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TM 5-6115-306-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

H6-26

OPERATOR, ORGANIZATIONAL, FIELD AND DEPOT
MAINTENANCE MANUAL

**GENERATOR SET,
GASOLINE ENGINE: 1.5 KW, AC, 120V,
SINGLE PHASE, 2 WIRE, 60 CYCLE;
AIR COOLED; OPEN; TUBULAR FRAME,
SHOCK MOUNTED (HOL-GAR MODEL
CE-015-AC) (LESS ENGINE)
FSN 6115-887-8644**



HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1963

TAGO 5545A

SAFETY NOTICES

TAKE NO UNNECESSARY CHANCES

- GENERAL.** This equipment contains and generates voltages which are dangerous and may be fatal if contacted. Use caution and discretion in the operation and maintenance of the equipment. Avoid contacting terminals, binding posts and other exposed connections. Use extra care when control cabinet is open.
- BEFORE.** Do not attempt to operate or maintain the equipment until complete familiarization is established by reading the instructions in the manual.
- Do not operate the generator set in an enclosed building unless the exhaust gases are piped outside. Exhaust gases contain carbon monoxide, which is a poisonous, odorless, colorless gas.
- Provide a metal-to-metal contact between the container and the fuel tank when filling.
- Do not operate the generator set until the ground terminal stud has been connected to a suitable ground. An ungrounded system can be dangerous.
- DURING.** Stop the equipment immediately if there is any doubt in the operating conditions and maintenance procedure.
- AFTER.** Do not leave fuel system valve open after operation has been completed. Place in OFF position.

TECHNICAL MANUAL }
 No. 5-6115-306-15 }

HEADQUARTERS,
 DEPARTMENT OF THE ARMY
 WASHINGTON 25, D.C., 5 AUGUST 1963

Operator, Organizational, Field, and Depot Maintenance Manual

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GENERATOR SET, GASOLINE ENGINE: 1.5 KW, AC 120V, SINGLE PHASE, 2 WIRE, 60 CYCLE; AIR COOLED; OPEN; TUBULAR FRAME, SHOCK MOUNTED (HOL-GAR MODEL CE-015-AC) (LESS ENGINE) FSN 6115-887-8644

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CHAPTER 1 INTRODUCTION

Section 1. GENERAL

1. Scope

a. These instructions are published for the use of the personnel to whom the Model CE-015-AC Hol-Car Generator Set is issued. Chapters 1 through 3 provide information on the operation, daily preventive maintenance services, and organizational maintenance of the equipment, accessories, components, and attachments. Chapter 4 provides information for field and depot maintenance (3d, 4th, and 5th echelons). Chapter 5 provides information on demolition, and shipment

and limited storage. This manual also provides descriptions of the main units and their functions in relationship to other components.

b. Appendix I contains a list of publications applicable to this manual. Appendix II contains the Maintenance Allocation Chart. Appendix III contains the list of basic issue items and the maintenance and operating supplies authorized the operator of this equipment. The organizational, field and depot maintenance repair parts and special tool lists are in TM 5-6115-306-25P.

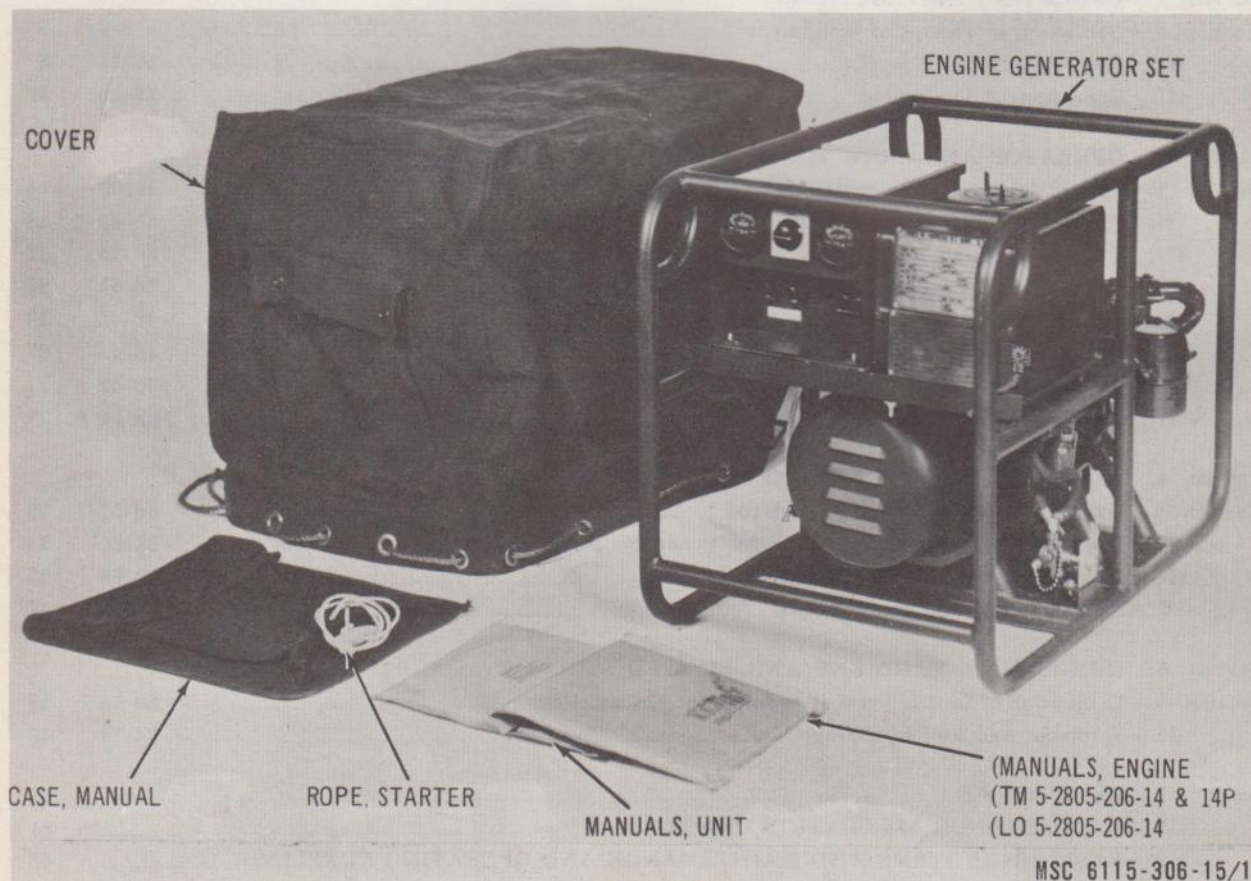


Figure 1. Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC (18339).

c. Report all deficiencies in this manual on DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9). Submit recommendations for changes, additions, or deletions to The Commanding Officer, U. S. Army Mobility Support Center, ATTN:SMOMS-MM, P.O. Box 119, Columbus 16, Ohio. Direct communications is authorized.

d. Report all equipment improvement recommendations as prescribed by TM 38-750.

2. Record and Report Forms

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. For other record and report forms applicable to the operator, organizational maintenance, and field and depot maintenance, refer to TM 38-750.

Note. Applicable forms, excluding Standard Form 46 (U.S. Government Motor Vehicle Operator's Identification Card), which is carried by the operator, shall be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION OF DATA

3. Description

a. *Engine Generator Set.* The generator set is a self-contained, air cooled, gasoline engine driven electric power unit equipped with rope starter. This unit can provide primary or emergency electric power within its rated capacity (par. 5) for communications, lighting or testing equipment and for other electrically powered equipment. It consists of the following major component groups.

| | |
|-----------------------|--------------------------------|
| Engine Group | Controls and Instruments Group |
| AC Generator Group | Fuel System Group |
| Frame and Cover Group | |

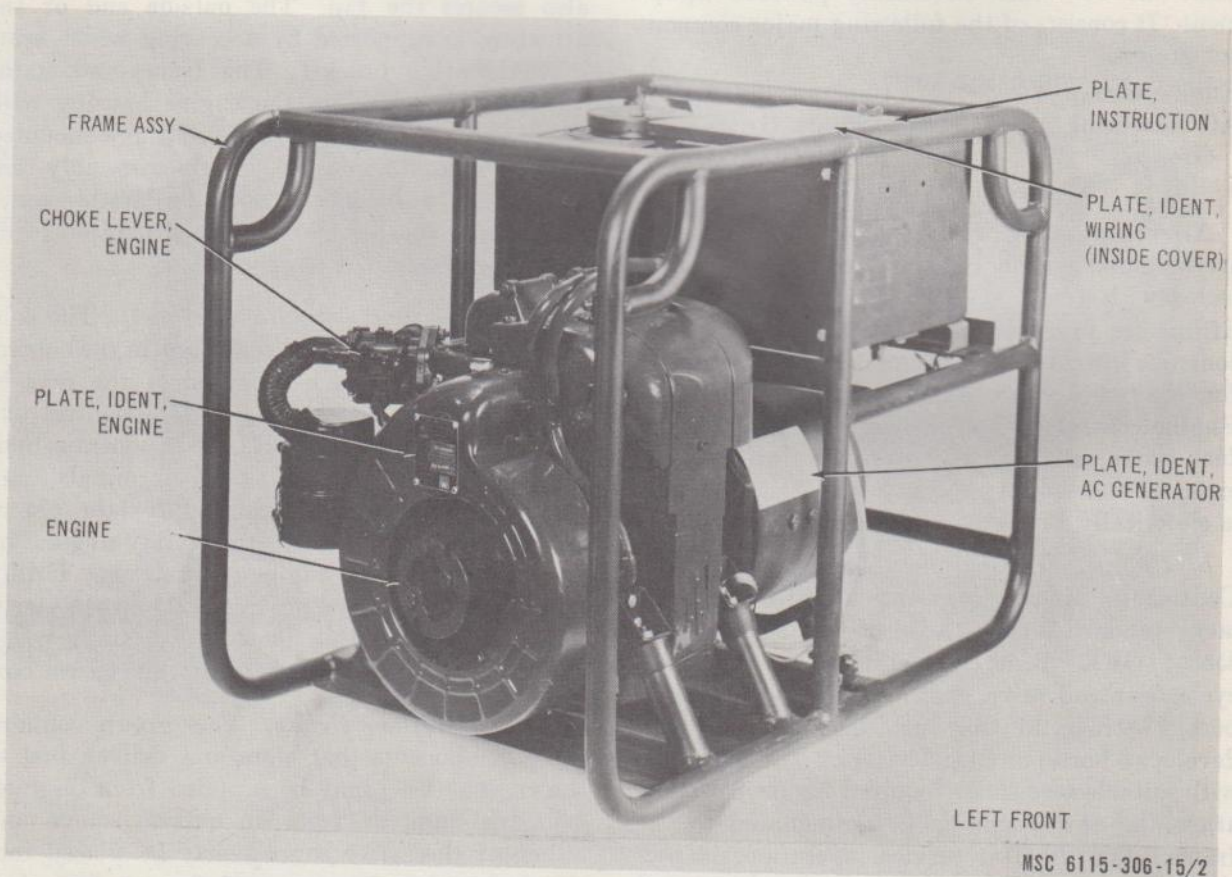
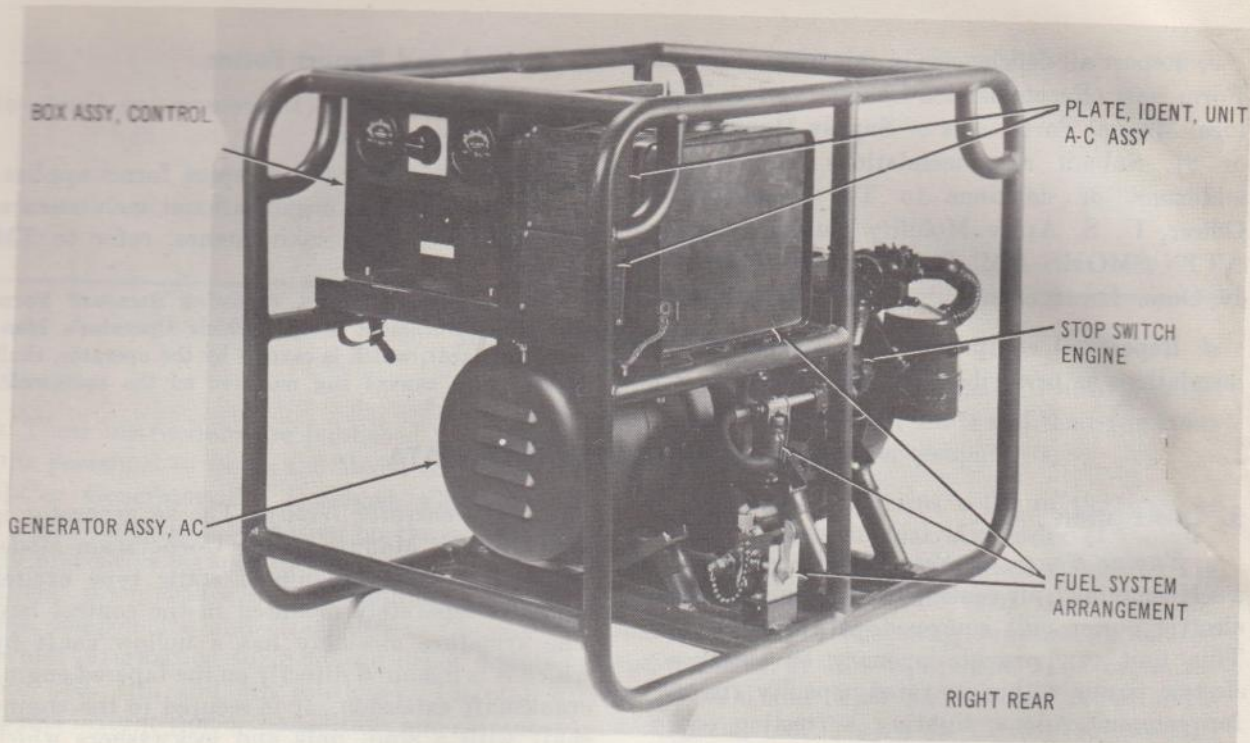
All components of the engine generator set are mounted within the tubular frame and protected with a canvas cover. Provisions for hand lifting are provided on the frame. Operational controls, instruments and external load terminals for the set are contained in the control box. Engine controls are on the engine. An auxiliary fuel valve is provided to allow for a large external fuel supply (figs. 1 and 2). The unit is electrically isolated for radio interference.

b. *Engine.* The engine is manufactured by Continental Motors Corporation and is the Military Standard Model 2A016-11 (FSN 2805-714-8553) (GFE. It is a 2 cylinder, air cooled, 4-cycle, overhead valve, gasoline engine with a 2 1/4" bore, 2" stroke, 16 cubic inch displacement which develops 3 horsepower at 3600 rpm. It is equipped with suitable accessories required for proper operation and safety and is shock mounted to the frame. For detailed service, operation, inspection, maintenance, overhaul instructions, and parts list, refer to TM 5-2805-206-14 (TO 38G2-17-2) and TM 5-2805-206-14P (TO 38G2-74-24).

c. *AC Generator Group.* The ac generator is a HOL-GAR Manufacturing Corporation Model 18262 that uses a regulated static type exciter which is separately mounted in the control box. The armature assembly has a hollow shaft by which it is mounted directly on the tapered engine crankshaft extension. It is secured to the engine shaft with a stud, nuts and lockwashers which also secures the fan. The outside end of the armature is supported by a bearing which seats in the bearing bracket. The frame and stator assembly is secured to the engine housing with four bolts and lockwashers and is shock mounted to the frame. The unit has a cable assembly that connects it to the control box. The static exciter converts the ac power from the generator to dc power for use in the generator.

d. *Controls and Instruments Group.* The controls and instruments are contained in the control box assembly which is mounted at the rear of the unit over the ac generator. The control box assembly contains, controlling components, indicating instruments, field flash terminals, and regulated static exciter required for the operational inspection, adjustment, safety regulation and operation of the engine generator set. Utility power receptacles are provided. The load terminals and canvas strap for securing power transmission cables are located under the control box.

e. *Fuel System Group.* This group contains those components that store and deliver fuel to the engine. Fuel may be supplied from the integral fuel tank or from an outside source and either of these two sources may be placed into the fuel system by means of the auxiliary fuel valve. The fuel supply is moved from the sources through the strainer and sediment bowl, by the



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Figure 2. Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC (18339) - 3/4 views.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT.

6. Unloading

a. No special handling procedures are required for unloading the equipment. The unit can be handled readily by two men using normal handling procedures.

b. Unload the equipment as close to the installation site as practicable to minimize any possible handling damage and manual effort.

7. Unpacking Equipment

a. Packaging of the engine generator set depends on the type of storage and shipment to which it may be subjected (i.e., limited or extended storage and domestic or overseas shipment). Regardless of the packing method, it is advisable to unpack the equipment as close to the installation site as practicable to minimize any possible handling damage.

b. When unpacking the equipment, be sure to remove all securing straps, wires, blocks, padding and protective tape. Be aware of and follow instructions on any special packing or caution notices that may be attached to the set.

c. Prior to inspecting or servicing the generator set, depreservation will be accomplished in accordance with instructions outlined on DA Form 2258 which is attached on or near the operator's controls.

8. Inspection of Equipment

a. Inspect the equipment for damage; especially take extra care in inspection if packaging shows shipping damage.

b. Inspect the generator set for missing parts and accessories. Use packing list to check for missing components.

c. Inspect the unit for loose connections and insecure mountings. Tighten and secure as required. Correct any deficiencies.

9. Servicing Equipment

a. General. The engine generator set is inspected for completeness and adjusted to specified operational requirements prior to shipment. Note that after operational inspection is completed at the factory, the fuel and lubrication oil are drained from the respective systems. Perform the following installation and operational services, and any special services given on attached tags or notices, before placing the engine generator set into operation.

b. Site Considerations. Consider the following when selecting and preparing the installation site for the engine generator set.

- (1) *Proximity of load.* To reduce transmission line voltage losses, place the engine generator set as close as possible to the load.
- (2) *Shelter.* Even though the engine generator set is weather-resistant, it is recommended that the unit be placed in an adequate shelter to protect it from climatic and local conditions. The shelter must be ventilated to admit sufficient air for engine combustion and to allow heated air and exhaust fumes to escape. Depending upon whether operation is to be transient, semi-permanent or permanent, facilities to maintain a suitable temperature in the shelter should also be provided. If unit is used in a shelter, connect a suitable exhaust tube from the unit to the exterior of the shelter.

Warning: Do not operate the generator set in an enclosed building unless the exhaust gases are piped outside. Exhaust gases contain carbon monoxide, which is a poisonous, odorless, colorless gas.

(3) *Clearances.* Provide enough working clearance around the engine generator set to facilitate operation and maintenance activities.

(4) *Fuel supply.* To insure an adequate fuel supply, install a fuel tank or tanks of sufficient capacity to meet operating conditions. Consider installation of these tanks underground or as near the shelter as practicable. Be sure that the bottom of the tank is not lower than four (4) feet from the fuel pump on the installed generator set. Connect the fuel line from the external source at the auxiliary fuel valve.

(5) *Weight.* If the engine generator set is installed in an existing shelter, be sure that the bearing surface can support its weight.

(6) *Foundation.* Since the unit is a readily portable type unit for use in transient type operation, no foundation should be required. However, place the unit on reasonably firm dry ground, using planks, timbers or suitable gravel as local earth conditions warrant. Provide for water drainage away from the unit.

c. Mounting. It is recommended that the unit be level in both planes of the frame base and that the frame be supported on its entire surface. If necessary, the frame may be secured to a suitable base.

d. Electrical Connections. All unit internal electrical connections for rated voltage operation are made at the factory. If there appears to be any signs of wiring changes, check wiring against the unit wiring diagram.

(1) *Power transmission cables.* Use a #12 AWG wire size as a minimum cable size; this gives approximately a 1 volt drop in 25 ft. at full load operation. Increase size of cables to #10 and #8 to minimize voltage drop if distances to load are longer. The load terminals can open to hold two #8 size wires each.

(2) *Power output connections.* All main output power connections for the engine generator set are made at the load terminals.

(3) *Ground connection.* Install a ground cable (#6AWG bare copper wire) from

the ground terminal on the frame to a ground rod or water pipe. Do not use fuel lines for grounding purposes.

e. Engine Group. For detailed instructions refer to engine publications (par. 4b (2))

(1) *Crankcase.* Using the engine dipstick, check level of the lube oil. In a new unit, there may be an indication of oil because of drainage from the engine, filter and oil lines. Drain this residual oil and discard it. Fill crankcase with engine oil for current temperatures. Check for and correct leaks.

(2) *Air cleaner.* Using lubricating oil (same as used in engine crankcase), fill oil cup in cleaner to oil level line. Be sure that air cleaner mounting hardware is secure and that air inlet ports are open.

(3) *Spark plugs.* Certain shipping and packaging instructions may require removal of plugs. If spark plugs have been removed; clean spark plug ports, adjust plug gaps, and install.

f. Ac Generator Group. See that louver inlets in end cover are open. Remove end cover and visually inspect brushes (4) for set against collector ring.

g. Controls and Instruments Group. Check all controls and instruments to see that they are present and in normal off position (par. 10).

h. Fuel System Group. Be sure that fuel used is clean. Note that the fuel tank cap has an air vent valve that may be placed in the closed position. Be sure that valve is in the open position. See that all fuel lines are secure; that tank drain valve is closed, and that 3-way valve is in OFF position. Check strainer bowl for secure fit.

(1) *Internal tank.* Fill internal fuel tank with gasoline, being careful not to spill over unit. Keep this tank full even though an external fuel source is used.

Warning: Do not fill the fuel tank while the set is in operation as gasoline spilled on a hot engine may explode and cause injury to personnel. Also, provide a metal-to-metal contact to the

container and the fuel tank when filling. This will prevent a spark from being generated as fuel flows over the metallic surface.

- (2) *External supply.* If an external fuel supply is used, connect a suitable size fuel line to the port provided on the auxiliary 3-way valve.

i. Frame and Cover Group. Check frame to see that all parts are secure. See that frame pan under engine is clean and that drain holes are open. When not in use fold and store cover in dry place.

j. Operational Check. Start the engine generator set to ascertain that it is operating properly (par. 22-28).

Section II. CONTROLS AND INSTRUMENTS

10. General

a. This section describes, locates, illustrates and furnishes the operator and maintenance personnel sufficient information about the various controls and instruments for proper operation of the generator set.

b. The purpose of the controls and instruments and the normal and maximum readings of the instruments are illustrated in figure 3 and described in paragraphs 11 through 21.

11. Ac Ammeter

This meter indicates the output current that the engine generator set is providing for the total particular load. It has a 0-5-10-15-20 ampere scale with a long line marking the normal full load current which is 12.5 amperes. Normal readings may vary between 0 and 12.5 amperes. Readings above 12.5 amperes indicate that the unit is operating at overload.

12. Ac Voltmeter

This meter indicates the voltage that is produced and available at the generator set. It has a 0-30-60-90-120-150 scale with a long line marking the normal full load voltage which is 120 volts. The set may operate at loads between no load and rated load at voltages between 114 and 126 volts.

13. Voltage Adjustment Knob

This knob is indicated as ADJUST VOLTS with an arrow indicating INCREASE direction. It provides manual adjustment of the regulated output voltage, while the set is operating, by varying the resistance of the rheostat which it operates. By changing the resistance in the regulated static exciter, it varies the exciter field voltage and then the output voltage. The control

provides a voltage range of 114 to 126 volts. Rotating the knob left decreases voltage; rotating right increases voltage. Normal voltage output is 120 volts. The voltage may be varied to obtain proper voltage required at the load.

14. Circuit Breaker

This control is indicated LOAD ON-OFF with ON-OFF markings also on the toggle levers of the breaker. It is used manually to connect (ON position up) or disconnect (OFF position down) the generator output from the load terminals. The circuit breaker will trip within 2 minutes when load current exceeds 125 percent of rated load current; and within 10 seconds when load current exceeds 200 percent of the rated load. It must be reset manually; however, reset only after load is checked and adjusted to prevent tripping.

15. Load Terminals

Two load terminals provide means for connecting the power transmission cable. Each terminal is capable of holding two #8 AWG wire cables. A canvas strap is provided near the terminals to secure the cables.

16. Field Flash Terminals

These terminals inside the control box marked positive (+) and negative (-) with instructions provide means to flash the field when voltage fails to build after prolonged storage or standby. The field is flashed with a 12-volt battery, by momentarily touching the battery positive to field flash positive and battery negative to field flash negative at the same time.

Caution: Observe correct polarity. Do not attempt this procedure with unit running.

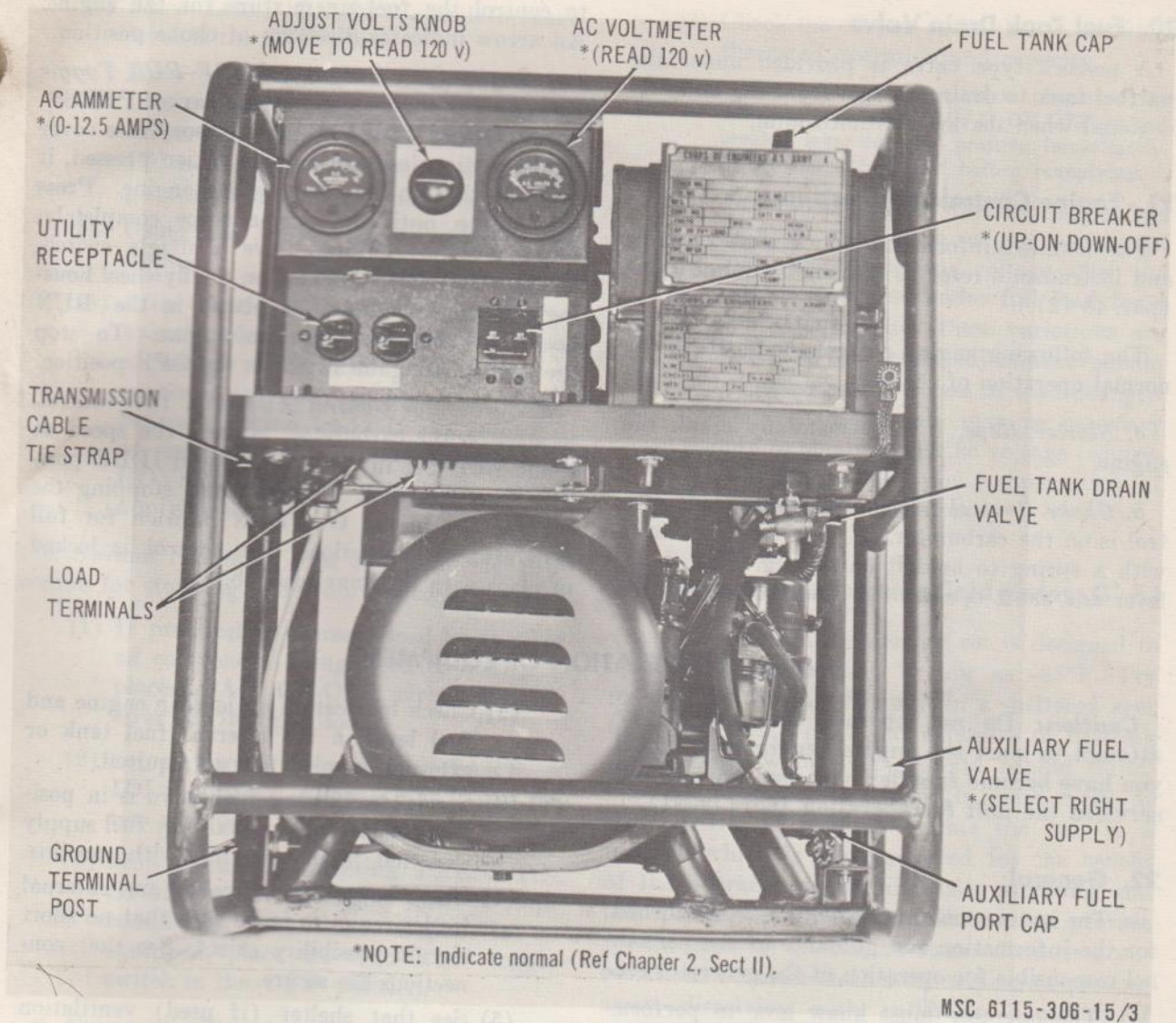


Figure 3. Control and Instruments—Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC (18339).

17. Auxiliary Fuel Valve

This is a 3-way valve marked OFF-AUXILIARY-SET TANK. Used to connect the external or internal fuel supply to the engine and to shut off the fuel supply completely. When in AUXILIARY position, fuel is supplied from an external source; in SET TANK position from the generator set fuel tank; in OFF position, the fuel is shut off. Place the valve lever to OFF position when set is not operating. A cap is provided to cover the auxiliary fuel line port.

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18. Ground Terminal

This terminal port is on the frame base. It is used to ground the complete unit.

19. Utility Receptacle

A duplex type receptacle, marked 120 VAC, with two 3-pole type sockets is provided on the control box to accommodate the external plug-in type utility lines.

20. Fuel Tank Drain Valve

A petcock type valve is provided under the set fuel tank to drain the fuel from the tank. It is closed when the lever is horizontal.

21. Engine Controls and Instruments

For detailed information on engine controls and instruments refer to the engine publications (par. 4b (2)).

The following engine controls are used in the normal operation of the set.

a. Starter Rope. Use to manually crank the engine.

b. Choke Control Lever and Shaft. This control is on the carburetor. It is an external lever with a spring to hold it on setting. The choke lever and shaft operate the internal choke valve

to control the fuel-air mixture for the engine. An arrow indicates direction of choke position.

c. Engine Stop Button and OFF-RUN Toggle Switch. The engine stop button, marked PRESS-TO-STOP, is located on the accessory case cover of the earlier designed engine. When pressed, it grounds the ignition to stop the engine. Press this button until the engine stops completely. Later designed engines have a toggle switch, marked OFF-RUN, located on the flywheel housing. The switch must be placed in the RUN position before starting the engine. To stop the engine, place the switch in the OFF position.

d. Carburetor Control Assembly. This control, located on the carburetor, governs the speed of the engine. Set in the START and IDLE position when starting, warming, and stopping the engine. Set in the GOVERN position for full generator set operation. The control is locked in place with the knurled knob.

Section III. OPERATION OF EQUIPMENT

Caution: Do not operate the controls or attempt to start the engine generator set until you have become familiar with the controls and serviced the unit for operation (pars. 9-21).

22. General

a. The instructions in this section are published for the information and guidance of the personnel responsible for operation of the generator set.

b. The operator must know how to perform every operation of which the generator set is capable. This section gives instructions on starting and stopping the generator set, basic motions of the generator set, and on coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

23. Operating Procedures

a. Preparation for Starting. Perform the following checks and adjustments to make sure that the engine generator is ready for use.

- (1) Ascertain that the unit is serviced for operation (par. 9). Particularly check electrical and mechanical connections.

- (2) Check lubrication oil level in engine and fuel level in the internal fuel tank or external supply. Fill as required.
- (3) See that auxiliary fuel valve is in position for internal or auxiliary fuel supply and that filter bowl fills with gasoline.
- (4) Check outgoing load cables and external load circuits to make sure that no short circuit possibility exists. See that connections are secure.
- (5) See that shelter (if used) ventilation facilities are in order.
- (6) Check exhaust lines (if used); see that exhaust is directed out and away from shelters.
- (7) In extreme cold weather (-25°F. to -65°F.), if required, heat engine (par. 24).

b. Starting (fig. 3)

- (1) Rotate ADJUST VOLTS knob to left stop position. Do this only if it appears that knob has been moved from previous setting or if arrow points to extreme right.

Note. If the unit has been operating properly with normal voltage, it is not necessary to move the ADJUST VOLTS knob.

- (2) Place LOAD ON-OFF circuit breaker lever in the OFF position.
- (3) Move engine choke lever to full close. If the engine is so equipped, set the carburetor control in the START and IDLE position, and the OFF-RUN toggle switch in the RUN position.
- (4) Using the engine starter rope, crank engine.
- (5) After start is attained and engine warms, reduce amount of choke. Allow engine to warm thoroughly so that it runs smoothly without benefit of choke, before applying load. If the engine is so equipped, set carburetor control in GOVERN position and lock before applying load.

c. Normal Stopping. Use the following procedure for stopping under normal conditions.

- (1) If practicable, decrease load by turning off components using electricity. If not, place LOAD ON-OFF circuit breaker lever in OFF position.
- (2) Set carburetor control in START & IDLE position. Allow engine to idle for two minutes.
- (3) Stop engine by pressing PRESS-TO-STOP button on engine until it stops completely, or if the engine is so equipped, place the OFF-RUN toggle switch in the OFF position.

d. Emergency Stopping. In an emergency the engine generator set is stopped by pressing the PRESS-TO-STOP button on the engine until it stops completely or by placing the OFF-RUN toggle switch in the OFF position depending on which control is on the engine. After an emergency stop, place LOAD ON-OFF circuit breaker level in OFF position.

e. Operating the Generator.

- (1) If required, rotate ADJUST VOLTS knob to left or right to obtain reading of 120 volts on ac voltmeter. If voltage fails to build it may be necessary to flash the field (pars. 16 and 68).
- (2) Place LOAD ON-OFF circuit breaker lever in ON position.

- (3) Check the current to see that it is within the rated operation and capacity.

Note. If the current is in excess of the rated amount place LOAD ON-OFF circuit breaker lever in OFF position immediately. Check and adjust load before reapplying.

- (4) As temperatures of various components stabilize and cause slight variations, check and adjust the voltage after the unit has operated under full load for a short time. After these variations are corrected, no further adjustments should be necessary regardless of load changes. Voltage adjustments may be necessary only to obtain a specific voltage requirement as the load for compensation of transmission line losses.

24. Operation in Extreme Cold (Below 0° F.)

a. General. This generator set is designed to operate in temperatures as low as -65°F. Try to store and operate the unit in a sheltered area to prevent wind chill and exposure to drifting snow. Erect windshields; locate behind buildings, equipment, natural wind barriers, rocks, or snow drifts. If possible operate the unit in a location which is also protected for the benefit of the operator, to permit easier servicing and unit performance. However, be sure to provide for the removal of exhaust fumes. Remove accumulations of snow and ice by wiping or picking away, dissolving with antifreeze liquid or if possible taking unit into a heated enclosure and melting it out. Anytime ice is removed by melting, change crankcase oil and dry electrical parts thoroughly. Avoid moving wiring as much as possible.

b. Engine (-25 to -65°F).

- (1) Lubricate engine in accordance with current lubrication order (par. 4b(2)).
- (2) If practical, apply heat to the engine with a suitable torch (Mil-H-55112, Type I).
- (3) Play the torch flame back and forth over intake manifold, oil pan, valve covers and air intake. Keep flame and heat from nonmetallic parts of the engine.

- (4) When engine is warmed, attempt to start. If engine fails to start, repeat heat application.
- (5) Once engine has started keep running for at least 30 minutes to eliminate all water vapors. Avoid operation for short periods of time.

c. Ac Generator Group.

- (1) Remove end cover and clean.
- (2) Inspect for accumulations of ice or snow around brushes and rotor. Carefully remove.
- (3) When started in extreme cold, allow at least a 15-minute stabilization period before applying load.

d. Controls & Instruments Group. Keep controls and instruments free of ice and snow. Avoid moving wiring, in control box, as much as possible to prevent cracking of insulation.

e. Fuel System Group. Keep snow and ice out of fuel supply. Keep tank as full as possible to prevent condensation. Use proper fuel. Check strainer bowl for moisture accumulation and clean more frequently. Keep auxiliary fuel port covered when not in use. Avoid unnecessary bending of fuel hoses.

f. Frame and Cover Group. Use canvas cover for unit protection.

25. Operation in Extreme Heat

a. General. Store or operate the unit in a shaded location. Block source of heat and set unit to allow a free flow of air. When in shelter, provide adequate ventilation and venting of exhaust fumes outside.

b. Engine.

- (1) Lubricate unit in accordance with current lubrication order (par. 4b (2)).
- (2) Keep air passages clean and unobstructed.

c. Ac Generator Keep end cover openings clean and free of obstructions.

d. Controls and Instruments Group. Keep control box openings clean for free air flow. The unit should be operated with control box cover closed.

e. Fuel System Group. Keep fuel tank less full to allow for expansion of fuel.

26. Operation in Duty or Sandy Areas

a. General. Keep area around unit free of dust or sand. If possible, wet area down. Provide wind barriers to prevent wind borne dust or sand from entering unit.

b. Engine. Clean air cleaner and fuel strainer more frequently. Keep dust and sand away from air intakes and passages. Clean more often. Keep lubricants tightly sealed and stored in clean location.

c. Ac Generator Group. Keep dust and sand from around air intake on end cover.

d. Controls and Instruments Group. Carefully clean dust and sand out of control box. Do not allow dust or sand to accumulate around terminals or regulated static exciter.

e. Fuel System Group. Keep dust and sand from around fuel tank cap. Keep fuel clean.

f. Frame and Cover Group. Keep cover cleaned ready for use.

27. Operation in Salt Water or High Humidity Areas

a. Salt Water. Salt water causes corrosive action on metal. Be careful to avoid contact of equipment with salt water. If contact is made, or if the unit is exposed to salt spray, wash the unit carefully and frequently with fresh clean water.

b. Humidity. When the generator set is operated outdoors, erect a shelter, if possible to protect the unit. If erection of a shelter is not possible, keep the generator set, when inoperative, covered with canvas or other waterproof material. Remove the cover during dry periods to allow the unit to dry out. Keep the fuel tanks full to prevent the forming of condensation.

c. Painting. Paint all exposed non-polished surfaces. Refer to TM-9-231. Coat all exposed polished surfaces with standard-issue rust-proofing material, if available, or cover parts with a light coat of grease.

28. Operation at High Altitudes

The generator set is designed to operate at elevations up to 8,000 feet above sea level without special service or adjustment. Provide adequate ventilation as the engine is more likely to over-

heat at high altitudes. It may be necessary to change the fuel-air ratio of the engine; if so, report the condition to organizational maintenance or refer to engine publications (par. 4b (2)). To calculate specific generator set output above 8,000 feet, use the following formula:

FORMULA:

$$7\% \times \frac{\text{actual altitude} - 5,000}{1,000} \times 5,000 \text{ ft rating} = \text{derating factor}$$

EXAMPLE SOLUTION FOR 13,000 FT:

$$0.07 \times \frac{13,000 - 5,000}{1,000} \times 1.5 \text{ kw} = \text{derating factor}$$

$$0.07 \times 8 \times 1.5 = .84$$

$$1.5 - .84 = .66 \text{ (derated power at 13,000 ft)}$$

CHAPTER 3

OPERATOR AND CREW MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND LUBRICANTS

29. Tools and Equipment

a. Unit. Tools and repair parts issued with or authorized for the engine generator set are listed in the Basic Issue Items List, Appendix III of this manual.

b. Engine. For tools and equipment required for engine maintenance, refer to the engine publications (par. 4b(2)).

c. Organizational Maintenance Repair Parts. Organizational maintenance repair parts are listed and illustrated in TM 5-6115-306-25P.

30. Lubrication

a. Components. The engine is the only component of the generator set that requires lubri-

cation. For detailed lubrication of the engine refer to engine manual and lubrication order (par. 4b(2)).

b. Lubricants. The following lubricants are listed by temperature range for ready reference. The engine crankcase capacity is 4/5 qt.; the air cleaner 1/8 qt. Use same lubricant in both.

| | |
|-----------------------|----------------------------|
| Above +32°F. | OE 30 or 9250 |
| +40°F. to -10° F..... | OE 10 or 9110 |
| 0°F. to -65°F. | OES |
| OE | Oil, engine, heavy duty |
| OES | Oil, engine, subzero. |

Section II. OPERATOR AND CREW PREVENTIVE MAINTENANCE

31. General

To insure that the generator set is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary Preventive Maintenance Services to be performed are listed and described in paragraphs 32 and 33. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

32. Daily Preventive Maintenance Services

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to chart I for the daily preventive maintenance services.

33. Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to chart II for the quarterly preventive maintenance services.

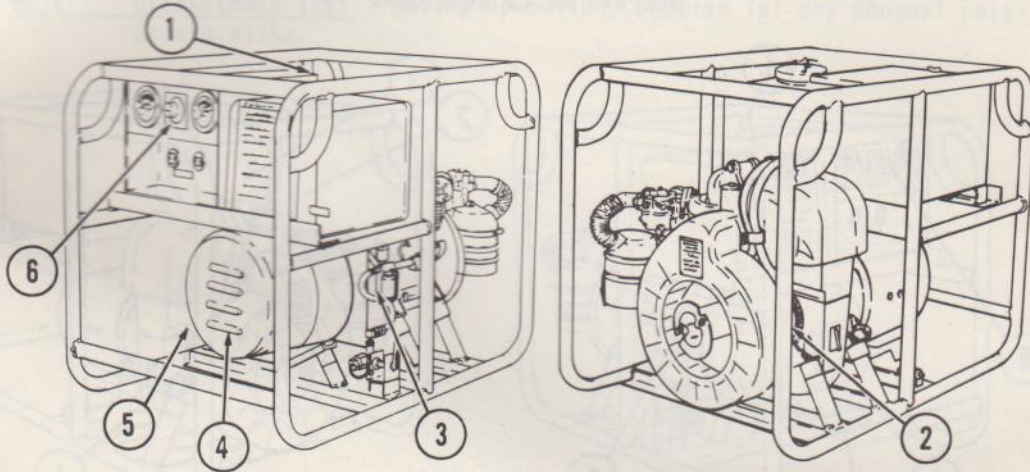
PREVENTIVE MAINTENANCE SERVICES

DAILY

TM5-6115-306-15

HOL-GAR MODEL CE-015-AC

GENERATOR SET



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

| ITEM | LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER | PAR REF |
|---------------------------|--|---------|
| 1 | <u>FUEL TANK.</u> Add fuel as required. | |
| 2 | <u>OIL LEVEL GAGE.</u> Add oil as indicated by level gage. Reference current L.O. | |
| 3 | <u>FUEL FILTER.</u> Clean sediment bowl and screen. Tighten thumb nut if gaskets leak. Reference TM5-2805-206-14. | |
| 4 | <u>GENERATOR.</u> Clean ventilation openings. | |
| 5 | <u>GROUND TERMINAL.</u> Check for proper ground. A proper ground will consist of a 3/4 inch dia. hollow or 5/8 inch dia. solid rod, 9 feet long. The cable will be No. 6 AWG copper wire bolted or clamped to the rod and attached to the ground terminal of the generator set. | |
| 6 | <u>CONTROLS AND INSTRUMENTS.</u> Inspect for damage and loose mounting. With the unit operating, check for proper operation. Normal operating readings for instruments are as follows: AC Ammeter indicates load current 12.5 amperes maximum AC Voltmeter 120 volts | |
| <u>NOTE 1. OPERATION.</u> | During operation, observe for any unusual noise or vibration. | |

MSC 6115-306-15/3.1

Chart I.

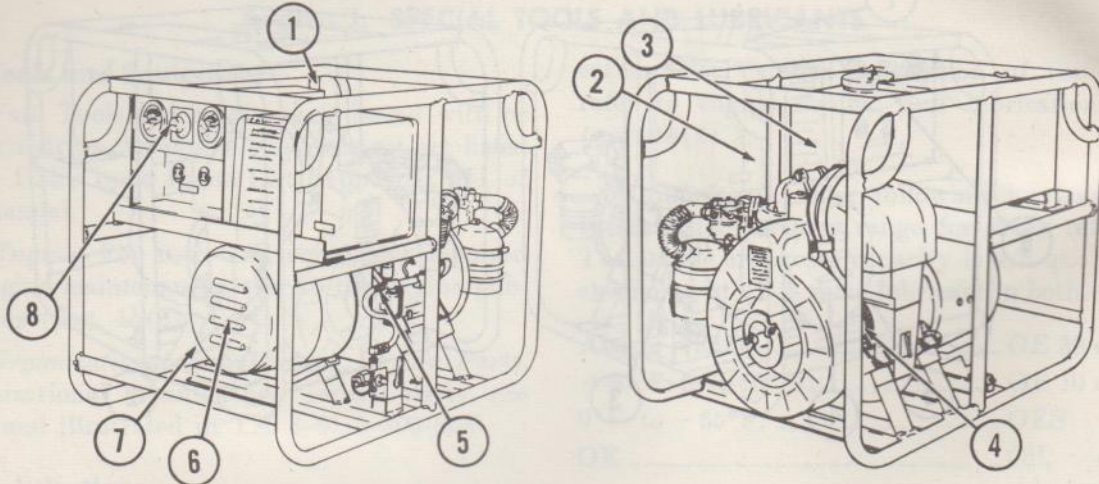
PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TM5-6115-306-15

HOL-GAR MODEL CE-015-AC

GENERATOR SET



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

| ITEM | | PAR REF |
|------|--|----------|
| 1 | <u>FUEL TANK.</u> Add fuel as required. Tighten loose mounting. Replace leaking fuel tank. Replace defective cap gasket. Clean cap vent. | 43 45 |
| 2 | <u>MAGNETO.</u> Replace pitted or burned magneto points. Proper gap adjustment is 0.018 inch. (Check adjustment every 500 hours.) Reference TM5-2805-206-14. | |
| 3 | <u>SPARKPLUGS.</u> Replace sparkplugs that have cracked insulators or burned electrodes. Clean and set sparkplug gap for 0.024 to 0.026 inch. Torque sparkplugs to 25 to 27 foot pounds. Replace leads which are frayed or broken. Clean and tighten lead connections. Reference TM 2805-206-14. | |
| 4 | <u>OIL LEVEL GAGE.</u> Add oil as indicated by level gage. Reference current L.O. | |
| 5 | <u>FUEL FILTER.</u> Clean sediment bowl and screen. Tighten thumbnut if gasket leaks. Reference TM5-2805-206-14. | |
| 6 | <u>GENERATOR.</u> Clean the ventilation openings and slip rings. Replace the brushes if worn to 3/8 inch. | 51 52 |
| 7 | <u>GROUND TERMINAL.</u> Check for proper ground. A proper ground will consist of a 3/4 inch dia. hollow or 5/8 inch dia. solid rod, 9 feet long. The cable will be No. 6 AWG copper wire bolted or clamped to the rod and attached to the ground terminal of the generator set. | |

Chart II.

| ITEM | | PAR REF |
|------|---|---------|
| 8 | <p>CONTROLS AND INSTRUMENTS. Replace damaged instruments. Tighten loose mounting. With the unit operating, check for proper operation. Normal operating readings for instruments are as follows:</p> <p>AC Ammeter indicates load current 12.5 amperes maximum</p> <p>AC Voltmeter 120 volts</p> | |
| | <p>NOTE 1. OPERATIONAL TEST. During operation, observe for any unusual noise or vibration.</p> | |

MSC 6115-306-15/3.2

Chart II—Continued

Section III. TROUBLESHOOTING

34. General

a. Scope. This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the generator set and its components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is described opposite the probable cause. Any operational trouble that is beyond the scope of the operator or crew must be reported to field maintenance, 3d echelon. For detailed troubleshooting of the engine, refer to TM 5-2805-206-14.

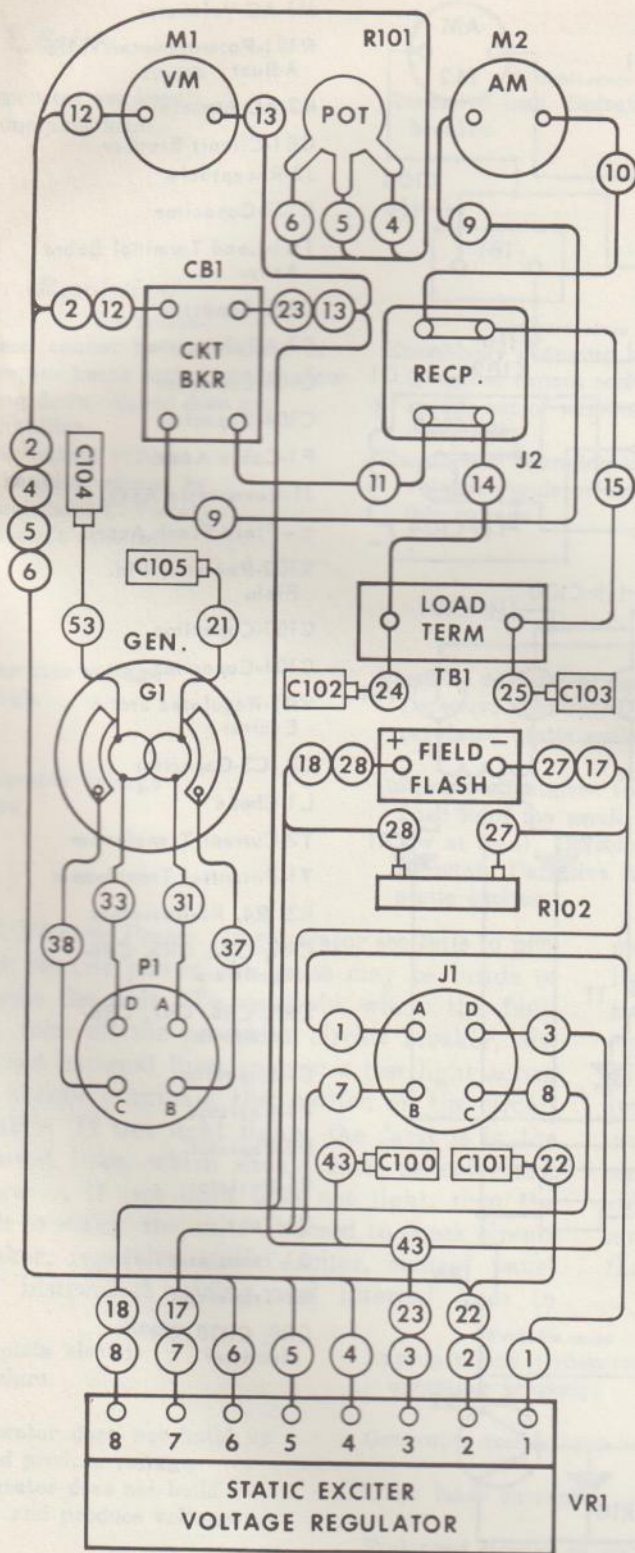
b. Methods. When troubleshooting the engine generator set, follow a logical systematic method, utilizing your primary troubleshooting tools, the wiring and schematic diagrams (figs. 4 and 5), and the functional information given for the various components (par. 10). Remember that basic function of the engine generator set is to produce power within its rated capacity (par. 5). To

accomplish this, liquid energy, the fuel, is converted to mechanical energy (in the engine) which provides the drive power for the ac generator that produces the electrical power. To aid in the final overall performance of the unit, operational, regulation, and safety components and systems are added. With this in mind, functional disturbances can be categorized into operational, safety regulation, electric power, and mechanical drive power groups. The troubleshooting tabulation (par. 35) is divided into the groups given and present typical troubles with probable cause and remedy.

35. Troubleshooting

This tabulation is divided into trouble, probable cause, and possible remedy which are categorized into operational, safety, regulation, electric power, and mechanical drive power trouble groups.

| <i>Trouble</i> | <i>Probable cause</i> | <i>Possible remedy</i> |
|--|--|--|
| Fuel delivery to engine stops or is erratic. | Fuel tank empty. Dirty fuel. Lines dirty, cracked or loose. Defective fuel pump. Auxiliary fuel valve not positioned properly. | Maintain equipment services. Replace fuel. Check lines and connections; replace or tighten. Clean or replace fuel pump (par. 4b(2)). Correct valve position. |
| No response to circuit breaker or voltage adjustment knob. | Loose wires or connections. No actuating voltages. Defective circuit or circuit part. | Locate actuated part in circuit diagram (figs. 4 & 5). Trace wiring, check connections; correct loose connections, replace or splice broken wires, replace indicated faulty part. Check actuating voltage peculiar to that circuit. |
| Improper meter reading or indication. | Component of circuit meter is monitoring, is defective or not functioning properly. Loose connections. | Locate meter in circuit diagram. Trace wiring, check connections; replace or splice broken wires, replace indicated faulty part. Check actuating voltage or condition source for the meter. If circuitry is correct or condition (voltage or current is satisfactory) check circuit with external meter to see if meter is defective. Replace defective meter. |
| Improper generator set output. | Load connections not correct. Faulty load. Generator set components malfunctioning. | Shut down unit immediately. Check and correct load connections. Determine if load or generator set is at fault (par. d below). |
| Engine malfunction | | Refer to TM 5-2805-206-14. |



- M1-AC Voltmeter
- R101-Potentiometer Volts ADJ
- M2-AC Ammeter
- CB1-Circuit Breaker
- J2-Receptacle
- C104-Capacitor
- C105-Capacitor
- G1-AC Generator
- P1-Cable Assy.
- TB1-Load Terminal Board Assy.
- C102-Capacitor
- C103-Capacitor
- ± -Field Flash Assy.
- R102-Resistor,Fld. Flash
- J1-Receptacle Assy.
- C100-Capacitor
- C101-Capacitor
- VR1-Regulated Static Exciter

Voltages at:

P1 Pins D-A = 120 VAC

P1 Pins C-B = Field DC

Voltage varies w/load
& temp.

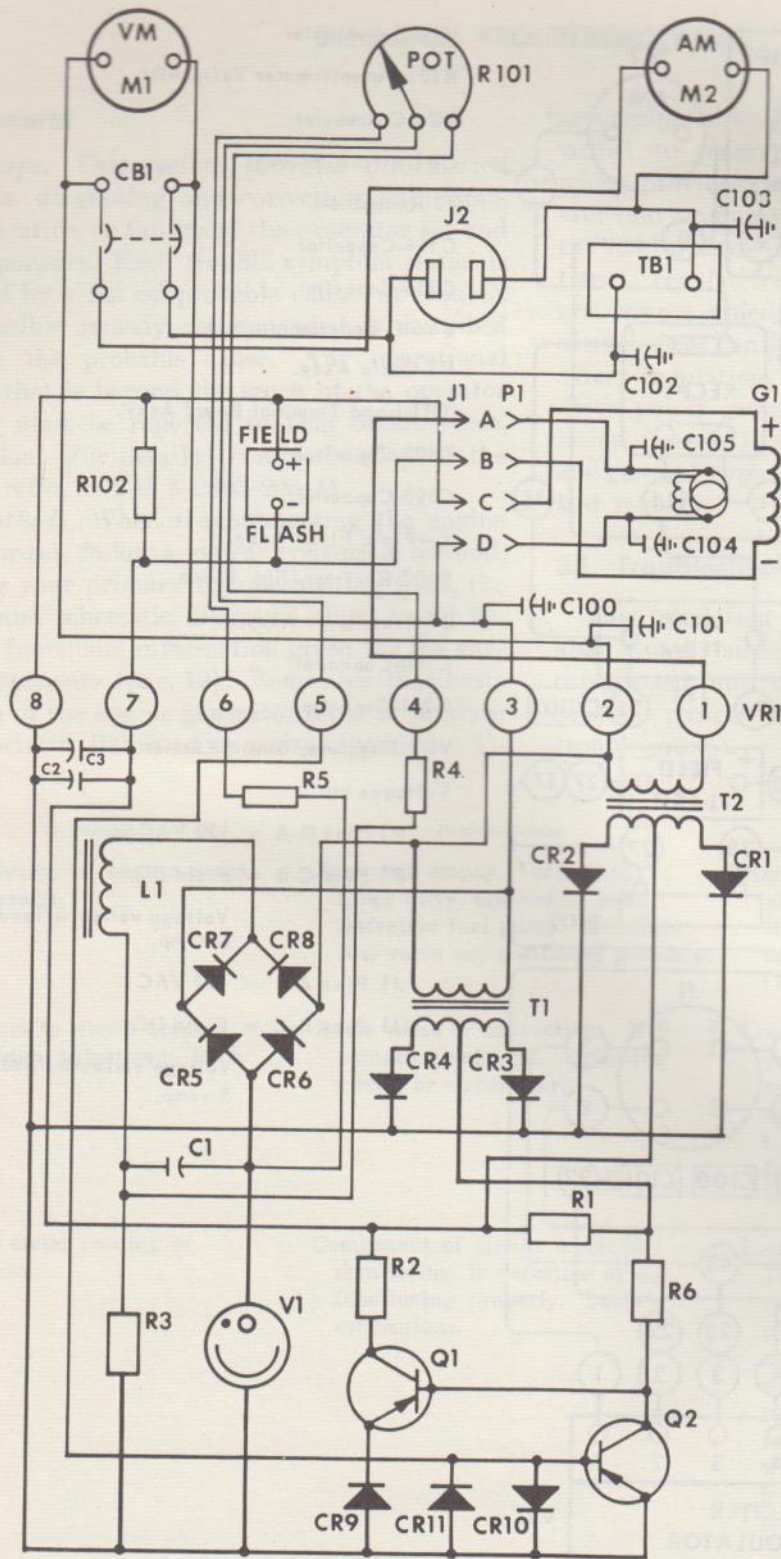
J1 Pins A-D = 120 VAC

J1 Pins B-C = Field DC

Voltage varies w/load
& temp.

MSC 6115-306-15/4

Figure 4. Wiring Diagram—Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC (18339).



- M1-AC Voltmeter
- R101-Potentiometer Volts Adjust
- M2-AC Ammeter
- CB1-Circuit Breaker
- J2-Receptacle
- C103-Capacitor
- TB1-Load Terminal Board Assy.
- C102-Capacitor
- G1-AC Generator
- C105-Capacitor
- C104-Capacitor
- P1-Cable Assy.
- J1-Receptacle Assy.
- ± -Field Flash Assy.
- R102-Resistor, Fld. Flsh.
- C100-Capacitor
- C101-Capacitor
- VR1-Regulated Static Exciter
- C2, C3-Capacitor
- L1-Choke
- T2-Current Transformer
- T1-Potential Transformer
- R3, R4, R5-Resistors
- CR1, CR2, CR3, CR4-Rectifiers
- CR5, CR6, CR7, CR8-Rectifiers
- C1-Capacitor
- R1-Resistor
- R2-Resistor
- R6-Resistor
- V1-Tube
- Q1-Transistor
- Q2-Transistor
- CR9, CR10, CR11-Rectifier

MSC 6115-306-15/5

Figure 5. Schematic Diagram —Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC (18339).

b. Safety.

Trouble
Generator set keeps dumping load.

Probable cause
Excessive load. Defective circuit breaker.

Possible remedy
Shut down unit. Check load and adjust. Reset circuit breaker. If condition continues, check circuit for continuity or grounds. See that conditions for which breaker was installed do not exist. Check circuit breaker and replace if defective.

c. Regulation.

Trouble
Speed cannot be maintained or engine keeps racing and/or slowing down. Speed does not stabilize.
Ac output voltage changing cannot be maintained. Voltage doesn't stabilize.

Probable cause
Excessively changing load.
Governor cannot control engine speed; out of adjustment or defective.
Excessively changing load.
Voltage regulator cannot maintain voltage.

Possible remedy
Check load and adjust as required. Adjust engine governor. Replace governor if adjustment cannot be made.
Check load and adjust as required. If load is not at fault, check regulated static exciter. Check voltage adjusting rheostat. See if parts in regulated static exciter are good. Check ac generator brushes and rigging. Also check capacitors. Replace if faulty.
Adjust voltage with rheostat. If not responsive, check rheostat and regulated static exciter. Replace if defective.
Adjust voltage with rheostat. If not responsive, check rheostat and regulated static exciter. Replace if defective. Increase size of load lines.

Generator voltage high.

Rheostat adjustment too high.
Defective rheostat. Defective regulated static exciter.

Generator voltage low.

Rheostat adjustment too low.
Load lines too small (voltage low at load). Defective rheostat. Defective regulated static exciter.

d. Electric Power. If generator set fails to produce electric power, the cause may be inside or outside the unit. To ascertain where the fault lies, turn off the generator circuit breaker, disconnect external lines, connect a test light across the output terminals, then switch on the circuit breaker. If test light lights, the fault is in the external lines, which should then be corrected. However, if test light does not light, then the fault is within the unit. Proceed to check circuit breaker, regulated static exciter, control panel and instrument wiring and internal lines to

generator. Remember one disconnected or improperly connected wire is sufficient to cause lack of power. If wiring between instruments, control panel and generator is correct, then the fault is in the generator itself. First, check the brushes, see that they are properly seated and connections are secure. Examine slip ring to be sure that it is clean and free from pits and mica ridges. Check the capacitors. The above faults may also cause decreased output and efficiency of the unit before a total breakdown occurs.

Trouble
Complete electric failure.

Probable cause
Improper load. Generator set not operating properly.

Possible remedy
Shut down unit. Determine if power failure is caused from an external or internal source.

Generator does not build up and produce voltage.

Generator exciter open or shorted

Check continuity of exciter. Replace entire exciter or part if defective.

Generator does not build up and produce voltage.

Loose leads on exciter

Check and tighten terminals.

Prolonged storage or standby resulting in loss of residual magnetism.

Flash the field (par. 68).

Exciter shorted, open, or grounded.
Main generator field shorted, open or grounded.

Replace exciter. Replace main fields. If grounded due to moisture, clean by spraying with suitable solvent and bake.

| <i>Trouble</i> | <i>Probable cause</i> | <i>Possible remedy</i> |
|---|--|---|
| Blackened collector rings | Regulated static exciter not functioning. Excessive sparking or flashing at brushes. | Replace exciter. Check all terminal connections. Sand or turn down collector rings. Replace short brushes. |
| Intermittent sparking at brushes. | Check for open armature winding | Adjust spring pressure or replace weak brush springs. Locate and repair bad coil or repair, defective joint. Replace armature. |
| Excessive hum | Uneven air gap | Measure with feeler gage. Check rotor for balance. Check bearings. Remove rotor and clean. |
| Regular clicking | Foreign matter in air gap | Check brush tension. |
| Brush chatter | Extreme vibration | Tighten mounting bolts to base and engine. |
| Vibration | Alignment of unit | Blow out all dirt in unit, use solvent on wound sections to remove sticky dirt. Check flow of ventilating air. Check for grounds. |
| Overheating (check with thermometer, don't depend on the hand). | Dirt or alignment. Poor ventilation, (temperature above 125°F.) | Clean all ground connection points. Be sure lockwashers fit in to make good metal-to-metal contact. Replace frayed and broken bonding straps. Replace capacitors. Check engine suppression parts. (TM 5-2805-206-14). |
| External radio interference. | Poor ground and bonding connections. Bad capacitors. Brush damage. Collector ring dirty. Engine spark plugs, cables and ignition faulty. | |

e. Mechanical Power. Refer to engine publications (par. 5b) for complete detailed troubleshooting and remedies. The following are listed for ready reference.

| <i>Trouble</i> | <i>Probable cause</i> | <i>Possible remedy</i> |
|----------------------------------|---|---|
| Engine will not turn | Loose or defective wiring | Tighten all loose connections or replace defective wiring. |
| Engine turns but will not start. | Engine flooded | Push choke control all the way in and turn engine over. If carburetor continues to flood, replace it. Replace or repair carburetor. |
| Engine turns but will not start. | Carburetor passages restricted by water, ice or corrosion. Fuel pump defective | Replace fuel pump. |
| | Restricted air cleaner | Remove air cleaner and clean filter. Refill to proper level with same oil used in engine. |
| | Air leaks around intake manifold | Replace manifold gaskets. |
| | Spark plugs damaged, dirty or wet; gap improperly spaced. | Clean, adjust and test spark plugs. Replace any defective plugs. |
| | Magneto brush worn or damaged | Replace magneto brush. |
| | Magneto coil defective | Replace magneto coil. |
| | Magneto condenser defective | Replace magneto condenser. |
| | Magneto improperly timed to engine. | Time magneto to engine. |
| | Breaker points improperly spaced, burnt or wet. | Clean and adjust, or replace breaker points. |
| Engine lacks power | Low or poor compression | Overhaul engine, grind valves and replace. |
| | Defective ignition system | Check ignition wiring, spark plugs and magneto. |
| | Carburetor not operating properly | Check the operation of the carburetor. A lean fuel mixture will cause burned valves and excessive engine temperatures. |
| | Restricted muffler | Inspect muffler. Replace if defective. |

Section IV. RADIO INTERFERENCE SUPPRESSION

36. Definitions

a. Interference. The term "interference" as used herein, applies to electrical disturbances in the radio frequency range, which are generated by the generator set and which may interfere with the proper operation of radio receiver or other electronic equipment.

b. Interference Suppression. The term "interference suppression" as used herein, applies to the methods used to eliminate or effectively reduce radio interference generated by the generator set.

37. Purpose of Interference Suppression

The tactical importance of effective interference suppression cannot be stressed too greatly. Since the electrical disturbances generated by the generator set are composed partly of electrical waves in the radio frequency range, they must be suppressed for two important reasons. First, they will interfere with the proper operation of the friendly radio net, and second, they will enable the enemy to locate the equipment and its associated units.

38. General Sources of Interference

Generally, radio interference is generated anywhere a spark occurs or where a high-frequency current is present. A spark is a small amount of current jumping an air gap in response to the force of a relatively high voltage. The gasoline engine ignition system is a common source. Magneto contacts, generator commutators, relay contacts, and static charges collecting on the frame are other common sources which in some way must be suppressed.

39. General Methods Used to Attain Proper Suppression

Essentially, suppression is attained by providing a low resistance path to ground for the stray currents. The method used to attain suppression include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitor, filter, and resistance circuits where necessary.

40. Interference Suppression Components

a. Engine Group. Refer to engine publications (par. 5b).

b. Ac Generator Group. Two capacitors (C104, C105) mounted on the bearing bracket (fig. 11) suppress interference that may be caused by the generator.

c. Controls and Instruments Group. Four capacitors (C100, C101, C102, C103) mounted inside the control box (fig. 8) suppress interference that may be caused by the regulated static exciter or at the load terminals.

d. Frame and Cover Group. A ground strap from the engine frame to the unit ground terminal post, which is attached to the frame, assures low resistance path from isolated parts to the frame.

e. Lockwashers. The generator set contains numerous internal, external, and internal-external tooth type lockwashers used to secure parts and wiring at terminals which are not related directly to the radio suppression parts (a, b, c, d, above). These lockwashers have a potential value for interference suppression. It is important that they be noted carefully during disassembly so that they may be assembled at the original locations.

41. Replacement of Suppression Components

a. General. When replacing suppression components, always replace with the identical parts to provide proper interference suppression. Take special care to obtain a firm metal-to-metal contact between all shields, lockwashers, leads, capacitor mounting brackets, and electrical leads. Be sure all connections are clean and tight.

b. Test. If available, use a capacitor tester to check for leaks or shorts. If test equipment is not available and interference is indicated, isolate the cause of interference by trial and error method of replacing each capacitor in turn until the cause of interference is determined and eliminated. Check for loose or dirty contact points. Clean and secure.

c. Removal and Installation. No special techniques are required to remove or install the suppression parts. All parts are secured with screws, washers and nuts. Access to capacitors in control box (C100, C101, C102, C103) is readily attained by opening control box cover. Access to capacitors in generator (C104, C105) is attained by removing the end cover. The ground strap is in the open at the ground terminal.

- (1) *Removal.* When removing capacitors, disconnect any lead wires at the capacitor terminals first; then, disconnect mounting hardware to release capacitor.
- (2) *Installation.* Be sure connection points

are clean. If possible, use new lockwashers. Connect capacitors to mounting point first; then, connect lead wires to capacitor. Make sure all connections are tight.

Section V. FUEL SYSTEM GROUP MAINTENANCE

42. Description

a. All components of the fuel system group for the generator set are exposed and readily accessible (figs. 2, 6 & 7). For fuel system components integral to the engine, refer to engine publications (par. 4b(2)).

b. Included in this group (figs. 6 & 7) are the fuel tank assembly which includes the tank, cap and strainer; the lines and fittings; the three-way valve with its mounting bracket and identification plate. These parts store and conduct fuel to the engine. The engine fuel filter provides the strainer and sediment bowl for the system.

43. Removal of Parts

a. Procedure. No special sequence is required for removal of parts of this group. When disconnecting hoses or separating fittings, hold one and turn off other using correct size wrench to fit hex-shoulders. If the whole system is to be removed, consider removing the hoses first, then the parts which are connected together as groups can be removed from the unit for separation at a more convenient location.

b. Fuel Tank (figs. 6 & 7). The cap, strainer and drain valve can be removed with tank installed. The elbow can be removed after hose is disconnected with tank installed, or after tank is removed. To remove the tank: drain; disconnect hose from elbow under tank; release bond strap, and two mounting straps by removing securing hardware (this also releases the unit identification plates).

c. 3-Way Valve. The valve and its mounting bracket is released by removing its mounting hardware (fig. 6).

44. Repair

a. Cleaning. Clean tank, fittings, hoses and valve. Carefully brush threads. See that flared surfaces are not damaged.

b. Fuel Tank. Check seams around tank and fittings under tank for leaks and cracks. Check

cap and gasket for damage; see that air vent valve operates. See that strainer is clean and that screen is not damaged. Replace leaking tank. Replace deteriorated cap gasket; replace cap if damaged or valve doesn't operate. Replace damaged strainer.

c. Fittings. Remove minor burrs from fitting threads. Replace fittings that have damaged threads or that have lost shape.

d. 3-Way Valve. Replace a loose or leaky valve. Replace identification plate that cannot be read; tighten if loose.

e. Fuel Lines. Replace deteriorated, frayed or porous fuel hoses. If fitting threads or flared seats in fittings are damaged so that a good connection cannot be made, replace hose.

45. Installation

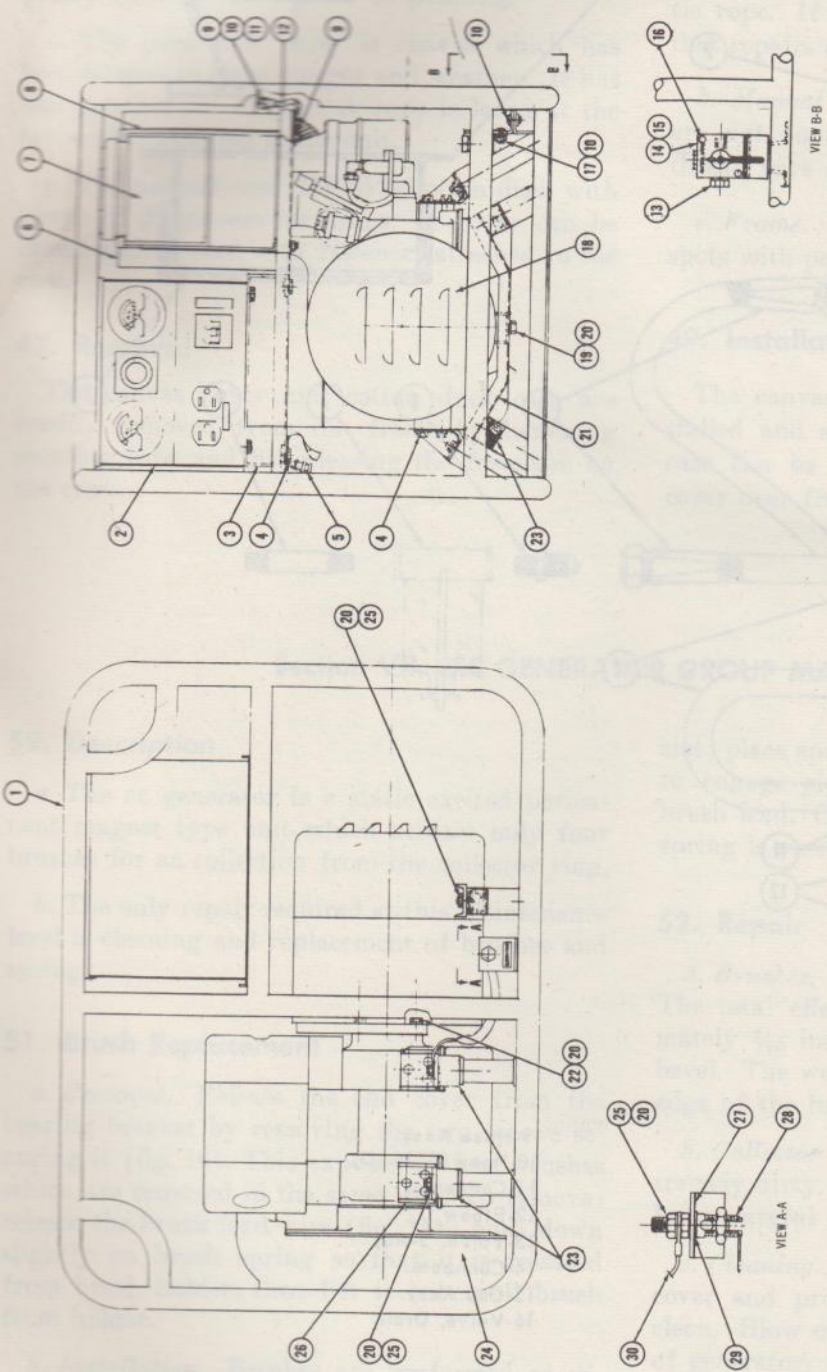
a. Procedure. No special sequence is required for installation of parts of this group. When connecting hoses or fittings, hold one and turn on other. Use pipe dope when connecting pipe fittings; do not use dope for flared fitting connections (usually between lines and fittings); keep pipe dope away from openings by applying at outer edge. If the whole system had been removed, consider assembly of the parts that are connected together as a group so that they may be installed more conveniently.

b. Fuel Tank (figs. 6 & 7). Install drain valve and elbow. Position fuel tank on frame with bond strap lug to the front. Place unit identification plate at rear of tank. Secure tank and plate with the two mounting straps, nuts and lockwashers. Connect bond strap to the tank lug. See that drain valve is off.

c. 3-Way Valve (figs. 6 & 7). Connect the 3-way valve and fittings together. Secure the 3-way valve to the mounting bracket with valve and fittings on the frame with screw and lockwashers. Place valve in OFF position.

d. Fittings. Secure fittings in fuel filter and install in engine.

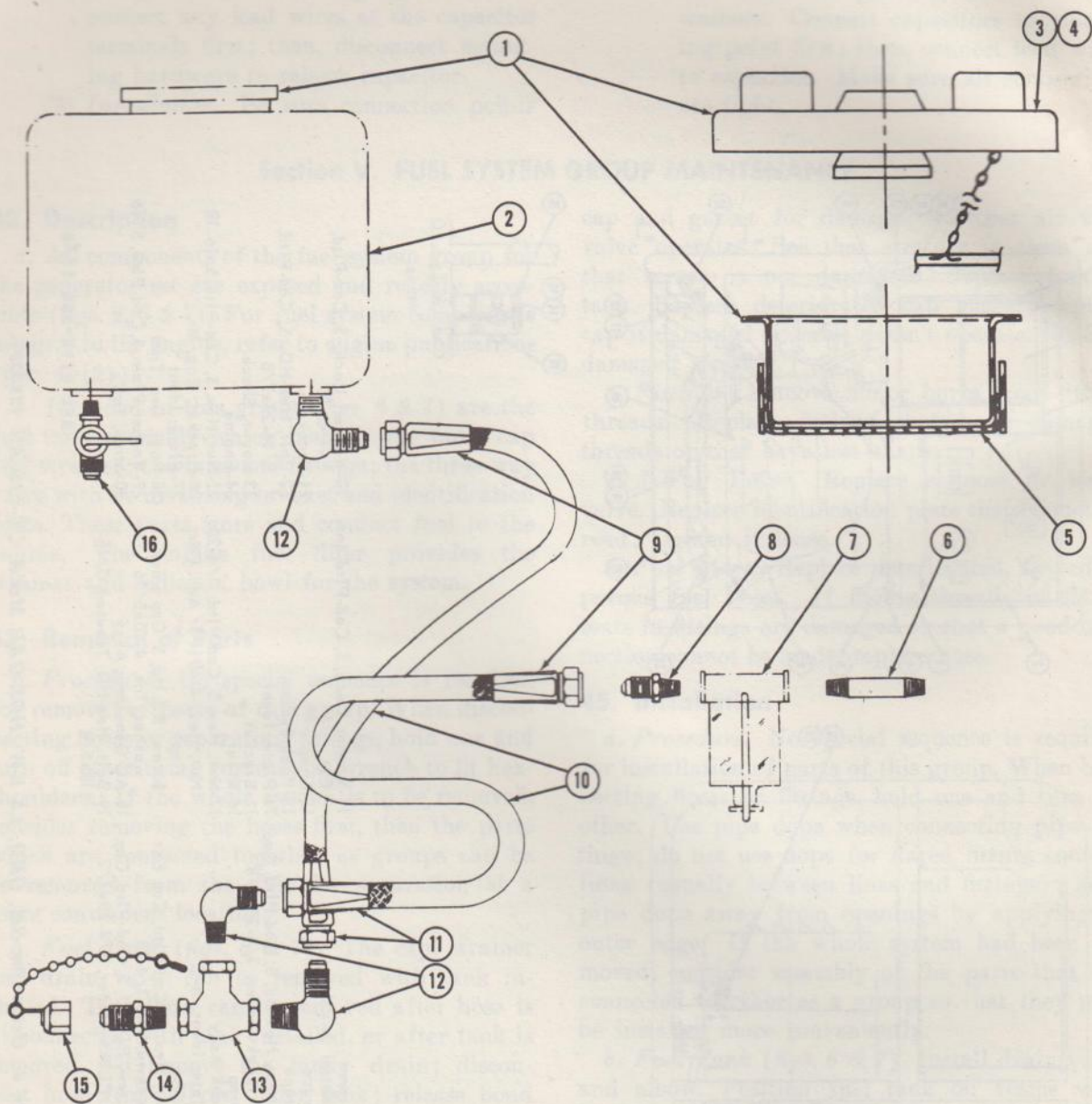
e. Fuel Lines. Install engine to 3-way valve hose and tank to 3-way valve hose.



- 1-Frame
- 2-Control Box Assy
- 3-Brace
- 3-Brace
- 4-Screw, Hex-Hd, S, Cad-Pltd, Cap
- Int Lockwasher, 1/4-20x5/8
- 5-Strap
- 6-Tank Assy
- 7-Plate, Ident, A-C
- 8-Strap
- 9-Nut, Hex, S, Cad-Pltd, Cap Ext Lockwasher, 1/4-20
- 10-Screw, RD-HD, S, Cad-Pltd, Cap Ext Lockwasher, 1/4-20x1/2
- 11-Washer, Lock, S, Cad-Pltd, Int-Ext, 1/4
- 12-Strap
- 13-Fuel System
- 14-Plate, Ident
- 15-Bracket
- 16-Rivet
- 17-Nut, Hex, S, Cad-Pltd, 1/4-20 Nut, Hex, 4-40 (For Aux. Port Cap)
- Screw, Rd Hd, S, Cap Lockwasher, Int, 4-40x5/16
- 18-AC Generator Assy
- 19-Bolt, Hex-HD, Treated, 5/16-18x5/8
- 20-Washer, Lock, S, Cad-Pltd, Ext, 5/16
- 21-Bracket
- 22-Bolt, Hex-HD, S, Cad-Pltd, 5/16-24x7/8
- 23-Mount, Shock
- 24-Engine
- 25-Nut, Hex, S, Cad-Pltd, 5/16-18
- 26-Bracket, Eng. Mt.
- 27-Plate, Ident
- 28-Post, Grd Trml
- 29-Washer, Plain, S, Cad-Pltd, 5/16
- 30-Strap, Grd

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Figure 6. Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC (18339).



- 1-Tank Assy.
- 2-Tank
- 3-Cap Assy.
- 4-Gasket
- 5-Strainer
- 6-Nipple
- 7-Filter
- 8-Connector

- 9-Hose Assy.
- 10-Hose (3/16 ID,
- 11-Connector
- 12-Elbow
- 13-Valve, 3-way
- 14-Connector
- 15-Cap Assy.
- 16-Valve, Drain

MSC 6115-306-15/7

Figure 7. Fuel System Group—Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC (18339).

Section VI. FRAME AND COVER GROUP MAINTENANCE

46. Description

a. The frame is fabricated from tubing and is a completely welded unit. It contains all mounting holes and brackets. The assembled frame is plated (zinc or cad.) prior to painting.

b. The protective cover is canvas which has been treated to resist fungus and weather. It has two pouches for storage. A rope is laced at the bottom for securing to the unit.

c. The manual case (GFE) is cotton duck with Corps of Engineers markings. Its cover can be closed and secured with fasteners attached to the case.

47. Removal

The canvas cover and cotton duck case are readily removed from the frame by loosening securing rope and by releasing the fasteners on the case.

48. Repair

a. Canvas Cover. Clean cover by brushing with dry brush. Tighten loose grommets. Sew minor tears if feasible. Replace frayed or broken tie rope. If cover is torn, worn or damaged so that repairs are impractical, replace.

b. Manual Case. Clean case so that manuals are not contaminated. Replace worn, torn or thread bare case.

c. Frame. Keep frame clean. Touch up bare spots with paint of original finish.

49. Installation

The canvas and manual case are readily installed and secured to the frame. The manual case can be secured to the frame by lapping cover over frame tubing and closing.

Section VII. AC GENERATOR GROUP MAINTENANCE

50. Description

a. The ac generator is a static excited permanent magnet type unit which utilizes only four brushes for ac collection from the collector ring.

b. The only repair required at this maintenance level is cleaning and replacement of brushes and springs.

51. Brush Replacement

a. Removal. Release the end cover from the bearing bracket by removing the two screws securing it (fig. 10). This exposes all four brushes which are removed in the same way. To remove; release the brush lead wire (fig. 11); push down slightly on brush spring so that it is released from brush holder, then lift it out; pull brush from holder.

b. Installation. Brushes are preformed so require no seating. To install: slide brush into holder so that beveled end slant faces the spring

slot; place spring roll over brush and press down to engage slots on the brush holder; connect brush lead. Check setting of brush and see that spring is secured in its bracket.

52. Repair

a. Brushes. Replaces defective or worn brushes. The total effective length of brush is approximately $\frac{7}{16}$ inch to the lower edge of the brush bevel. The wear limit is $\frac{3}{8}$ inch from the lower edge of the brush bevel.

b. Collector Ring. Clean rings that are extremely dirty. Use a fine non-metallic sandpaper being careful not to dig into the ring surface.

c. Cleaning. Keep air intake louvers in end cover and protective screen in front of stator clean. Blow or carefully brush dirt from inside of generator.

d. Hardware. See that all mounting hardware and wire leads are secure.

Section VIII. CONTROLS AND INSTRUMENTS GROUP

53. Description

a. The control box assembly (figs. 6 & 8) has a cover which may be opened or completely removed to gain access to all parts in the control box. The wiring and schematic identification plate (figs. 4 & 5) is inside the cover. Parts in the control box have been symbolized for ready identification.

b. Repair required at this maintenance level is cleaning and replacement of the complete assembly or individual components that are faulty or suspected of being faulty. The only serviceable component is the regulated static exciter and this is limited to the replacement of the voltage regulator tube at this level. If a regulated static exciter is suspected, refer this condition to field maintenance, 3d echelon.

54. Replacement of Parts

a. *Removal-Installation Procedure.* Depending upon the amount of repair that may be required, consider removing the complete control box assembly from the unit for work at a more convenient location. No special techniques are required as all components are secured with standard hardware. However, observe how parts are installed before removal. Installation is essentially the reverse of removal. When installing parts, be sure that the wiring connections are correct; check against wiring diagram (fig. 4).

b. *Control Box Assembly (fig. 6).* Disconnect cable from ac generator at receptacle under the control box. Release control box by removing the hardware securing it to the frame. This also releases the cable tie-down strap. It is best to leave the control box braces attached to the box as they serve as a stand.

c. *Cover (fig. 8).* Open the cover by releasing the wing stud (4) from the receptacle (6). Release the cover (2) from the body (3) by removing the hardware security it. The wing stud in the cover can be removed by prying off the grommet (5).

d. *Wiring.* As required, trace (figs. 4 and 5) and disconnect leads at screw terminals. This

releases all parts from the electrical circuit. Note that wires are soldered to the potentiometer and to the field flash resistor (fig. 9) which are not replaced at this level.

e. *Meters (fig. 8).* Disconnect wires from terminals. Release meters (18 & 31) from panel by removing securing hardware (supplied with meter).

f. *Field Flash Panels (fig. 8).* Disconnect leads at terminals. Release panel (13) from side of control box by removing securing hardware.

g. *Circuit Breaker (fig. 8).* Remove field flash panel (f above). Disconnect leads. Release circuit breaker (20) from control box by removing securing hardware.

h. *Capacitors (fig. 8).* Refer paragraphs 36 through 41.

i. *Load Terminal Board Assembly (figs. 8 & 9).* Disconnect leads. Remove components as required to gain better access. Release terminal board assembly (23, fig. 8) by removing securing hardware. Note that capacitors (14 and 36, fig. 8) are also secured with this mounting hardware. Remove load terminals as required (fig. 9).

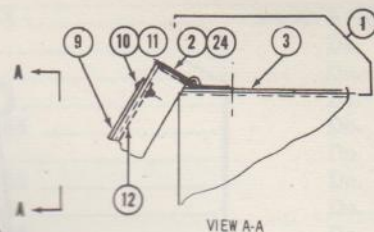
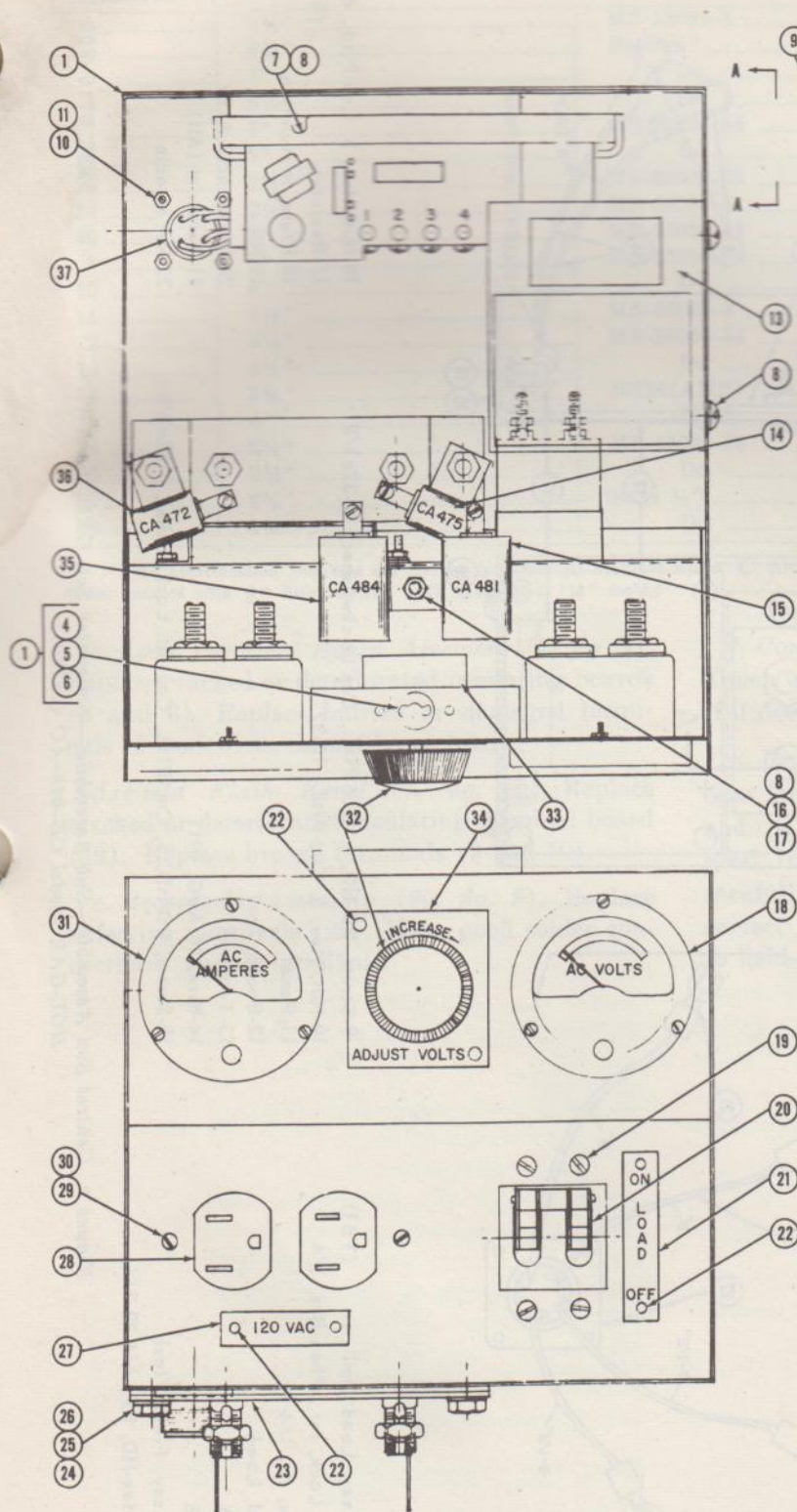
j. *Receptacle Assembly (fig. 8).* Disconnect leads at terminals. Release receptacle (37) by removing securing hardware. Remove leads, if required, by unsoldering (20, fig. 9).

k. *Utility Receptacle (fig. 8).* Disconnect leads. Release receptacle (28) by removing securing hardware (29 and 30). Replace a faulty receptacle.

55. Repair

a. *Cleaning.* Clean all terminals with brush. Use a suitable solvent to remove scum or oxidation. Clean meters. Remove all accumulations of dirt, scum and other foreign particles that may form an electrical ground and arc from the unit electrical circuit.

b. *Wiring.* Replace defective wires. Tighten terminals on wires. Check wiring against diagrams (figs. 4 and 5). Use the following wire tabulation to fabricate wires.

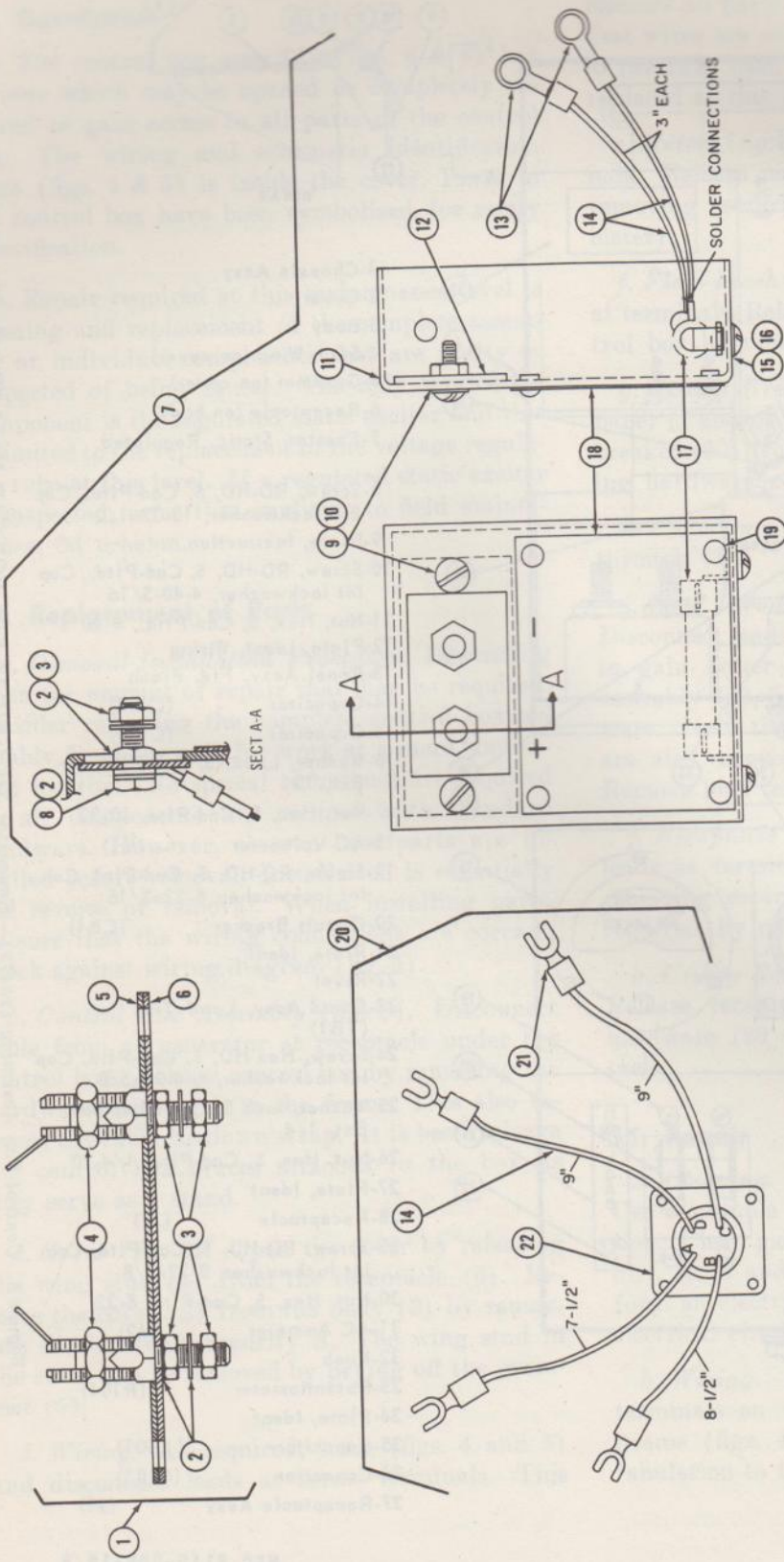


- 1-Chassis Assy
- 2-Cover
- 3-Body
- 4-Stud, Wing (on cover)
- 5-Grommet (on cover)
- 6-Receptacle (on body)
- 7-Exciter, Static, Regulated

- 8-Screw, RD-HD, S, Cad-Pltd., Cap
Ext lockwasher, 10-32x1/2
- 9-Plate, Instruction
- 10-Screw, RD-HD, S, Cad-Pltd., Cap
Int lockwasher, 4-40-5/16
- 11-Nut, Hex, S, Cad-Pltd., 4-40
- 12-Plate, Ident, Wiring
- 13-Panel Assy, Fld. Flash
- 14-Capacitor (C102)
- 15-Capacitor (C100)
- 16-Washer, Lock, S, Cad-Pltd, Int-
Ext, 10
- 17-Nut, Hex, S, Cad-Pltd, 10-32
- 18-AC Voltmeter (M1)
- 19-Screw, RD-HD, S, Cad-Pltd, Cap
Int lockwasher, 6-32x3/16
- 20-Circuit Breaker (CB1)
- 21-Plate, Ident
- 22-Rivet
- 23-Board Assy, Load Trml
(TB1)
- 24-Screw, Hex HD, S, Cad-Pltd, Cap
Int lockwasher, 1/4-20x5/8
- 25-Washer, lock S, Cad-Pltd, Int-
Ext, 1/4
- 26-Nut, Hex, S, Cad-Pltd, 1/4-20
- 27-Plate, Ident
- 28-Receptacle (J2)
- 29-Screw, RD-HD, S, Cad-Pltd, Cap
Int lockwasher, 8-32x3/8
- 30-Nut, Hex, S, Cad-Pltd, 8-32
- 31-AC Ammeter (M2)
- 32-Knob
- 33-Potentiometer (R101)
- 34-Plate, Ident
- 35-Capacitor (C101)
- 36-Capacitor (C103)
- 37-Receptacle Assy (J1)

Figure 8. Control Box Assembly (18479)—Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC 18839.

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- 16-Nut, Hex, S, Cad-Pltd., 8-32 (R102)
- 17-Resistor
- 18-Plate, Instruction
- 19-Rivet
- 20-Receptacle Assy (J1)
- 21-Terminal (All)
- 22-Receptacle

- 9-Screw, RD-HD, S, Cad-Pltd., Cap Lockwasher, 10-32x1/2
- 10-Nut, Hex, S, Cad-Pltd., 10-32
- 11-Panel
- 12-Board, Trml
- 13-Terminal
- 14-Wire, 16 AWG, WHT
- 15-Screw, RD-HD, S, Cad-Pltd., Cap Int. Lockwasher, 8-32x3/8

- 1-Board Assy, Load Trml (TB1)
- 2-Washer, Lock, Int., Phos-Brz, 1/4
- 3-Nut, Hex, Br, 1/4-20
- 4-Terminal, Load
- 5-Board, A
- 6-Board, B
- 7-Panel Assy, Field Flash
- 8-Screw, Hex-HD, BR, 1/4-20-3/4

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Figure 9. Control Box Assembly—Sub-Assemblies—Generator Set, GED, 1.5 KW, HOL-GAR Model CE-015-AC (18339).

| *Wire Ident. No. | Wire length | Terminal end | Terminal end |
|------------------|-------------|--------------|--------------|
| 2 | 3¼" | MS-25036-8 | 40832 (AMP) |
| 4 | 6¼" | Bare ¼" | Do. |
| 5 | 6" | Do. | Do. |
| 6 | 6¼" | Do. | Do. |
| 17 | 7" | MS-25036-54 | Do. |
| 18 | 7" | Do. | Do. |
| 22 | 2½" | MS-25036-53 | Do. |
| 23 | 2½" | MS-25036-8 | Do. |
| 43 | 2" | MS-25036-53 | Do. |
| 9 | 8" | MS-25036-54 | MS-25036-8 |
| 10 | 6" | Do. | 40836 (AMP) |
| 11 | 4½" | MS-25036-8 | Do. |
| 12 | 4½" | MS-25036-54 | MS-25036-8 |
| 13 | 4½" | Do. | Do. |
| 14 | 3¼" | 40836 (AMP) | MS-25036-54 |
| 15 | 4" | Do. | Do. |
| 24 | 2¼" | MS-25036-53 | Do. |
| 25 | 2¼" | Do. | Do. |
| 27 | 2¼" | Bare ¼" | Do. |
| 28 | 2¼" | Do. | Do. |

* Wire Identification Numbers are derived from Wiring Diagram figure 4. All wire size #16 AWG per MIL-W-5086 Color White. Wires bundled with ¼" Black Spirap AMP #500030-2 (13" req'd.)

c. Load Terminal Board Assembly (1, fig. 9). Replace cracked or deteriorated insulating boards (5 and 6). Replace burned or damaged terminals if load wires cannot be secured.

d. Field Flash Panel (7, fig. 9). Replace cracked or deteriorated insulating terminal board (12). Replace broken terminals (9 and 10).

e. Receptacle Assembly (20, fig. 9). Replace defective receptacle (22). Make good solder connections. Secure terminals.

f. Control Box Chassis Assembly (1, fig. 8). Touch up paint. Replace defective wing stud (4) if it does not lock cover properly.

g. Regulated Static Exciter. If voltage had been building up only part way, shut down unit and try replacing the regulator tube with a known good tube. Remove the tube shield and then carefully lift tube from its socket. If this doesn't correct condition, refer repair of static exciter to field maintenance, 3d echelon.

CHAPTER 4

REPAIR AND OVERHAUL INSTRUCTIONS

Section I. OVERHAUL AND REPLACEMENT STANDARDS

56. Standards

a. Special Tools and Equipment. No special tools and equipment are required by field and depot maintenance personnel for performing maintenance on the generator set.

b. Field and Depot Maintenance Repair Parts. Field and depot maintenance repair parts are listed and illustrated in TM 5-6115-306-25P.

c. Specially Designed Tools and Equipment. No specially designed tools and equipment are required by field and depot maintenance personnel performing major overhaul work on the generator set.

d. Engine Repair Standards. For repair and overhaul instructions and standards, refer to engine publications (par. 4b(2)).

e. Armature Assembly (18770) (2, fig. 10). It is not feasible to rewind the armature. If, however, conditions warrant, it should be rewound in accordance with instructions contained on the manufacturer's prints furnished to the prime depot. The following data is furnished as ready reference only.

(1) *Balance.* The armature assembly is to be dynamically balanced.

(2) *Winding data.*

Wire Magnet, 15SE (Single Epoxy),
MIL-W-583B, Type B.
Insulation, slot Polyester Laminate
Rag Paper-Mylar (Mil-I-19632).

Resistance at
25° C. 515 ohms
Slots 22
Turns/Coil Pitch 22/4-8
 22/3-9
 22/2-10
 22/1-11
 22/15-19
 22/14-20
 22/13-21
 22/12-22

(3) *Impregnation data.*

1-Preheat 1 hr at 250°F.
2-Cool to 120°F.
3-Dip in Dolphs BC-340 Baking Varnish
4-Drain for 30 minutes
5-Bake for 2 hrs at 300°F.
6-Repeat steps 2, 3 and 4
7-Bake for 4 hrs at 300°F.

(4) *Sealer coat data.*

Spray with Dolphs AC-24 air drying
varnish.

f. Field Coil (18792) (3, fig. 12). It is not feasible to wind a field coil. If, however, conditions warrant, it should be wound in accordance with instructions contained on the manufacturer's prints furnished to the prime depot. The following data is furnished as ready reference only.

(1) *Winding data.*

Wire Magnet, 17SE (Single Epoxy)
MIL-W-583B, Type B
Turns 520
Resistance at
25°C. 2.975 ohms
Total field
resistance. 5.95 ohms (2x2.975)

(2) *Impregnation data.*

1-Preheat 1 hr at 250°F.
2-Cool to 120°F.
3-Dip in Dolphs BC-340 Baking Varnish
4-Drain for 30 Minutes
5-Bake for 2 hrs at 300°F.
6-Repeat steps 2, 3, and 4
7-Bake for 4 hrs at 300°F.

(3) *Sealer coat.*

Spray with Dolphs AC-24 air drying
varnish

g. Regulated Static Exciter (18780). Refer to figure 13 for check out voltage of an exciter operating normally under no load.

h. Brushes (18773) (17, fig. 11).

Total effective length. 7/16 inch from lower edge of brush bevel.
Minimum limit 3/8 inch from lower edge of brush bevel.

57. Overhaul Voltage Regulation

a. No Load. The repaired unit should have a

voltage adjustment range of 120 volts \pm 6 volts (114v to 126v).

b. Rated Load. The following voltage and current values should be obtainable.

| Load | Voltage | Line current |
|--------|---------|--------------------|
| 1.5 kw | 114v | 13.2 amps |
| 1.5 kw | 120v | 12.5 amps (normal) |
| 1.5 kw | 126v | 11.8 amps |

Section II. DISASSEMBLY AND ASSEMBLY OF ENGINE GENERATOR SET

58. Unit Disassembly

a. Removal Procedures. No special techniques are required for the removal of components of the engine generator set. When removing a component, take into consideration the position of the component, its size for any required blocking, electrical connections and mechanical connections. Do not use undue force in freeing any component.

b. Removal Sequence. With the exception of the removal of the engine alone, which requires partial disassembly of the ac generator, no special sequence is required. Use the following sequence when complete disassembly is in order. Each step of the sequences is complete for the particular removal.

- (1) *Removal of cover and manual case* (par. 47).
- (2) *Removal of fuel system group* (pars. 42 & 43).
- (3) *Removal of controls and instruments Group* (pars. 54a and b).
- (4) *Removal of ac generator* (figs. 6 & 10). The generator is partially disassembled as it is removed. Keep parts together. Be sure cable is disconnected at control box.
 - (a) Release end cover (12, fig. 10) by removing securing hardware (13). Remove cover.
 - (b) Release fan (5) by removing securing hardware (7 and 8). Remove fan and stud (5 and 6). Removal of the stud also releases the armature assembly (2), but it cannot be removed at this time.
 - (c) Release bearing bracket assembly (3) by removing hardware (4). Carefully remove bearing bracket from armature assembly, taking care that brushes do not catch on collector ring and bearing.

(d) The armature assembly (2) has a hollow shaft which fits over the engine crankshaft extension (14). Disengage the armature assembly from the shaft and slide off.

(e) Release frame and stator assembly (1) from engine by removing securing hardware (20 and 22, fig. 6). At this time, if only the engine is being removed, it is not necessary to remove the frame and stator assembly from the unit frame.

(f) Release frame and stator assembly from the unit frame (1) by removing hardware (20 and 25) securing it to the shock mounts (23) and bracket (21). Then lift it away from the shock mounts. Release bracket (21) from frame and stator assy by removing hardware (19 and 20).

(g) Shock mounts (23) can be turned off the mounting pad of the frame.

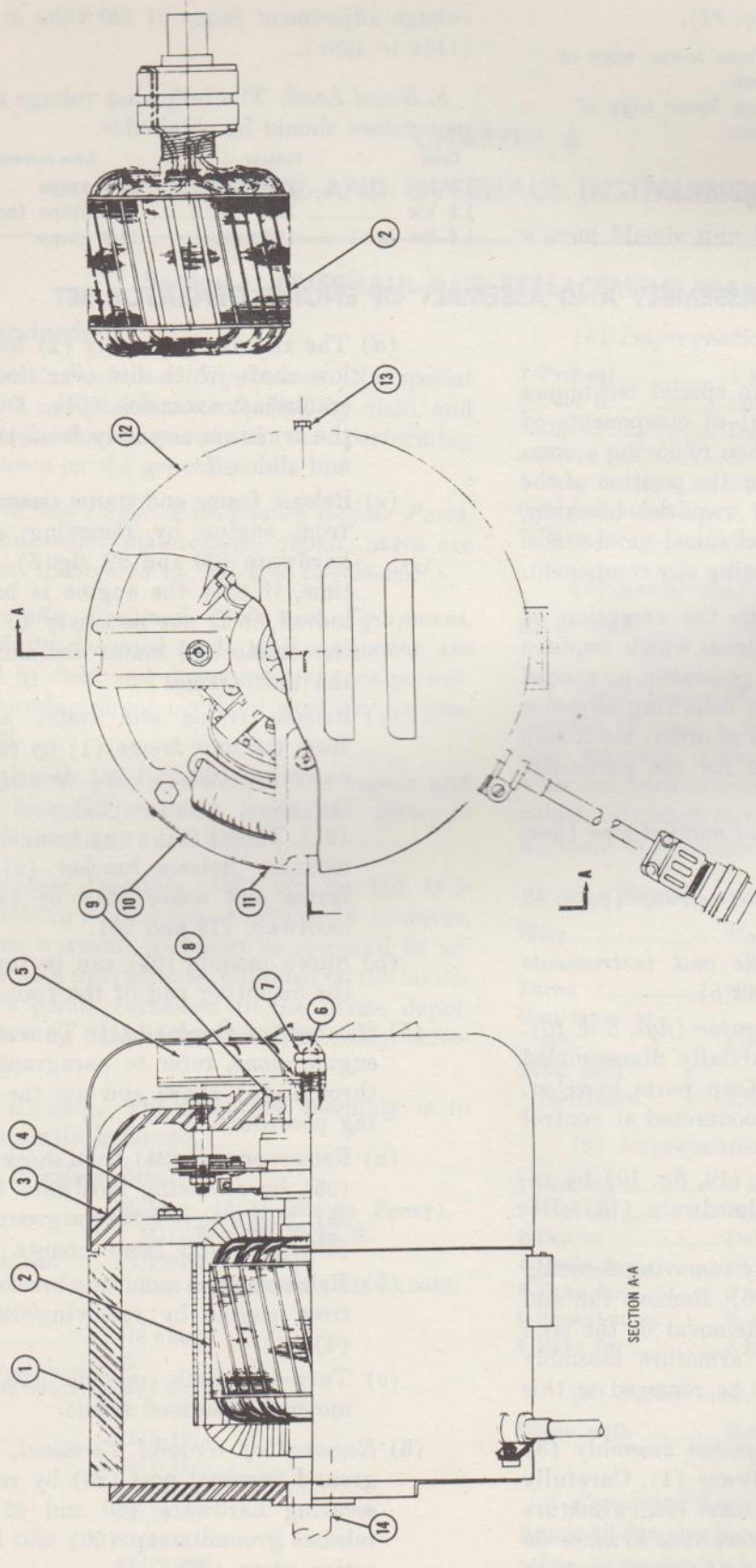
(5) *Removal of Engine (24).* To remove the engine alone, refer to paragraph b(4)a through (b) above and use the following procedure.

(a) Release engine (24) from shock mounts (23) by removing hardware (20 and 25). This also releases the ground strap (30). Lift unit from mounts.

(b) Release engine mounting brackets (26) from engine by removing hardware (4).

(c) Turn-off shock mounts (23) from mounting pads of frame.

(6) *Removal of Ground Terminal.* Release ground terminal post (28) by removing securing hardware (20 and 25). This releases ground strap (30) and identification plate (27).



- 1-Frame & Stator Assy
- 2-Armature Assy
- 3-Bearing Bracket Assy
- 4-Screw, Hex HD, Cap Lockwasher, 1/4-28x1
- 5-Fan

- 6-Stud (Nut, Jam, 5/16-24
- 7-(Nut, Hex, 5/16-24
- 8-Washer, Lock, Split, 5/16
- 9-Bearing

- 10-Plate, Id
- 11-Screw, Drive, Type U #4, 1/4 lg.
- 12-Cover
- 13-Screw, Hex-HD, Sld, Cap lockwasher, 10-32x3/8
- 14-Engine crankshaft extension

Figure 10. AC Generator Assembly (18262).

59. Unit Assembly

a. Installation Procedure. No special techniques are required for installation of components of the unit. When installing a component, take into consideration the position the component is to be installed, its size for any required blocking, electrical connections and mechanical connections. Do not use undue force to install a component. Be sure all components are serviceable before installation (ch. 4, sec. III).

b. Installation Sequence. Use the following sequence when complete assembly is in order. Each step of the sequence is complete for the particular installation. It is essentially the reverse of disassembly.

- (1) *Installation of ground terminal.* Install ground terminal post (28, fig. 6), strap (30), and indent plate (27) and secure with hardware (20 and 25).
- (2) *Shock mounts (23).* Install a shock mount on each of the six mounting pads on the frame.
- (3) *Installation of engine.*
 - (a) Install engine mounting brackets (26) on engine and secure with hardware (4).
 - (b) At this point, if engine and ac generator had been completely removed and separated, install the ac generator completely on the engine (4)(a) through (g) below.
 - (c) Position engine alone or engine with ac generator on shock mounts (23) and secure with hardware (20 and 25). Be sure to attach ground strap (30) from ground post.
- (4) *Installation of ac generator.*
 - (a) Attach bracket (21) to frame and

stator assembly with hardware (19 and 20).

- (b) Position frame and stator assembly (1, fig. 10) on engine, and bracket (21, fig. 6) on shock mounts (23). Secure to engine with hardware (20 and 22) and to shock mounts with hardware (4). Check bracket (21) for secure fit against generator, tighten hardware (19 and 20).
- (c) Slide armature assembly (2, fig. 10) on engine crankshaft extension (14). Be sure bearing (9) is on armature shaft.
- (d) Carefully place bearing bracket assembly (3) over armature bearing and collector ring, being sure not to catch brushes. Seat bracket against frame and stator and secure with hardware (4). Check brush seating against collector ring.
- (e) Install stud (6) into armature hollow shaft and engage engine crankshaft extension. Tighten stud on extension.
- (f) Install fan (5) on stud and secure with hardware (7 and 8). Be sure to use jam nut.
- (g) Install end cover (12) and secure with hardware (13).
- (h) Connector generator cable at control box.
- (5) *Installation of controls and instruments group (pars. 54a & b).*
- (6) *Installation of fuel system group (par. 45).*
- (7) *Installation of cover and manual case (par. 49).*

c. Operational Check. Service unit and operate to see that it meets standards (pars. 56 and 57).

Section III. REPAIR GENERATOR SET COMPONENTS

60. Description

a. Scope. This section contains instructions covering description, adjustments, disassembly, cleaning, inspection, repair, assembly of major components of the generator set not provided in Chapter 3.

b. General Procedures. The following items are applicable to all parts of the generator set except as noted with the procedures for a particular part.

- (1) *Cleaning.* Clean all components with a suitable solvent. Keep exterior of unit

free of oil and grime. Maintain an inspection ready unit at all times. Do not allow the cleaning solvent to get into bearings, engine or fuel system. Do not use gasoline as a cleaning solvent.

- (2) *Painting.* Clean painted surfaces, remove rust spots. Retouch small spots with paint of original color. If surfaces are badly scuffed, chipped and deteriorated, repaint completely.
- (3) *Welding.* As feasible, repair welded items using best welding techniques.
- (4) *Rivets.* Tighten loose rivets securing name plates. Check heads for cracks and deterioration. Replace damaged rivets that may fall out. See that all unit identification plates are secure.
- (5) *Soldering.* Use best soldering techniques. When soldering electrical connections, do not use acid flux as acid may effect the insulation. Clean connections before soldering. Use extra care when soldering items that excessive heat will effect.
- (6) *Inspection* (par. 8).

61. Engine Group

a. Engine. Refer to engine publications (par. 4b(2)) for overhaul instructions; for removal and installation (pars. 58 and 59).

b. Mounting Parts. Replace damaged or deteriorated shock mounts. Check engine mounting brackets (26, fig. 6) for broken welds. Repair welds or replace bracket if too badly damaged.

62. Fuel System Group

a. Group Maintenance (pars. 42-45).

b. Fuel Tank. Joints of the fuel tank are crimped and soldered. If feasible, repair minor breaks in seams with solder. Be sure tank is clean and free of fuel and fumes. See that filler neck is securely riveted.

63. Frame and Cover Group

a. Group Maintenance (pars. 46-49).

b. Frame. Check tubular frame welds. Repair minor cracks using standard welding techniques. Welds should be full and continuous and free from defects. Paint frame after welding or if complete unit is being overhauled.

64. Ac Generator Group

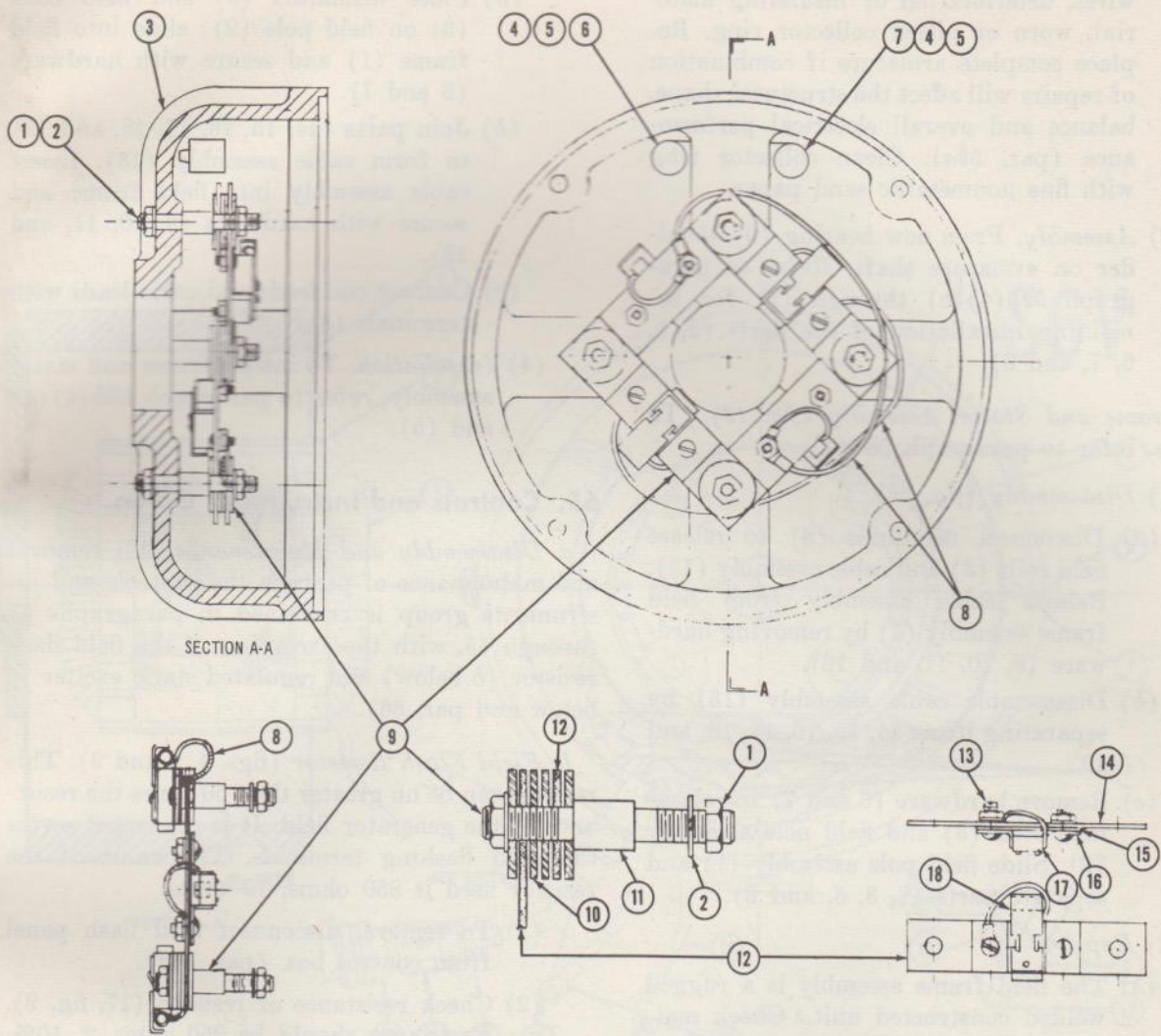
a. Removal (par. 58b(4)(a) through (g)).

b. Bearing Bracket Assembly (fig. 11).

- (1) *Disassembly.* Disconnect capacitor wire leads (4). Release capacitors (6 and 7) by removing securing hardware (5). Release brush rigging assembly (9) by removing hardware (1 and 2). Dismantle brush rigging assembly (9) by removing hardware (1 and 2) from stud (11) and separating washers (10) and brush holder assembly (12). Remove spring (18) from brush holder assembly (12) separate remaining items (14, 15, 16 and 17) by removing hardware (13).
- (2) *Repair.* Replace broken, cracked, or charred insulating washers (10) and plates (14). Check and remove burrs from bracket (16). Replace worn or damaged brushes. Replace deteriorated wires. Check mating surface of bracket (3) and clean.
- (3) *Assembly.* This is essentially the reverse of disassembly. Refer to figure 11. Assemble the brush holder assembly (12), then the brush rigging assembly (9); when assembling the latter (9) note that two brush holders (12) face out and two inwards (sec. A-A fig. 11). This allows for alignment on the collector ring (fig. 10). Install the items (9, 6, 7, and 4) and the bracket (3).

c. Armature Assembly and Allied Parts (fig. 10). The armature assembly (2) and the allied parts (5, 6, 7, and 8) are separated when the ac generator is removed from the unit. With the exception of the removal of the bearing (9) from the armature shaft, no further disassembly is required. The bearing may be removed with a bearing puller.

- (1) *Repair.* Replace damaged or worn bearing (9) as indicated by operational noises. Check stud (6) for damage or evidence of twisting; replace stud indicating damage or fatigue. Replace damaged washer (8) and hardware (7). Replace fan that has damaged or loose blades that require repair that would impair its balance or structural strength or shape. Examine armature for broken



- 1-Nut, Hex 1/4-20
- 2-Washer, Lock, Int, 1/4
- 3-Bracket
(Wire, 16 AWG)
- 4-(Terminal 16W-8S
(Terminal 16W-10S)
- 5-(Screw RD-HD, Cap Lock Washer, 10-32x5/16)
(Washer, Lock, S, Cad. Pltd, Int-Ext, 10
- 6-Capacitor, C105
- 7-Capacitor, C104
(Wire, 16AWG)
- 8-(Terminal
- 9-(Brush Rigging Assy.
(Items 1, 2, 8, 10, 11, 12)
- 10-Washer
- 11-Stud
- 12-Brush Holder Assy.
(Items 13-18)
- (Nut, Hex, Std, BR, 10-32
- 13-(Washer, Lock, Int, Phos-Broz, No. 10
(Screw, RD-HD, BR, 10-32x1/2
(Screw, RD-HD, BR, 10-32x5/8
- 14-Insulator
- 15-Plate
- 16-Bracket
- 17-Brush
- 18-Spring

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Figure 11. Bearing Bracket Assembly (18425).

wires, deterioration of insulating material, worn or pitted collector ring. Replace complete armature if combination of repairs will effect the structural shape, balance and overall electrical performance (par. 56a). Clean collector ring with fine nonmetallic sand paper.

- (2) *Assembly*. Press new bearing (9) shoulder on armature shaft. Refer to paragraph 59b(4)(c) through (f) for remaining installation of the parts (2, 5, 6, 7, and 8).

d. Frame and Stator Assembly (fig. 12). To remove, refer to paragraph 58b(4).

(1) *Disassembly (fig. 12)*.

- (a) Disconnect terminals (8) to release field coils (3) and cable assembly (13). Release cable assembly from field frame assembly (1) by removing hardware (9, 10, 11, and 12).
- (b) Disassemble cable assembly (13) by separating items 14, 15, 16, 17, 18, and 19.
- (c) Remove hardware (6 and 7) to release field coils (3) and field pole assembly (2). Slide field pole assembly (1) and separate parts (2, 3, 5, and 6).

(2) *Repair*.

- (a) The field frame assembly is a rugged welded constructed unit. Check mating surfaces for cleanness; and clean. Check welds for cracks; repair as may be required. See that screen is secure.
- (b) Replace deteriorated parts of cable assembly (13). Check solder connections in connector; solder if loose or break is developing. Clean tubing (16 and 17); replace broken or cracked tubing.
- (c) Check field pole assembly (2) for loose, welded joints; weld if required. Clean thoroughly.
- (d) Check field coils (3) for broken or deteriorated insulation. Repair badly damaged coil or coils with overall broken insulation (par. 56f).
- (e) Replace field pole insulator (5).

(3) *Assembly (fig. 12)*.

- (a) Place insulators (5) and field coils (3) on field pole (2); slide into field frame (1) and secure with hardware (6 and 7).
 - (b) Join parts (14, 15, 16, 17, 18, and 19) to form cable assembly (13). Insert cable assembly into field frame and secure with hardware (9, 10, 11, and 12).
 - (c) Connect coil leads and cable leads with terminals (8).
- (4) *Installation*. To install frame and stator assembly, refer to paragraph 59b(4)(a) and (b).

65. Controls and Instruments Group

a. Disassembly and Maintenance. All removal and maintenance of parts in the controls and instruments group is contained in paragraphs 53 through 55, with the exception of the field flash resistor (*b* below) and regulated static exciter (*c* below and par. 66).

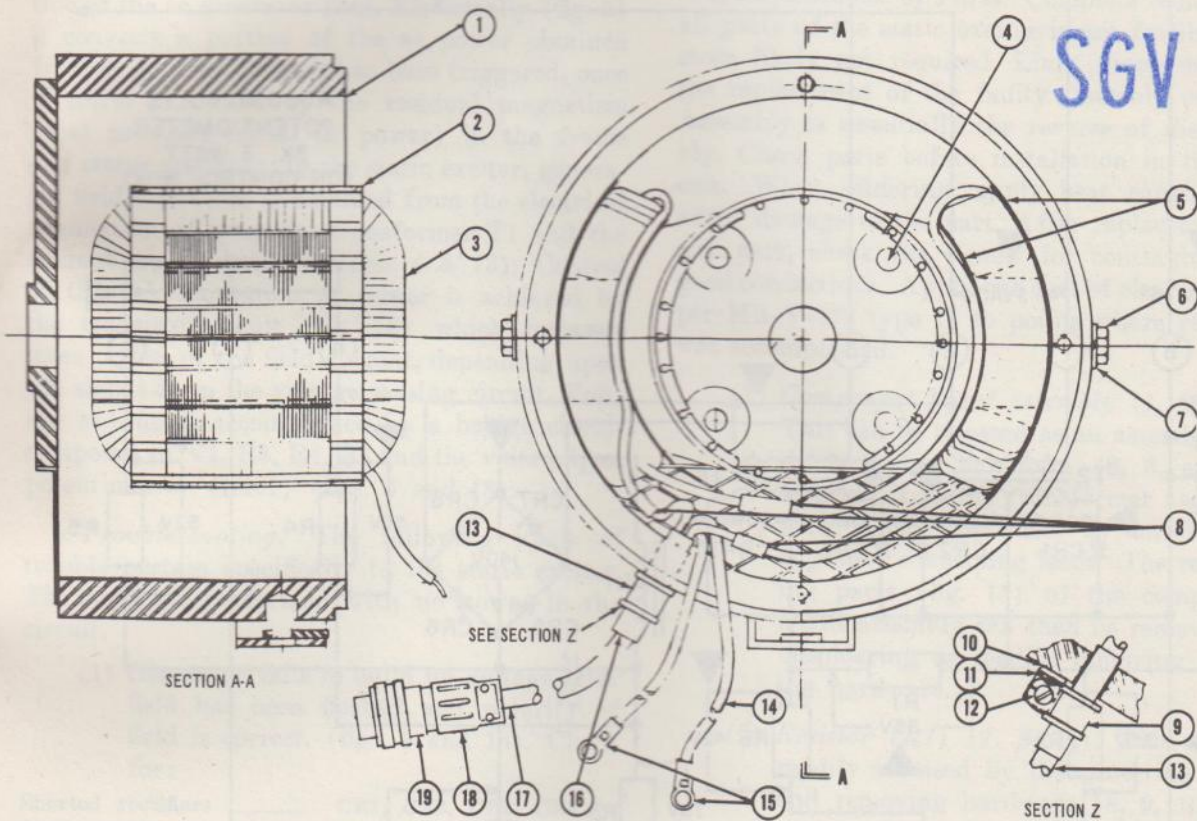
b. Field Flash Resistor (figs. 4, 5 and 9). This resistor can be no greater than 50 times the resistance of the generator field. It is connected across the field flashing terminals. The value of the resistor used is 250 ohms, 10 watts.

- (1) To remove, disconnect field flash panel from control box (par. 54f).
- (2) Check resistance of resistor (17, fig. 9). Resistance should be 250 ohms \pm 10%.
- (3) Remove a defective resistor (17) by removing hardware (15 and 16). Unsolder leads (14). Reverse procedure for installing the resistor in the field flash panel, and the panel into control box.

c. Regulated Static Exciter (7, fig. 8). The regulated static exciter is removed by releasing all connecting wires at the terminals. Then remove securing hardware (8) under control box. To install reverse procedure; however when connecting wires use wiring diagram (figure 4) Check wiring connections carefully. Repair in accordance with instructions in paragraphs 56g and 66.

d. Fungus Proofing. If any parts are removed, replaced or disturbed, they should be recoated by brushing or spraying as they were originally

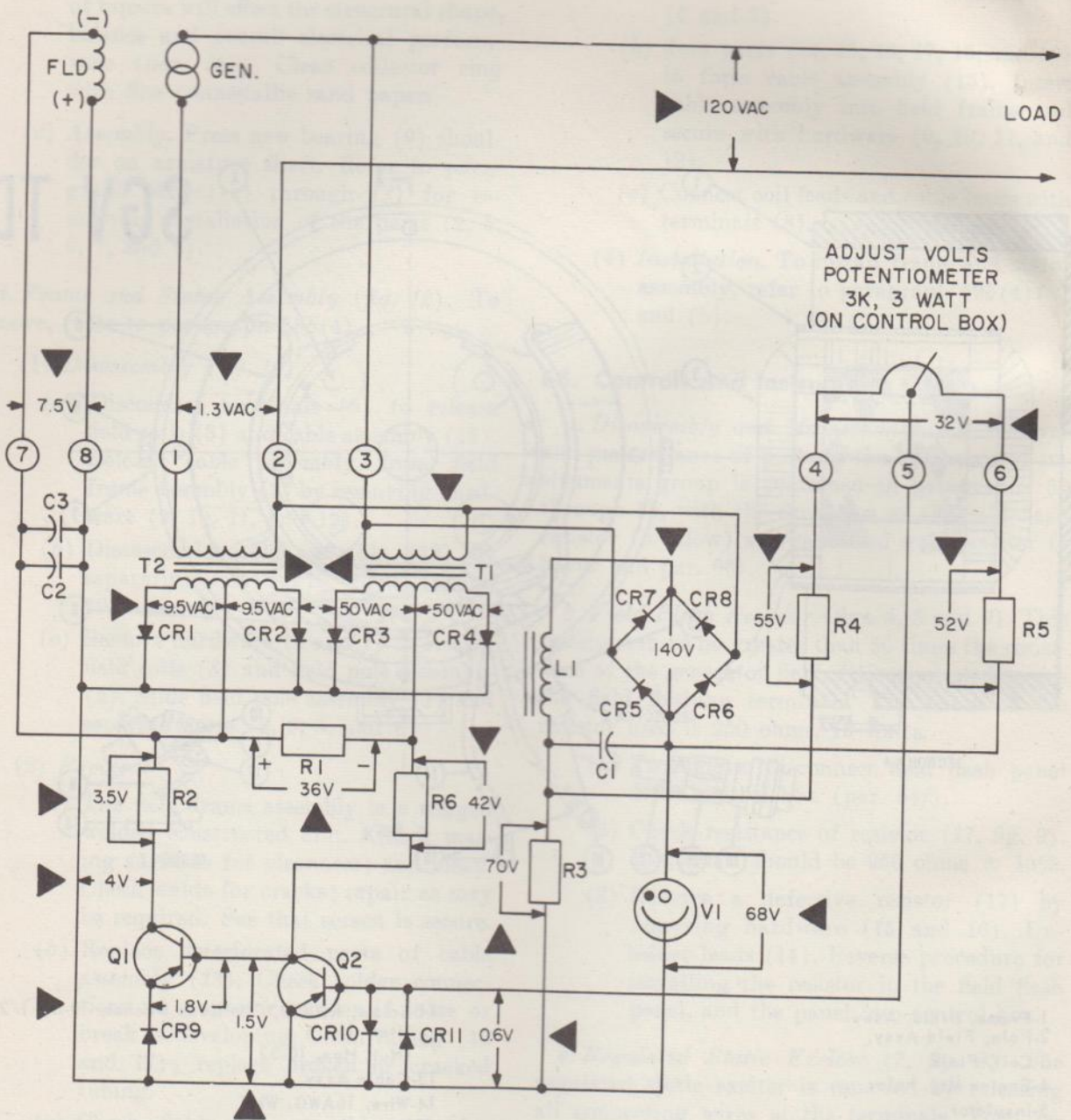
SGV TD



- | | |
|--|--|
| <ul style="list-style-type: none"> 1-Frame, Field, Assy. 2-Pole, Field Assy. 3-Coil, Field 4-Engine Mtg. holes 5-Insulator 6-Bolt, Hex HD, 5/16-24x1 1/4 7-Washer, Lock, Ext. 5/16 8-Terminal 9-Clamp 10-Bracket | <ul style="list-style-type: none"> 11-Screw, RD-HD, Cap Lock Washer, 10-32x1/2 12-(Item 11 (Nut, Hex, 10-32 13-Cable Assy. 14-Wire, 16AWG, WHT 15-Terminal 16-Tubing, 2 1/2" 17-Tubing, 17" 18-Clamp 19-Connector |
|--|--|

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Figure 12. Frame and Stator Assembly (18771).



LEGEND

ALL VOLTAGES WITH NO LOAD ON GENERATOR.
 VOLTAGES ARE D.C. UNLESS OTHERWISE NOTED.
 DC VOLTAGES TAKEN WITH 20,000 OHM/VOLTMETER.
 AC VOLTAGES TAKEN WITH 5,000 OHM/VOLTMETER.

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Figure 13. Schematic Diagram—Voltage Checks—Regulated Static Exciter (18780).

covered with a varnish conforming to Mil-V-173, type II.

66. Regulated Static Exciter Repair

a. Description. The regulated static exciter (fig. 14) is a self contained unit which regulates and produces the dc power required for the excitation of the ac generator field. Electrically (fig. 5) it converts a portion of the ac power obtained from ac generator which has been triggered, once it starts to rotate, by the residual magnetism (that provides initial dc power) in the frame and stator assembly. In the static exciter, generator field excitation is obtained from the electrical summation of potential transformer T1 and the current transformer T2 (figs. 4 & 13). Control of the field excitation dc power is achieved by the transistor circuit (fig. 13) which bypasses more or less of the field current, depending upon the signal from the voltage sensing circuit. Voltage sensing is accomplished by a bridge circuit composed of V1, R3, R4, R5 and the volts adjust potentiometer (R101) (figs. 5 and 13).

b. Troubleshooting. The following items of trouble pertain specifically to the static exciter. The tests are performed with no power in the circuit.

- (1) Generator fails to build up voltage after field has been flashed and polarity of field is correct. (figs. 5 and 13). Check for:

| | |
|--------------------------|--------------------|
| Shorted rectifiers | CR1, CR2, CR3, CR4 |
| Open transformer | T1, or T2 |
| Open resistor | R1 |

- (2) Generator voltage builds only part way. Check for:

| | |
|---------------------------------------|-------------|
| Shorted or defective transistor | Q1 |
| Defective rectifier | CR3, or CR4 |
| Defective tube | V1 |

- (3) Generator voltage goes to maximum no voltage control. Check for open:

| | |
|------------------|-----|
| Transistor | Q1 |
| Rectifier | CR9 |
| Resistor | R2 |
| Resistor | R6 |

c. Test. Before any disassembly of the static exciter is attempted, try to ascertain the faulty

part by a continuity test of the complete circuit (figs. 4 and 13). If possible, and if facilities permit perform a voltage check (fig. 13) to ascertain the faulty part. Voltages indicated are normal for a good unit operating with no load on the generator.

d. Replacement of Parts. Complete removal of all parts of the static exciter is not feasible and more likely not required. Limit disassembly to the replacement of the faulty assembly or part. Assembly is essentially the reverse of disassembly. Check parts before installation in the circuit. When soldering, apply heat carefully to avoid damage to the part. After replacement of any part, check the circuit for continuity and good connections. Apply one coat of clear varnish per Mil-V-173 type II to points where removal was accomplished.

- (1) *Component board assembly (1, fig. 14).*

This can be released as an assembly (1) by removing hardware (2, 3, and 4) securing it to the transformer assembly (12). Then disconnect by unsoldering any inter connecting leads. The remaining parts (fig. 15) of the component board assembly can then be removed by unsoldering or readily removing securing hardware.

- (2) *Resistor (R1) (7, fig. 14).* This can be readily released by disconnecting leads and removing hardware (8, 9, 10, and 11).

- (3) *Transformer assembly (12, fig. 14).* Note that loctite is used on screw threads and that the item is impregnated so that disassembly is not recommended. The parts of this assembly can be separated by releasing capacitors (13) by removing hardware (14 and 15) first, then removing hardware (18, 19, 20, 21, 22, 23 and 24) to release the two transformers (16 and 17). After assembly, place loctite on all screw threads and if possible impregnate with suitable compound.

- (4) *Removal and installation.* Refer paragraph 65a, b, and c.

Section IV. UNIT TESTS AND ADJUSTMENTS

67. Unit Test After Overhaul

- a. Service unit for operation (par. 9).
- b. Start and operate unit (par. 22).
- c. Check operation of all controls (par. 10).
- d. Ascertain that the unit is providing rated capacity (par. 4b(1), (3), (4) and 57). Refer also to paragraph 56a.

68. Field Flashing

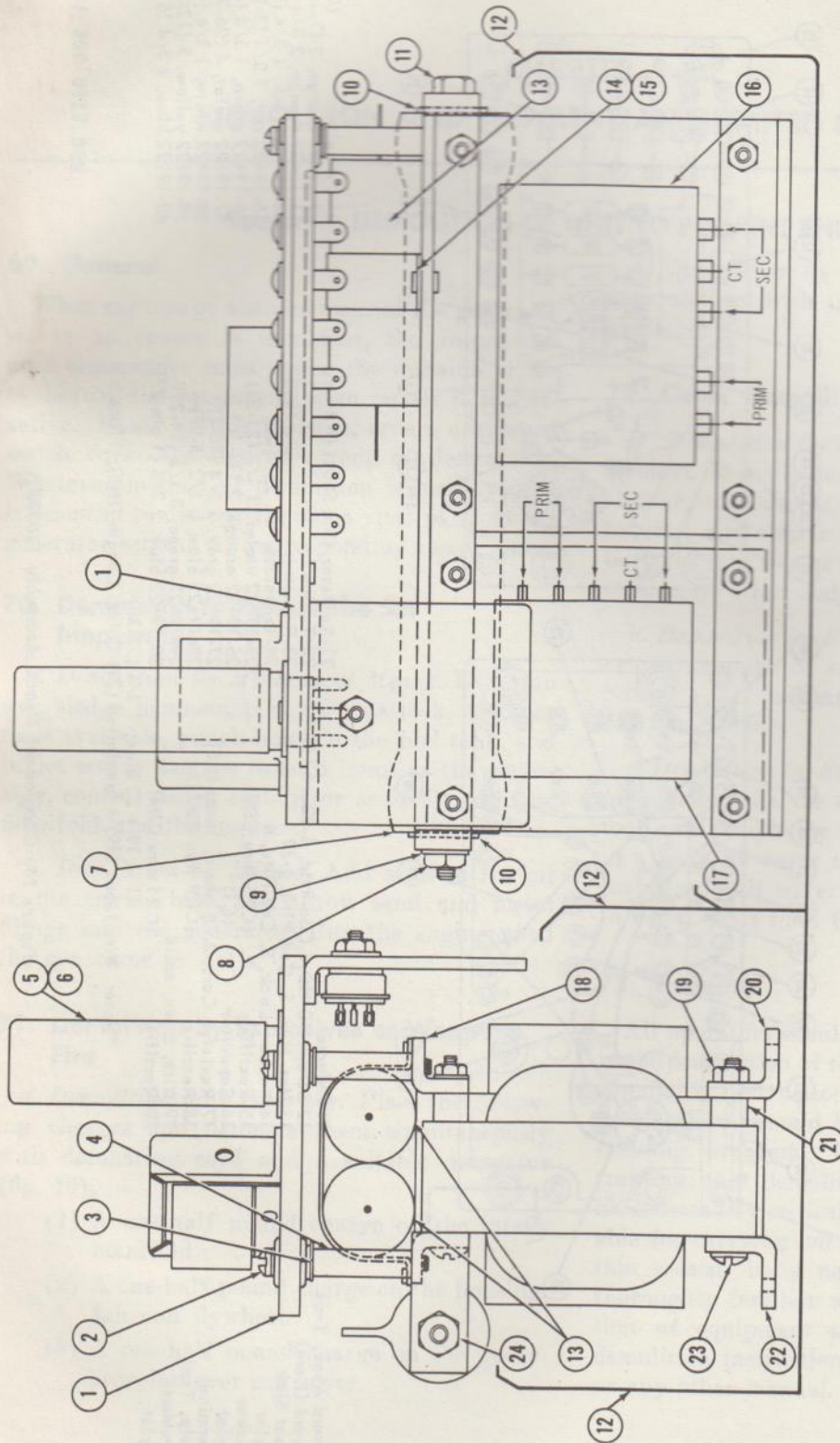
a. *Description.* The process of building up voltage in this self static-excited type unit requires a small amount of residual magnetism to be present in the ac generator. This residual magnetism should be enough to provide a magnetic field sufficient to produce ac power to overcome the initial resistance of the system when the armature rotates to activate the regulated static exciter circuit for continued supply of dc power.

This dc power provides a greater magnetic field for continued generation of the ac power and maintenance of dc power.

b. *Purpose.* Long periods of storage, standby or rough handling may result in the loss of this residual magnetism in the ac generator and effect the buildup of operating voltage. To restore this residual magnetism the ac generator field is flashed.

c. *Procedure.* In a unit that fails to build up voltage, first check brushes for proper set and see that all circuits are correct (figs. 4 and 5). To restore the residual magnetism, apply 12 volts across the field flash terminals (par. 16) by momentarily touching the battery positive and battery negative at the same time to the positive and negative field flash terminals respectively.

Caution: Observe correct polarity. Do not attempt this procedure with unit running.



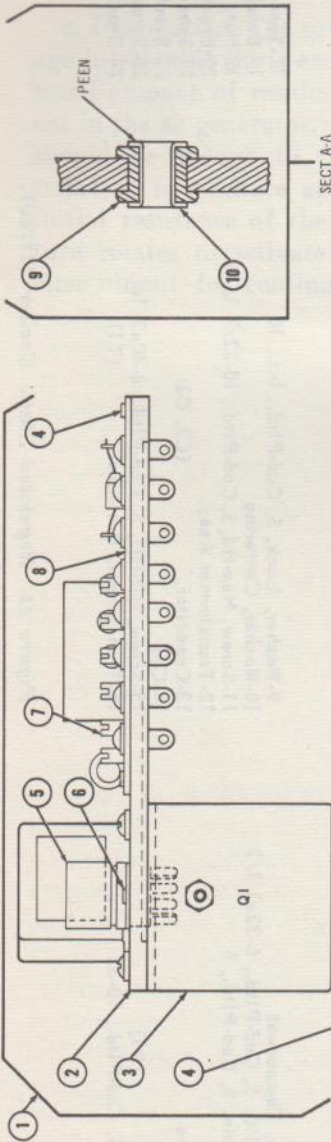
- 1-Board Assy, Component
- 2-Screw, RD-HD, S, Cad-Pltd., 6-32x1 1/2
- 3-Washer, Plain, S, Cad-Pltd., 6
- 4-Spacer
- 5-Shield, Tube
- 6-Tube
- 7-Resistor, (R1)
- 8-Nut, Hex, S, Cad-Pltd., 10-32

- 9-Washer, Lock, S, Cad-Pltd., Int., 10
- 10-Washer, Centering
- 11-Screw, Hex-Hd, S, Cad-Pltd., 10-32x7 1/16
- 12-Transformer Assy. (C2, C3)
- 13-Capacitor
- 14-Clip
- 15-Screw, BD-HD, S, Cad-Pltd., 4-40x3/16
- 16-Transformer, Potential (T1)

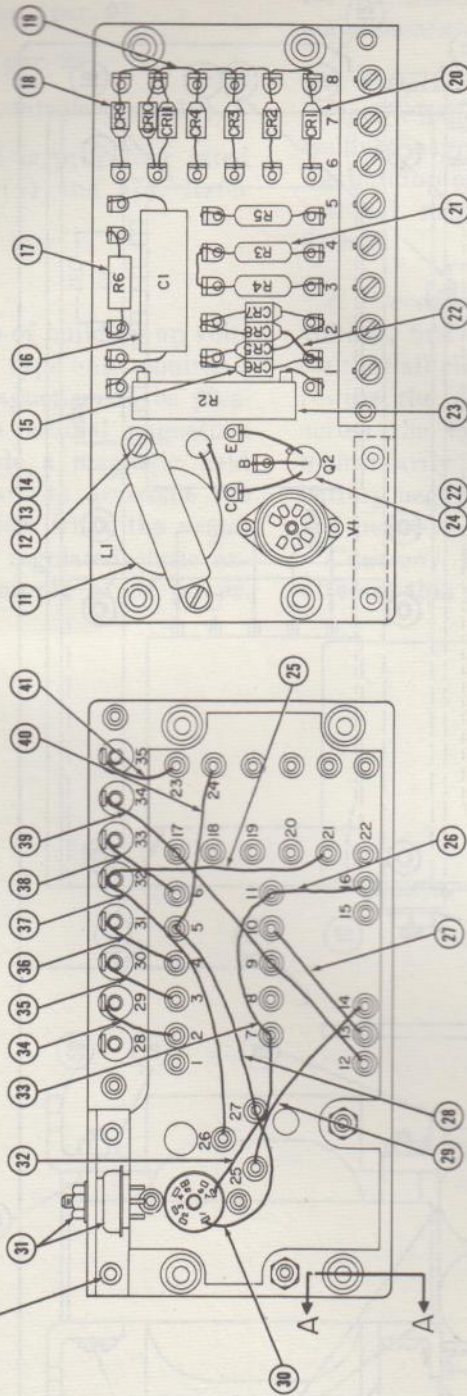
- 17-Transformer, Current (T2)
- 18-Bracket
- 19-Nut, Hex, S, Cad-Pltd., 8-32
- 20-Bracket, RH
- 21-Spacer
- 22-Bracket, LH
- 23-Screw, BD-HD, S, Cad-Pltd., 8-32x1 3/4
- 24-Bracket

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Figure 14. Regulated Static Exciter (18780).



SECT A-A



- 1-Board Assy, Trml
- 2-Board (Bare)
- 3-Heat Sink
- 4-Eylet
- 5-Socket
- 6-Eylet
- 7-Terminal
- 8-Strip, Trml
- 9-Grommet
- 10-Eylet

- 11-Inductor
- 12-Screw, BD-HD, S, Cad-Pltd, 6-32 x 5/16
- 13-Nut, Hex, S, Cad-Pltd, 6-32
- 14-Washer, Lock, S, Cad-Pltd, 6
- 15-Rectifier (CR5 thru CR8)
- 16-Capacitor (C1)
- 17-Resistor, Carb, 2.7K-ohms, 1watt (R6)
- 18-Rectifier (CR9 thru CR11)
- 19-Wire, Buss, solid (CR1 thru CR4)
- 20-Rectifier
- 41 - 19 + 22 blue, 1 3/4 (23-35)

- 21-Resistor, (3 x 5000) (R3 thru R5)
- 22-Tubing
- 23-Resistor, 10w (R2)
- 24-Transistor (Q2)
- *25-19+22 violet, 3 1/2 (21-32)
- 26-19+22 orange, 2 (11-16)
- 27-19+22 gray, 2 3/4 (10-13)
- 28-19+22 blue, 3 1/2 (5-27)
- 29-19+22 green, 3 1/2 (14-25)
- 30-19+22 blue, 2 3/4 (1 pin-27)

- 31-Transistor (Q1)
- 32-19+22 orange, 3 (7 pin-7)
- 33-19+22 orange, 2 3/4 (7-11)
- 34-19+22 black, 1 3/4 (2-29)
- 35-19+22 red, 1 3/4 (3-30)
- 36-19+22 green, 1 3/4 (4-31)
- 37-19+22 violet, 4 (26-32)
- 38-19+22 white, 1 3/4 (6-33)
- 39-19+22 yellow, 5 (12-34)
- 40-19+22 blue, 2 3/4 (5-24)

*Note: Wire leads (19) + Insulation (22) Color, Length (INS), TRMLS

Figure 15. Component Board Assembly (10389).

CHAPTER 5

DEMOLITION AND SHIPMENT AND LIMITED STORAGE

Section I. DEMOLITION OF UNIT TO PREVENT ENEMY USE

69. General

When capture or abandonment of the 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 the generator set and all corresponding repair parts.

70. Demolition to Render the Set Inoperative

a. Demolition by Mechanical Means. Using an axe, sledge hammer, pick, pickmattock, or other tools available, punch holes in the fuel tank, and inflict severe damage to such items as the generator, control panel, carburetor assembly, exhaust manifold, and the engine.

b. Demolition by Misuse. Add sand to the oil in the engine base, and throw sand and metal filings into the generator. Run the engine until the generator set fails.

71. Demolition by Explosives or Weapons Fire

a. Demolition by Explosives. Place the following charges and detonate them simultaneously with detonating cord and a suitable detonator (fig. 16).

- (1) A one-half pound charge on the intake manifold.
- (2) A one-half pound charge on the housing, fan and flywheel.
- (3) A one-half pound charge on the generator, lap over end cover.

b. Demolition by Weapon's Fire. Fire on the generator set with the heaviest suitable weapons available.

72. Other Demolition Methods

a. Demolition by Scattering and Concealment. Remove all easily accessible parts such as the air cleaner, carburetor, magneto, and generator brushes, and scatter them through dense foliage, bury them in dirt or sand, or throw them in lake, stream, or other body of water.

b. Demolition by Burning. Pack rags, clothing, or canvas under or around engine and generator. Saturate this packing with gasoline, oil or diesel fuel, and ignite.

c. Demolition by Submersion. Knock the spark plug base from the engine with any convenient tool and completely submerge the generator set in a body of water to provide damage and concealment. Salt water will do the greater damage to metal parts than fresh water.

73. Training

All operators should receive thorough training in the destruction of the generator set (FM 5-25). Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment and be able to carry out demolition instructions without reference to this or any other manual.

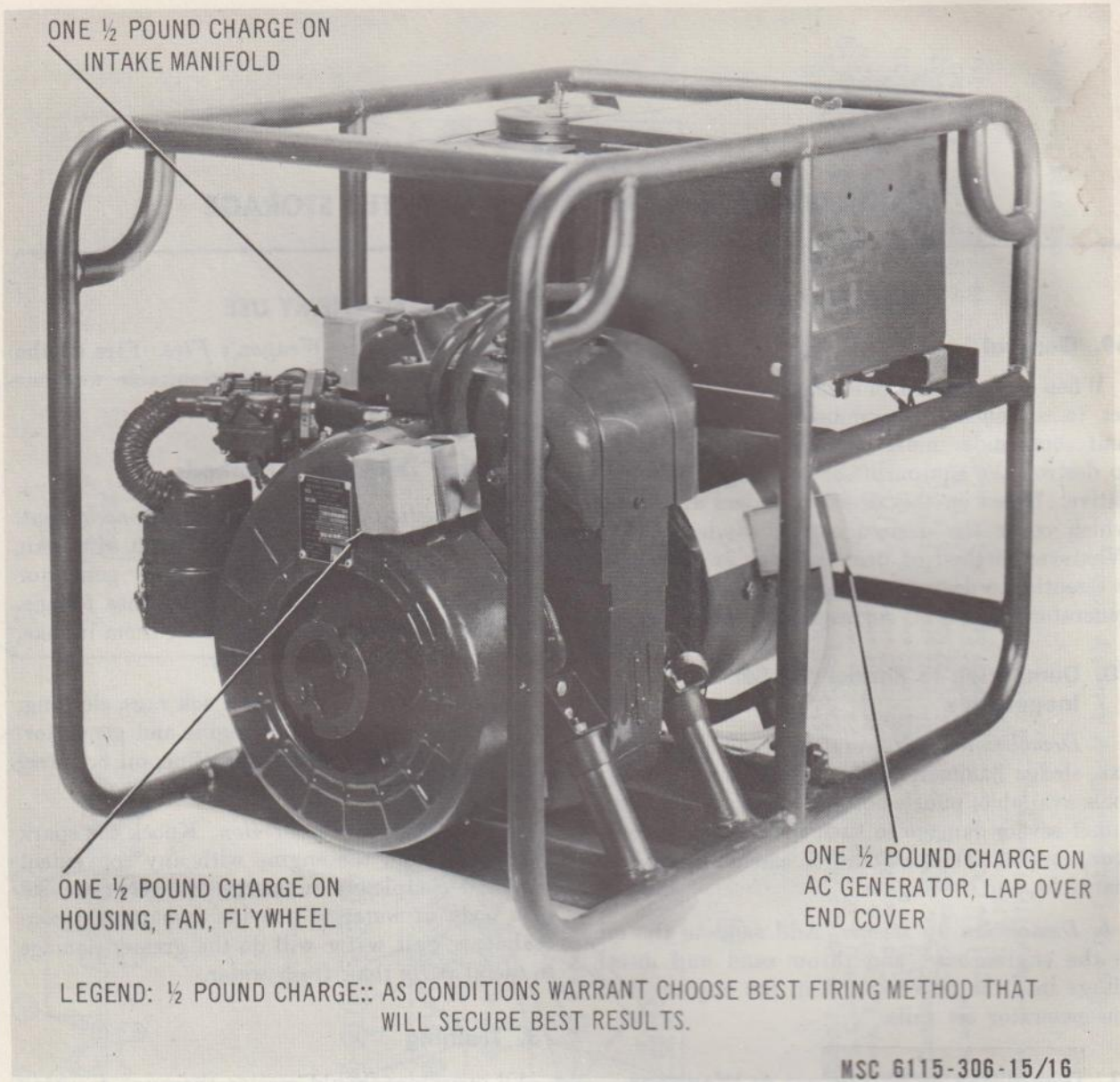


Figure 16. Placement of charges.

Section II. SHIPMENT AND LIMITED STORAGE

74. Preparation of Equipment for Shipment

a. General. Detailed instructions for the preparation of generator set for domestic shipment are outlined within this paragraph. Preservation will be accomplished in sequence that will not require the operation of previously preserved components.

b. Inspection. Equipment will be inspected for any usual condition such as damage, rusting,

accumulation of water, or pilferage. Inspect the generator set in accordance with steps outlined in Quarterly Preventive Maintenance Services.

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 when the paint has been removed or damaged. Refer to TB ENG 60 for detailed cleaning and painting instructions.

e. Depreservation Guide. DA Form 2258, Depreservation Guide of Engineer Equipment. A properly annotated depreservation guide will be completed concurrently with preservation for each item of mechanical equipment with any peculiar requirements outlined in the blank spaces, 27 through 33, provided on the form. 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.

f. Lubrication system (Wet Sump) Boxed or Crated. Check level of lubricant. Operate the engine at a fast idle until lubricant has been circulated throughout the system. The crankcase 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 gasoline engine driven equipment, etc., shall be sealed with pressure-sensitive tape conforming to Specification PPP-T-60, type III, class 1.

h. Fuel Tank. Drain fuel tank after engine preservation and fog interior with preservative oil, type P-10, grade 2, conforming to Specification Mil-L-21260.

i. Air Cleaners. Drain the air cleaner and seal all openings that permit the direct entry of water. Use type III, class 1, waterproof pressure-sensitive tape conforming to PPP-T-60.

j. 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, automotive and artillery grease (GAA) as specified on the lubrication order may be used.

k. Marking. Shall conform to Mil-Std-129.

l. Basic Issue Items.

- (1) Cover unit with its canvas cover. Secure to frame with tie rope.
- (2) Loose items shall be packed in cover pocket or publications case which may be secured to frame prior to covering.

Otherwise items will be packed in a suitable container and secured to the equipment to prevent loss or pilferage.

m. Crating. If packing is required to provide adequate protection against damage during shipment, refer to TM 38-230 for guidance in crate fabrication.

Total overall crated dimensions are approximately 38" L x 25" W x 26" H. Approximate crated weight is 190 pounds.

75. Loading Equipment For Shipment

Load the generator set on the carrier, using a forklift, crane or if feasible manually with enough manpower. Approximate weight of a crated unit is 190 lbs; uncrated 165 lbs. Keep the generator set right side up when handling and block or tie it to the bed of the carrier to prevent shifting while it is being transported (pars. 6 & 7).

76. Limited Storage

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

b. Preparation of Equipment for Storage.

- (1) *Inspection.* Equipment will be inspected for any unusual condition such as damage, rusting, accumulation of water, or pilferage. Inspect the generator set in accordance with steps outlined in Quarterly Preventive Maintenance Services. Execute DA Form 2404 on the unit.
- (2) *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.
- (3) *Painting.* Paint all surfaces when the paint has been removed or damaged. Refer to TB ENG 60 for detailed cleaning and painting instructions.
- (4) *Depreservation Guide.* DA Form 2258, Depreservation Guide of Engineer Equipment. A properly annotated de-

preservation guide will be completed concurrently with preservation for each item of mechanical equipment with any peculiar requirements outlined in the blank spaces, 27 through 33, provided on the form. The completed depreservation guide will be placed with the equipment in a waterproof envelope marked "Depreservation Guide" and fastened in a conspicuous location or near the operator's controls.

- (5) *Sealing of openings.* Openings that will permit the direct entry of water into the interior of gasoline engine-driven equipment, etc., shall be sealed with pressure-sensitive tape, conforming to Specification PPP-T-60, type III, class 1.
- (6) *Fuel tank.* Drain fuel tank after engine preservation and fog interior with preservative oil, type P-10, grade 2, conforming to Specification Mil-L-21260.
- (7) *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, automotive and artillery grease (GAA) as specified on the lubrication order may be used.
- (8) *Basic issue items.*
 - (a) Loose items shall be packed in cover

pockets or publication case. Otherwise, items will be packed in a suitable container and secured to the equipment to prevent loss or pilferage. Publications case may be secured to frame before covering.

- (b) Cover unit with its canvas cover and secure to frame with tie-down rope.

77. Inspection and Maintenance of Equipment in Storage

a. Inspection. When equipment has been placed in storage, all scheduled preventive maintenance services, including inspection, will be suspended and preventive maintenance inspection will be performed as specified herein. Refer to AR 743-505.

b. 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 surfaces. Cover the equipment with a tarpaulin or other suitable waterproof covering and tie down securely.

c. Exercising. Every 90 days equipment, if in standby storage, will be inspected in accordance with steps outlined in Quarterly Preventive Maintenance Services and operated long enough to bring it up to its operating temperature and for complete lubrication of gears, bearings, etc. After each exercising period, the equipment will be represerved as outlined in paragraph 76.

APPENDIX I REFERENCES

1. Dictionaries of Terms and Abbreviations

- AR 320-5 Dictionary of United States Army Terms
AR 320-50 Authorized Abbreviations and Brevity Codes

2. Lubrication

- LO 5-2805-206-14 Engine, Gasoline (Mil-Std Models). Also, refer to paragraphs 4b(2) and 30.

3. Operating Instructions

- TM-5-2805-206-14 Operator, Organizational and Field Maintenance Manual, Engine, Gasoline (Mil-Std-Model) (par. 4b (2)).

4. Painting

- TB ENG 60 Preservation and Painting of Serviceable Corps of Engineers Equipment.
AR-750-5 Organization, Policies, and Responsibilities for Maintenance Operations.
TB ENG 347 Winterization Techniques for Engineer Equipment

6. Publication Indexes

- DA Pam 108-1 Index of Army Motion Pictures, Film Strips, Slides and Phono-Recordings.
DA Pam 310-1 Index of Administrative Publications
DA Pam 310-2 Index of Blank Forms
DA Pam 310-3 Index of Training Publications
DA Pam 310-4 Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310-5 Index of Graphic Training Aids and Devices
DA Pam 310-25 Index of Supply Manuals—Corps of Engineers

7. Radio Interference Suppression

- TM 11-483 Radio Interference Suppression

8. Shipment and Limited Storage

- AR 743-505 Limited Storage of Engineer Mechanical Equipment
TM 9-200 General Packaging Instructions for Ordnance General Supplies.
TM 38-230 Preservation, Packaging, and Packing of Military Supplies and Equipment.

9. Supply Publications

SM 10 C 9100-SL
TM 5-2805-206-14P

Petroleum, Petroleum-Base Products, and Related Material. Operators, Organizational and Field Maintenance Repair Parts and Special Tool List. Engine, Gasoline (Mil-Std-Model) par. (4b(2)).

TM 5-6115-306-25P

Operator, Organizational, Field and Depot Maintenance Manual, Generator Set, Gasoline Engine: 1.5 kw, ac, 120v, Single Phase, 2 Wire, 60 Cycle; Air Cooled; Open; Tubular Frame, Shock Mounted (Hol-Gar Model CE-015-AC (Less Engine)).

10. Training Aids

FM 5-25
FM 21-5
FM 21-6
FM 21-30

Explosives and Demolition
Military Training
Techniques of Military Instruction
Military Symbols

APPENDIX II

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

This appendix contains a Maintenance Allocation Chart listing all maintenance and repair operations authorized for the various echelons.

2. Maintenance

Maintenance is any action taken to keep material in a serviceable condition or to restore it to serviceability when it is unserviceable. Maintenance of material includes the following:

a. Service. To clean, to preserve, and to replenish fuel and lubricants.

b. Adjust. To regulate periodically to prevent malfunction.

c. Inspect. To verify serviceability and to detect incipient mechanical failure by scrutiny.

d. Test. To verify serviceability and to detect incipient mechanical failure by use of special equipment such as gages, meters, and so on.

e. Replace. To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.

f. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and straightening.

g. Overhaul. To restore an item to completely serviceable condition as prescribed by serviceability standards developed and published by

heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

3. Explanation of Columns

a. Functional Group. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes are taken from the Corps of Engineers Functional Grouping Indexes, and appear on the Maintenance Allocation Chart in their correct numerical sequence. These indexes are normally set up according to their proximity to each other and their function.

b. Components and Related Operation. This column contains the functional index grouping heading, subgroup headings, and a brief description of the part starting with the noun name. It also designates the operation to be performed such as service, adjust, inspect, test, replace, repair and overhaul.

c. Echelons of Maintenance. This column contains the various echelons of maintenance by number designation. An "X" placed in the appropriate echelon column in line with an indicated maintenance function authorizes that echelon to perform the function. The "X" indicated the lowest responsible for performing the function, but does not necessarily indicate repair parts stockage at that level. Higher echelons are authorized to perform the indicated functions of lower echelons.

| Functional group | Components and related operation | Echelons of maintenance | | | | | Remarks |
|------------------|---|-------------------------|---|---|---|---|------------------------------------|
| | | 1 | 2 | 3 | 4 | 5 | |
| 01 | ENGINE: | | | | | | Reference TM 5-2805- 206-14. |
| 0100 | Engine Assembly | | | | | | |
| | Engine, gasoline | | | | | | Compression |
| | Service----- | X | | | | | |
| | Inspect----- | X | | | | | |
| | Test----- | | X | | | | |
| | Replace----- | | | X | | | |
| | Repair----- | | | X | | | |
| | Overhaul----- | | | | | X | |
| 03 | FUEL SYSTEMS: | | | | | | |
| 0306 | Tanks, Lines, Fittings | | | | | | |
| | Cap, fuel tank | | | | | | |
| | Replace----- | | X | | | | |
| | Lines, fittings | | | | | | |
| | Replace----- | | X | | | | |
| | Tank, fuel | | | | | | |
| | Service----- | X | | | | | |
| | Replace----- | | X | | | | |
| | Strainer, fuel | | | | | | |
| | Service----- | X | | | | | |
| | Replace----- | | X | | | | |
| | Valve, shut, off | | | | | | |
| | Replace----- | | X | | | | |
| 15 | FRAME: | | | | | | |
| 1501 | Frame Assembly | | | | | | |
| | Frame assembly | | | | | | |
| | Replace----- | | | X | | | |
| | Isolators, vibration | | | | | | |
| | Replace----- | | X | | | | |
| | Post, ground terminal | | | | | | |
| | Replace----- | | X | | | | |
| 22 | MISCELLANEOUS BODY CHASSIS OR HULL, AND ACCESSORY ITEMS: | | | | | | |
| 2201 | Canvas Items | | | | | | |
| | Cover, canvas | | | | | | |
| | Replace----- | X | | | | | |
| | Repair----- | | | X | | | |
| 2210 | Data Plates | | | | | | |
| | Plate, Instruction | | | | | | |
| | Replace----- | | X | | | | |
| | Plate, Data (C.O.E.) | | | | | | |
| | Replace----- | | | X | | | |
| 40 | GENERATORS: | | | | | | |
| 4000 | Generator | | | | | | |
| | Generator assembly | | | | | | |
| | Service----- | X | | | | | Clean ventila- tion openings. |
| | Inspect----- | X | | | | | |
| | Test----- | | | X | | | |
| | Replace----- | | | X | | | |
| | Repair----- | | | X | | | |
| | Overhaul----- | | | | | X | |

| Functional group | Components and related operation | Echelons of maintenance | | | | | Remarks |
|------------------|----------------------------------|-------------------------|---|---|---|---|---------|
| | | 1 | 2 | 3 | 4 | 5 | |
| 40 | Generators—Cont. | | | | | | |
| 4001 | Rotor Assemblies | | | | | | |
| | Rotor assembly | | | | | | |
| | Test | | | X | | | |
| | Replace | | | X | | | |
| | Repair | | | X | | | |
| | Overhaul | | | | | X | Rewind |
| 4002 | Stator Assemblies | | | | | | |
| | Stator assembly, generator | | | | | | |
| | Test | | | X | | | |
| | Replace | | | X | | | |
| | Repair | | | X | | | |
| | Overhaul | | | | | X | Rewind |
| 4003 | Brush Holders | | | | | | |
| | Rigging, brush | | | | | | |
| | Replace | | | X | | | |
| | Repair | | | X | | | |
| | Holder, brush | | | | | | |
| | Replace | | | X | | | |
| | Brush, electrical contact | | | | | | |
| | Replace | | X | | | | |
| 4004 | Ventilating System | | | | | | |
| | Fan, cooling | | | | | | |
| | Replace | | | X | | | |
| | Screen | | | | | | |
| | Service | X | | | | | Clean |
| | Replace | | X | | | | |
| 4005 | Frame Supports and Housings | | | | | | |
| | Bell, end | | | | | | |
| | Replace | | | X | | | |
| | Bearing, rotor | | | | | | |
| | Replace | | | X | | | |
| 4009 | Control Panel, Housing | | | | | | |
| | Leads, electrical | | | | | | |
| | Replace | | X | | | | |
| | Meters | | | | | | |
| | Replace | | X | | | | |
| | Box assembly, control | | | | | | |
| | Replace | | X | | | | |
| 4011 | Circuit Breakers | | | | | | |
| | Circuit Breaker | | | | | | |
| | Replace | | X | | | | |
| 4014 | Resistors | | | | | | |
| | Potentiometer | | | | | | |
| | Replace | | X | | | | |
| 4017 | Transformers | | | | | | |
| | Transformer | | | | | | |
| | Test | | | X | | | |
| | Replace | | | X | | | |
| 4018 | Terminal Blocks | | | | | | |
| | Board, terminal | | | | | | |
| | Replace | | X | | | | |
| | Terminal, power | | | | | | |
| | Replace | | X | | | | |
| | Receptacle assembly | | | | | | |
| | Replace | | X | | | | |

| Functional group | Components and related operation | Echelons of maintenance | | | | | Remarks |
|------------------|----------------------------------|-------------------------|---|---|---|---|---------|
| | | 1 | 2 | 3 | 4 | 5 | |
| 40 | Generators—Cont. | | | | | | |
| 4019 | Radio Interference Suppression | | | | | | |
| | Capacitors | | | | | | |
| | Test..... | | X | | | | |
| | Replace..... | | X | | | | |
| | Strap, ground | | | | | | |
| | Replace..... | | X | | | | |
| 4020 | Static Excitor Components | | | | | | |
| | Excitor assembly | | | | | | |
| | Test..... | | | X | | | |
| | Replace..... | | | X | | | |
| | Repair..... | | | X | | | |

APPENDIX III
BASIC ISSUE ITEMS LIST AND MAINTENANCE AND
OPERATING SUPPLIES

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required in 1st echelon maintenance and operation, initially issued with, or authorized for the generator set. Section III lists the maintenance and operating supplies required for initial operation.

2. Explanation of Columns Contained in Section II

a. Source Codes. The information provided in each column is as follows:

- (1) *Technical service.* This column lists the basic number (or symbol) of the technical service assigned supply responsibility for the part. Blank spaces denote Corps of Engineers supply responsibility. General Engineer supply parts are identified by the letters "GE" in parentheses, following the nomenclature in the description column.

10—Quartermaster Corps

12—Adjutant General's Corps

- (2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

(a) P—applied to high-mortality repair parts which are stocked in or supplied from the technical service depot system, and authorized for use at indicated maintenance echelons.

(b) P1—applied to repair parts which are low-mortality parts, stocked in or supplied from technical service depots, and authorized for installation at indicated maintenance echelons.

(c) M—applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance echelons.

(d) X2—applied to repair parts which are not stocked. The indicated maintenance echelon requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

- (3) *Maintenance.* The lowest maintenance echelon authorized to use, stock, install, or manufacture the part is indicated by following code symbol:

O—Organization Maintenance
(1st and 2d Echelon).

- (4) *Recoverability.* Repair parts and/or tool and equipment items that are recoverable are indicated by one of the following code symbols:

(a) R—applied to repair parts and assemblies which are economically repairable at field maintenance facilities (3d and 4th echelons) and normally are furnished by supply on an exchange basis.

(b) T—applied to high-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance facilities.

(c) U—applied to repair parts specifically selected for salvage by reclamation

units because of precious metal content, critical materials, high-dollar value reusable casings, castings, and the like.

Note. When no code is shown in the recoverability column the part is considered expendable.

b. Federal Stock Numbers. The Federal stock number will be shown in this column, and will be used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part are shown.

(2) A five-digit Federal supply code for manufacturers and/or other technical services is shown in parentheses followed by the manufacturer's part number. This number will be used for requisitioning purposes when no Federal Stock Number is indicated in the Federal Stock Number column.

Example: (08645) 86453

(3) The letters "GE", shown in parentheses immediately following the description, indicate General Engineer supply responsibility for the part.

d. Unit of Issue. If no abbreviation is shown in this column, the unit of issue is "each".

e. Quantity Authorized. This column lists the quantities of repair parts, accessories, tools, or publications authorized for issue to the equipment operator or crew as required.

f. Quantity Issued with Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

g. Illustrations. This column is subdivided into two columns which provide the following information:

(1) *Figure number.* Provides the identifying number of the illustration.

(2) *Item number.* Provides the referenced number for the parts shown in the illustration.

3. Index to Federal Supply Code for Manufacturers

4. Explanation of Columns Contained in Section III

a. Item. This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

b. Component Application. This column identifies the component application of each maintenance or operating supply item.

c. Source of Supply. This column lists the basic number of the technical service assigned supply responsibility for the item. Those spaces left blank denote Corps of Engineers supply responsibility.

10—Quartermaster Corps

d. Federal Stock Number. The Federal stock number will be shown in this column and will be used for requisitioning purposes.

e. Description. The item name and a brief description are shown.

f. Quantity Required for Initial Operation. This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

g. Quantity Required for 8 Hours Operation. Quantities listed represent the estimated requirement for an average eight hours of operation.

h. Notes. This column contains informative notes keyed to data appearing in the preceding columns.

5. Comments and Suggestions

Suggestions and recommendations for changes to the Basic Issue Items List and/or Maintenance and Operating Supplies Table shall be submitted on DA Form 2028 to the Commanding Officer, U. S. Army Mobility Support Center, ATTN: SMOMS-MM, P. O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

Section II. BASIC ISSUE ITEMS LIST

| Technical service | Source codes | | | Federal stock No. | Description | Unit of issue | Expendability | Quantity authorized | Quantity issued with equipment | Illustration | |
|-------------------|--------------|-------------|----------------|-------------------|--|---------------|---------------|---------------------|--------------------------------|--------------|------|
| | Source | Maintenance | Recoverability | | | | | | | Fig. | Item |
| | | | | | GROUP 01. ENGINE | | | | | | |
| | | | | | 0114. HAND CRANKING DEVICES | | | | | | |
| | M | O | ---- | | ROPE ASSEMBLY, STARTING (81336) ERO-2520. | ---- | ---- | 1 | | | |
| | X2 | O | ---- | | MANUFACTURE FROM: HANDLE, STARTING ROPE (81336) ERO-252. | | | | | | |
| 10 | P | O | ---- | 4020-240-2146 | CORD, NYLON: (4 ft required). | FT | ---- | 4 | * | | |
| | | | | | GROUP 26. ACCESSORIES, PUBLICATIONS, TEST EQUIPMENT AND TOOLS | | | | | | |
| | | | | | 2602. ACCESSORIES | | | | | | |
| 10 | P | O | ---- | 7520-559-9618 | CASE, MAINTENANCE AND OPERATIONAL MANUALS: Cotton duck, water repellent, mildew resistant. | ---- | ---- | 1 | 1 | | |
| | P1 | O | ---- | 5975-624-8937 | ROD, GROUND: 9 ft. lg, 5/8 in. dia, cone point 3 sections. (GE) | ---- | ---- | 1 | 1 | | |
| | P1 | O | ---- | 5975-243-5861 | CLAMP, ELECTRICAL: Ground rod, 1/2 in. to 1 in. id. (GE) | ---- | ---- | 1 | 1 | | |
| | M | O | ---- | | WIRE, ELECTRICAL: MANUFACTURE FROM: | | | | | | |
| | P | O | ---- | 6145-189-6695 | WIRE, ELECTRICAL: No. 6 AWG, (10 ft required). (GE) | FT | ---- | 10 | 10 | | |
| | | | | | 2603. COMMON TOOLS | | | | | | |
| 10 | P | O | ---- | 5120-277-9491 | SCREWDRIVER, FLATTIP: Wood handle, flared tip, 1/4 in. 4 in. lg blade. | ---- | ---- | 1 | * | | |
| 10 | P | O | ---- | 5120-240-5328 | WRENCH, OPEN END ADJUSTABLE: single head, 0.0947 in. jaw opening, 8 in. lg. | ---- | ---- | 1 | * | | |
| | | | | | 2605. PUBLICATIONS | | | | | | |
| 12 | ---- | ---- | ---- | | DEPARTMENT OF THE ARMY OPERATOR, ORGANIZATIONAL, FIELD AND DEPOT MAINTENANCE MANUAL: TM 5-6115-306-15. | ---- | ---- | 2 | 2 | | |

| Technical service | Source codes | | | Federal stock No. | Description | Unit of issue | Expendability | Quantity authorized | Quantity issued with equipment | Illustration | |
|-------------------|--------------|-------------|----------------|-------------------|--|---------------|---------------|---------------------|--------------------------------|--------------|------|
| | Source | Maintenance | Recoverability | | | | | | | Fig. | Item |
| | | | | | | | | | | | |
| 12 | --- | --- | --- | | 2605. Publications—Cont. DEPARTMENT OF THE ARMY ORGANIZATIONAL, FIELD AND DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOL LISTS: TM 5-6115-306-25P. | --- | --- | 2 | 2 | | |
| | | | | | DEPARTMENT OF THE ARMY LUBRICATION ORDER: LO 5-2805-206-14. | --- | --- | 1 | 1 | | |
| 12 | --- | --- | --- | | 2605. PUBLICATIONS DEPARTMENT OF THE ARMY TECHNICAL MANUAL: OPERATOR, ORGANIZATIONAL, AND FIELD MAINTENANCE MANUAL TM 5-2805-206-14 WITH C1, C2. | --- | --- | 2 | 2 | | |
| 12 | --- | --- | --- | | DEPARTMENT OF THE ARMY TECHNICAL MANUAL: OPERATOR, ORGANIZATIONAL AND FIELD MAINTENANCE REPAIR PARTS AND SPECIAL TOOL LISTS TM 5-2805-206-14P WITH C1. | --- | --- | 2 | 2 | | |

Section III. Maintenance and Operating Supplies

| Item | Component application | Source of supply | Federal stock No. | Description | Quantity required for initial operation | Quantity required for 8 hours operation | Notes |
|------|-------------------------|------------------|---|--|---|---|---|
| 1. | 0101 CRANKCASE | 10 10 10 | 9150-265-9433 (2) 9150-265-9425 (2) 9150-242-7602 (2) | OIL, LUBRICATING: 1 qt can as follows: OE-30 OE-10 OES OIL LUBRICATING: (4) | ½ qt ½ qt ½ qt ½ qt | (3) (3) (3) (3) | (1) Includes quantity of oil to fill engine system as follows: ½ qt—crankcase (2) See SM10 C9100-SL for additional data and requisitioning procedures. (3) See LO 5-2805-206-14 for grade application and replenishment intervals. (4) Use oil as prescribed in item 1 above. |
| 2. | 0304 AIR CLEANER (4) | | | FUEL GASOLINE: AUTOMOTIVE, COMBAT 5 gal pail as follows: 91A | 1 ¾ gal (5) | 6 gal (6) | (5) Tank capacity. (6) Average fuel consumption per hr (hour) continuous operation: ¾ gal. |
| 3. | 0306 TANK, FUEL | 10 | 9130-160-1817 (2) | | | | |

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By Order of the Secretary of the Army:

Official:

J. C. LAMBERT,
Major General United States Army,
The Adjutant General.

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Distribution:

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