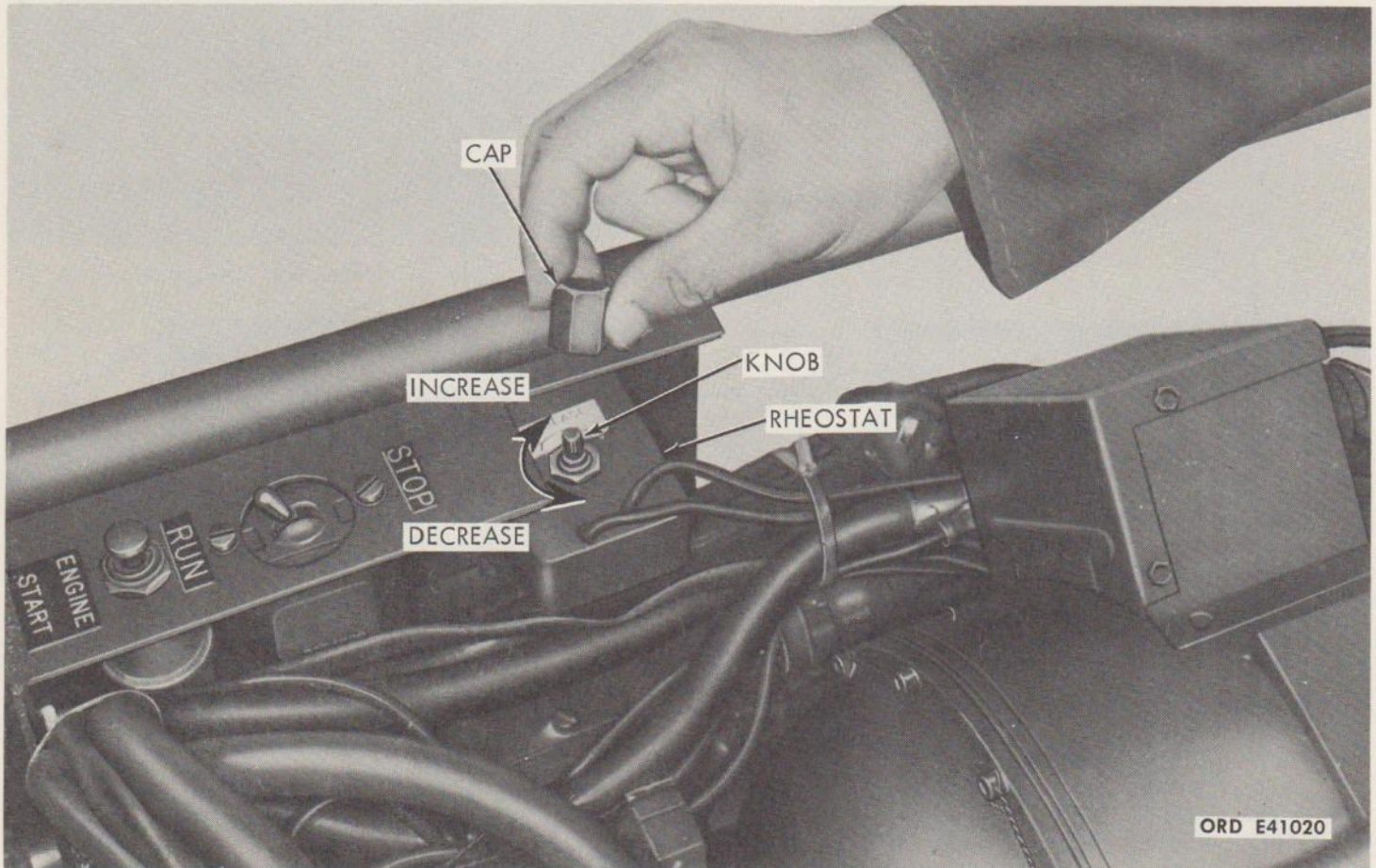
FIGURE 30. ADJUSTING GENERATOR DRIVE BELTS.

b. Setting Voltage Adjusting Rheostat.

- (1) Test specific gravity of battery source. Batteries must be functioning properly to adjust voltage. See TM 9-6140-200-15 for information on batteries.
- (2) Start engine, and place load across bat-

teries until generator and regulator reach operating temperature.

- (3) Connect voltmeter across battery terminals.
- (4) Adjust rheostat as shown in figure 31 until voltmeter reads 27.5 volts.



ORD E41020

FIGURE 31. ADJUSTING GENERATOR VOLTAGE.

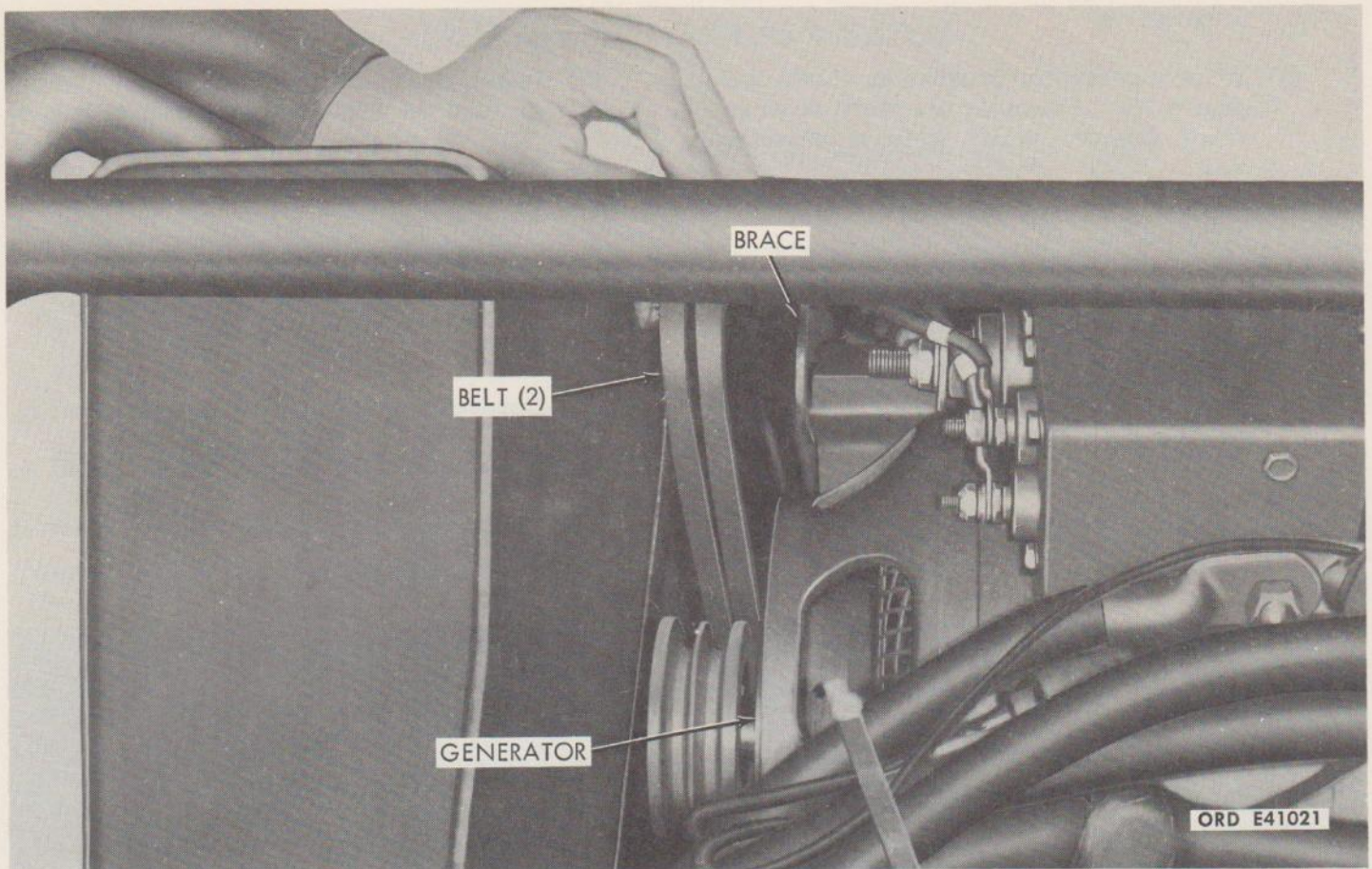


FIGURE 32. REMOVING OR INSTALLING GENERATOR DRIVE BELTS.

48. REMOVAL AND INSTALLATION OF GENERATOR DRIVE BELTS

a. Removal.

- (1) Loosen generator belts as much as possible without removing brace (fig. 30).
- (2) Remove generator belts as shown in figure 32.

b. Inspection and Repair. Twist belts until underside shows. Inspect for cracks, frayed sides, and separated laminations. If any one of these defects shows, replace belts (with matched pair).

c. Installation.

- (1) Install generator belts as shown in figure 32.
- (2) Adjust belts (fig. 30).

49. REMOVAL AND INSTALLATION OF GENERATOR

a. Coordination with Field Maintenance Unit. Generator replacement must be coordinated with

the supporting field maintenance unit (par. 2).

b. Removal (fig. 33).

- (1) Disconnect circuit 1 at generator terminal A.
- (2) Disconnect circuit 2 at generator terminal B.
- (3) Disconnect circuit 478 at generator terminal D.
- (4) Disconnect two circuit 50 leads and one ground lead at generator terminal E.
- (5) Remove one screw, washer, and nut that secure generator belt brace to generator.
- (6) Remove generator belt.
- (7) Remove two screws and four washers that secure generator to inner frame.
- (8) Remove generator.

c. Inspection and Repair.

- (1) Check generator with an ohmmeter as shown in figure 19. Replace generator

if defective.

- (2) Inspect generator brushes as shown in J, figure 18. If brushes are worn to wear-limit groove, notify field maintenance unit.

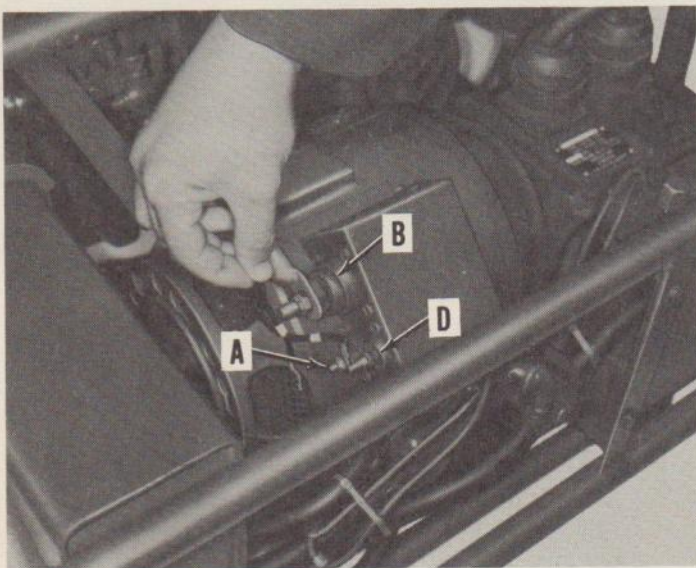
d. Installation.

Note. If replacement generator is installed, record in Equipment Log Book on DA Form 2408-3 in accordance with TM 38-750.

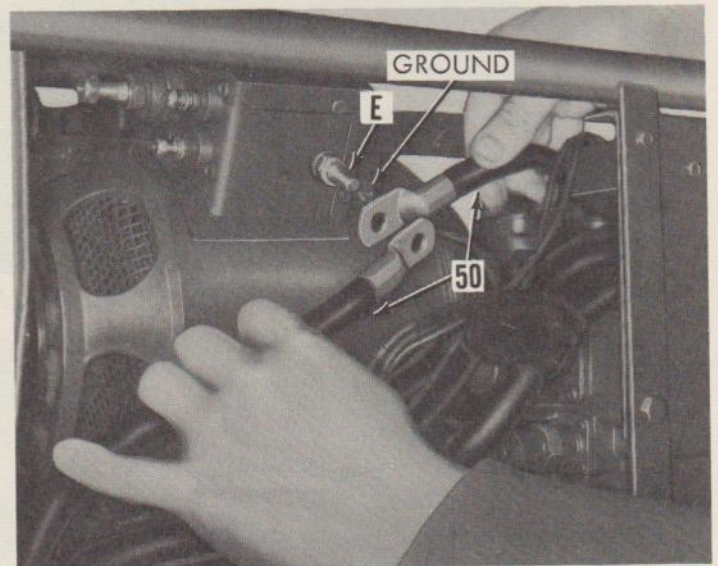
- (1) Position generator on inner frame, and secure with two cap screws and four washers.
- (2) Install drive belts on generator and engine

sheaves.

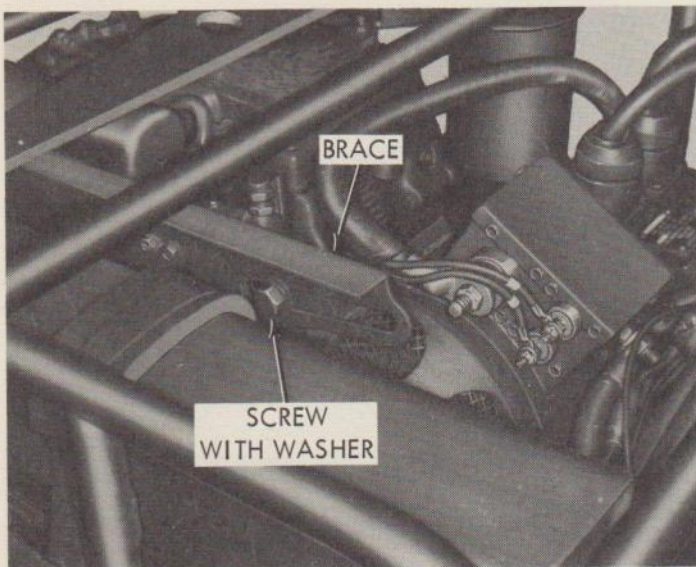
- (3) Install brace-to-generator screw, washer, and nut securing generator to brace.
- (4) Adjust drive belts (par. 47a).
- (5) Connect two circuit 50 leads and one ground lead at generator terminal E.
- (6) Connect circuit 478 at generator terminal D.
- (7) Connect circuit 2 at generator terminal B.
- (8) Connect circuit 1 at generator terminal A.
- (9) Start engine, and adjust voltage rheostat (par. 47b).



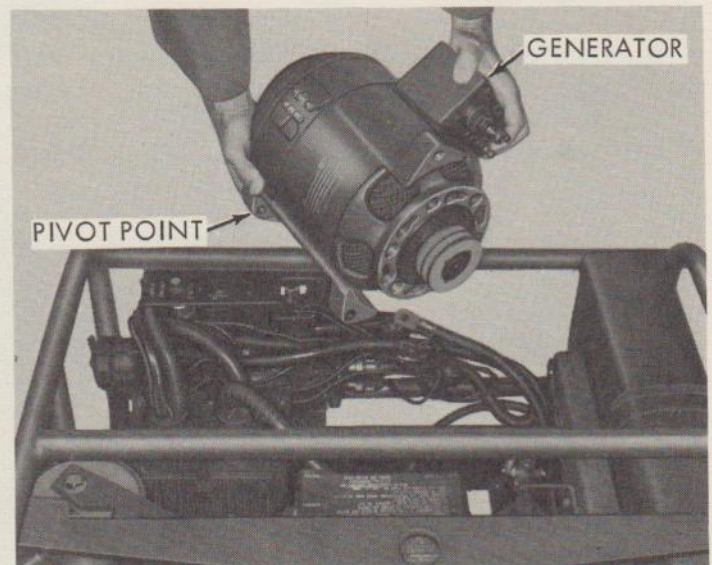
A. Generator terminals A, B, and D.



B. Generator terminal E.



C. Generator brace screw and washer.



D. Generator removed.

ORD E41022

FIGURE 33. REMOVING OR INSTALLING GENERATOR.

Section IV. VOLTAGE REGULATOR

50. GENERAL

This section contains instructions for removal, inspection and repair, and installation of voltage regulator resilient mounts. Refer all other maintenance of the voltage regulator to the supporting field maintenance unit.

51. REMOVAL AND INSTALLATION OF VOLTAGE REGULATOR RESILIENT MOUNTS

a. Removal (fig. 34).

Note. Do not remove more than one mount at a time.

- (1) Remove screw, lock washer, and flat washer that secure support to resilient mount.
- (2) Remove flat washer (not shown) positioned between support and mount.
- (3) Loosen other three mount screws, so regulator can be moved a little to either side.
- (4) Remove two mount-to-inner frame screws.

- (5) Remove resilient mount.

Note. The left rear support-to-resilient mount screw also secures the regulator-to-inner frame ground strap.

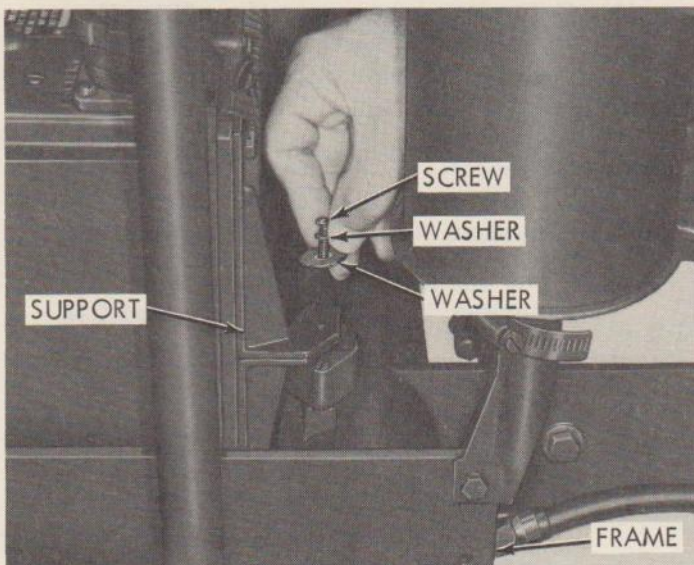
b. Inspection and Repair. Inspect resilient mounts for deep cracks, wear, and loss of resiliency. If any one of these defects shows, replace mounts.

c. Installation (fig. 34).

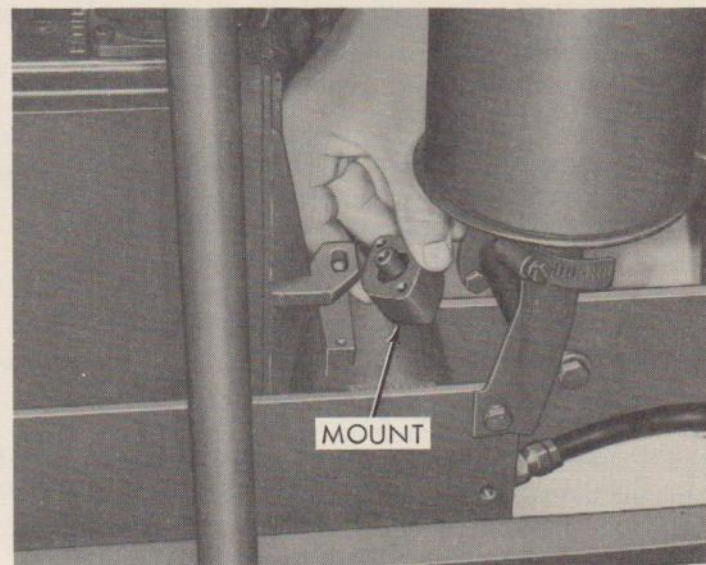
- (1) Position resilient mount between regulator support and inner frame.
- (2) Install two screws to secure mount to inner frame.
- (3) Position flat washer between support and resilient mount.

Note. If left rear mount was removed, position ground strap to secure with mount.

- (4) Install screw, lock washer, and flat washer, reposition regulator and tighten four mount screws.



A. Mount-to-regulator support screw and washers.



B. Regulator resilient mount.

ORD E41023

FIGURE 34. REMOVING OR INSTALLING REGULATOR RESILIENT MOUNT.

CHAPTER 5

FIELD MAINTENANCE INSTRUCTIONS

Section I. GENERAL

52. SCOPE

This chapter contains instructions for field maintenance of the generator set. It contains descriptions of, and procedures for, removal, installation, disassembly, assembly, inspection, test, adjustment, and repair of the generator set components.

53. FIELD MAINTENANCE REPAIR PARTS

Field maintenance repair parts are listed and illustrated in TM 9-6115-202-24P.

54. SPECIAL TOOLS AND EQUIPMENT

No special tools and equipment are required by field maintenance personnel for maintenance of the generator set.

Section II. TROUBLESHOOTING

55. GENERAL

a. Scope. This section contains information for field maintenance personnel to use in conjunction with and as a supplement to the troubleshooting contained in paragraphs 34 through 36.

b. Purpose. Operation of a deadlined generator set without a preliminary examination can cause further damage to a disabled component and possible injury to personnel. By careful inspection and troubleshooting, such damage and injury can be avoided, and in addition the causes of faulty operation of a set or component can often be determined without extensive disassembly.

56. INSPECTION

a. General. Inspection and troubleshooting are performed either while a disabled component is still mounted in the generator set, or after it has been removed.

b. Component Mounted. Inspection made with the component mounted in the set is for the most part visual and is performed before attempting to operate the set. The object of this inspection is to determine the condition of the component, and if found defective to take precautions to prevent any further damage.

c. Component Removed. Inspection made after the component is removed from the set verifies the diagnosis made when the component was in the set, uncovers further defects, or determines malfunctions if the component alone is received by the field maintenance unit. This inspection is particularly important in the last case because it is often the only means of determining the malfunction without completely disassembling the component.

57. TROUBLESHOOTING

Table II lists malfunctions or warning symptoms of trouble that may develop in the generator set components covered in this chapter. Each malfunction is followed by a list of probable causes or tests that must be considered in determining the corrective action necessary to remedy the malfunction or symptom.

58. TROUBLESHOOTING WITH AN OHMMETER

a. General. See paragraph 36 for general information on troubleshooting with an ohmmeter, and see table III for ohmmeter tests.

b. Test Points. The following system of terminal, pin, socket designations for use as electrical test points has been assigned in table III.

- (1) Generator test points (fig. 19). Generator capacitor box terminals are designated by letters without plug or connector designation.
- (2) Regulator test points.
 - (a) The connector on the regulator (fig. 35) marked "GENERATOR" is termed CG.
 - (b) The connector on the regulator (fig. 35) marked "BATTERY" is termed CB.
 - (c) After the connector or plug designation, CG and CB, a letter - A, B, C, D, E, F, G, or H - indicates the pin or socket in the connector or plug to be tested.
 - (d) Inside the regulator (fig. 54) are four plug strips and a connector block. The plug strips are termed PS, and the connector block is termed CR. A pin or a socket within the strips or block is identified by a number - 1 through 20.

Table II. TROUBLESHOOTING

MALFUNCTIONS (symptoms)	PROBABLE CAUSES (tests)	CORRECTIVE ACTION (remedies)
ENGINE		
1. All engine malfunctions.	All probable causes.	See TM 5-2805-203-14.
2. Generator set vibrates excessively while engine is running.	<u>a.</u> Loose or worn engine drive sheave. <u>b.</u> Loose or worn generator drive sheave. <u>c.</u> Broken or loose engine mounting screw.	<u>a.</u> Tighten or replace sheave (par. 61). <u>b.</u> Tighten or replace sheave (par. 63). <u>c.</u> Tighten or replace screw (O, fig. 23).
GENERATOR		
3. No generator output.	<u>a.</u> Brushes making poor contact with commutator. <u>b.</u> Defective voltage regulator. <u>c.</u> Short-circuited or grounded armature.	<u>a.</u> Replace brushes (Q, fig. 41), and recondition commutator if necessary (par. 67b). <u>b.</u> Repair or replace voltage regulator (pars. 71 and 72). <u>c.</u> Replace armature assembly (par. 64).
4. Generator has no output or output is very low.	<u>a.</u> Brushes making poor contact with commutator. <u>b.</u> Short-circuited or grounded armature. <u>c.</u> Reversed polarity in electrical system.	<u>a.</u> Replace brushes if approaching their minimum length (par. 66c). Seat brushes (O and P, fig. 40) and run in brushes (par. 69). <u>b.</u> Replace armature (par. 64). <u>c.</u> Make certain negative elements are connected to negative elements and positive elements to positive elements.
5. Generator produces full voltage with reverse polarity.	<u>a.</u> Brushes not connected properly. <u>b.</u> Defective housing assembly.	<u>a.</u> Connect brushes properly (fig. 45). <u>b.</u> Check for defective housing (par. 66e). Replace defective housing (par. 64).
6. Generator produces low voltage output.	<u>a.</u> Rheostat out of adjustment. <u>b.</u> Defective voltage regulator. <u>c.</u> Defective rheostat. <u>d.</u> Brushes making poor contact with commutator. <u>e.</u> Short-circuited armature. <u>f.</u> Short-circuited or grounded field windings.	<u>a.</u> Adjust rheostat (par. 47b). <u>b.</u> Repair or replace voltage regulator (pars. 71 and 72). <u>c.</u> Check for defective rheostat (par. 58). Replace defective rheostat (pars. 75 and 76). <u>d.</u> Replace brushes if approaching their minimum length (par. 66c). Seat brushes (O and P, fig. 40) and run in brushes (par. 69). <u>e.</u> Replace armature assembly (par. 64). <u>f.</u> Replace housing assembly (par. 64).
7. Excessive sparking at brushes.	<u>a.</u> Brushes not properly seated on commutator. <u>b.</u> Open-circuited or short-circuited armature.	<u>a.</u> Seat brushes (O and P, fig. 40) and run in brushes (par. 69). <u>b.</u> Replace armature (par. 64).

Table II. TROUBLESHOOTING - Continued

MALFUNCTIONS (symptoms)	PROBABLE CAUSES (tests)	CORRECTIVE ACTION (remedies)
GENERATOR - Continued		
7. Excessive sparking at brushes - Continued	<ul style="list-style-type: none"> c. Short-circuited field winding. d. Pitted or eccentric commutator. e. Worn ball bearings. 	<ul style="list-style-type: none"> c. Replace housing assembly (par. 64). d. Refinish commutator (par. 67b). e. Replace ball bearings (par. 64).
8. Generator overheats.	<ul style="list-style-type: none"> a. Obstruction in air passages. b. Broken cooling fan. c. Grounded insulated brush. d. Open armature winding. 	<ul style="list-style-type: none"> a. Disassemble and clean generator (par. 64). b. Replace cooling fan (par. 64). c. Disassemble generator (par. 64), and replace insulated tube (U, fig. 41). d. Replace armature (par. 64).
9. Excessive brush movement.	<ul style="list-style-type: none"> a. Worn or out-of-round commutator. b. Broken or weak brush spring. 	<ul style="list-style-type: none"> a. Repair commutator (par. 67). b. Check brush spring for proper tension (par. 66d and fig. 44). Replace brushes that are out of tolerance.
10. Generator does not operate as starter, but operates properly as generator.	<ul style="list-style-type: none"> a. Defective regulator. b. Defective starting relay. c. Defective START switch. 	<ul style="list-style-type: none"> a. Check regulator with ohmmeter (par. 58). Replace or repair defective regulator (par. 71). b. Check starting relay with ohmmeter (par. 58). Replace defective relay (par. 76). c. Check START switch with ohmmeter (par. 58). Replace defective switch (par. 76).
REGULATOR		
11. All regulator malfunctions.	All probable causes.	Check with ohmmeter (par. 58).
CONTROL PANEL		
12. All starting relay malfunctions.	All probable causes.	Check with ohmmeter (par. 58).
13. All START switch malfunctions.	All probable causes.	Check with ohmmeter (par. 58).

Table III. TROUBLESHOOTING WITH AN OHMMETER

COMPONENTS	TEST CIRCUITS		RESISTANCE (OHMS)	REMARKS
	FROM	TO		
Voltage regulator assembly	CG-A, G, or H	to case	45 to 50	Higher or lower reading indicates defective internal regulator. Replace defective regulator (par. 72).
	CG-C and E	to case	2	Zero reading or higher reading indicates defective internal relay. Replace defective relay (par. 72).
	CG-A, G, or H	to CG-D	Less than 1	Higher reading indicates defective internal regulator. Replace defective regulator (par. 72).
	CB-A and G	to case	150 to 175	Higher or lower reading indicates defective internal relay. Replace defective relay (par. 72).
	CB-F	to case	100 to 150	Higher or lower reading indicates defective internal relay. Replace defective relay (par. 72).
	CB-C and E	to CG-C and E	Infinite	Lower reading indicates defective internal relay. Replace defective relay (par. 72).
	CB-B	to CB-D	10 to 15	Zero reading or higher reading indicates defective internal regulator. Replace defective regulator (par. 72).
	PS-18 and 19	to case	Over 500	Lower reading indicates defective internal relay. Replace defective relay (par. 72).
	PS-16	to case	Infinite	Lower reading indicates defective internal relay. Replace defective relay (par. 72).
	PS-12	to case	2	Zero reading or higher reading indicates defective relay. Replace defective relay (par. 72).
	PS-11	to case	100 to 150	Higher or lower reading indicates defective internal relay. Replace defective relay (par. 72).
Voltage regulator assembly relay unit.				

Table III. TROUBLESHOOTING WITH AN OHMMETER—Continued

COMPONENTS	TEST CIRCUITS		RESISTANCE (OHMS)	REMARKS
	FROM	TO		
Voltage regulator assembly internal regulator	CR-2 to CR-18		Less than 1	Higher reading indicates defective internal regulator. Replace defective regulator (par. 72).
	CR-18 to case		45 to 50	Lower or higher reading indicates defective internal regulator. Replace defective regulator (par. 72).
	CR-18 to CR-5		10 to 15	Zero reading or higher reading indicates defective internal regulator. Replace defective regulator (par. 72).
START switch	Prods across connectors current through switch: Switch depressed Switch not depressed		Zero Infinite	Higher reading indicates defective switch. Lower reading indicates defective switch. Replace defective switch (par. 75).
	Prods across connectors current through switch: Switch in RUN position Switch in STOP position		Infinite Zero	Lower reading indicates defective switch. Higher reading indicates defective switch. Replace defective switch (par. 75).
Starting relay	Connector (A, fig. 60) to ground		50-52	Lower or higher reading indicates defective relay. Replace defective relay (par. 75).
	Connector (B, fig. 60) to connector (G, fig. 61) With battery current through connector (A, fig. 60) to ground		Infinite Zero	Lower reading indicates defective switch. Higher reading indicates defective switch. Replace defective switch (par. 75).
Rheostat	Prods across connectors		5 to 100	Lower reading indicates defective rheostat. Higher reading indicates defective rheostat. Replace defective rheostat (par. 75).

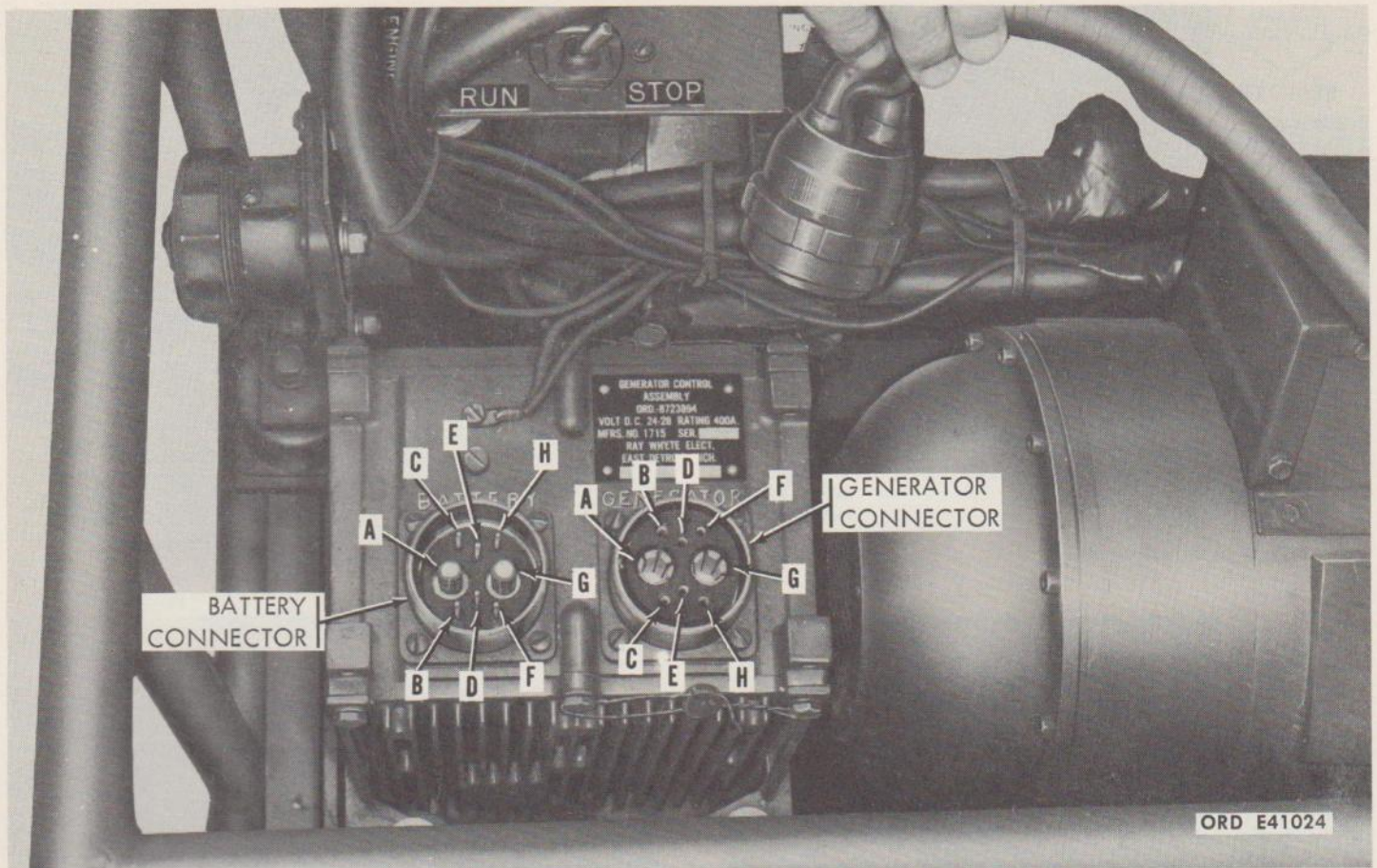


FIGURE 35. REGULATOR PIN AND SOCKET DESIGNATIONS.

Section III. REPAIR OF ENGINE

59. GENERAL

This section contains instructions for repair of the engine, and removal, installation, inspection, and repair of the engine belt drive sheaves.

60. REPAIR OF ENGINE

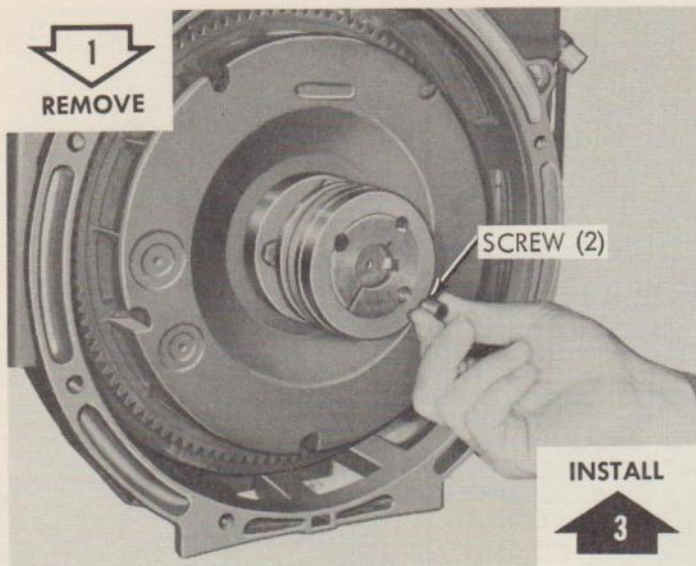
- a. Removal and Installation. See paragraph 38.
- b. Repair. See TM 5-2805-203-14.

61. REMOVAL AND INSTALLATION OF ENGINE BELT DRIVE SHEAVE AND ADAPTER

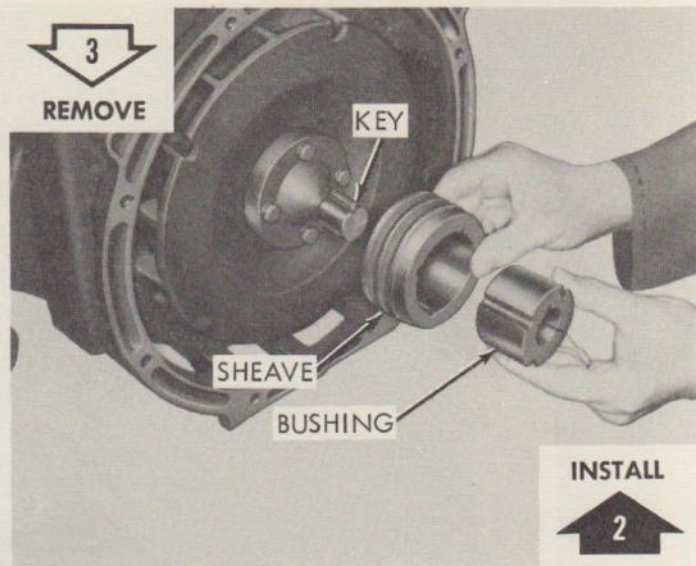
a. Removal. See figure 36. The engine must be removed from set before sheave and adapter can be removed.

b. Inspection and Repair. Inspect sheave for loose belts or broken grooves. If either of these defects shows, tighten or replace sheave.

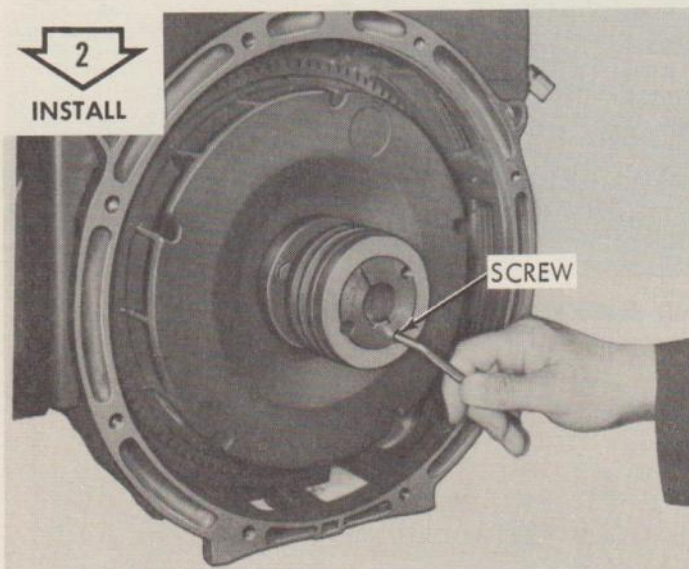
c. Installation. See figure 36.



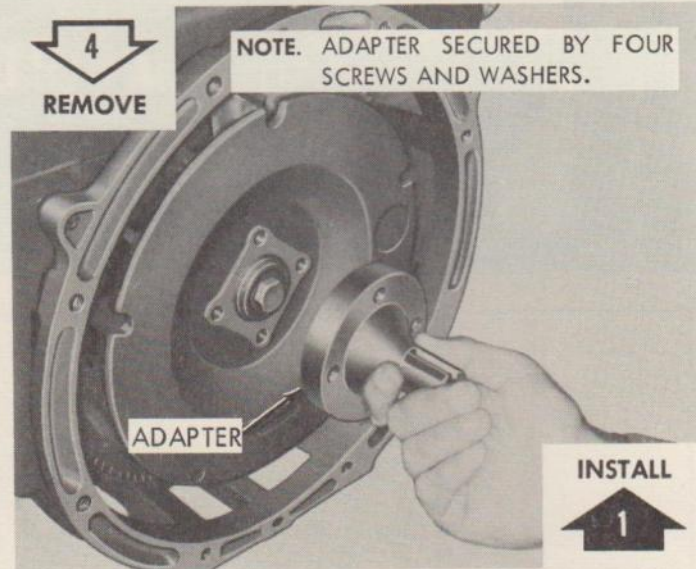
A. Sheave retaining screws.



C. Sheave, bushing, and key.



B. Sheave retaining screw, and push sheave from bushing.



D. Adapter.

ORD E41025

FIGURE 36. REMOVING OR INSTALLING ENGINE BELT DRIVE SHEAVE AND ADAPTER.

Section IV. REPAIR OF GENERATOR

62. GENERAL

a. Scope. This section contains instructions for removal, installation, inspection, and repair of the generator drive belt sheave and bushing. This section also contains instructions for disassembly, assembly, cleaning, inspection, and repair standards of the generator.

b. Description. For this application, the belt-driven generator delivers a rated current of 150 amperes at 28 volts when driven at 4,330 rpm. The generator is a six-pole, six-brush unit equipped with a three-capacitor radio noise box. Self-air induction is obtained by a fan at the commutator end driving air across the armature and field coils. The generator is operated as a starter to start the

gasoline engine, which is governed at 3,600 rpm to drive the generator at 4,330 rpm.

c. Removal and Installation of Generator. See paragraph 49.

63. REMOVAL AND INSTALLATION OF GENERATOR BELT DRIVE SHEAVE

a. Removal. See Figure 37. The generator must be removed before the sheave can be removed.

b. Inspection and Repair. Inspect sheave for loose or broken grooves. If either of these defects

shows, tighten or replace sheave.

c. Installation. See figure 37.

64. DISASSEMBLY AND ASSEMBLY OF GENERATOR

a. Inspection.

- (1) Inspect generator according to paragraph 66a(1) before disassembly.
- (2) Inspect generator parts according to paragraph 66a(2) before assembling the generator. Do not remove ball bearings unless inspection of measurement indicates item is unserviceable.

Caution: When handling generator parts, exercise care to avoid damaging them. Nicks, dents, and scratches from careless handling may cause subsequent failure.

b. Disassembly and Assembly. See figures 38 through 41.

Note. The instructional arrows, coupled with the test that appears in or below each illustration, provide the sequence and procedures for each maintenance operation. Follow numbered arrows consecutively, starting with No. 1, depending on which procedure is desired.

65. CLEANING

a. General. After completely disassembling the generator, clean all parts, except ball bearings, brushes, capacitors, and the basic generator housing (which contains the field coils) using mineral spirits paint thinner or dry-cleaning solvent. Immerse all parts, except those noted above, in solvent and brush with a soft bristle brush to remove stubborn accumulations that cannot be rinsed away by dipping. After cleaning, dry parts with compressed air, and place in a clean dust-free location until ready for assembly.

Caution: Do not allow parts to remain in cleaning solvent more than 30 seconds: continued contact with solvent tends to soften protective coatings on some parts.

b. Generator Housing. Clean generator housing, including field coils, by brushing between coils with soft bristle brush to loosen dust and other accumulations. After brushing, use compressed air to dislodge and remove all loosened material. Clean outer surfaces by wiping with cloth moistened in mineral spirits paint thinner or dry-cleaning solvent.

c. Ball Bearings. See TM 9-214 and clean bearings as outlined.

d. Brushes. Always replace brushes when generator is completely disassembled.

e. TM 9-208-1. For complete information regarding cleaning of Ordnance material, see TM 9-208-1.

Caution: Do not use carbon-tetrachloride for cleaning any part of generator: use of this chemical can cause severe damage to brushes and commutator.

66. INSPECTION

a. General.

- (1) Before disassembly. Inspect generator before disassembly or before tests are performed to eliminate any possibility of further damage. Rotate armature by hand to make certain it is free. If armature rotates with difficulty, disassemble with care and inspect components. If armature rotates freely, remove brush cover band and inspect brushes and commutator.
- (2) During disassembly.
 - (a) Inspect all bolts, screws, and nuts for worn or damaged threads. Replace lock washers and lock wires. Do not use safety devices a second time.
 - (b) Visually inspect housing parts, support, fan, drive shaft part of armature, and other internal parts for damage such as cracks, burned insulation, corrosion, rust, and other damage that can be detected by visual inspection. Replace all damaged or defective parts.

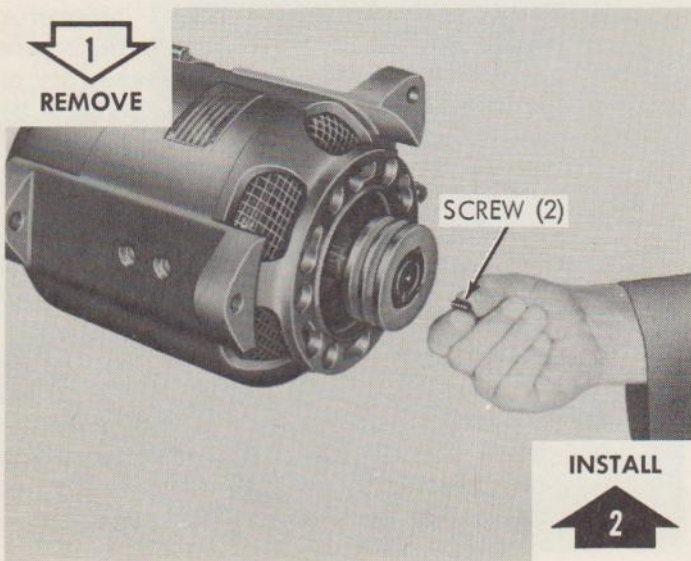
b. Armature.

- (1) Inspect brush contact surface of armature. A highly burnished, dark-copper color indicates satisfactory condition. If contact surface is rough, pitted, scored, burned in areas, or coated with hardened varnish or carbon accumulations, re-surface commutator (par. 67). A short-circuited or open-circuited armature coil leaves adjacent commutator bars burned or extremely dark in color. Check for shorts or opens with test lamp (fig. 42) with growler (fig. 43). If test indicates short-circuit, carefully inspect between commutator bars for copper particles or a carbon bridge. If test and inspection

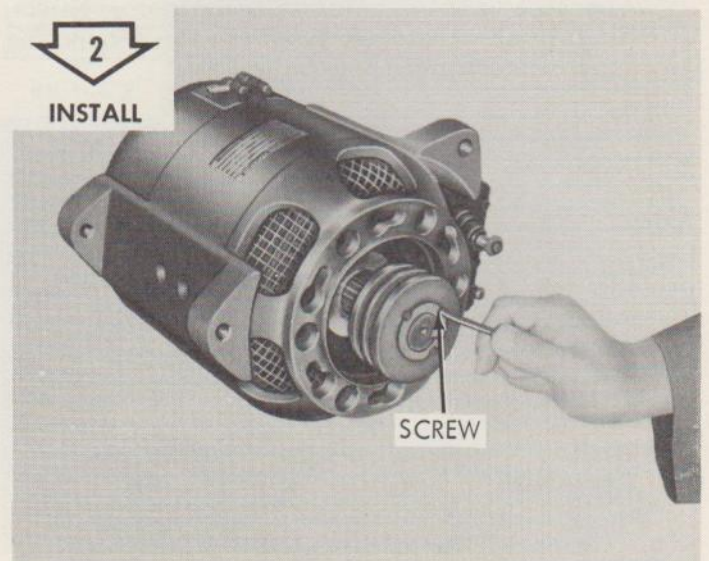
indicates faulty armature coil, replace armature.

- (2) If a series of defective commutator bars show burns, trouble may be due to eccentricity or grease deposits on surfaces. If burned areas are caused by grease deposits, clean and resurface commutator (par. 67). If burned areas are caused by eccentricity, mount armature on its bearings (not on shaft centers) and check concentricity. Eccentricity should not exceed 0.0002 inch bar-to-bar or 0.001 inch total runout. If test indicates eccentric commutator, resurface commutator (par. 67).

- (3) Check soldering between commutator and conductors on armature. If "solder throwing" is indicated, resolder armature before continuing inspection.
- (4) If generator armature is in good condition, bake it in dry oven from 2 to 4 hours at 193°F. (77°C.) to remove all traces of moisture.
- (5) Check for a grounded armature with 220-volt ac or dc line and 50-watt lamp connected in series (fig. 42). When 220-volt source is not available, use 110-volt source. Touch one test prod to armature

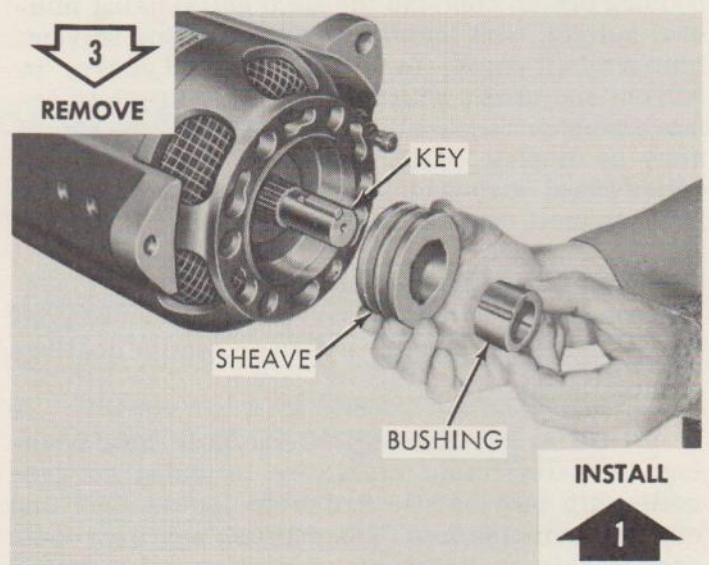


A. Sheave retaining screws.



B. Sheave retaining screw.

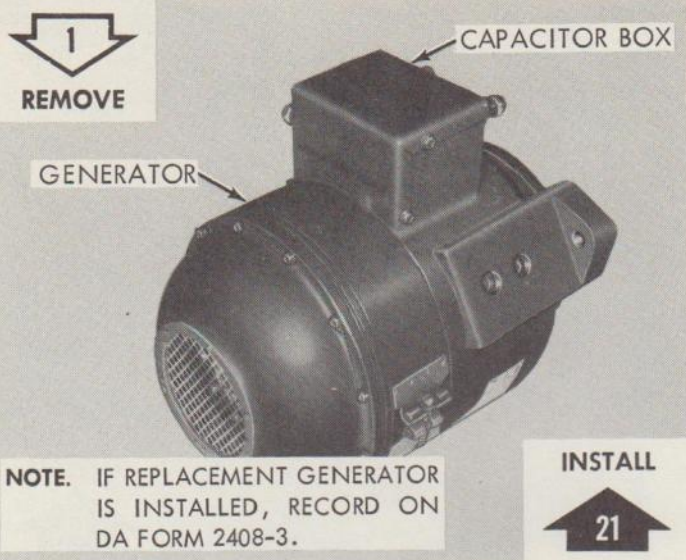
NOTE. Use sheave retaining screw removed in view A as a pusher screw, as shown in view B.



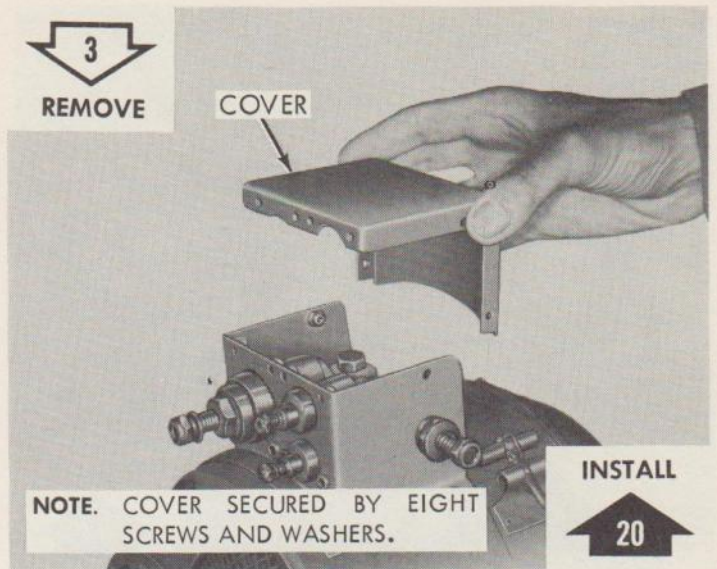
C. Sheave, bushing, and key.

ORD E41026

FIGURE 37. REMOVING OR INSTALLING GENERATOR BELT DRIVE SHEAVE.

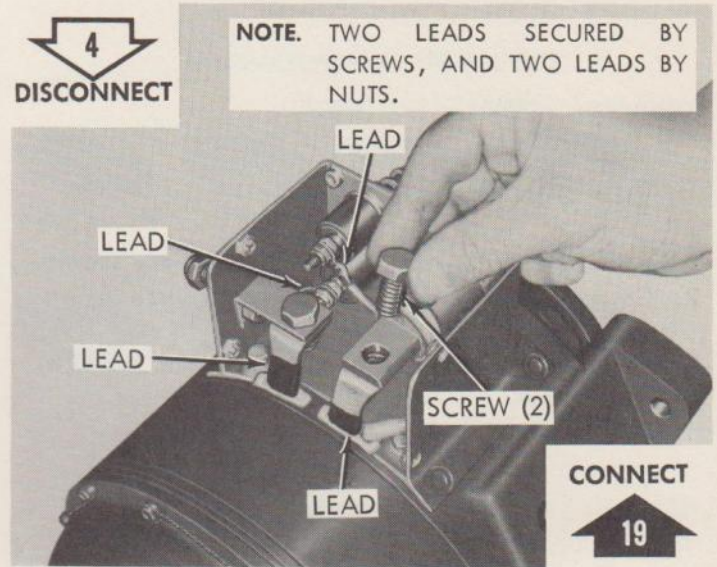


A. Generator (par. 49 and fig. 33).

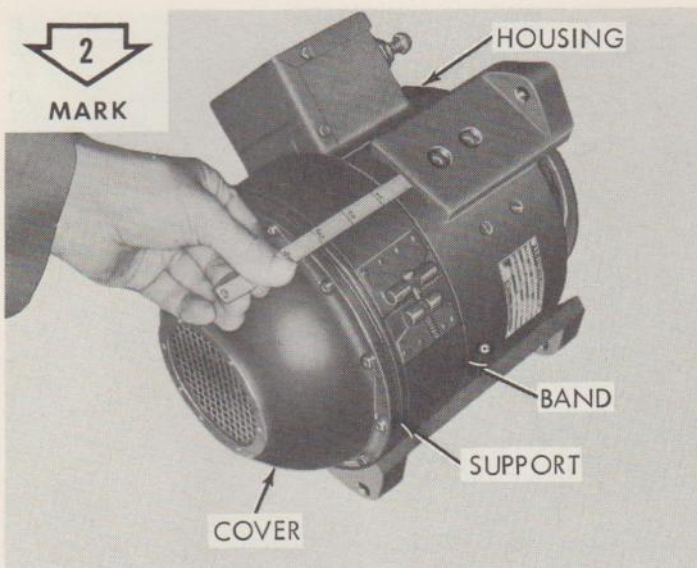


C. Radio-noise suppression filter cover.

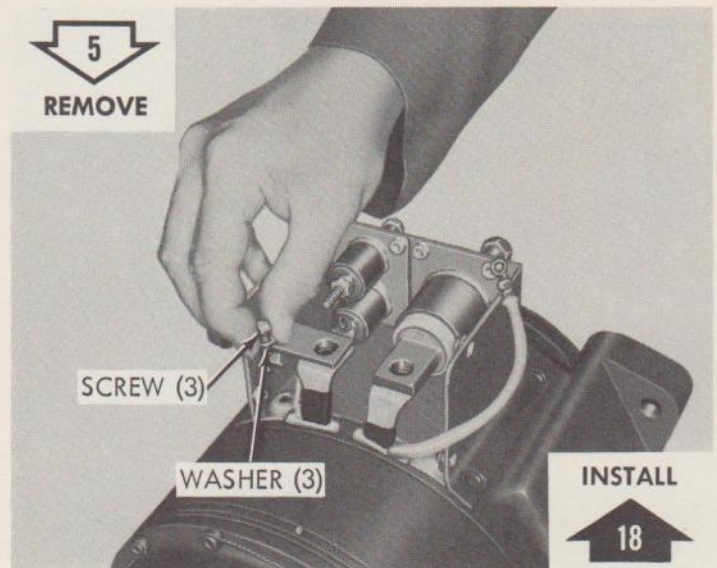
NOTE. Mark generator housing assembly, brush cover band assembly, bearing and brush support assembly, and fan cover assembly, as shown in view B, so components may be aligned in the same relative positions when assembled.



D. Four leads.



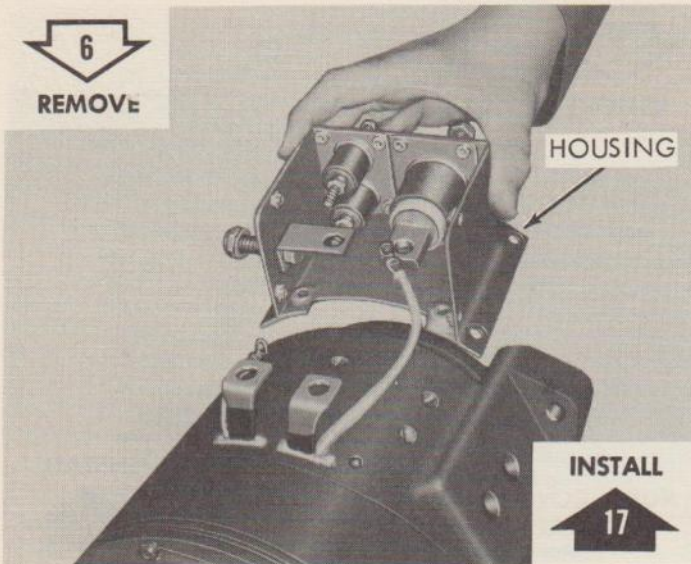
B. Generator for disassembly.



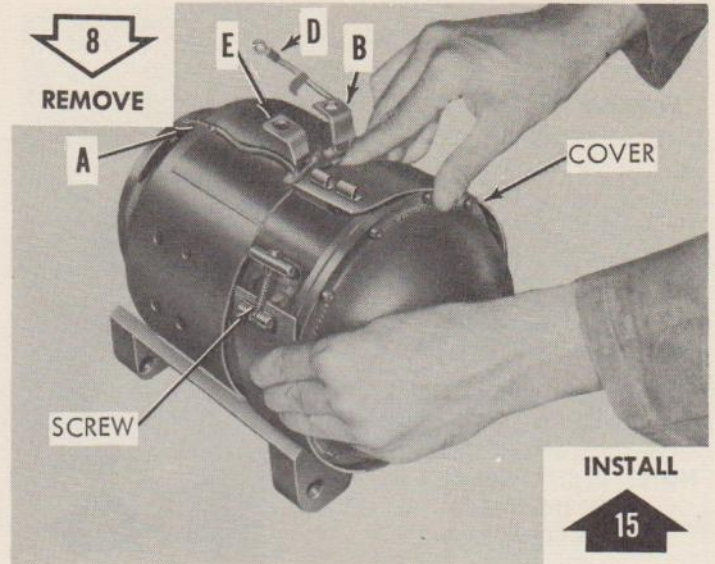
E. Filter housing screws and washers.

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FIGURE 38. DISASSEMBLING OR ASSEMBLING GENERATOR (continued to fig. 39).



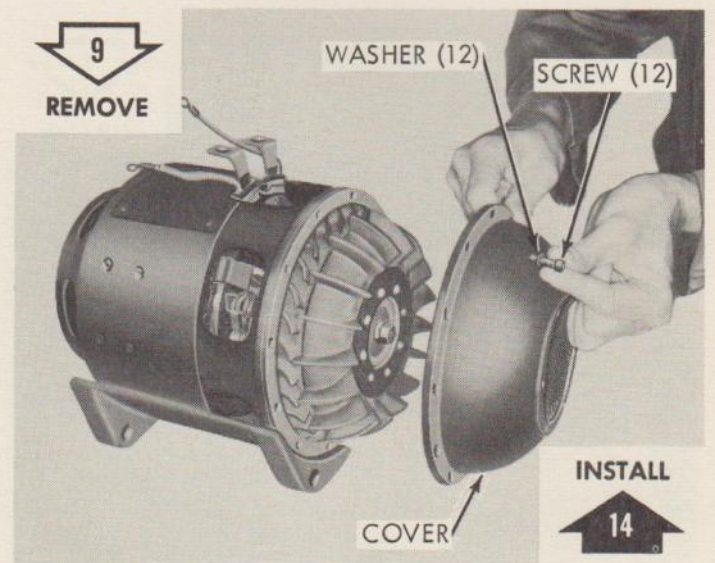
F. Radio-noise suppression filter housing.



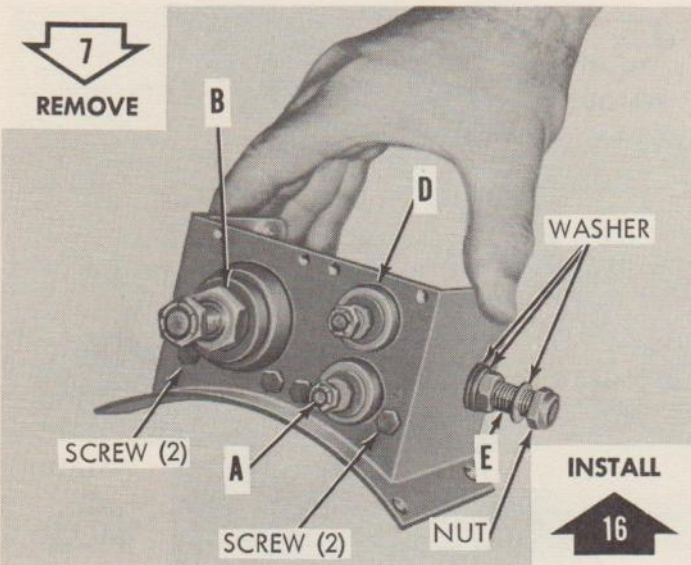
H. Brush cover band assembly.

VIEW G INSTRUCTIONS

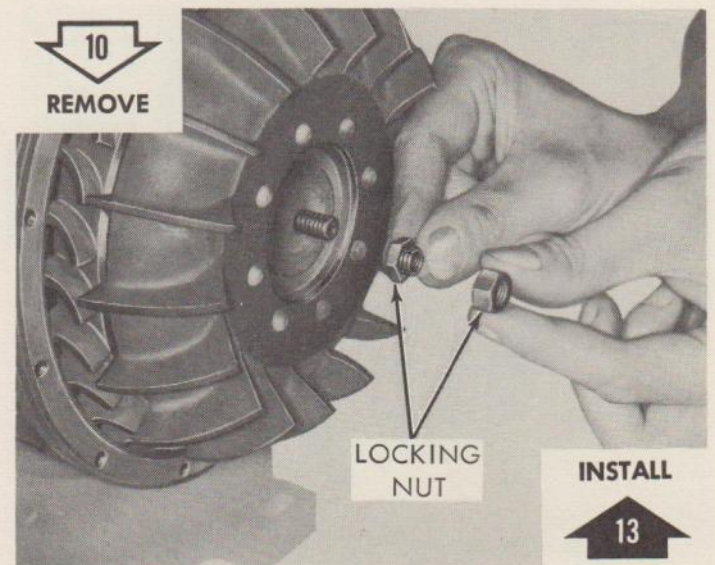
1. Capacitor at terminal B is secured by two screws.
2. Capacitors at terminal D and A secured by two screws.
3. Terminal E secured by three washers and two nuts.



I. Fan cover assembly.



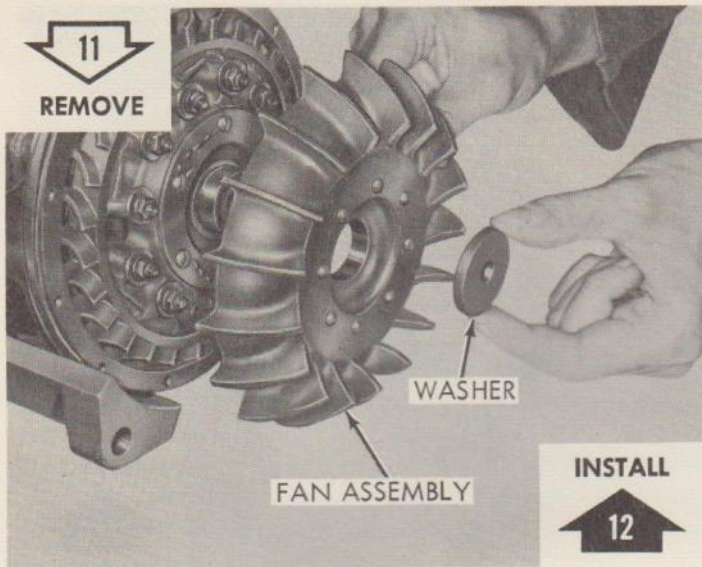
G. Capacitors, terminal, and hardware.



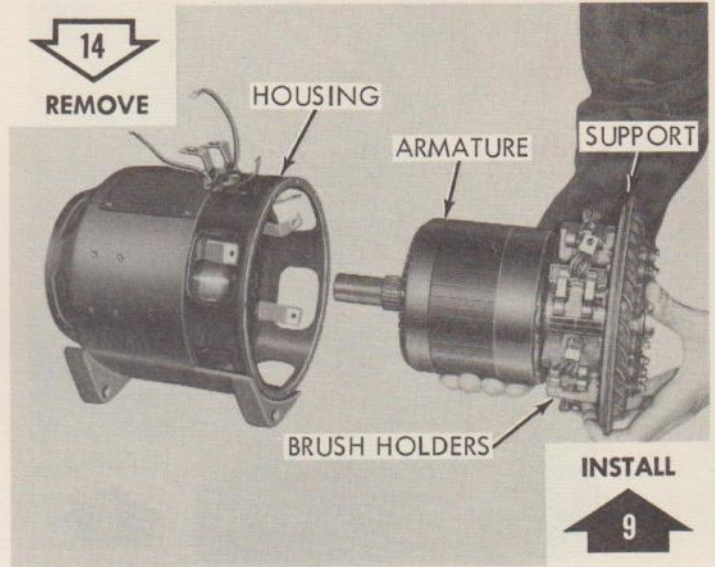
J. Outer and inner locking nuts.

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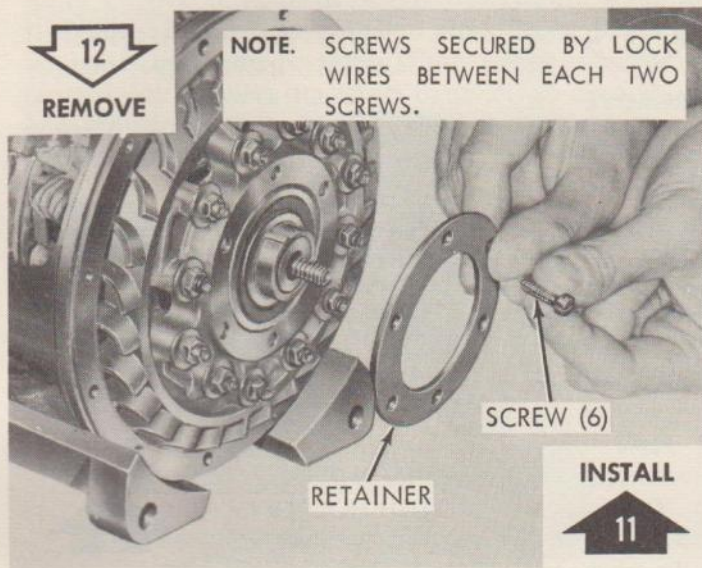
FIGURE 39. DISASSEMBLING OR ASSEMBLING GENERATOR (continued to fig. 40).



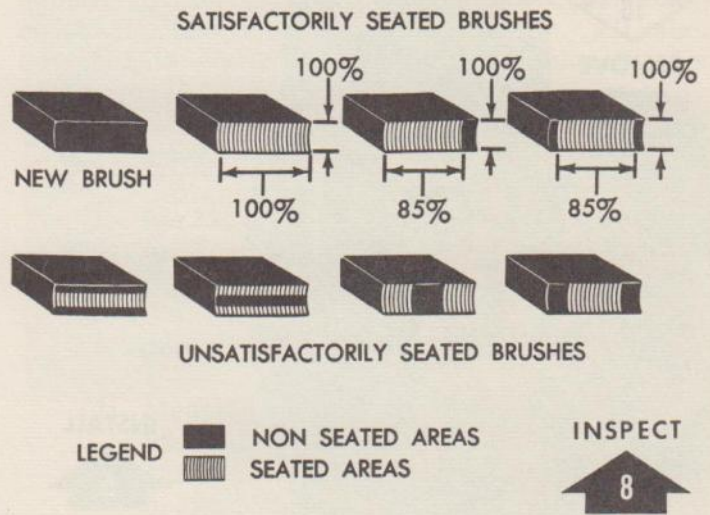
K. Washer and fan assembly.



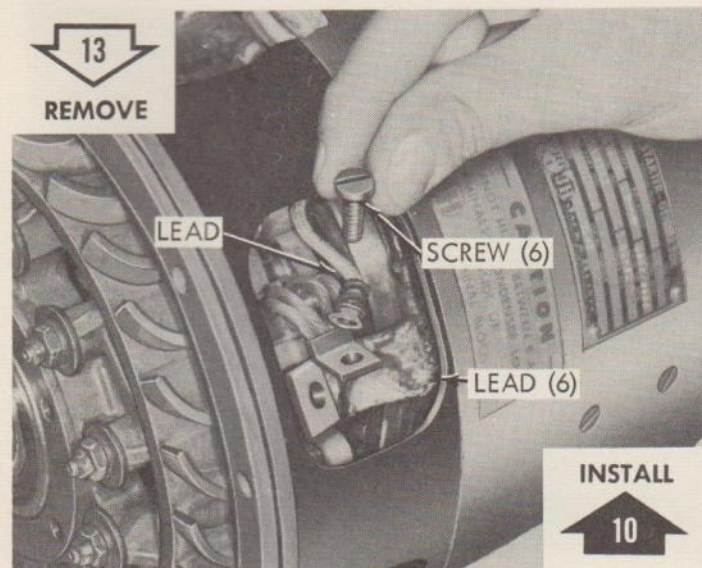
N. Armature with bearing and brush holder support assembly.



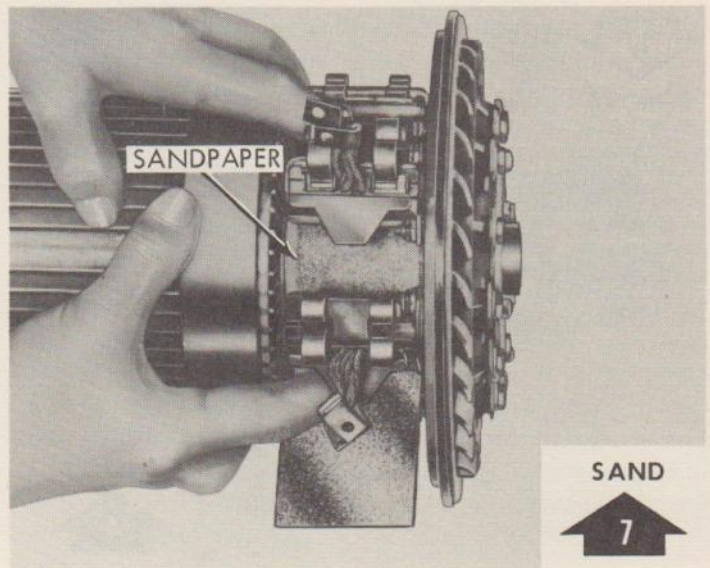
L. Retainer and screws.



O. Brushes for proper seating.



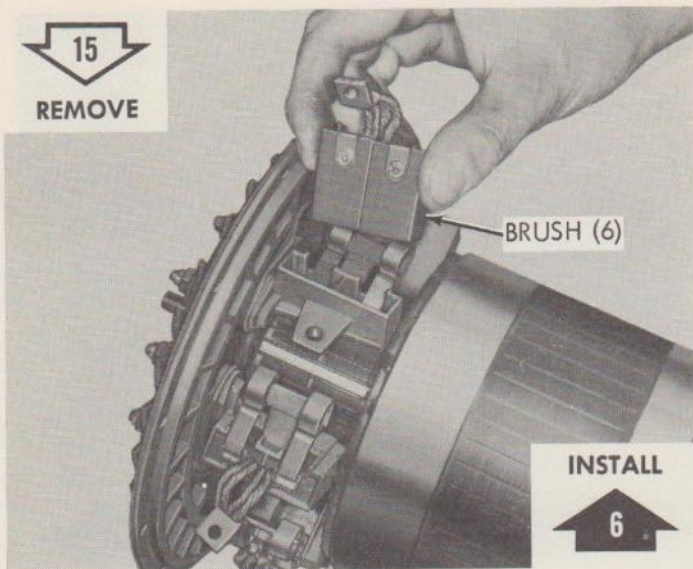
M. Screws securing brush leads.



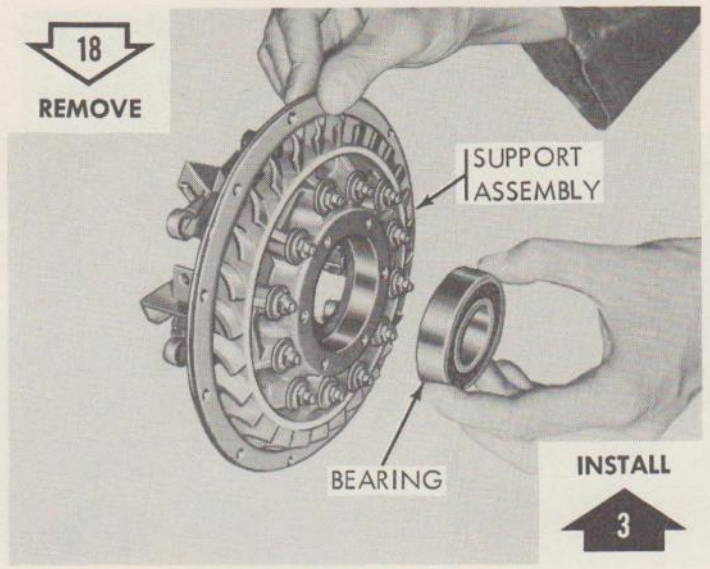
P. Brushes for proper seating.

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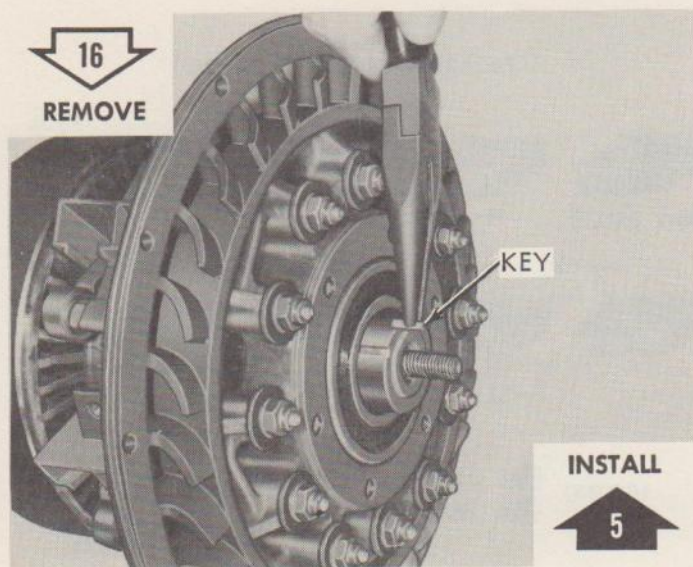
FIGURE 40. DISASSEMBLING OR ASSEMBLING GENERATOR (continued to fig. 41).



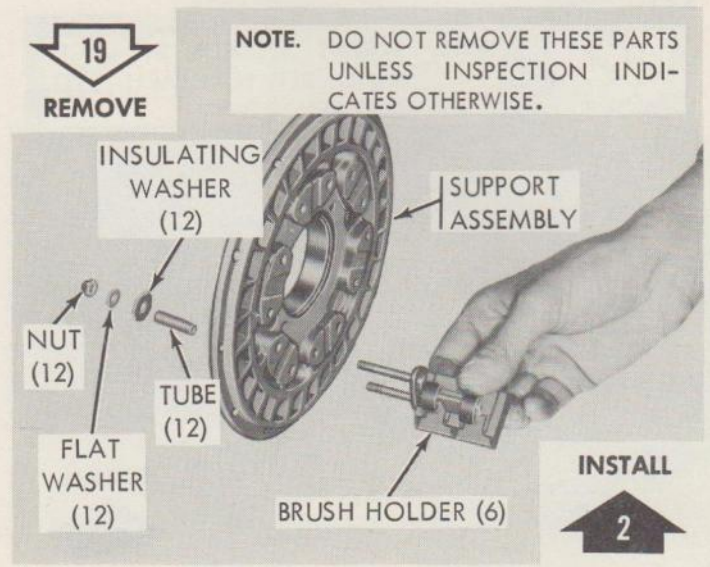
Q. Brush assemblies.



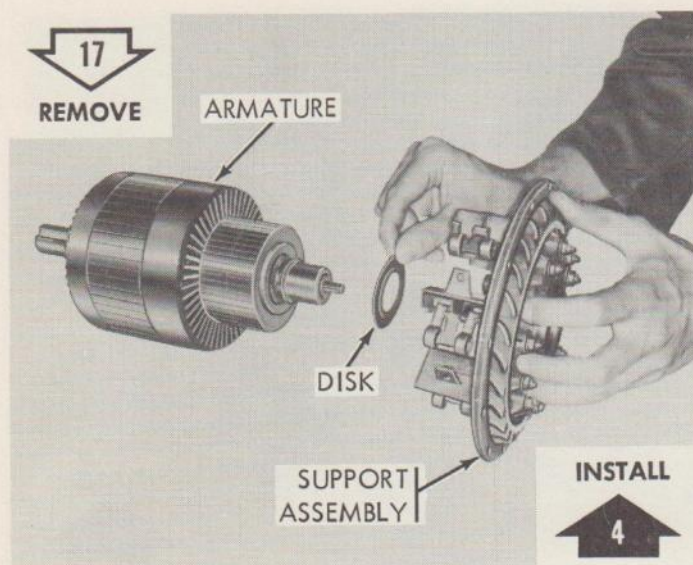
T. Commutator-end ball bearing.



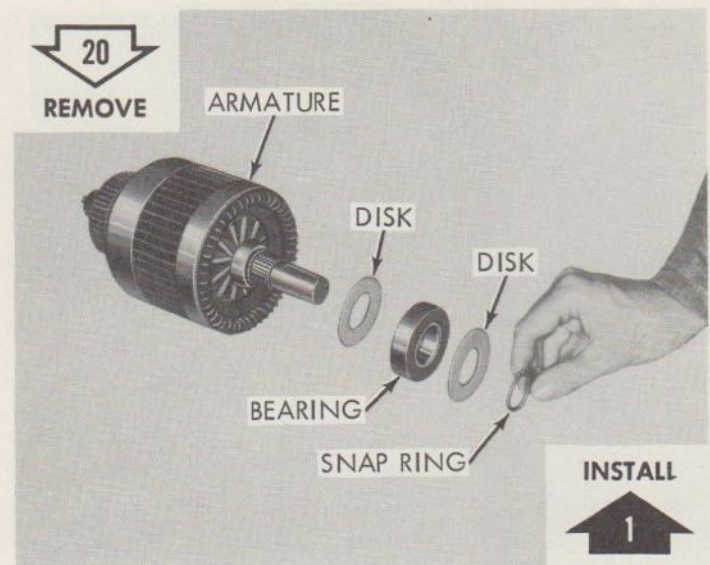
R. Fan key.



U. Nuts, washers, tubes, and brush holders.



S. Disk and support assembly.



V. Disks, ball bearing, and snap ring.

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FIGURE 41. DISASSEMBLING OR ASSEMBLING GENERATOR (continued from fig. 40).

core and simultaneously touch other prod to one commutator bar. If lamp lights, armature is grounded; replace grounded armature. Test all commutator bars in this manner.

Warning: Exercise care when using a 220-volt current: bodily injury may result under certain conditions. Do not use voltage in excess of 220 volts for any of these tests.

- (6) Place armature assembly on growler and hold thin strip of steel, such as a hacksaw blade, approximately 1/16-inch away from armature core (fig. 43). Rotate armature slowly in growler. If steel strip vibrates, winding is short circuited; replace shorted armature.

c. Brushes. If brushes are worn to lateral wear groove in edge of brush (maximum wear allowable), replace brushes in sets. If brushes are approaching wear groove when generator is received for repair, replace brushes to extend operation time after repair before replacement is again necessary.

d. Brush Springs. Check brush springs for distortion and cracks. Check brush spring tension as shown in figure 44. Spring tension is between 45 and 54 ounces when spring is in position with a new brush installed. Replace springs that are distorted, cracked, or not within tension tolerances.

e. Generator Housing Assembly.

- (1) Visually inspect generator housing assembly, making certain that pole shoe attaching screws are tight and staked.
- (2) Inspect external insulation of field coils. If insulation is burned or cracked, or if coils show signs of mechanical damage, replace entire housing assembly.
- (3) To test for short circuits, use same test circuit equipment used for testing armature (fig. 42). Connect one test lead to generator field coil housing and touch other test lead in succession to both main armature leads, field lead, and equalizer lead (fig. 45). If lamp lights on any one or more of these tests, coil insulation is defective; replace housing assembly.

f. Bearing and Brush Holder Support Assembly.

- (1) Visually inspect for cracks and distortion of brush holder assemblies. If either of

these defects shows, replace holder assembly.

- (2) Do not disassemble support assembly when all parts appear to be in good condition, with brush holders tight on the brush holder support.

g. Cooling Fan. Check cooling fan for broken vanes, broken hub, and damaged keyways. If any one of these defects shows, replace fan.

h. Fan Cover Assembly. Inspect cover assembly for chips, cracks, and distortions. If deep chips, cracks, or distortions show, replace cover.

67. REPAIR

a. General. The armature and housing assembly are the only two components repaired by restoring them to serviceable condition. All other components and repair parts are replaced when inspection indicates unserviceable condition.

b. Resurfacing Commutator.

- (1) Install commutator end bearing on armature, and mount in lathe with armature turning center in place on bearing (fig. 48). Do not mount armature on shaft centers.
- (2) Measure diameter of commutator (fig. 52, ref. E) to make certain it can be safely turned to minimum diameter of 3.220 inches. Do not attempt to refinish commutator reduced by previous resurfacing to less than 3.220 inches.
- (3) Secure and sharpen cutting tool for commutator work (fig. 46). Position cutting tool against commutator as shown in figure 47. Make certain tool is sharpened by final honing with hard, fine stone.
- (4) Take light cut across entire surface of commutator with armature rotating between 600 and 800 rpm (fig. 48). If commutator is not severely worn or pitted, first cut should renew entire surface. If commutator is badly worn, take additional cuts until entire surface is renewed. Carry each cut across entire surface without stopping, and remove no more than 0.005 inch of material in any one cut.

c. Undercutting Mica.

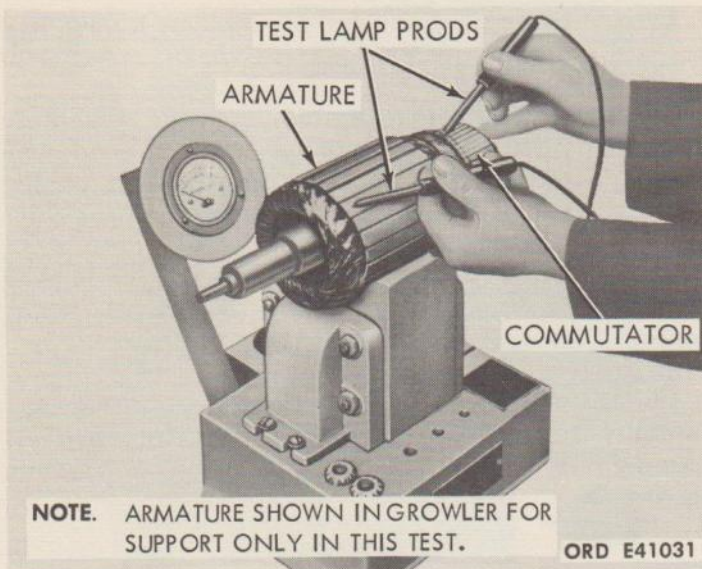


FIGURE 42. TESTING ARMATURE FOR GROUNDS.

- (1) After commutator surface has been renewed, measure depth of mica below surface. If this depth is less than 0.025 inch, undercut mica with power-driven mica undercutting tool, using cutter that will produce groove 0.052 inch wide. Cut to a depth of 0.032 inch deep (fig. 49).
- (2) After undercutting, remove carbon and mica particles with compressed air. Remove burs left by undercutting: hold strip of 5/0 sandpaper against commutator while armature rotates in lathe at approximately 2,000 rpm (fig. 50).
- (3) Set up dial indicator gage, and measure accuracy of finished commutator (fig.

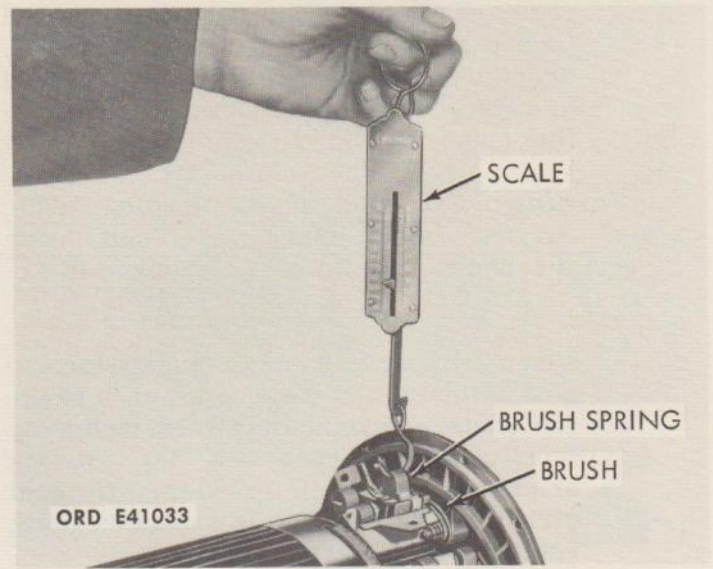


FIGURE 44. TESTING BRUSH SPRING TENSION.

51). The total indicated runout shall not exceed 0.001 inch, and variations between any two adjacent commutator bars shall not exceed 0.0002 inch.

d. Repairing Varnished Surfaces of Housing Assembly and Armature Coils.

- (1) If insulating compound on outer surface of coils is dry, cracked, or chipped, apply coat of insulating varnish and dry until tacky.
- (2) Add as many additional coats as necessary to protect surface. Dry each coat until tacky before applying next coat.

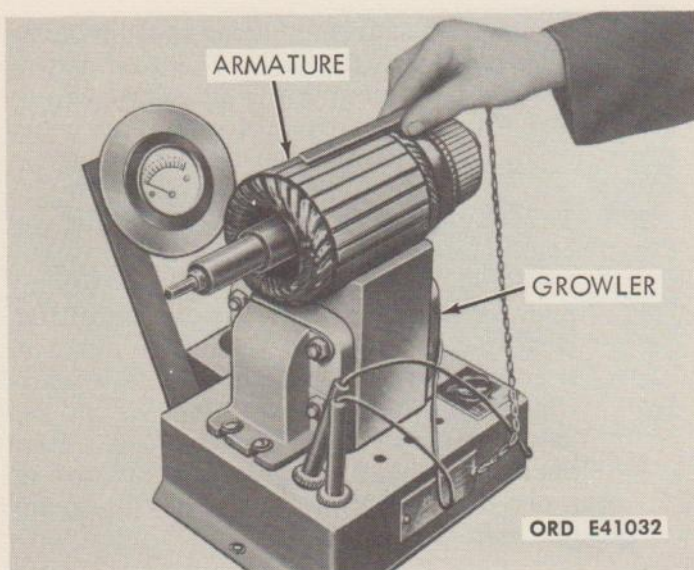


FIGURE 43. TESTING ARMATURE FOR SHORT CIRCUITS.

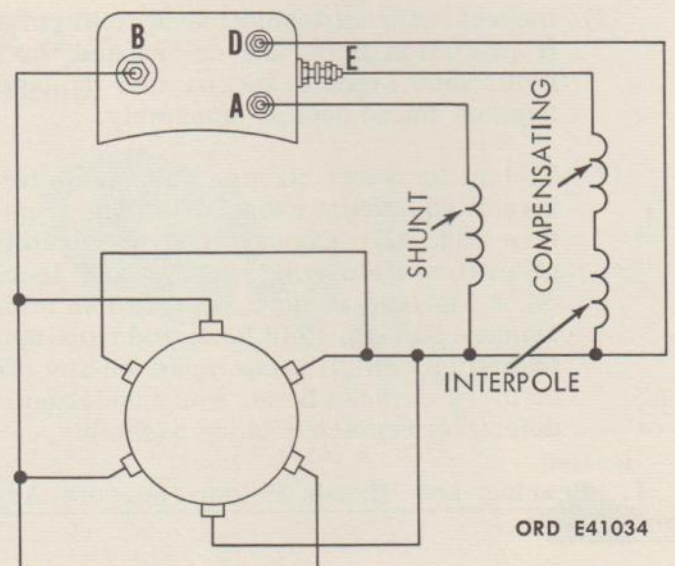


FIGURE 45. INTERNAL WIRING SCHEMATIC.

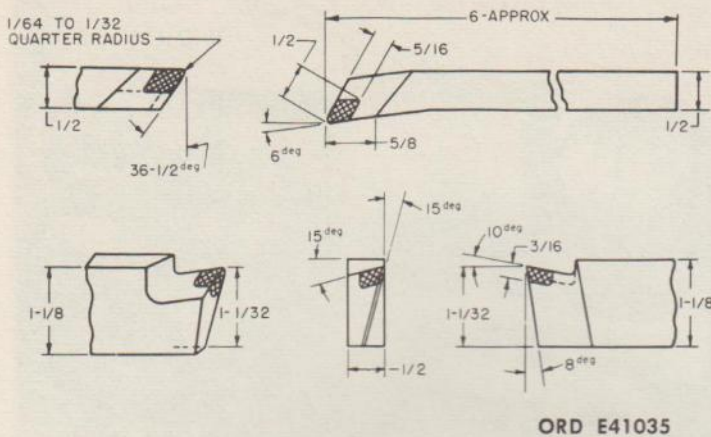


FIGURE 46. LATHE TOOL PROPERLY SHAPED FOR COMMUTATOR TURNING.

- (3) Place housing assembly or armature in oven and bake for 2 hours at 193°F. (77°C.).
- (4) After baking armature or housing assembly, perform test series outlined in paragraphs 66b or 66e.

68. GENERATOR REPAIR STANDARDS

See figure 52 for repair standard points of measurement, and table IV for repair standards for the generator. These standards give the minimum, maximum, and key clearances of new or repaired parts. They also give wear limits indicating that point to which a part or parts may be

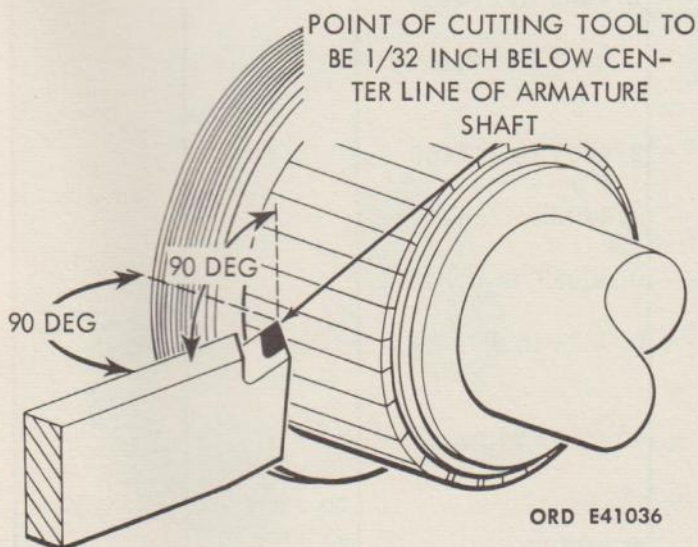


FIGURE 47. POSITION OF CUTTING TOOL TO COMMUTATOR.

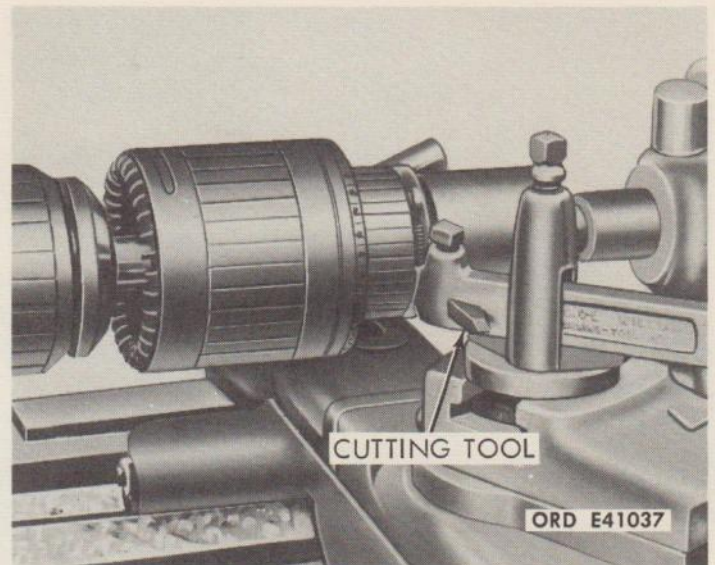


FIGURE 48. ARMATURE MOUNTED IN LATHE.

worn before replacement, in order to get maximum service with minimum replacement. Normally, all parts not worn beyond the "wear limits" dimensions or damaged from corrosion will be approved for service. Explanation of columns is as follows:

- a. The "Figure Number" column lists the number of the figure illustrating the points of measurement for each fit or limit.
- b. The "Reference Letter" column lists the callout letter(s) within the illustration.
- c. The "Point of Measurement" column defines the area or surface subject to wear.

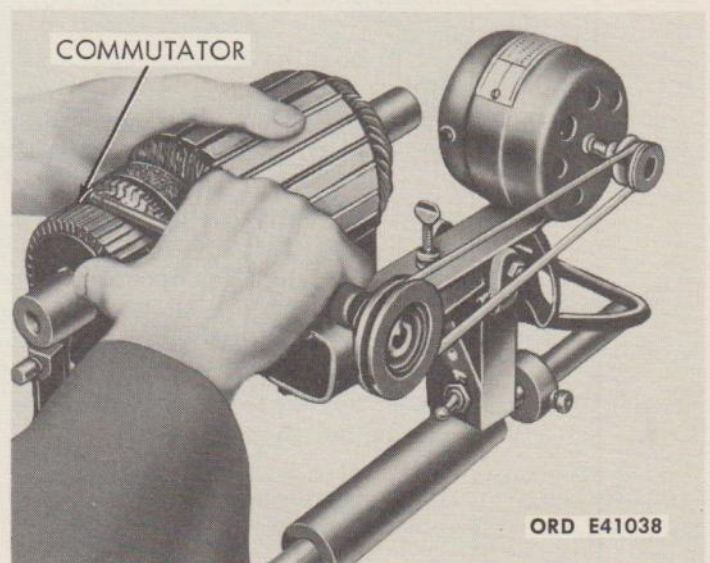


FIGURE 49. UNDERCUTTING MICA BETWEEN COMMUTATOR BARS.

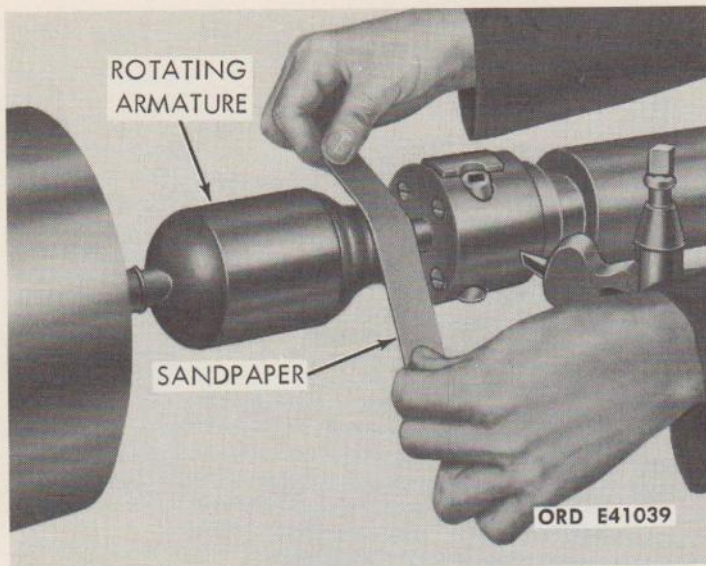


FIGURE 50. POLISHING COMMUTATOR SURFACE.

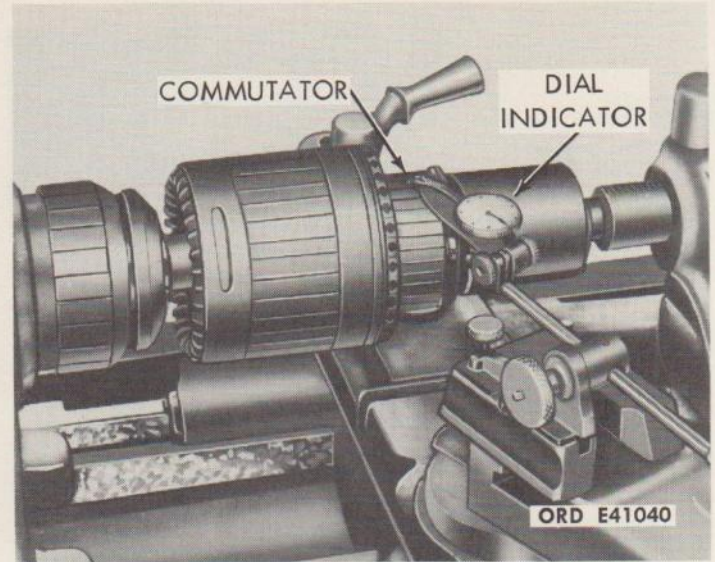


FIGURE 51. CHECKING ACCURACY OF REFINISHED COMMUTATOR.

Table IV. GENERATOR REPAIR STANDARDS

FIGURE	REF. LETTER	POINT OF MEASUREMENT	SIZES AND FITS OF NEW PARTS	WEAR LIMITS
52	A	Inside diameter of commutator bearing -----	1.1807 to 1.1811	*
	D	Diameter of armature shaft journal --	1.1810 to 1.1813	*
	A-D	Fit of shaft in bearing -----	0.0001L to 0.0006T	
	B	Outside diameter of commutator bearing -----	2.4407 to 2.4409	*
	F	Inside diameter of housing bore -----	2.4406 to 2.4409	
	B-F	Fit of bearing in bore -----	0.0003T to 0.0002L	
	B	Outside diameter of commutator bearing -----	2.4407 to 2.4409	*
	G	Inside diameter of support bore -----	2.4406 to 2.4409	*
	B-G	Fit of bearing in support -----	0.0003T to 0.0002L	
	C	End play of armature -----	0.0004 to 0.0009	*
	H	Brush spring tension (measured at new brush position) -----	45 oz to 54 oz	*
	J	Brush wear length -----		to wear groove in side of brush

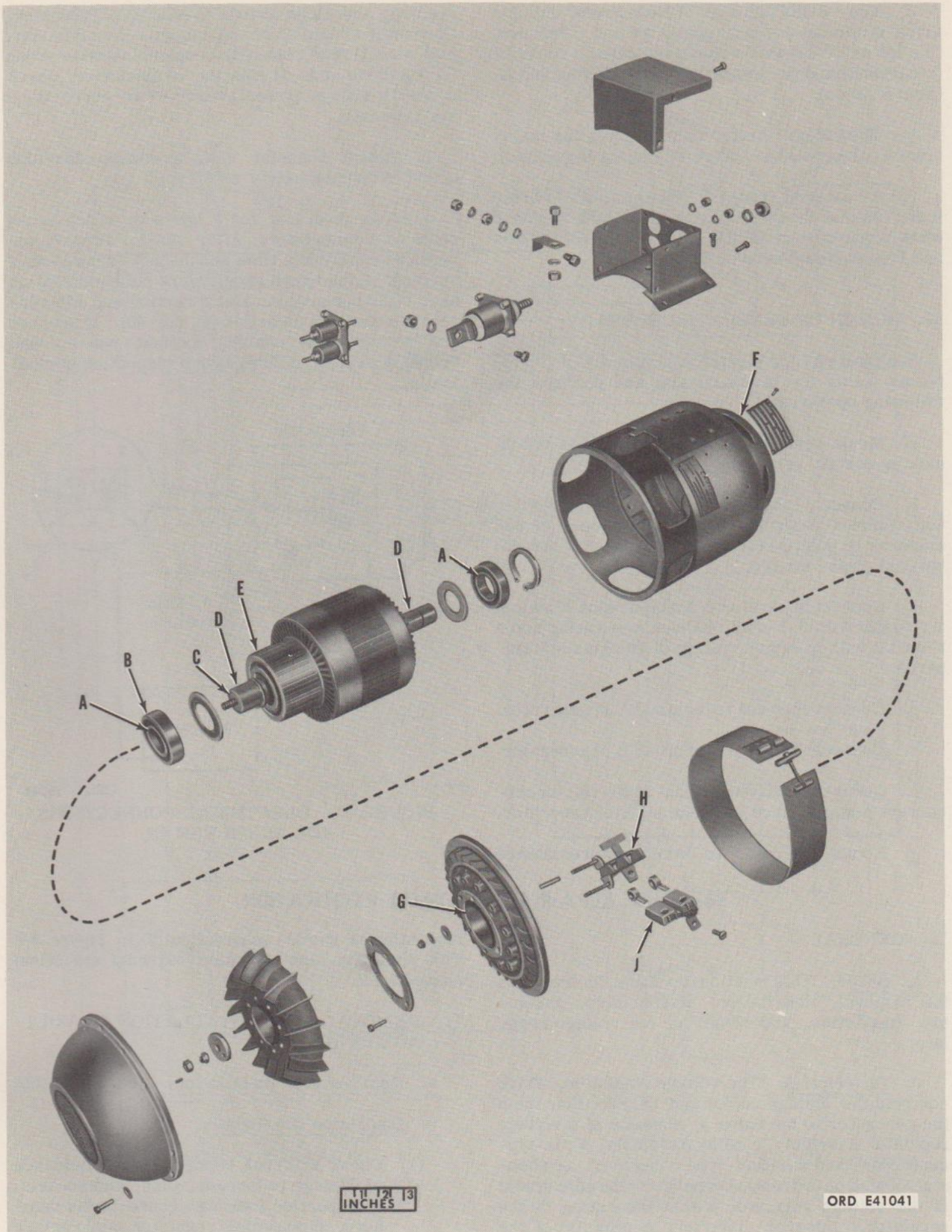


FIGURE 52. GENERATOR INSPECTION POINTS, AND REPAIR STANDARD POINTS.

d. The "Sizes and Fits of New Parts" column gives minimum-to-maximum size and clearance. The letter "L" in this column indicates a loose fit (clearance) and the letter "T" indicates a tight fit (interference).

e. The "Wear Limits" column gives the maximum wear permitted before replacing the part(s).

f. An asterisk (*) in the "Wear Limits" column indicates that the part or parts should be replaced when worn beyond the limits given in the "Sizes and Fits of New Parts" column.

69. RUN-IN OF GENERATOR BRUSH

See figure 53 for electrical continuity of a temporary setup for brush run-in, and perform the following operations:

a. Mount generator in test stand or on bench, making certain generator is well secured.

b. Connect single-pole, single-throw switch with current-carrying capacity in excess of 300 amperes to positive (+) terminal of 28-volt direct-current power source.

c. Connect in parallel from other side of switch a resistor with 0.1-ohm, 400-ampere rating and a rheostat with minimum rating of 10 ohms, 15 amperes.

d. Connect rheostat to terminal A of generator.

e. Connect resistor to terminal B of generator.

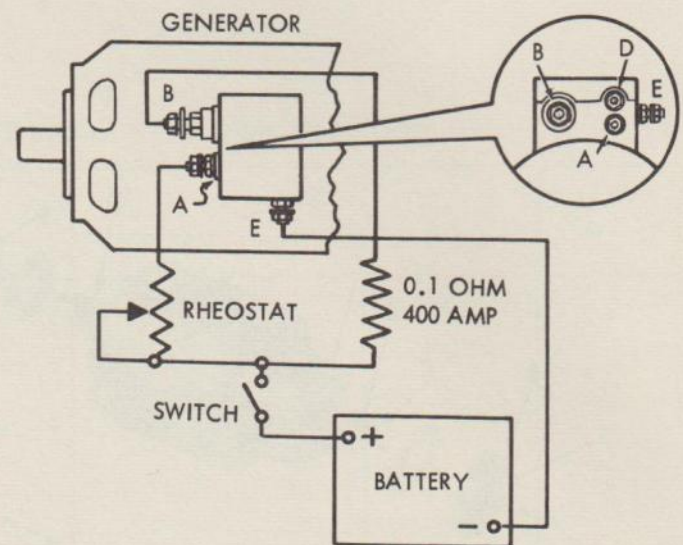
f. Connect negative terminal of 28-volt direct-current power source to terminal E of generator.

g. Rotate rheostat to minimum resistance

reading, and close switch to energize generator. Generator should start and run as a motor in normal direction of rotation, counterclockwise when facing drive end. If rotation is clockwise, check connection from power source: two connections are reversed.

h. Adjust rheostat until armature develops speed of approximately 4,000 rpm.

i. Run generator for 3 hours to polish brush seats on commutator. After run-in, remove one brush assembly at a time and inspect brush contact surface. Each brush should show polished seating area of 90 percent in axial direction and 100 percent in rotational direction (O, fig. 40). If brushes are not properly seated, continue run-in until properly seated, making brush inspection periodically.



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FIGURE 53. ELECTRICAL CONNECTIONS FOR BRUSH RUN-IN.

Section V. REPAIR OF VOLTAGE REGULATOR

70. GENERAL

a. Scope. This section contains instructions for removal, installation, disassembly, assembly, inspection, and repair of the voltage regulator.

b. Description. The voltage regulator, which controls the voltage output and current flow from the generator to the battery, consists of a voltage regulator assembly, a relay assembly, a pin-type connector, and a socket-type connector. A rheostat located on the central panel controls adjustment of the voltage regulator within the rating of the regulator. Internal electrical continuity of the

regulator is shown schematically in figure 54. This diagram also indicates external electrical connections.

71. REMOVAL AND INSTALLATION OF VOLTAGE REGULATOR

a. Removal and Installation. See figure 55.

b. Inspection and Repair.

- (1) Check external connectors for evidence of damage to threads, pins, and sockets. If inspection indicates connector is damaged, disassemble regulator, and replace connector (par. 72).

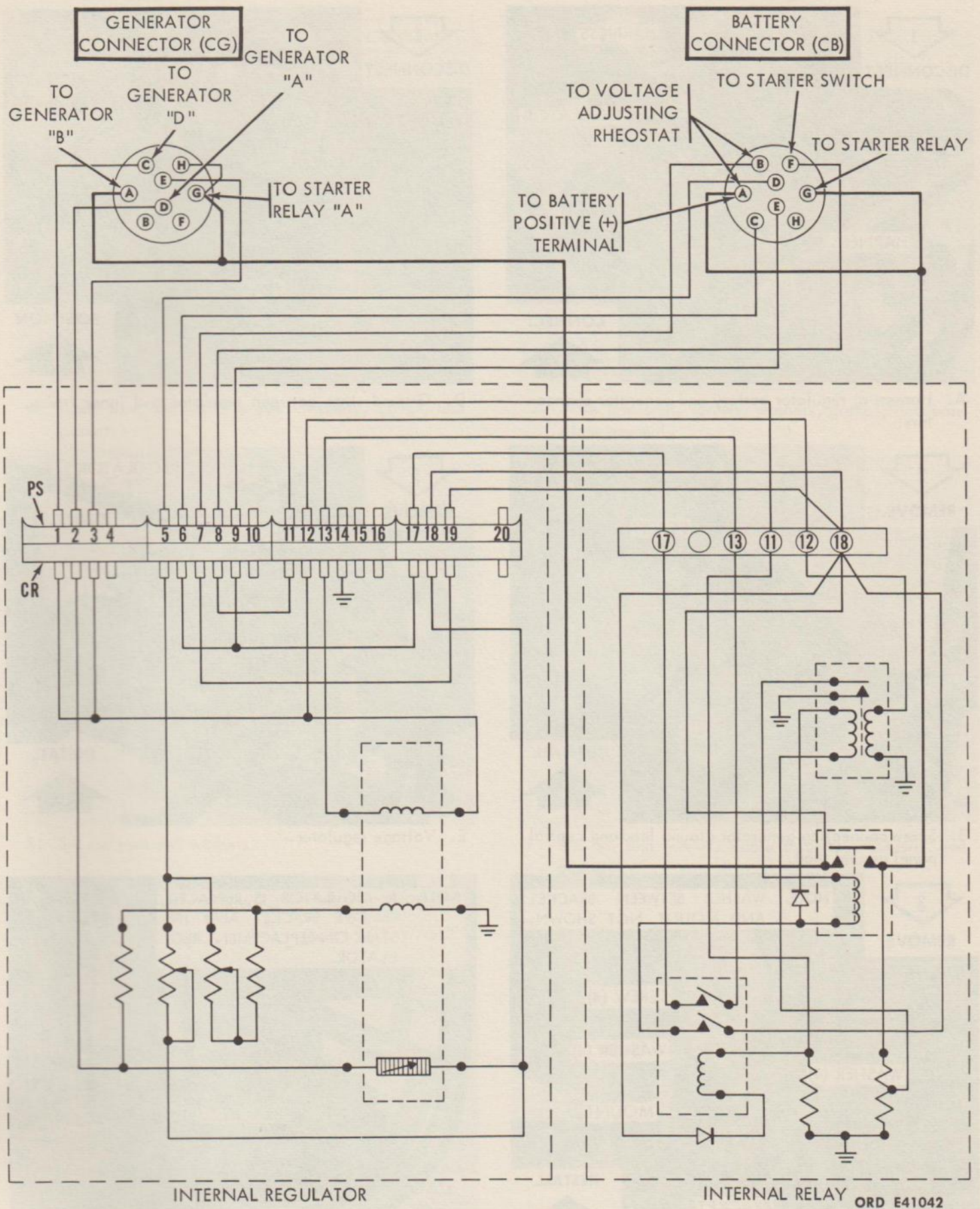
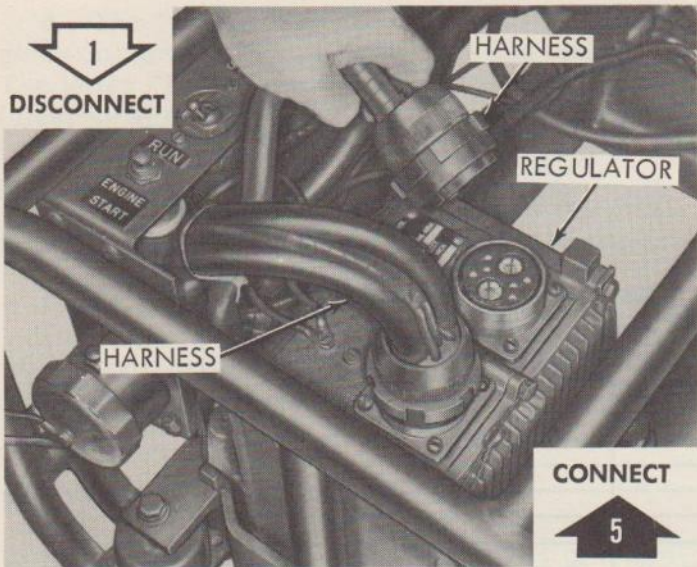
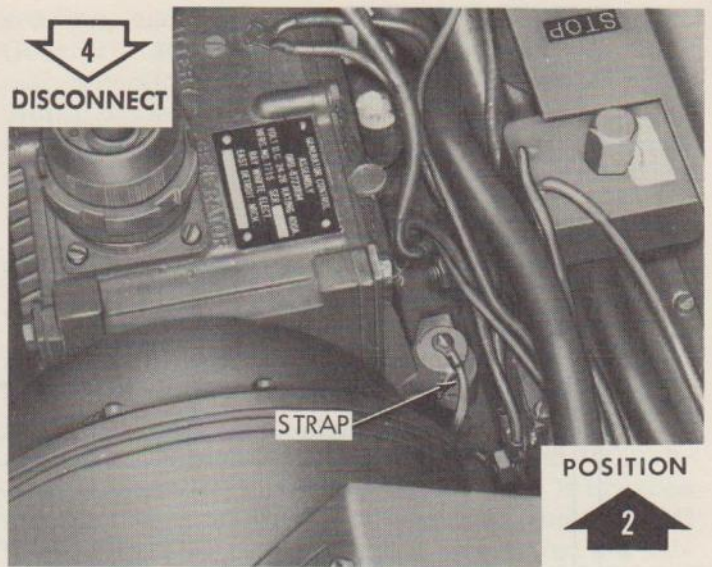


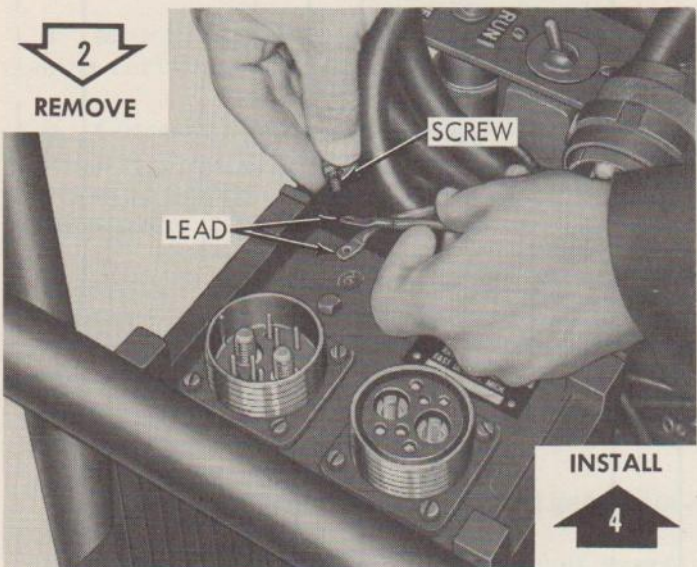
FIGURE 54. REGULATOR INTERNAL WIRING - SCHEMATIC DIAGRAM.



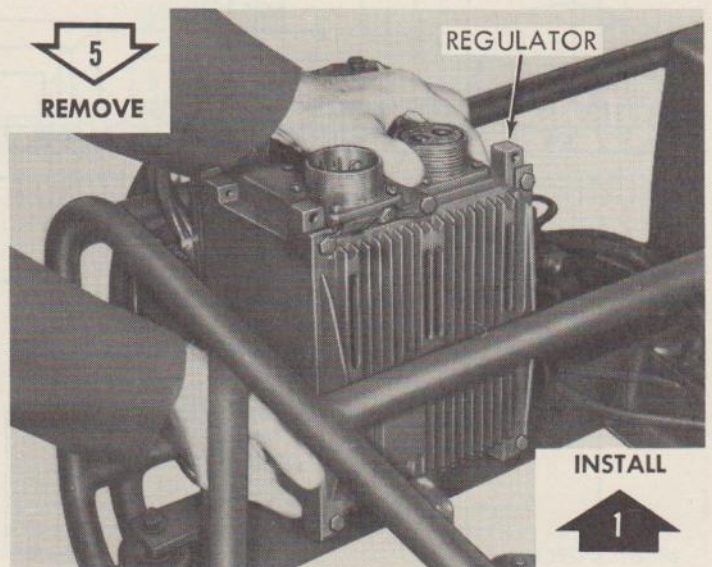
A. Harness at regulator battery and generator connectors.



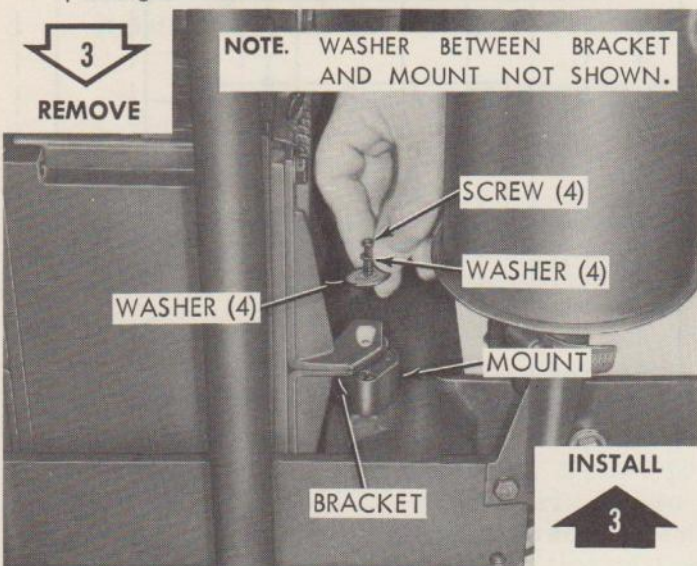
D. Ground strap between regulator and inner frame.



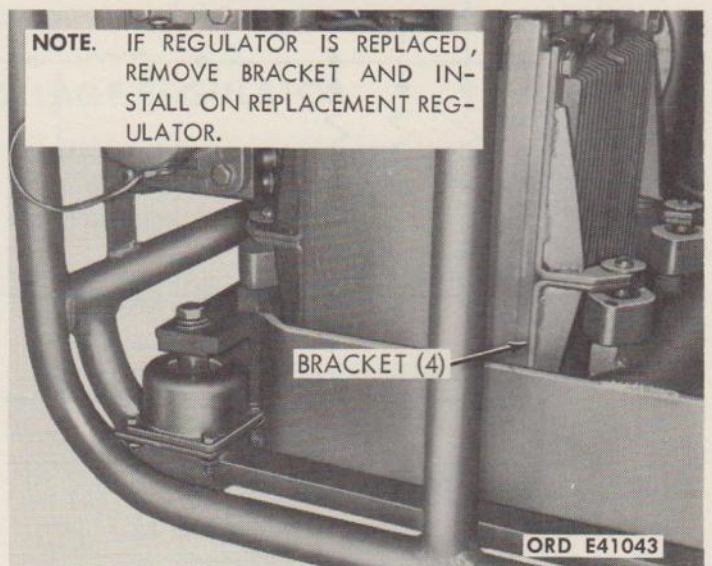
B. Screw connecting generator ground lead and control panel ground lead.



E. Voltage regulator.



C. Regulator mounting screws and washers.



F. Replacing voltage regulator mounting brackets.

FIGURE 55. REMOVING OR INSTALLING VOLTAGE REGULATOR.

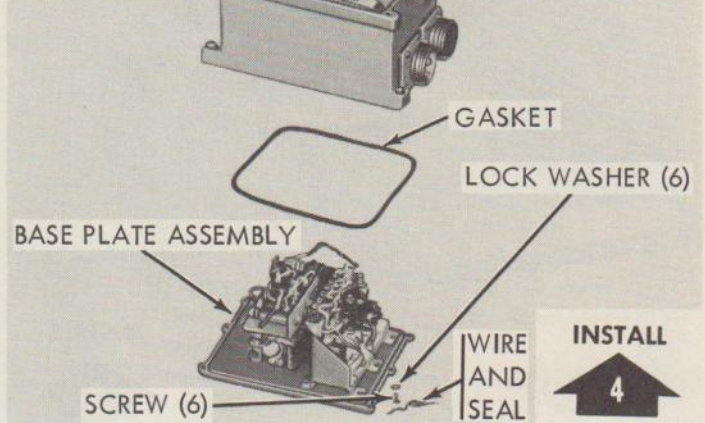
1
REMOVE

LOCK WIRE → SCREW (6)
LOCK WASHER (6) →



A. Lock wire and seal, screws, washers, cover, and gasket.

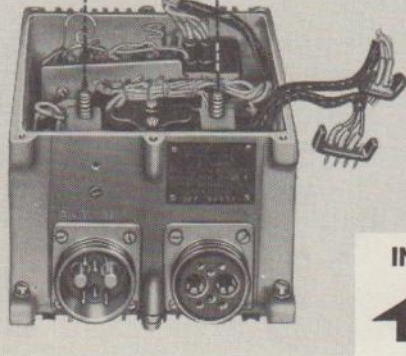
4
REMOVE



D. Wire and seal, screws, washers, gasket, and base plate assembly.

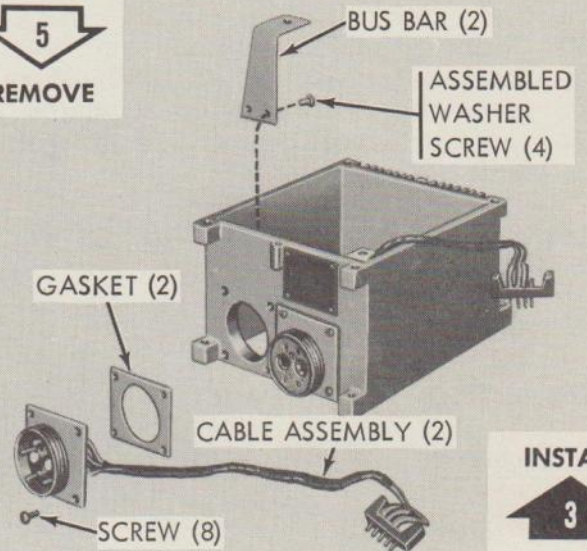
2
REMOVE

NUT → LOCK WASHER → WASHER →



B. Bus bar nuts and washers.

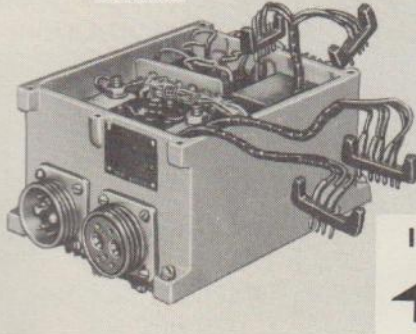
5
REMOVE



E. Bus bar and screws, cable assembly, screws, and gaskets.

3
REMOVE

SCREW → LOCK WASHER → WASHER → CLAMP →

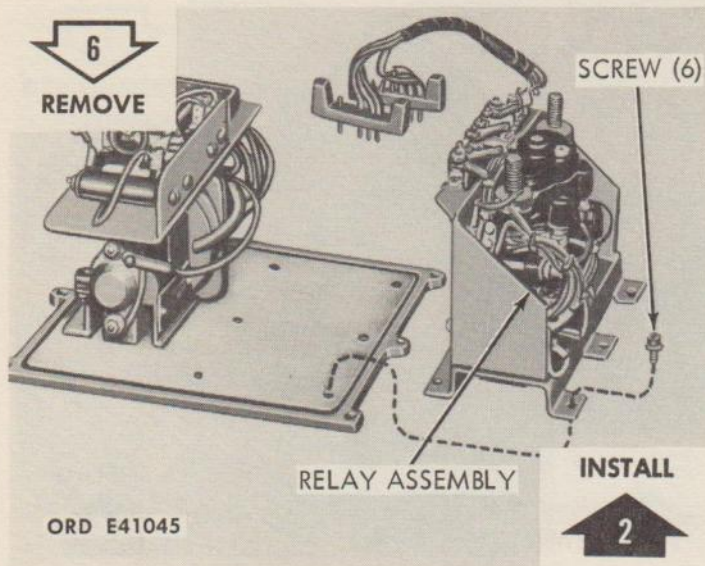


C. Screw, washers, and clamp.

NOTE. See Figure 54 for correct position to plug cable assembly pins in socket receptacle.

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FIGURE 56. DISASSEMBLING OR ASSEMBLING REGULATOR (continued to fig. 57).



F. Relay screws and relay assembly.

FIGURE 57. DISASSEMBLING OR ASSEMBLING REGULATOR (continued from fig. 56).

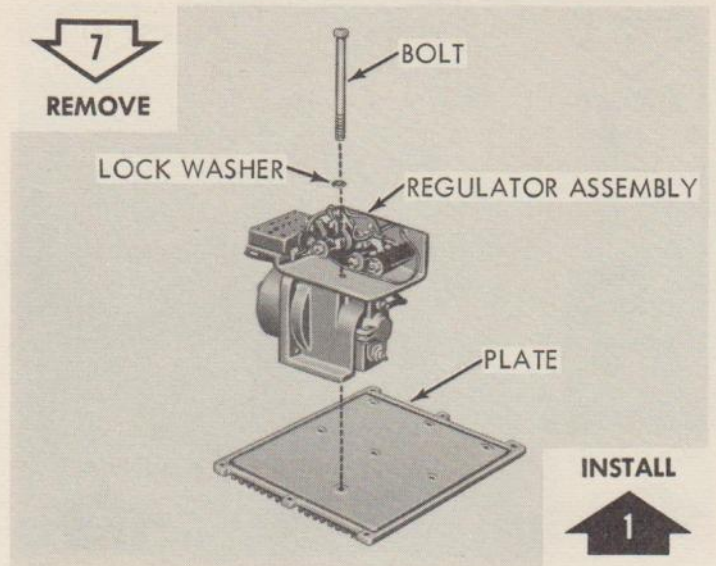
- (2) Check regulator with an ohmmeter as described in ohmmeter troubleshooting (par. 58). Disassemble regulator and check individual components if regulator is defective.

72. DISASSEMBLY AND ASSEMBLY OF VOLT-AGE REGULATOR

See figures 56 and 57.

73. INSPECTION AND REPAIR

a. Inspection.



G. Regulator assembly, bolt, and washer.

- (1) See figure 58 for visual inspection points.
- (2) See paragraph 58 and table III for checking regulator components with an ohmmeter for electrical characteristics.

b. Repair. Repair of the regulator components consists of replacing parts that do not pass visual inspection and have not retained proper electrical characteristics.

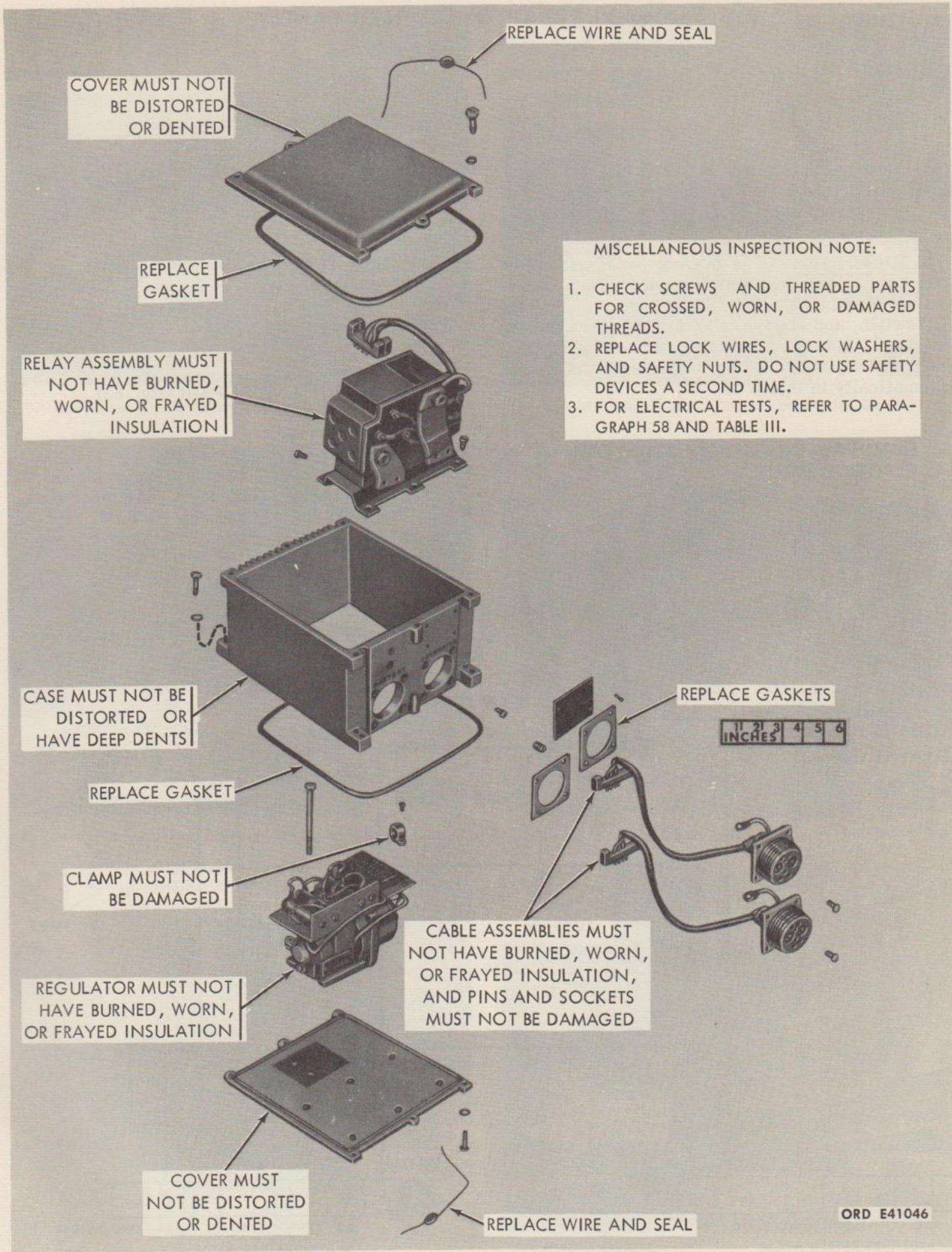


FIGURE 58. VOLTAGE REGULATOR INSPECTION POINTS.

Section VI. REPAIR OF CONTROL PANEL

74. GENERAL

a. Scope. This section contains instructions for removal, installation, disassembly, assembly, inspection, and repair of the control panel.

b. Description. The control panel assembly is an open-type panel which secures the voltage control rheostat, ENGINE START switch, STOP-RUN switch, and starter relay to the generator set. The panel, in turn, is secured to the outer frame. Electrical continuity of the panel assembly is shown schematically in figure 59.

Note. It is not necessary to remove the control panel to remove any one of the controls. For removal or installation of a single control, see the electrical disconnect point in figure 60 and removal or installation of the item in figure 61.

76. DISASSEMBLY AND ASSEMBLY OF CONTROL PANEL

See figure 62.

77. INSPECTION AND REPAIR (fig. 62)

a. Starter Relay.

- (1) Visually inspect relay for evidence of overheating, deep dents, and other damage. If any of these defects show, replace relay.

75. REMOVAL AND INSTALLATION OF CONTROL PANEL

See figure 60.

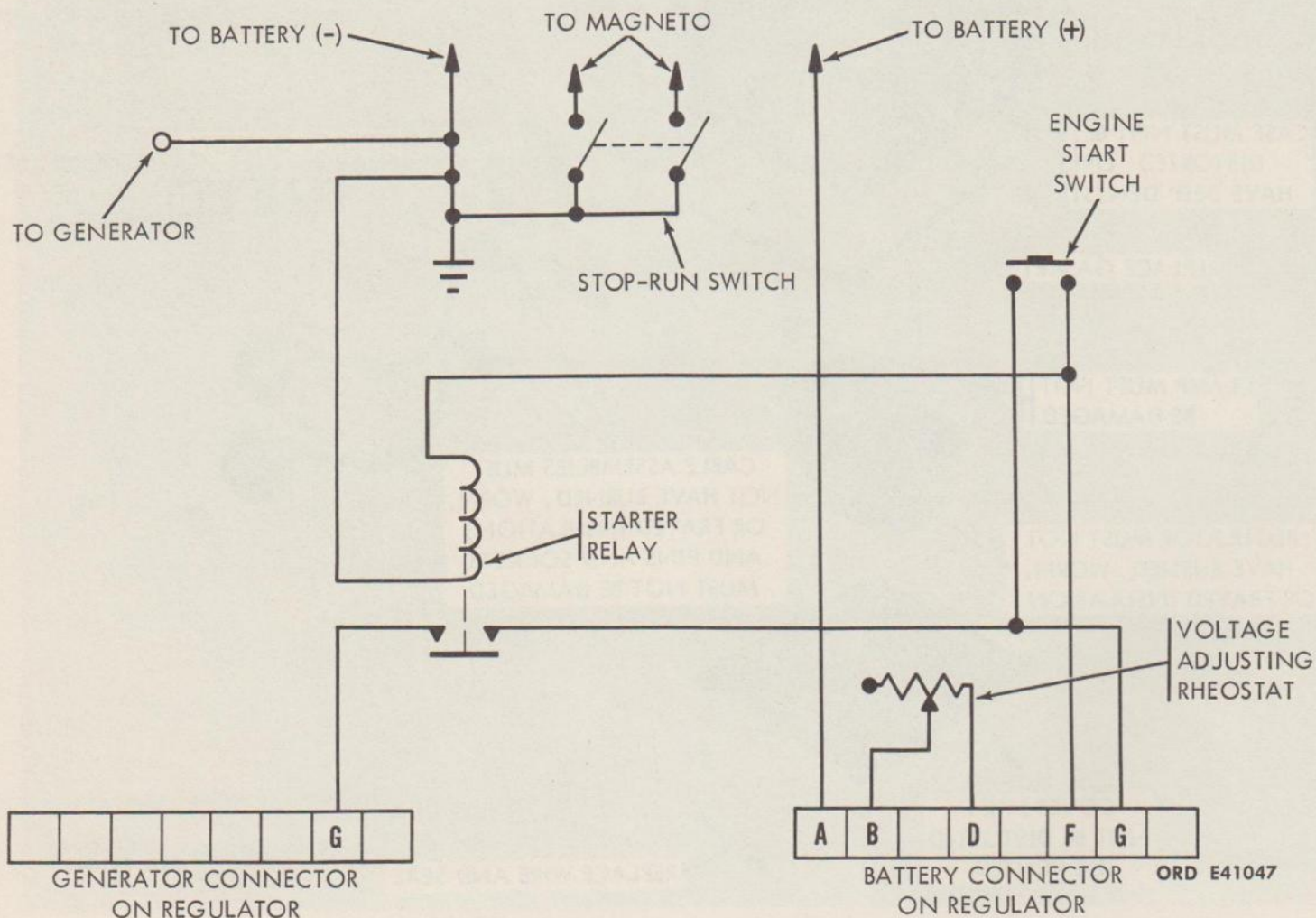
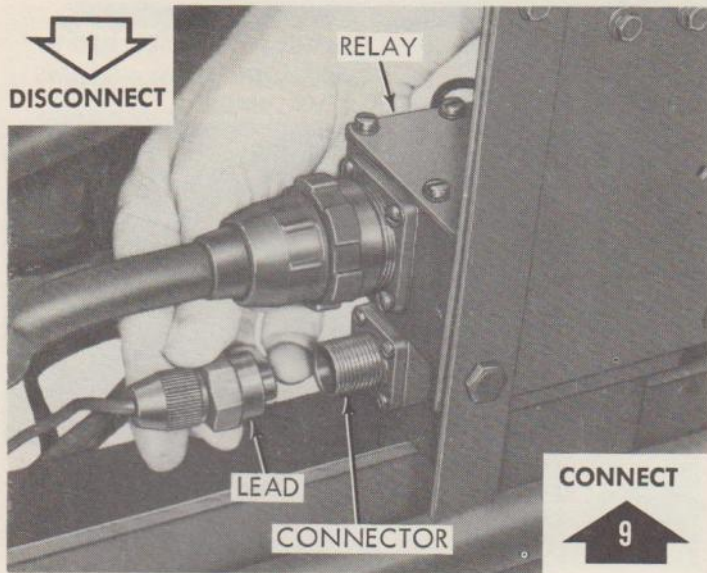
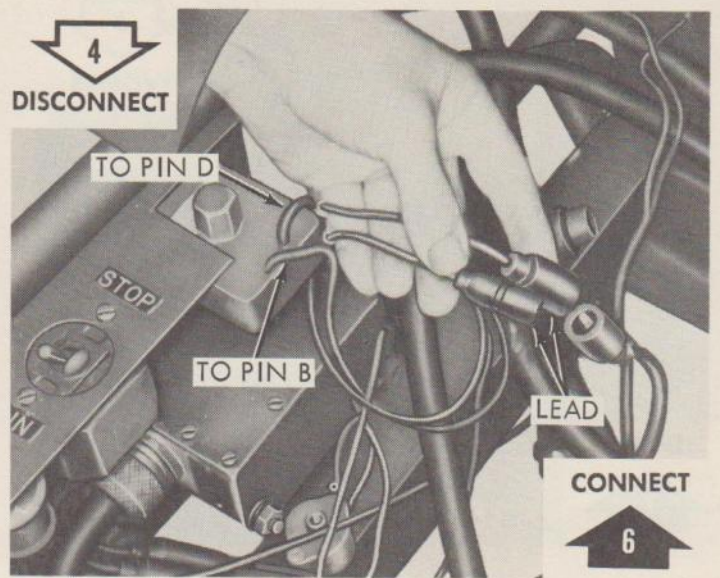


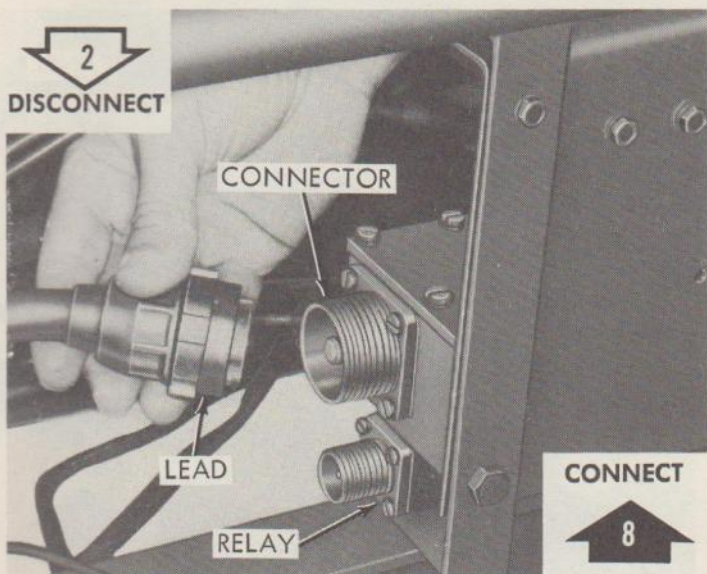
FIGURE 59. CONTROL PANEL ELECTRICAL CONTINUITY - SCHEMATIC DIAGRAM.



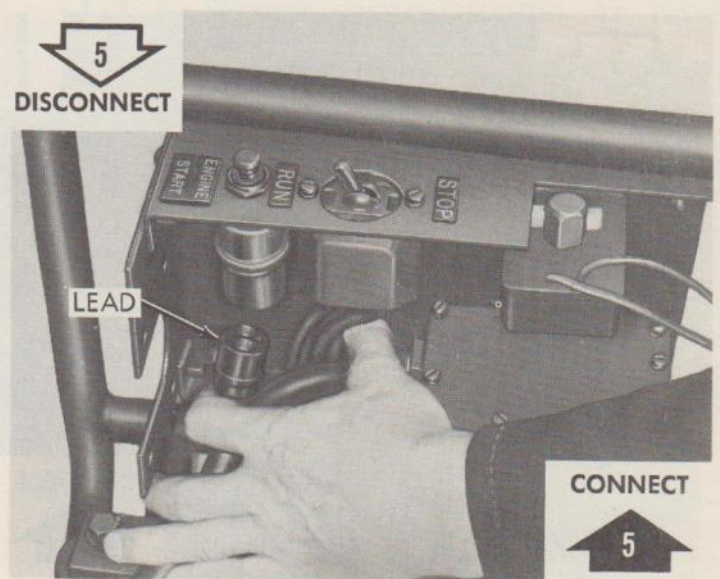
A. Starter switch-to-relay lead at relay.



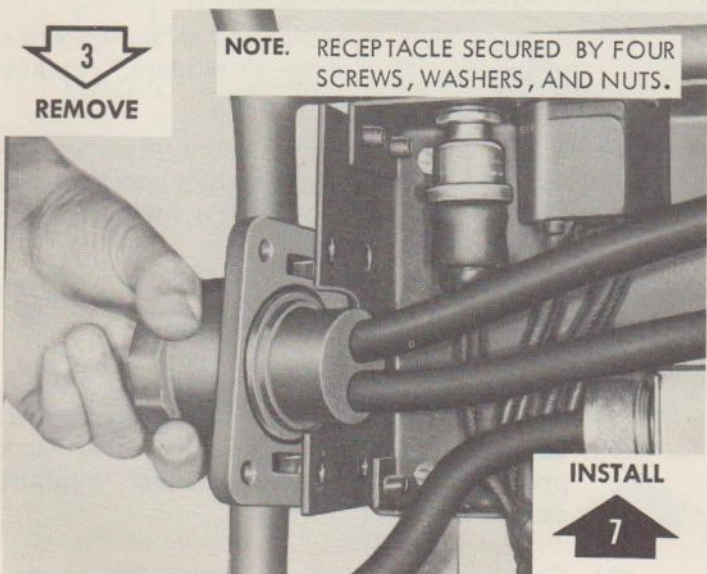
D. Rheostat-to-regulator battery connector leads.



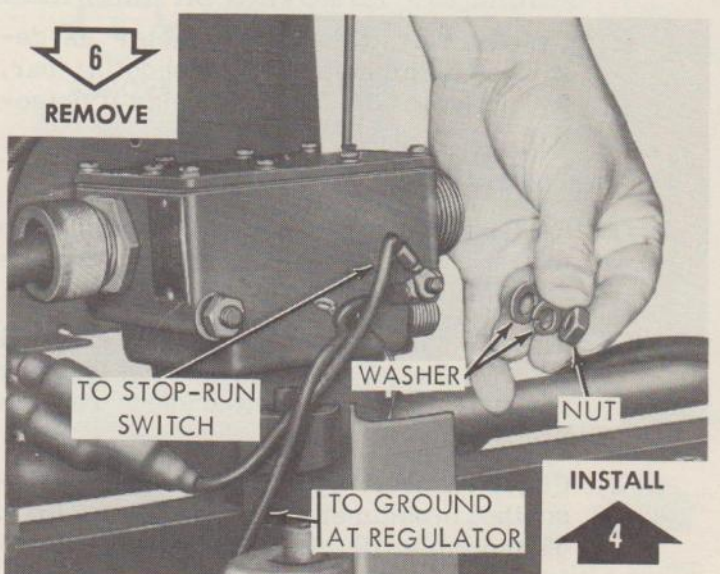
B. Relay-to-regulator battery connector pin G lead.



E. Leads at ENGINE START switch.



C. Power receptacle.



F. Nut and washers.

ORD E41048

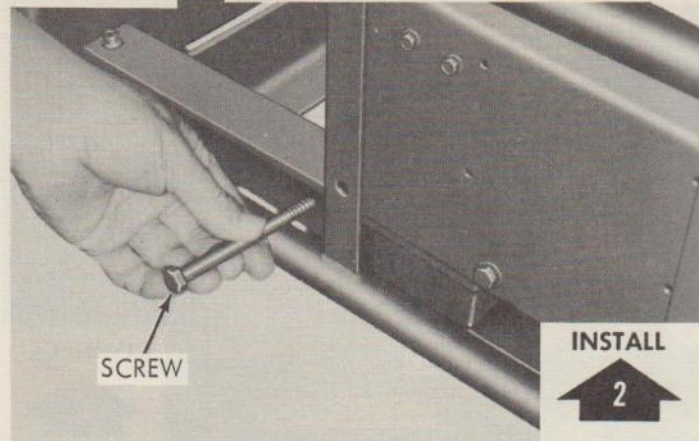
FIGURE 60. REMOVING OR INSTALLING CONTROL PANEL (continued to fig. 61).

VIEW F REMOVAL NOTE. Disconnect STOP-RUN switch lead and relay ground lead at relay.

VIEW F INSTALLATION NOTE. Position STOP-RUN switch lead and relay ground lead on screw at relay.

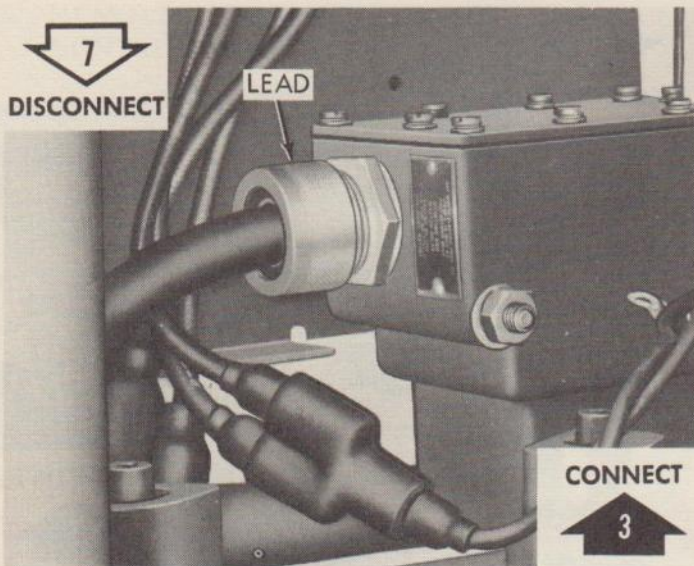
8
REMOVE

NOTE. CONTROL PANEL SECURED BY THREE ADDITIONAL SCREWS AND WASHERS.



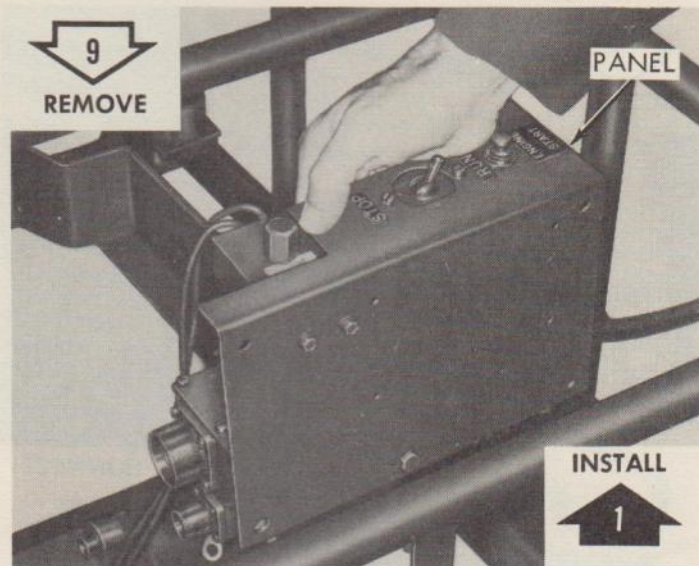
H. Screw at control panel.

7
DISCONNECT



G. Relay-to-regulator generator connector socket G lead.

9
REMOVE



I. Control panel.

ORD E41049

FIGURE 61. REMOVING OR INSTALLING CONTROL PANEL (continued from fig. 60).

- (2) Check relay with an ohmmeter as described in ohmmeter troubleshooting (par. 58 and table III). Replace relay if defective.

b. Rheostat.

- (1) Rotate adjusting knob to determine if knob moves freely. If knob is frozen, replace rheostat.
- (2) Visually inspect rheostat for any external damage that would cause it not to work properly. If damage is evident, replace rheostat.
- (3) Check rheostat with an ohmmeter as described in ohmmeter troubleshooting (par. 58 and table III). Replace rheostat if defective.

c. STOP-RUN Switch.

- (1) Visually inspect switch for any external

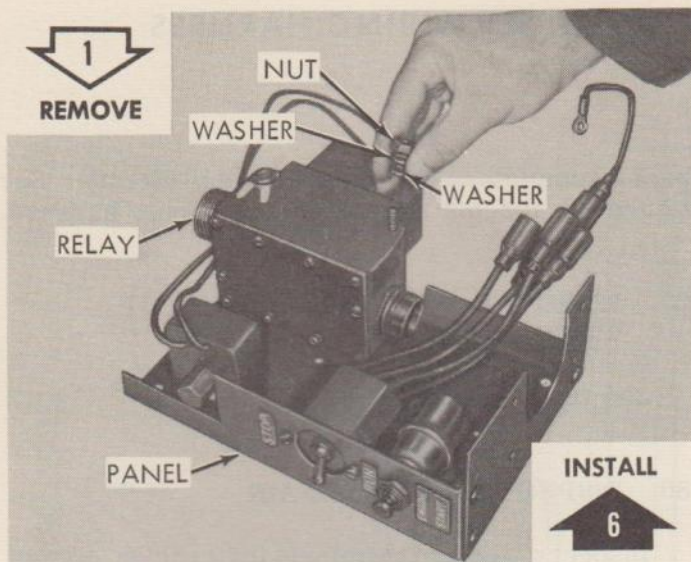
damage that would cause it not to work properly. If damage is evident, replace switch.

- (2) Check switch with an ohmmeter as described in ohmmeter troubleshooting (par. 58 and table III). Replace switch if defective.

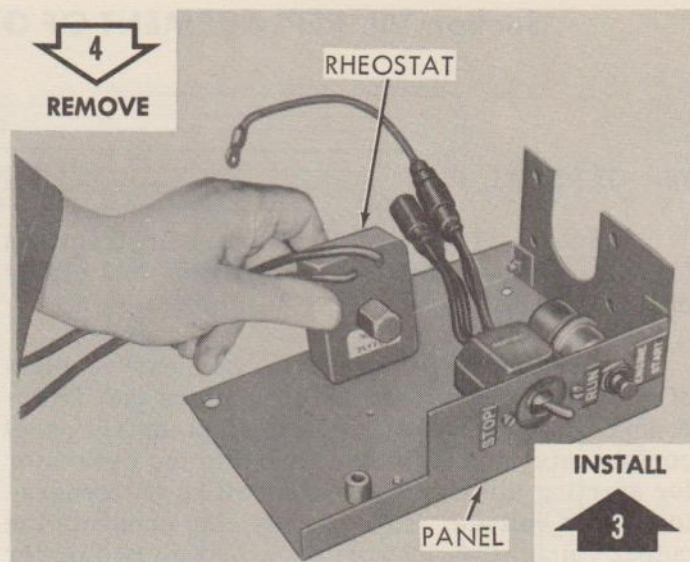
Note. Switch is off (open) in RUN position and on (closed) in STOP position.

d. ENGINE START Switch.

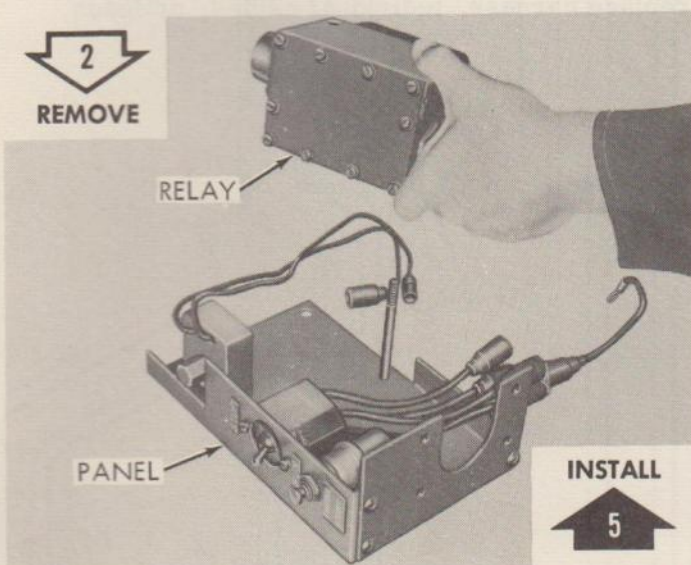
- (1) Visually inspect switch for any external damage that would cause it not to work properly. If damage is evident, replace switch.
- (2) Check switch with an ohmmeter as described in ohmmeter troubleshooting (par. 58 and table III). Replace switch if defective.



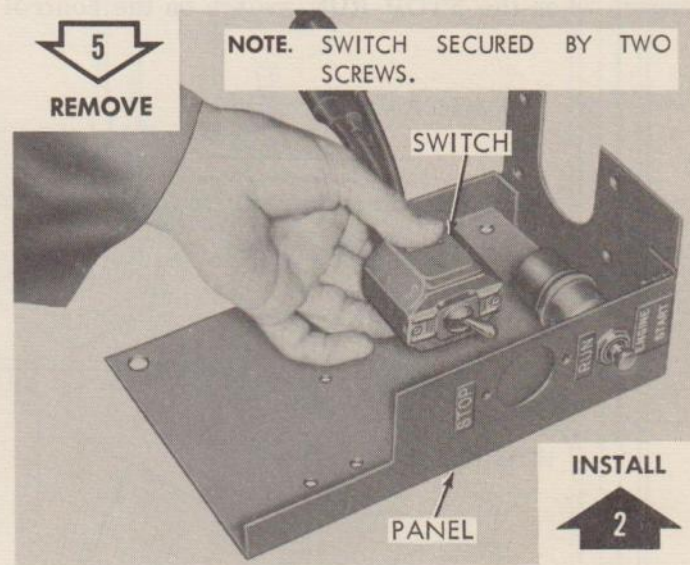
A. Nut and washers at relay.



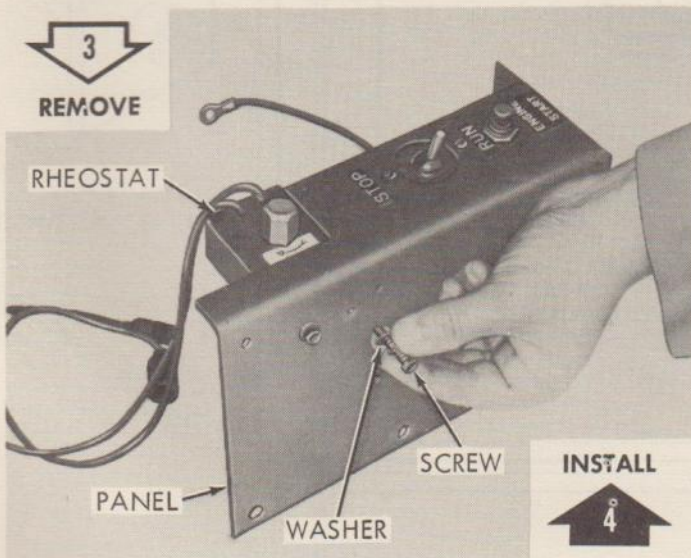
D. Rheostat.



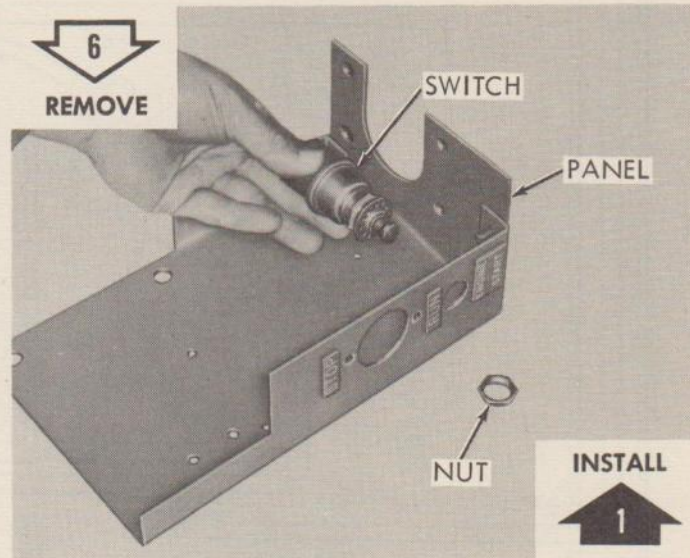
B. Starter relay.



E. STOP-RUN switch.



C. Rheostat screws and washers.



F. Switch nut and ENGINE START switch. ORD E41050

FIGURE 62. DISASSEMBLING OR ASSEMBLING CONTROL PANEL.

Section VII. REPLACEMENT OF GENERATOR SET WIRING HARNESS

78. GENERAL

a. Scope. This section contains instructions for removal, installation, inspection, and repair of the wiring harness.

b. Description. The wiring harness consists of the necessary wiring and connectors that interconnect the generator, regulator and control panel components, and furnish current to the generator for starting the engine and controlling the generator output voltage. The harness also connects the output voltage to a load or loads through two power receptacles. Two electrical wires clamped to the harness and grounded at the starter relay stop the engine when the STOP-RUN switch on the control

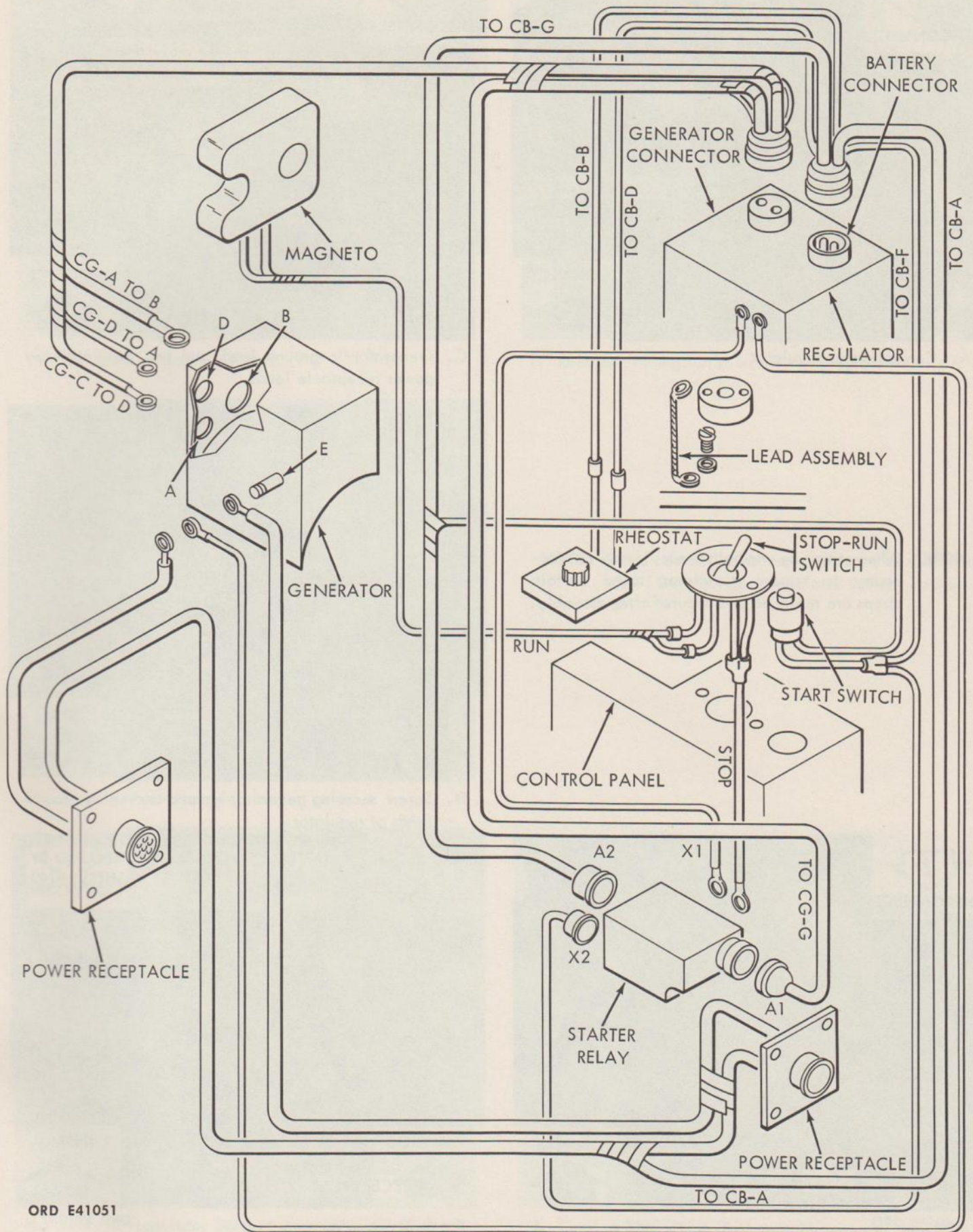
panel completes or interrupts the circuit. See figure 63 for the generator set wiring harness.

79. REMOVAL AND INSTALLATION OF WIRING HARNESS

See figures 64 through 66.

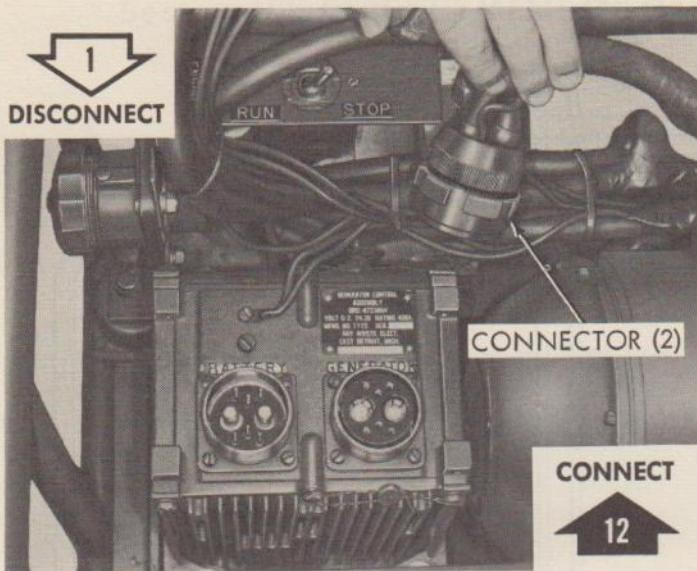
80. INSPECTION AND REPAIR

Inspect wires and terminals for cracks, breaks, burned places, and worn and damaged insulation. If wires or terminals show any one of these defects, replace harness, individual cables, or leads.

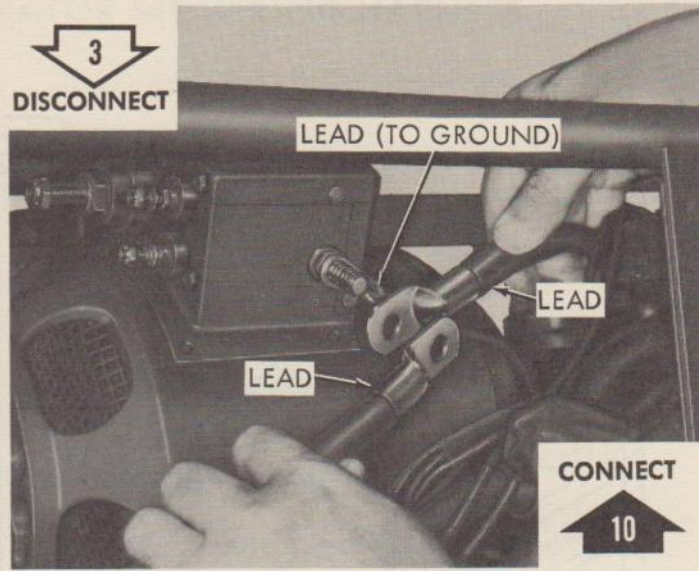


ORD E41051

FIGURE 63. GENERATOR SET WIRING HARNESS - SCHEMATIC DIAGRAM.

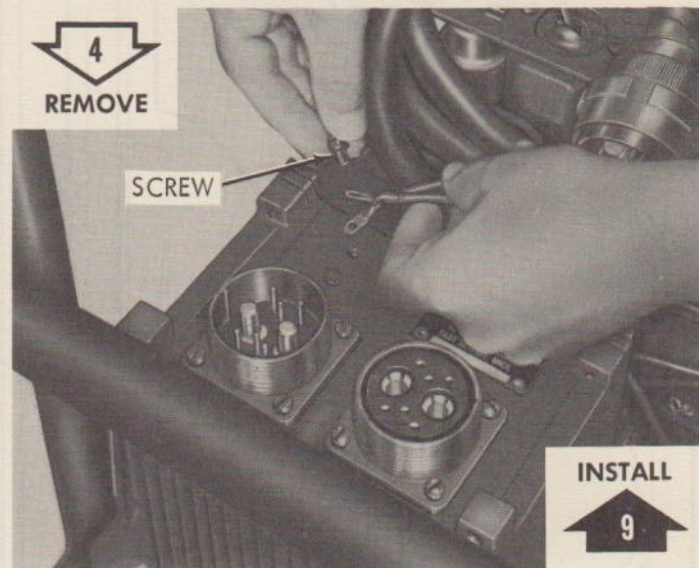


A. Connectors at regulator.

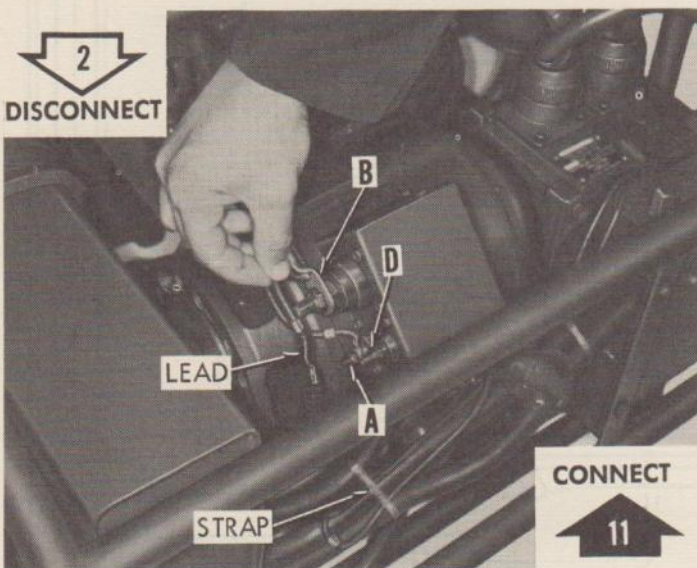


C. Generator-to-ground lead and two generator-to-power receptacle leads.

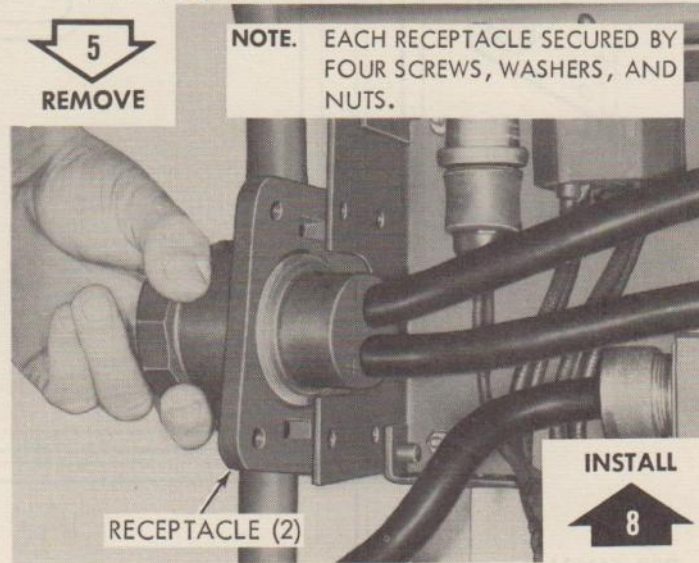
NOTE. When removing wiring harness, it may be necessary to remove tie-straps; make certain straps are replaced and secured after assembly.



D. Screw securing generator ground and relay ground leads at regulator.



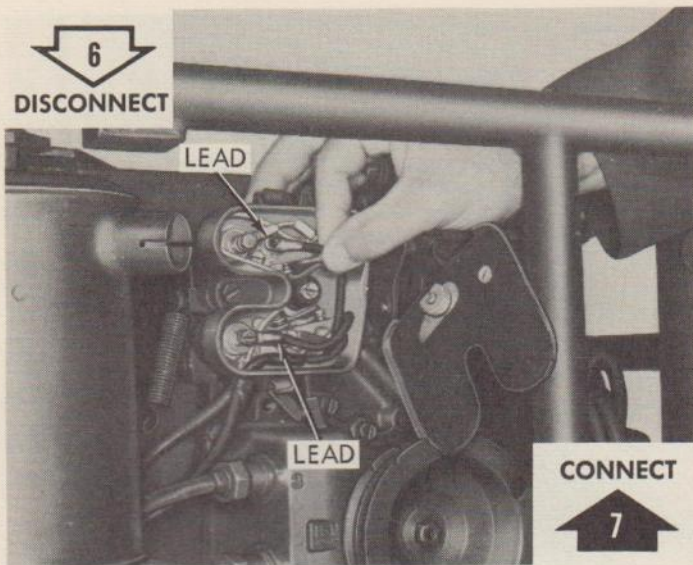
B. Leads at generator terminals B, D, and A.



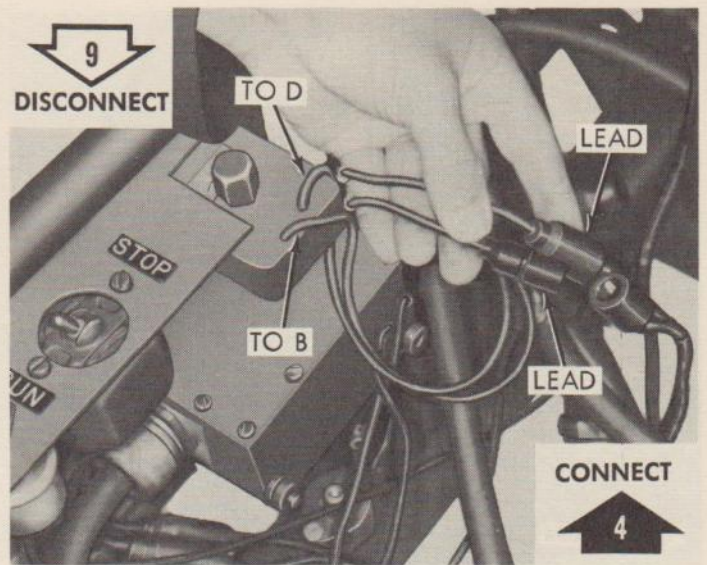
E. Both power receptacles.

ORD E41052

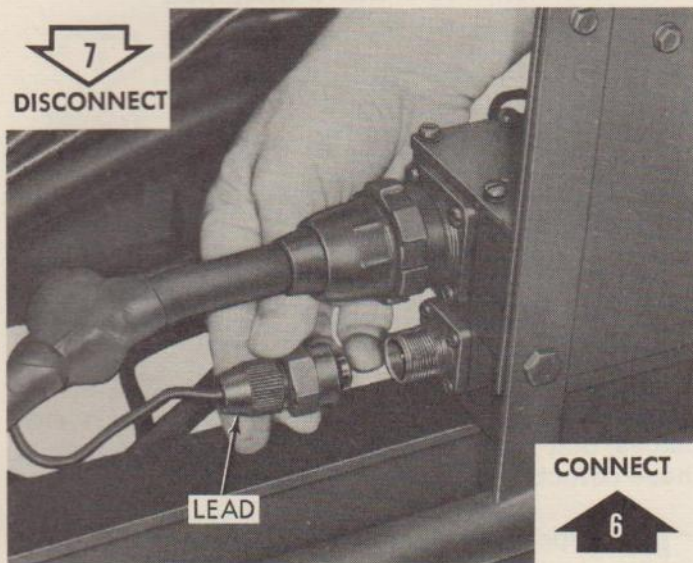
FIGURE 64. REMOVING OR INSTALLING GENERATOR SET WIRING HARNESS (continued to fig. 65).



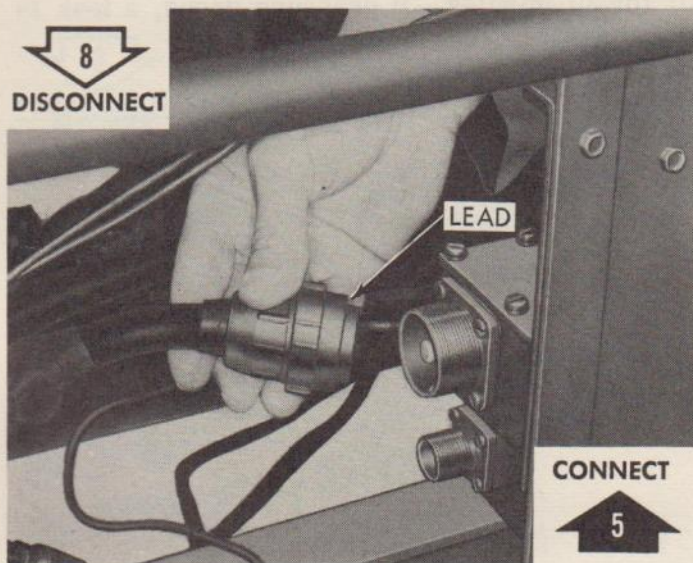
F. Two leads at magneto.



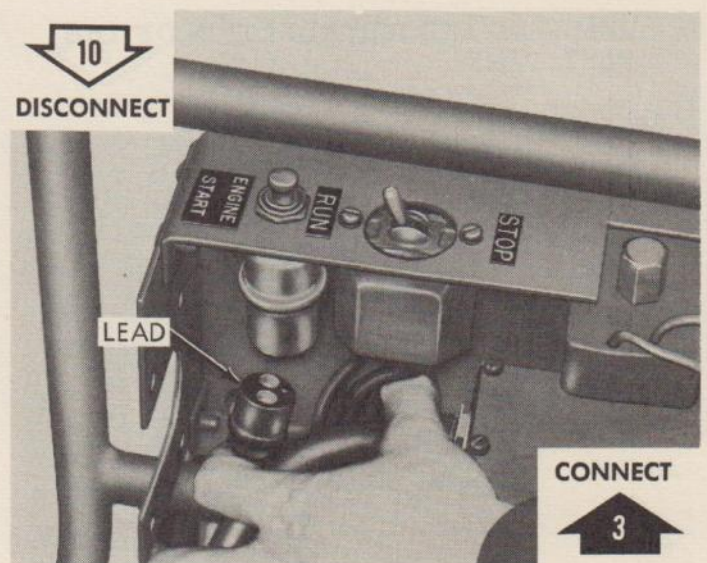
I. Rheostat-to-regulator battery connector.



G. Starter switch-to-relay lead at relay.



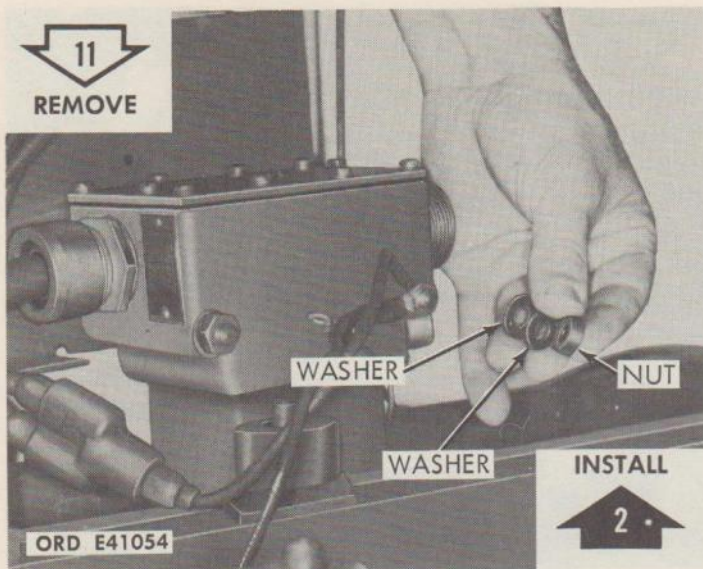
H. Relay-to-regulator battery connector pin G lead.



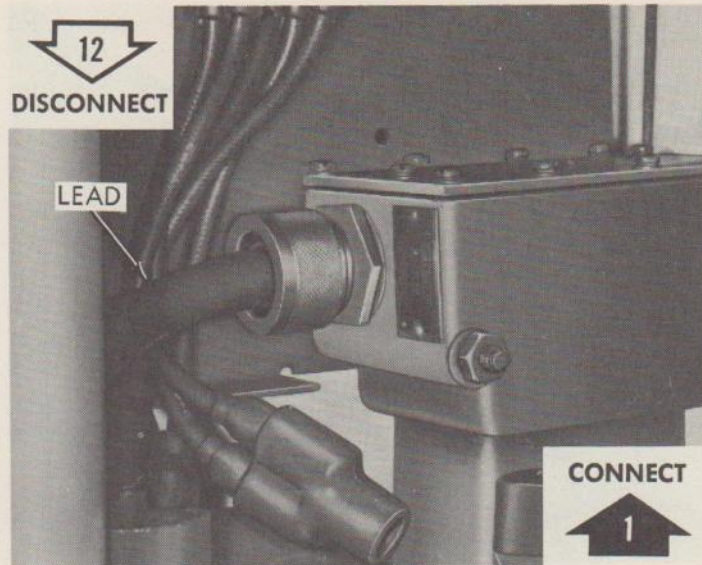
J. Lead at ENGINE START switch.

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FIGURE 65. REMOVING OR INSTALLING GENERATOR SET WIRING HARNESS (continued to fig. 66).



K. Nut and washers.



L. Relay-to-regulator generator connector socket G lead.

FIGURE 66. REMOVING OR INSTALLING GENERATOR SET WIRING HARNESS (continued from fig. 65).

Section VIII. REPLACEMENT OF FUEL TANK

81. GENERAL

a. Scope. This section contains instructions for removal, installation, inspection, and repair of the fuel tank.

b. Description. The fuel tank mounts within the outer frame on the left side of the set. Cushioned by resilient pads, the tank is secured to the frame by two straps. Before removing or installing the tank, all other components of the generator set must be removed.

82. REMOVAL AND INSTALLATION OF THE FUEL TANK

See figure 67.

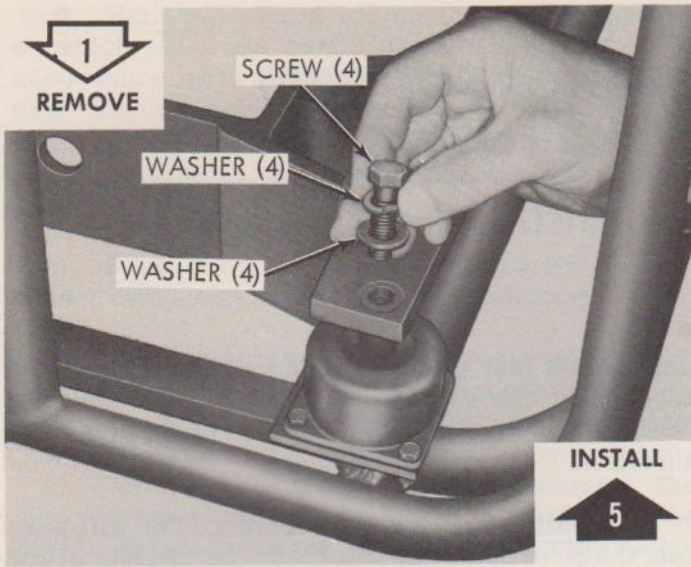
83. INSPECTION AND REPAIR

a. Inspect threaded bosses for stripped or damaged threads. If either of these defects shows, replace tank.

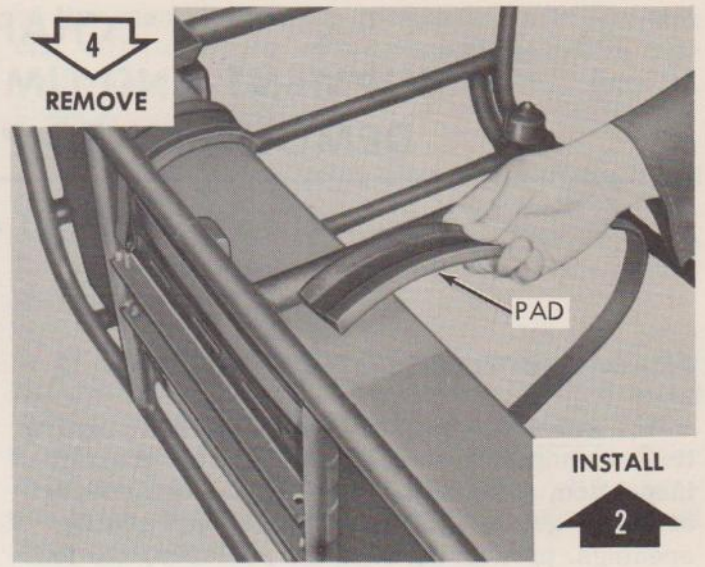
b. Inspect tank for deep dents and crushed places that could cause tank to leak. If either of these defects shows, replace tank.

c. Inspect tank for indications of leaks, such as discoloring and wet or damp markings. If leaks are indicated, pressurize tank to 2 psi and let it sit for 20 minutes. If pressure drops, a leak is present; replace tank.

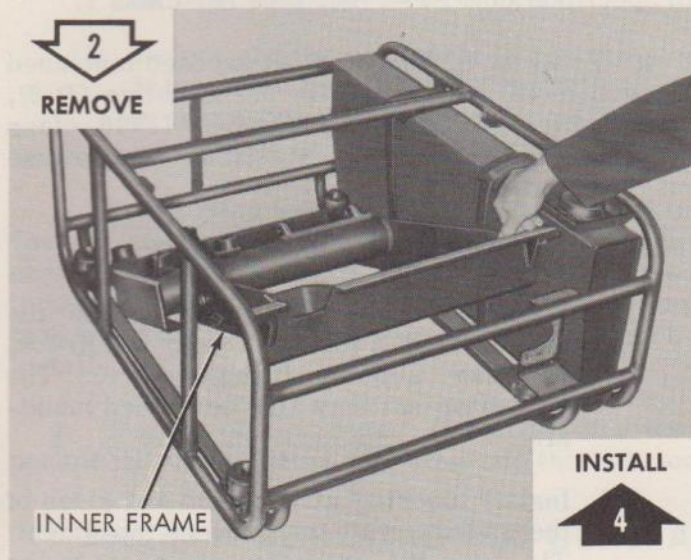
Caution: Do not apply more than 2 psi pressure to tank.



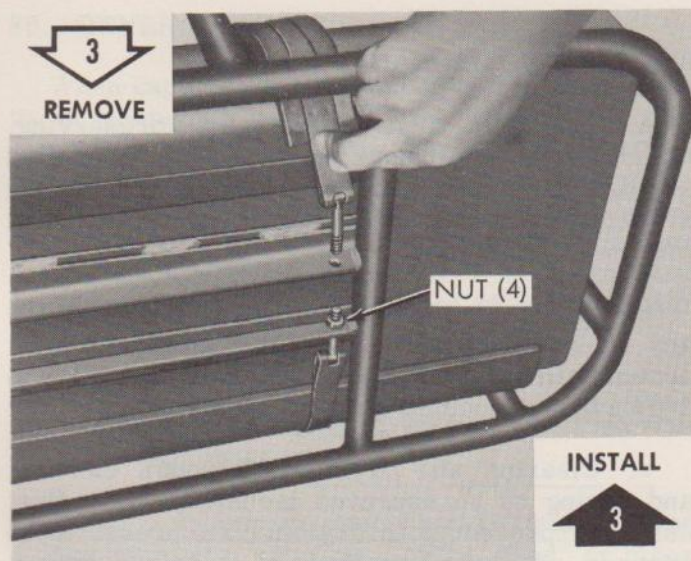
A. Inner frame mounts screws and washers.



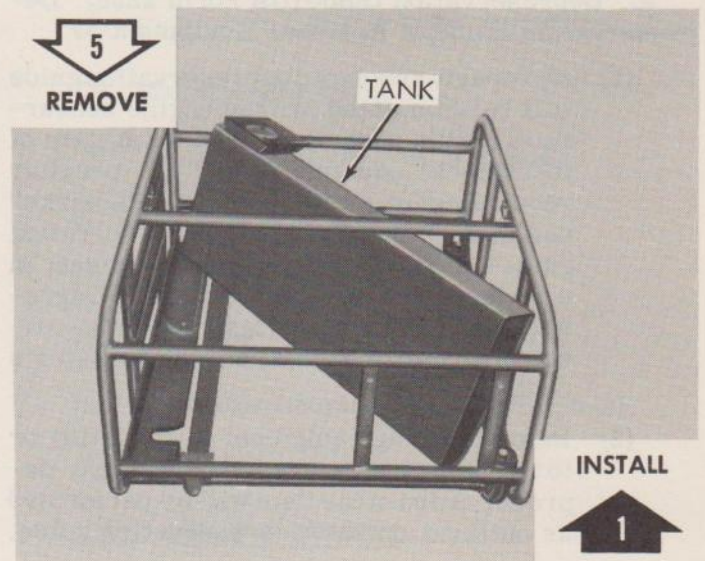
D. Resilient pads.



B. Inner frame.



C. Tank strap nuts.



E. Tank.

ORD E41055

NOTE. Inspect resilient pads under tank, and replace if damaged.

FIGURE 67. REMOVING OR INSTALLING FUEL TANK.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

84. DOMESTIC SHIPPING INSTRUCTIONS

a. General. This paragraph covers preparation of equipment for shipment, which consists of inspection, cleaning and drying, painting, depreservation guide, lubrication system, sealing of openings, preserving exterior surfaces, and loading equipment for shipment.

b. Inspection. Equipment will be inspected for any unusual condition such as damage, rusting, accumulation of water, or pilferage. DA Form 2404 will be executed on the equipment.

c. Cleaning and Drying. Thorough cleaning and drying by an approved technique is the first essential procedure in any effective preservation process. Approved methods of cleaning, drying, types of preservatives, and methods of application are described in TM 38-230.

d. Painting. Paint all surfaces of the engine on which paint has been removed or damaged, in accordance with TB ENG 60. Clean and paint other surfaces of the generator set in accordance with TM 9-208-1, "Cleaning of Ordnance Materiel," and TM 9-2851, "Painting Instructions for Field Use."

e. Depreservation Guide (DA Form 2258, "Depreservation Guide of Engineer Equipment").

- (1) A properly annotated depreservation guide will be completed for the engine concurrently with preservation of each item of mechanical equipment, and any peculiar requirements outlined in the "Remarks" columns. The completed depreservation guide will be placed with the equipment in a waterproof envelope marked "Depreservation Guide," and fastened in a conspicuous location on or near the operator's controls.
- (2) Before placing equipment in operation or to the extent necessary for inspection, depreservation of the item will be performed as outlined on the depreservation guide.

f. Lubrication System (Wet Sump), Boxed or Crated. Check level of lubricant. Operate the

engine at a fast idle until lubricant has circulated throughout the system. The crankcase and fuel tank will then be drained, and the drain plugs reinstalled.

g. Sealing of Openings. Openings that will permit the direct entry of water into the interior of the gasoline engine, generator, and fuel tank cap will be sealed with pressure-sensitive tape conforming to Specification PPP-T-60, type III, class 1.

h. Exterior Surfaces. Coat exposed machined ferrous metal surfaces with preservative (P-6), conforming with Specification MIL-C-11796, class 3. If preservative is not available, cup grease may be used.

i. Loading Equipment for Shipment.

- (1) Load the crated generator set on the carrier with a forklift truck, handtruck, or other suitable lifting device. The generator set may also be loaded manually.
- (2) Install blocking at each end and sides of the engine crate to prevent movement. Tie down the generator set crate to the carrier with straps in at least two places.

85. LIMITED STORAGE

a. General. Instructions for preserving, maintaining, and inspecting equipment in limited storage are outlined in this paragraph. Limited storage is defined as storage not to exceed 6 months. See AR 743-505.

b. Inspection. Equipment will be inspected for any unusual condition such as damage, rusting, accumulation of water, or pilferage. DA Form 2404 will be executed on the equipment.

c. Cleaning and Drying. Thorough cleaning and drying by an approved technique is the first essential procedure in any effective preservation process. Approved methods of cleaning, drying, types of preservatives, and methods of application are described in TM 38-230.

d. Painting. Paint all surfaces of the engine on which paint has been removed or damaged, in accordance with TB ENG 60. Clean and paint other surfaces of the generator set in accordance with TM 9-208-1, "Cleaning of Ordnance Materiel," and TM 9-2851, "Painting Instructions for Field Use."

e. Depreservation Guide (DA Form 2258, "Depreservation Guide of Engineer Equipment").

(1) A properly annotated depreservation guide will be completed concurrently with preservation of each item of mechanical equipment, and any peculiar requirements outlined in the "Remarks" column. The completed depreservation guide will be placed with the equipment in a waterproof envelope marked "Depreservation Guide," and fastened in a conspicuous location on or near the operator's controls.

(2) Before placing equipment in operation or to the extent necessary for inspection, depreservation of the item will be performed as outlined on the depreservation guide.

f. Lubrication System (Wet Sump), Boxed or Crated. Check level of lubricant. Operate the engine at a fast idle until lubricant has circulated throughout the system. The crankcase and fuel tank will then be drained, and the drain plugs re-installed.

g. Sealing of Openings. Openings that will permit the direct entry of water into the interior

of the gasoline engine, generator, and fuel tank cap will be sealed with pressure-sensitive tape conforming to Specification PPP-T-60, type III, class 1.

h. Exterior Surfaces. Coat exposed machined ferrous metal surfaces with preservative (P-6), conforming with Specification MIL-C-11796, class 3. If preservative is not available, cup grease may be used.

i. Weatherproofing. When suitable shelter is not available, select a firm, level, well-drained storage location, protected from prevailing winds. Position the equipment on heavy planking or other solid surface. Cover the equipment with a tarpaulin or other suitable waterproof covering, and tie down securely.

j. Inspection and Maintenance of Equipment in Storage.

(1) Inspection. Equipment will be inspected for any unusual condition such as damage, rusting, accumulation of water, or pilferage. DA Form 2404 will be executed on the equipment.

(2) Exercising. Every 30 days, equipment will be inspected and operated long enough for it to reach operating temperature and for complete lubrication of gears, bearings, etc. After each exercising period the equipment will be represerved.

Section II. DEMOLITION OF GENERATOR SET TO PREVENT ENEMY USE

86. GENERAL

When capture or abandonment of generator set to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or to render it inoperative. Based on this decision, orders are issued, which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all generator sets and all corresponding repair parts.

87. DEMOLITION TO RENDER THE GENERATOR SET INOPERATIVE

a. Demolition by Mechanical Means. Use sledge hammers, crowbars, picks, axes, or other heavy tools available to destroy the following:

(1) Carburetor, governor, and fuel pump.

(2) Engine crankcase and cylinder heads.

(3) Magneto and spark plugs.

(4) Oil filter and exhaust manifolds.

(5) Fuel tank and fuel filter.

(6) Generator drive belts.

(7) Generator housing.

(8) Regulator housing and control panel.

(9) Outer frame.

b. Demolition by Misuse.

(1) Remove the drain plugs from the engine and drain the crankcase. Remove the oil level gage rod from the oil fill tube and

pour in sand, gravel, nuts, bolts, screws, or broken glass.

- (2) Open generator brush inspection band and fill opening with sand, gravel, or broken glass. Replace band.
- (3) Run the engine at full throttle until it fails.

88. OTHER DEMOLITION METHODS

a. Scattering and Concealment. Remove all

easily accessible parts such as starting rope pulley, wiring harness, spark plug cables, spark plugs, carburetor, switches, and generator brushes. Scatter them through dense foliage, bury them in dirt or sand, or throw them in a lake, stream, or other body of water.

b. Burning. Pack rags, clothing, or canvas under, around, and inside the cylinder covers, generator, regulator, and control panel. Saturate this packing with gasoline, oil, or diesel fuel. Ignite.

APPENDIX I

REFERENCES

1. MILITARY PUBLICATION INDEXES

Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings -----	DA Pam 108-1
Index of Administrative Publications -----	DA Pam 310-1
Index of Blank Forms -----	DA Pam 310-2
Index of Training Publications -----	DA Pam 310-3
Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders -----	DA Pam 310-4
Index of Graphic Training Aids and Devices -----	DA Pam 310-5
Index of Supply Manuals - Ordnance Corps -----	DA Pam 310-29

2. SUPPLY MANUALS

Organizational and Field Maintenance Repair Parts and Special Tool Lists: Engine, Gasoline: 6HP; Military Standard Model 4A032-1, FSN 2805- 776-0483 -----	TM 5-2805-203-24P
Organizational and Field Maintenance Repair Parts and Special Tool Lists for Generator Set: Gasoline Engine Driven, 4.2 KW, 28V, 150 Amps (Model DC 4.2-ORD/28) (6115-857-1397) Composed of: Starter- Generator (Jack and Heintz Model 23041-001) and Engine (Military Standard Model 4A032-1) -----	TM 9-6115-202-24P

3. FORMS

Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9 -----	DA Form 2028
Depreservation Guide of Engineer Equipment -----	DA Form 2258
Equipment Inspection and Maintenance Worksheet -----	DA Form 2404
Maintenance Request -----	DA Form 2407
Equipment Lubrication Record -----	DA Form 2408-2
Equipment Modification Record -----	DA Form 2408-5
Equipment Transfer Record -----	DA Form 2408-7
Equipment Acceptance Record -----	DA Form 2408-8

(For listing of forms generally applicable to maintenance of this materiel, refer to TM 38-750. For a list of all forms, refer to DA Pam 310-2).

4. OTHER PUBLICATIONS

Dictionary of United States Army Terms -----	AR 320-5
Authorized Abbreviations -----	AR 320-50
Safety: Reports of Accident -----	AR 385-40
Military Training -----	FM 21-5
Techniques of Military Instruction -----	FM 21-6
Military Symbols -----	FM 21-30
Basic Arctic Manual -----	FM 31-70
Operations in the Arctic -----	FM 31-71
Lubrication Order, Engine, Gasoline: 6HP; Military Standard Model 4A032-1, FSN 2805-776-0483 -----	LO 5-2805-203-14
Preservation and Painting of Serviceable Corps of Engineers Equipment -----	TB ENG 60
Operator, Organizational, and Field Maintenance Manual, Engine, Gasoline: 6HP; Military Standard Model 4A032-1, FSN 2805-776-0483 -----	TM 5-2805-203-14

Operation and Maintenance of Ordnance Materiel in Extreme Cold Weather, 0° to -65° F	--	TM 9-207
Cleaning of Ordnance Materiel	-----	TM 9-208-1
Inspection, Care, and Maintenance of Antifriction Bearings	-----	TM 9-214
Painting Instructions for Field Use	-----	TM 9-2851
Operation, and Organizational, Field, and Depot Maintenance: Storage Batteries, Lead-Acid Type	-----	TM 9-6140-200-15
Preservation, Packaging, and Packing of Military Supplies and Equipment	-----	TM 38-230
The Army Equipment Record System and Procedures	-----	TM 38-750

Index of Supply Manuals - Ordnance Corps	-----	DA Pam 310-29
Index of Ordnance Training Aids and Devices	-----	DA Pam 310-2
Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders	-----	DA Pam 310-4
Index of Training Publications	-----	DA Pam 310-3
Index of Blank Forms	-----	DA Pam 310-2
Index of Administrative Publications	-----	DA Pam 108-1

SUPPLY MANUALS

Organizational and Field Maintenance Repair Parts and Special Tool Lists Engine, Gasoline, GHP, Military Standard Model 4A13-1, 250 2002	-----	TM 9-2112-202-242
Organizational and Field Maintenance Repair Parts and Special Tool Lists for Generator Set, Gasoline Engine Driven, 4.2 KW, 28V, 150 Amps (Model DC 4.2-082) (5112-287) Composed of: Starter Generator (See and Helix Model 3304-081) and Helix (Military Standard Model 4A02-1)	-----	TM 9-2112-202-242

2. FORMS

Recommended Changes to DA Technical Manual Parts Lists or Supply Manual	-----	DA Form 2028
Departmental Order of Engineer's Equipment	-----	DA Form 2029
Equipment Inspection and Maintenance Worksheet	-----	DA Form 2404
Maintenance Manual	-----	DA Form 2405
Equipment Label (Form 2406)	-----	DA Form 2406-2
Equipment Modification Report	-----	DA Form 2406-3
Equipment Transfer Report	-----	DA Form 2406-4
Equipment Assignment Report	-----	DA Form 2406-5

For listing of forms generally applicable to maintenance of this material, refer to TM 38-750. For a list of the forms, refer to DA Pam 310-29.

4. OTHER PUBLICATIONS

Directory of United States Army Terms	-----	AR 320-2
Organized Administration	-----	AR 320-30
Index, Reports of Accident	-----	AR 382-40
Military Training	-----	FM 21-2
Techniques of Military Instruction	-----	FM 21-6
Military Symbols	-----	FM 21-20
Basic Army Manual	-----	FM 21-70
Operations in the Arctic	-----	FM 21-71
Laboratory Order, Engine, Gasoline, GHP, Military Standard Model 4A13-1	-----	LO 2-2802-202-14
Form-Technical Printing of Serviceable Corps of Engineer's Equipment	-----	TM 38-750
Generator, Organizational and Field Maintenance Manual, Engine, Gasoline, GHP	-----	TM 9-2802-202-14
Military Standard Model 4A13-1, 250 2002-116-082	-----	TM 9-2802-202-14

REF ID: A67839

APPENDIX II
MAINTENANCE ALLOCATION CHART

GENERATOR SET: GASOLINE ENGINE DRIVEN, 4.2 KW, 150 AMP, 28 V, DC

PURPOSE: To allocate specific maintenance operations to the proper echelon.

BASIS: Allocation of maintenance operations is made on the basis of time, tools, and skills normally available to the various echelons in a combat situation, and is influenced by maintenance policy and sound maintenance practices as outlined in AR 750-5, FM 9-3, and FM 9-4.

EXPLANATIONS AND DEFINITIONS: The Maintenance Allocation Chart designates overall responsibility for the maintenance function on an end item or assembly. Repair and/or rebuild of major assemblies is designated by authority of the Army Commander representative, except for the specific repair subfunctions listed in the Maintenance Allocation Chart. Deviation from maintenance allocation operations allocated in the Maintenance Allocation Chart is authorized only upon approval of the Army Commander representative.

SERVICE	To clean, to preserve, and to replenish fuel and lubricants.
ADJUST	To regulate periodically to prevent malfunction.
INSPECT	To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.
TEST	To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.
REMOVE AND INSTALL	To remove and install the same item for service, or when required for the performance of other maintenance operations.
REPLACE	To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.
REPAIR	To restore to a serviceable condition by replacing unserviceable parts or by any other action required; utilizing tools, equipment, and skills available to include welding, grinding, riveting, straightening, adjusting, etc.
ALINE	To adjust two or more components of an electrical system so that their functions are properly synchronized.
CALIBRATE	To determine, check, or rectify the graduation of any instrument, weapon or weapons system or components of a weapons system.

REBUILD

To restore to a condition comparable to new by disassembling the item to determine the condition of each of its component parts and reassembling it using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

SECOND ECHELON "C" AND "D"

"C" and "D" columns refer to those maintenance operations authorized to be performed within the company or battery. "D" column refers to those maintenance operations authorized to be performed at separate company and separate battery, battalion and/or regimental level. "C" and "D" columns are intended as a guide for unit commander and motor pool officers in the performance of Organizational Maintenance. Deviation from this guide within Second Echelon is authorized where considered appropriate by the unit commander.

SYMBOL "X"

The symbol "X" placed in the appropriate column indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by "X" are authorized to perform the indicated operation. Symbol "X" used with a repair operation requiring no parts, indicates overall responsibility for performance; however, authority for performing less complex repairs will be governed by time, tools, and skills available.

SYMBOL "%%"

The symbol "%%", which may be placed only in the second echelon "D" column, indicates that second echelon may perform the particular maintenance function provided the request originates from organizational level and is specifically authorized by the direct support technical service officer. Use of the symbol will be strictly limited, and will apply only to replacement of major assemblies and time-consuming operations which are within the capabilities of organizational maintenance, but over which control by the technical service is considered essential. In no case will performance of a "double percent" function be directed by the direct support technical services officer, and in no case will a "double percent" function authorize stockage of parts at organizational level.

MAINTENANCE ALLOCATION CHART

GENERATOR SET: GASOLINE ENGINE DRIVEN, 4.2 KW, 150 AMP, 28 V, DC

GROUP NO.	COMPONENTS AND RELATED OPERATIONS	ECHELONS					TOOLS REQ'D	REMARKS	
		1st	C	D	3rd	4th			5th
			2nd						
1	2	3	4	5	6	7	8	9	10
2900	Cover, canvas remove and install ----- replace -----	x	x						
2910	Engine replace ----- repair -----			%%	x				
Note: See TM 5-2805-203-14 TM 5-2805-203-24P LO 5-2805-203-14									
	Pulley, drive replace -----				x				
	Mount, shock replace -----			x					
2935	Lines and connections, fuel replace -----			x					
	Tank, fuel replace -----				x				
	Valve, fuel shutoff replace -----			x					
2941	Muffler replace -----		x						
	Elbow, exhaust replace -----		x						
2961	Starter-Generator replace -----			%%	x				
	Pulley, drive replace -----				x				
	Armature replace ----- repair -----				x		x		
	Bearings replace -----				x				
	Belt, drive replace -----		x						
	Brushes replace -----				x				
	Capacitors replace -----				x				

MAINTENANCE ALLOCATION CHART

GENERATOR SET: GASOLINE ENGINE DRIVEN, 4.2 KW, 28 V, DC

GROUP NO.	COMPONENTS AND RELATED OPERATIONS	ECHELONS					TOOLS REQ'D	REMARKS	
		1st	C	D	3rd	4th			5th
			2nd						
1	2	3	4	5	6	7	8	9	10
2962	Regulator, generator adjust (external) -----			x					
	replace -----				x				
	repair -----					x			
	Relay replace -----						x		
	Regulator, voltage replace -----					x			
	Mount, shock replace -----			x					
2967	Control panel repair -----				x				
	Wiring harness replace -----				x				
	Relay replace -----				x				
	Rheostat replace -----				x				
	Switches replace -----				x				

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By Order of the Secretary of the Army:

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For Explanation of abbreviations used, see AR 320-50.

