

TM 5-6115-323-14

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TO 35C2-3-385-1

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

TECHNICAL MANUAL

OPERATOR/CREW, ORGANIZATIONAL, INTERMEDIATE (FIELD)
(DIRECT SUPPORT AND GENERAL SUPPORT) AND DEPOT
MAINTENANCE MANUAL

GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED,
TUBULAR FRAME, 1.5 KW, SINGLE PHASE, AC, 120/240 V,
28 V DC (LESS ENGINE)

DOD MODELS

HERTZ

NSN

MEP-015A

60

6115-00-889-1446

MEP-025A

DC

6115-00-017-8236

HEADQUARTERS, DEPARTMENT OF THE ARMY
and AIR FORCE
1976

WARNING

Take particular heed to specific cautions and warnings throughout this manual.

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH

or severe burns may result if personnel fail to observe safety precautions.

Do not operate this generator set until the ground terminal stud has been connected to a suitable ground.

On gasoline engine driven generator sets utilizing magnetos, set magneto switch to OFF or STOP position.

Do not attempt to change load connections when generator is running.

Before servicing any part of a generator set, make sure unit is completely de-energized.

DANGEROUS GASES

are generated as a result of operating this equipment.

DEATH

or severe injury may result if personnel fail to observe safety precautions.

Do not smoke, or use open flame when servicing batteries.

Batteries generate explosive gas while discharging and charging.

Always maintain metal-to-metal contact when filling the fuel tank. Do not smoke or use open flame when filling the fuel tank. Do not attempt to fill the fuel tank when the generator is running. Do not operate generator sets in inclosed areas unless exhaust gases are properly vented to the outside.

Exhaust discharge contains noxious and deadly fumes.

NOISE

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

CAUTION

DAMAGE

to the equipment may result if personnel fail to observe safety precautions.

If the generator set is shut-down by the operation of a safety device, do not attempt to operate the unit until the cause has been determined and eliminated.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F.-138°F. (38°C.-59°C.).

CHANGE
NO. 10

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND AIR FORCE
WASHINGTON, D.C., 25 September 1996

Operator/Crew, Organizational, Intermediate (Field)
(Direct Support and General Support) and
Depot Maintenance Manual

**GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED,
TUBULAR FRAME, 1.5 KW, SINGLE PHASE, AC, 120/240 V,
28 V DC (LESS ENGINE)**

| <u>DOD MODEL</u> | <u>HERTZ</u> | <u>NSN</u> |
|------------------|--------------|------------------|
| MEP-015A | 60 | 6115-00-889-1446 |
| MEP-025A | 28 V DC | 6115-00-017-8236 |

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NO. 9

Operator/Crew, Organizational, Intermediate (Field) (Direct Support and General Support)
and Depot Maintenance Manual

GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TUBULAR FRAME,
1.5 KW, SINGLE PHASE, AC, 120/240 V, 28 V DC (LESS ENGINE)

| DOD MODEL | HERTZ | NSN |
|-----------|---------|------------------|
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WASHINGTON, D.C., 24 OCTOBER 1990

NO. 8

Operator/Crew, Organizational, Intermediate (Field) (Direct Support and General Support)
and Depot Maintenance Manual

**GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TUBULAR FRAME,
1.5 kW, SINGLE PHASE, AC, 120/240 V, 28 V DC (LESS ENGINE)**

| DOD MODEL | HERTZ | NSN |
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| MEP-015A | 60 | 6115-00-889-1446 |
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Operator/Crew, Organization, Intermediate (Field) (Direct Support
and General Support and Depot Maintenance Manual

GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TABULAR FRAME,
1.5 KW, SINGLE PHASE, AC, 120/240 V, 28 V DC (LESS ENGINE)

| <u>DOD MODELS</u> | <u>HERTZ</u> | NSN |
|-------------------|--------------|------------------|
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WASHINGTON D. C., 17 March 1989

OPERATOR/CREW, ORGANIZATIONAL, INTERMEDIATE (FIELD) (DIRECT SUPPORT
AND GENERAL SUPPORT) AND DEPOT MAINTENANCE MANUAL

GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TABULAR FRAME,
1.5 KW, SINGLE PHASE, AC, 120/140 V, 28 V DC (LESS ENGINE)

| <u>DOD MODELS</u> | <u>HERTZ</u> | <u>NSN</u> |
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WASHINGTON, D. C., 22 April 1988

Operator/Crew, Organizational, Intermediate (Field) (Direct Support
and General Support) and Depot Maintenance Manual

**GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TABULAR FRAME,
1.5 KW, SINGLE PHASE, AC, 120/240 V, 28 V DC (LESS ENGINE)**

| <u>DOD MODELS</u> | <u>HERTZ</u> | <u>NSN</u> |
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OPERATOR/CREW, ORGANIZATIONAL, INTERMEDIATE (FIELD) (DIRECT SUPPORT
AND GENERAL SUPPORT) AND DEPOT MAINTENANCE MANUAL

GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TABULAR FRAME,
1.5 KW, SINGLE PHASE, AC, 120/240 V, 28 V DC (LESS ENGINE)

| <u>DOD MODELS</u> | <u>HERTZ</u> | <u>NSN</u> |
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| MEP-015A | 60 | 6115-00-889-1446 |
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WASHINGTON, D.C., 18 July 1985

OPERATOR/CREW, ORGANIZATIONAL, INTERMEDIATE (FIELD) (DIRECT SUPPORT
AND GENERAL SUPPORT) AND DEPOT MAINTENANCE MANUAL

GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TABULAR FRAME,
1.5 KW, SINGLE PHASE, AC, 120/240 V, 28 V DC (LESS ENGINE)

| DOD MODELS | HERTZ | NSN |
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| MEP-025A | DC | 6115-00-017-8236 |

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THE AIR FORCE
WASHINGTON, D.C., 1 October 1982

OPERATOR/CREW, ORGANIZATIONAL, INTERMEDIATE (FIELD) (DIRECT SUPPORT
AND GENERAL SUPPORT) AND DEPOT MAINTENANCE MANUAL

GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TABULAR FRAME,
1.5 KW, SINGLE PHASE, AC, 120/240 V, 28 V DC (LESS ENGINE)

| DOD MODELS | HERTZ | NSN |
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60 HZ.

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DEPARTMENT OF THE ARMY, AND
THE AIR FORCE
WASHINGTON, D.C., 1 December 1981

OPERATOR/CREW, ORGANIZATIONAL, INTERMEDIATE (FIELD) (DIRECT SUPPORT AND GENERAL
SUPPORT) AND DEPOT MAINTENANCE MANUAL

GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TABULAR FRAME, 1.5 KW, SINGLE
PHASE, AC, 120/240 V, 28 V DC (LESS ENGINE)

| DOD MODELS | HERTZ | NSN |
|------------|-------|------------------|
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Logistics Command

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Generator Sets, Engine Driven 1.5 KW 60 HZ.

WARNING

Serious eye injury can result from the starter rope knot. Wear eye protection when pull starting.

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH

or severe burns may result if personnel fail to observe safety precautions.

Do not operate this generator set until the ground terminal stud has been connected to a suitable ground.

On gasoline engine driven generator sets utilizing magnetos, set magneto switch to OFF or STOP position.

Do not attempt to change load connections when generator is running.

Before servicing any part of a generator set, make sure unit is completely de-energized.

DANGEROUS GASES

are generated as a result of operating this equipment.

DEATH

or severe injury may result if personnel fail to observe safety precautions.

Do not smoke, or use open flame when servicing batteries.

Batteries generate explosive gas while discharging and charging.

Always maintain metal-to-metal contact when filling the fuel tank. Do not smoke or use open flame when filling the fuel tank. Do not attempt to fill the fuel tank when the generator is running. Do not operate generator sets in inclosed areas unless exhaust gases are properly vented to the outside.

Exhaust discharge contains noxious and deadly fumes.

NOISE

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

CAUTION

DAMAGE

to the equipment may result if personnel fail to observe safety precautions.

If the generator set is shut-down by the operation of a safety device, do not attempt to operate the unit until the cause has been determined and eliminated.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F.-138°F.(38°C.-590C.).

TECHNICAL MANUAL
NO. 5-6115-323-14

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND THE AIR FORCE
WASHINGTON, D.C., 23 July 1976

Operator/Crew, Organizational, Intermediate (Field)
(Direct Support and General Support) and
Depot Maintenance Manual

**GENERATOR SET, GASOLINE ENGINE DRIVEN, SKID MOUNTED,
TUBULAR FRAME, 1.5 KW, SINGLE PHASE, AC, 120/240 V,
28 V DC (LESS ENGINE)**

DOD MODEL

HERTZ

NSN

**MEP-015A
MEP-025A**

**60
28 V DC**

**6115-00-889-1446
6115-00-017-8236**

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CHAPTER 1

INTRODUCTION

SECTION I. GENERAL

1-1. Scope

a. This manual is for your use in operating and maintaining the Military Designed DOD Models MEP-015A and MEP-025A Generator Sets. Information is provided on the operation, preventive maintenance checks and services, troubleshooting, operator/crew, organizational, intermediate (Field), (Direct Support and General Support) and Depot Maintenance.

b. This manual is primarily concerned with the operation and maintenance of the generator sets less engine. However, where it becomes necessary for understanding, portions of the maintenance and operation instruction which apply to the engine are included. For complete maintenance information on the engine, refer to the engine manuals in Appendix A.

c. Appendix A contains a list of reference publications applicable to this manual. Appendix B contains the Basic Issue Items List and Items Troop Installed or Authorized List. Appendix C contains the Maintenance Allocation Chart (MAC), which determines the level of maintenance responsibility for Army.

1-2. Limited Applicability

Some portions of this publication are not applicable to all services. These portions are prefixed to indicate the services to which they pertain; (A) for Army, and (F) for Air Force. Portions not prefixed are applicable to both services.

1-3. Maintenance Forms and Records

a. (A) Maintenance forms and records used by Army personnel are prescribed by DA PAM 738-750. Maintenance forms used by personnel are as follows:

(1) DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

(2) DA Form 2407 (Maintenance Request Used for Requesting Support Maintenance).

(3) DA Form 2407-1 (Continuation Sheet Used for Requesting Support Maintenance).

b. (F) Maintenance forms and records used by Air Force personnel are prescribed in AFM-66-1 and the applicable 00-20 Series Technical Orders..

1-4. Reporting of Errors

Report of errors, omissions, and recommendations for improvement of this publication by the individual user is encouraged. Reports should be submitted as follows:

a. (A) Army-DA Form 2028 (Recommended Changes to Publications, and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

b. (F) Air Force-AFTO Form 22 directly to: Commander, Sacramento Air Logistics Center, ATTN: SM-ALC-MMEDTA, McClellan Air Force Base, CA 95652-5609, in accordance with TO-00-5-1.

1-5. Levels of Maintenance Accomplishment

a. (A) Army users shall refer to the Maintenance Allocation Chart (MAC) for tasks and levels of maintenance to be performed.

b. (F) Air Force users shall accomplish maintenance at the user level consistent with their capability in accordance with policies established in AFM 66-1.

1-6. Destruction of Army Materiel to Prevent Enemy Use.

(A) Demolition of materiel to prevent enemy use will be in accordance with the requirement of TM 750-244-3 (Procedures for Destruction of Equipment to Prevent Enemy Use for U.S. Army)

Change 10 1-1

1-7. Administrative Storage

If the generator sets must be placed in administrative storage proceed as follows:

a. (A) *Army*.

(1) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions. For example, strategically locate recovery vehicles, snowplows, slave units, and similar items, likely to be needed on short notice.

(2) Take into account environmental conditions, such as extreme heat or cold; high humidity; blowing sand, dust, or loose debris; soft ground; mud; heavy snows; earthquakes; or combinations there of and take adequate precautions.

(3) Establish a fire plan and provide for adequate firefighting equipment and personnel.

(4) For further information, refer to TM 740-90-1 (Administrative Storage).

b. (F) *Air Force*. Refer to TO 35-1-4 (Processing and Inspection of Aerospace Ground Equipment).

1-8. Preparation for Shipment and Storage

If the generator sets must be placed in storage or shipped to another location, proceed as follows:

a. (A) *Army*. Refer to TM 740-90-1 (Administrative Storage) and TB 740-97-2 (Preservation of USAMECOM Mechanical Equipment for Shipment and Storage).

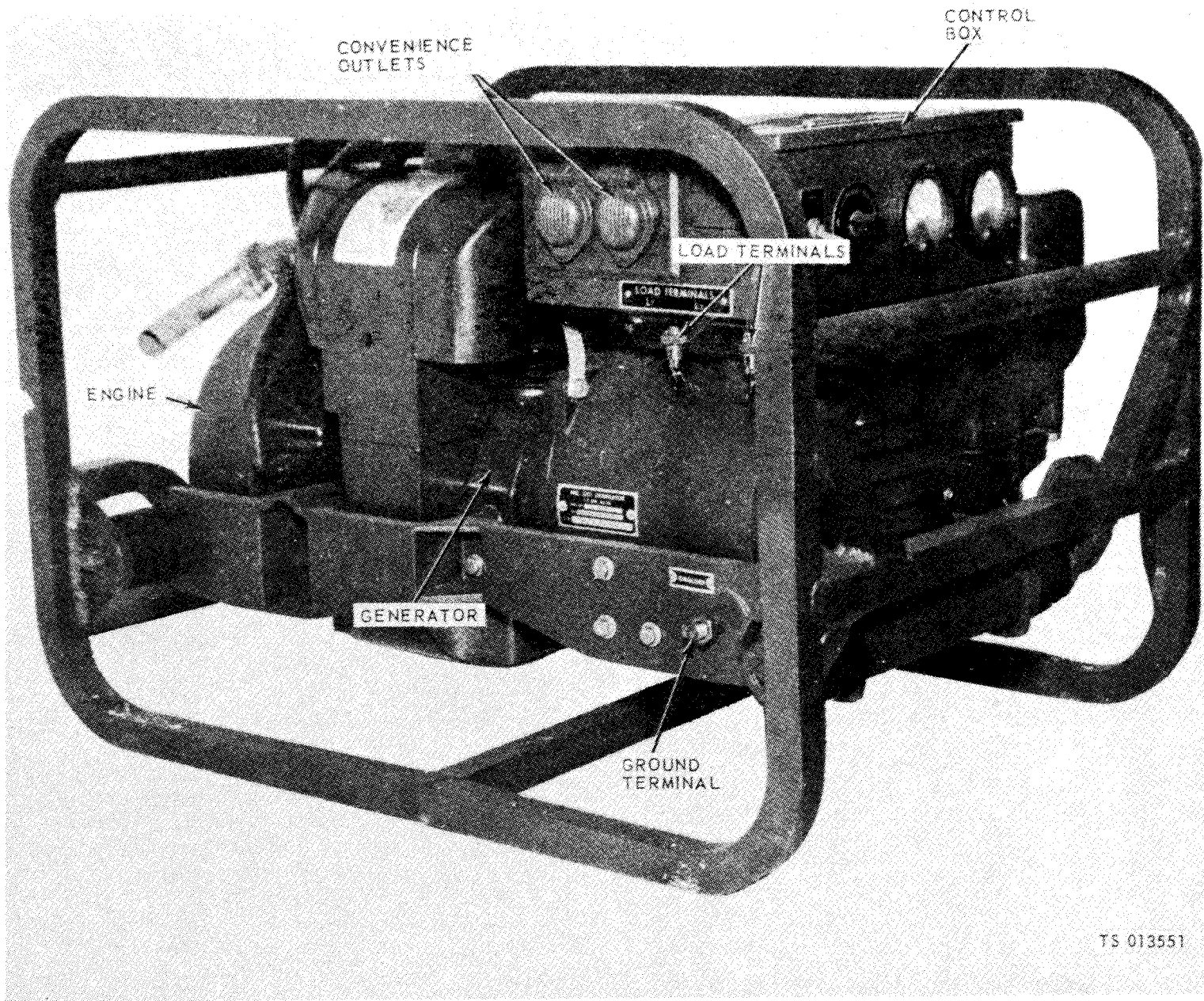
b. (F) *Air Force*. Refer to TO 35-1-4 (Processing and Inspection of Aerospace Ground Equipment) for the end item generator sets and TO 38-1-5 (Processing and Inspection of Non-Mounted, Non-Aircraft Gasoline and Diesel Engines for Storage and Shipment) for the installed engine.

Section II. DESCRIPTION AND DATA

1-9. Description

The military design generator sets, DOD Model MEP-015A (AC Unit) (figs. 1-1 and 1-2), and DOD Model MEP-025A (DC Unit) (figs. 1-3 and 1-4), are designed for general purpose use for lighting and to provide power for pumps, blowers, heaters, compressors and similar equipment. They are

suitable for use in a variety of applications that can be served by small, portable, generating units when used within the limits of their voltage, frequency, and power characteristics. The units consist primarily of the generator, control box, engine, fuel tank, and frame. Both generator sets have a capacity of 1.5 KW (kilowatts).



TS 013551

Figure 1-1.

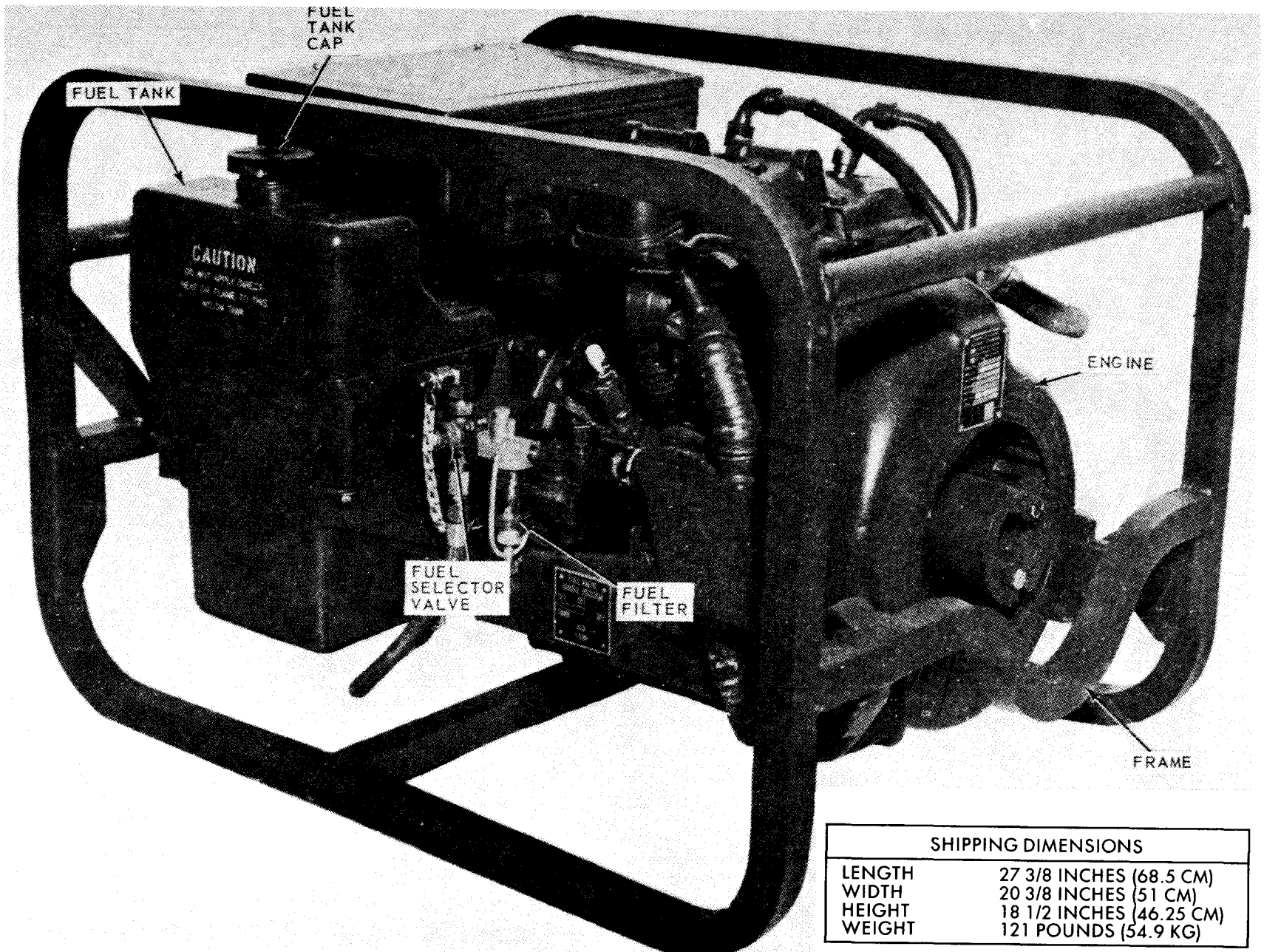


Figure 1-2.

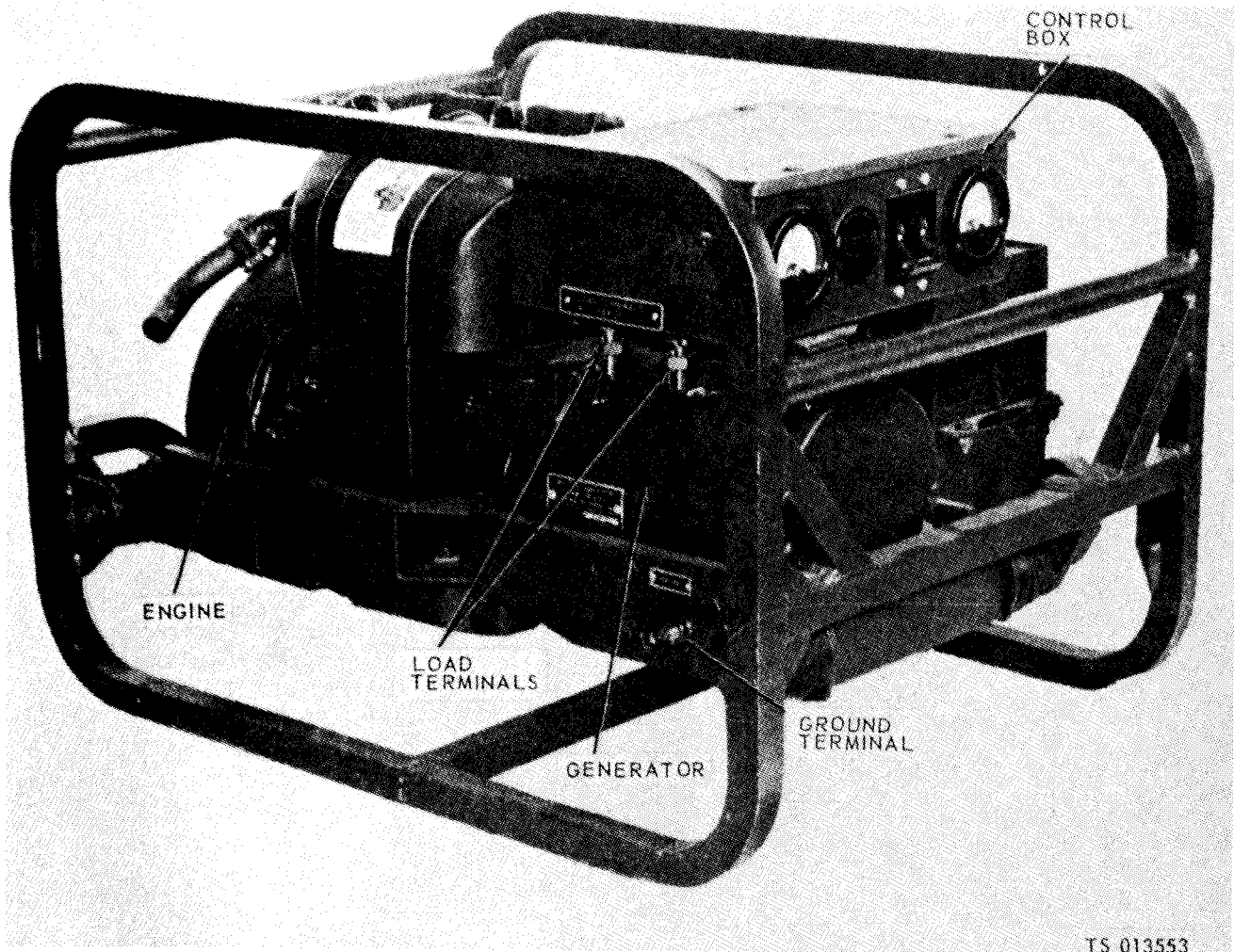


Figure 1-3. Generator set, left rear three-quarter view (Model MEP-025A) (DC Unit).

1-10. Identification and Tabulated Data

a. *Identification.* The generator sets are provided with unit, engine, and generator identification plates. The information contained on these plates is listed in subparagraph d, tabulated data.

b. *Explanation of Military Design Generator Set Serial Numbers.* The serial number of a military design generator set (end item) is comprised of four alpha-numeric characters to which are appended a numeric series that corresponds, in quantity, to the number of sets furnished.

(1) The first character (alpha) specifies the manufacturer. It is defined as follows:

- G ----- Hol-Gar Manufacturing Co.
- K ----- John R. Hollingsworth Manufacturing Co.

N ----- Chimera Corp.

Q ----- American Marc, Div. of EON Corp.

R ----- Aircraft Appliance and Equipment

(2) The second character (alpha) denotes the frequency characteristics:

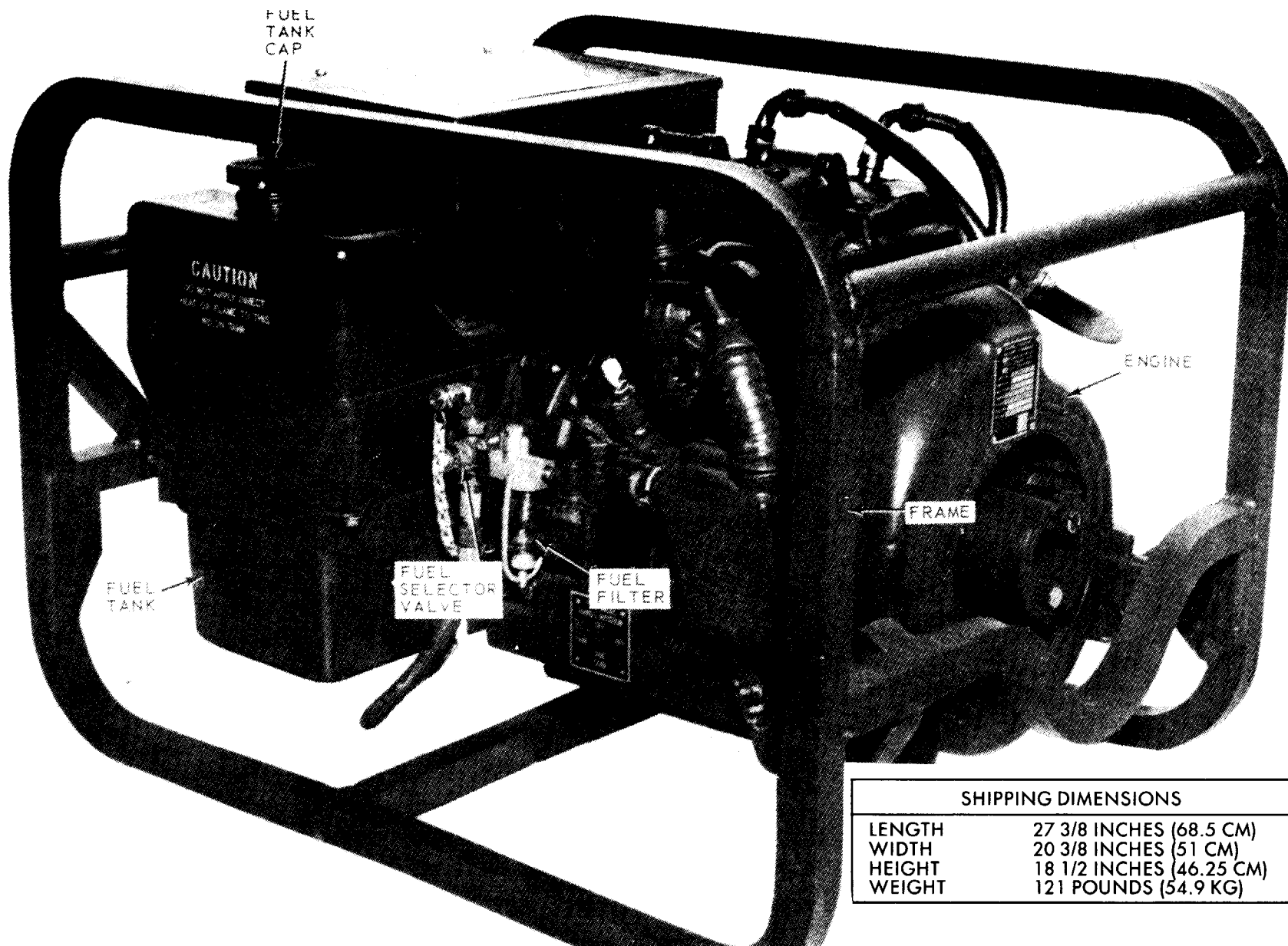
A ----- 60 Hertz

B ----- 28 Volt DC

(3) The third and fourth characters (numeric) represent the year of delivery.

(4) On some units, the fifth, sixth and seventh characters represent the unit sizes in KW and the remaining characters represent the unit number in the series.

c. *Explanation of Department of Defense (DOD Model Designations.)* The DOD family of mobile



| SHIPPING DIMENSIONS | |
|---------------------|--------------------------|
| LENGTH | 27 3/8 INCHES (68.5 CM) |
| WIDTH | 20 3/8 INCHES (51 CM) |
| HEIGHT | 18 1/2 INCHES (46.25 CM) |
| WEIGHT | 121 POUNDS (54.9 KG) |

Figure 1-4.

electric power sources (MEP) model number assignments for this series follows:

| Spark Ignition Engine Driven (SIED) | | |
|-------------------------------------|------|----------|
| Rating in KW | DC | 60 Hertz |
| 1.5 | 025A | 015A |

(1) AC Unit, NSN 6115-00-889-1446, applies to Generator Sets, 1.5 KW, Military Design, 60 Hertz, DOD Model MEP-015A, serial number ranges GA64-1 through GA64-7525, GA65-0001 through GA65-4579, GA67-0001 through GA67-6807, NA68-0001 through NA68-0829, GA69-001 through GA69-1250, RA710001 through RA714666, KA7201.50001 through KA7201.57488, KA73500001 through KA73507085, and GA741.5001 through GA741.57079, hereafter referred to as the AC Unit.

(2) DC Unit, NSN 6115-00-017-8236, applies to Generator Sets, 1.5 KW, Military Design, 28 Volt DC, DOD Model MEP-025A, serial number ranges GC64-1 through GC64-5915, GS65-0001 through GS65-2563, GS66-0001 through GS66-11947 and RA710001 through RA714666, hereafter referred to as the DC Unit.

d. Tabulated Data.

(1) *Generator set, AC unit, NSN 6115-00-889-1446.*

| | |
|-----------------------|--|
| Manufacturer | Hol-Gar Mfg. Corp. |
| DOD Model MEP-015A | Formerly Hol-Gar Model CE-016-AC, and Military Design Model SG-1.5MD |
| Part Number | Hol-Gar 21251; MERDC 13214E0100 |
| National Stock Number | 6115-00-889-1446 |
| Specification | MIL-G-52282 (MO) |
| Contract Number | DA 11-184-AMC-560 (T) |
| Serial Number Range | GA64-1 thru GA64-7525 |
| Contract Number | DA 23-195-AMG0017 (T) |
| Serial Number Range | GA65-001 thru GA65-4579 |
| Contract Number | DAAK01-67-C-1489 |
| Serial Number Range | GA67-0001 thru GA67-6807 |
| Contract Number | DAAK01-69-C-5285 |
| Serial Number Range | GA69-0001 thru GA69-1250 |
| Manufacturer | Chimera Corp. |
| DOD Model MEP-015A | Formerly Chimera Corp. Model MD105-1-2-M |
| National Stock Number | 6115-00-889-1446 |
| Contract Number | DAAK01-68-C-8540 |
| Serial Number Range | NA68-0001 thru NA68-0829 |
| Manufacturer | American Marc, Div. of EON Corp. |
| Contract Number | DAAK01-69-C-A359 |
| Serial Number Range | QA6901.500001 thru QA6901.517102 |
| Manufacturer | Aircraft Appliance and Equipment |
| Contract Number | DSA 400-71-C-007 |
| Serial Number Range | RA710001 thru RA714666 |

| | |
|---------------------|--------------------------------|
| Manufacturer | Hollingsworth Mfg. Corp. |
| Contract Number | DSA 400-72-C-2974 |
| Serial Number Range | KA7201.50001 thru KA7201.57488 |
| Manufacturer | Hollingsworth Mfg. Corp. |
| Contract Number | DSA 400-73-C-7063 |
| Serial Number Range | KA73500001 thru KA73507085 |
| Manufacturer | Hol-Gar Mfg. Corp. |
| Contract Number | DSA 400-73-C-8041 |
| Serial Number Range | GA741.50001 thru GA741.57079 |

(2) *Generator set, DC unit, NSN 6115-00-017-8236.* (Same as AC Unit unless otherwise indicated.)

| | |
|-----------------------|--|
| Manufacturer | Hol-Gar Mfg. Corp. |
| DOD Model MEP-025A | Formerly Hol-Gar Model CE-017-DC and Military Design Model DC-1.5-MD/28 V, DC |
| Part Number | Hol-Gar 20070; MERDC 13213E-2700 |
| National Stock Number | 6115-00-889-1446 |
| Specification | MIL-G-52283 |
| Contract Number | DA 11-184-AMC-566 (T) |
| Serial Number Range | GC64-1 thru GC64-5915 |
| Contract Number | DA 23-195-AMC-00175 (T) |
| Serial Number Range | GC65-0001 thru GC65-2563 |
| Contract Number | DA 23-195-AMC-00423 (T) |
| Serial Number Range | GC66-0001 thru GC66-11947 |
| Manufacturer | John R. Hollingsworth Corp. |
| DOD Model MEP-025A | Formerly Hollingsworth Model JHGV1.5A and Military Design Model DC-1.5-MD/28 V, DC |
| National Stock Number | 6115-00-017-8236 |
| Contract Number | DSA 400-71-C-6007 |
| Serial Number Range | RA710001 thru RA714666 |
| Duty | Continuous |
| Mounting | Skid, shock mounted, tubular frame |
| Control | Local |
| Fuel capacity | 1 1/2 gallons (5.7 liters) |
| Operating speed | 3600 rpm |
| Radio suppression | MIL-STD-461 Class III B |

(3) *Engine.*

| | |
|-----------------------|---|
| Type | Government furnished, Military Standard, Gasoline, 3, HP, Model 2A016-3 |
| Part Number | 97887E3 (97403) |
| National Stock Number | 2805-00-072-4871 |
| References | See Appendix A |

(4) *Generator assembly, AC unit.*

| | |
|------------------|---------------------------------------|
| Type | AC, brushless, self-excited |
| Frequency | 60 Hertz |
| Speed | 3600 rpm |
| Temperature rise | 75° C. (167° F.) |
| Power | 1.5 KW |
| Power factor | 1.0 |
| Voltage | 120/240 VAC, single phase |
| Current | 12.50/6.25 amperes |
| Duty | Continuous |
| Altitude rating | 1.5 KW below 8,000 ft. (2,400 meters) |

(5) Generator assembly, DC unit.

| | |
|------------------------|--|
| Type | DC, brushless, self-excited |
| Frequency..... | DC |
| Speed | 3600 rpm |
| Temperature rise | 75°C.(1670F.) |
| Power | 1.5 KW |
| Voltage..... | 28VDC |
| Current | 53.5 amperes |
| Duty..... | Continuous |
| Altitude rating | 1.5 KW level to 8,000 ft. (2,400 m) |

e. Dimensions and Weight, AC and DC Units (figs. 1-2 and 1-4).

| | |
|--------------------|-----------------------------------|
| Weight (dry) | 121 lbs. (pounds) (54.9 KG) |
| Length | 27 3/8 inches (68.5 centimeters) |
| Height | 18 1/2 inches (46.25 centimeters) |
| Width | 20 3/8 inches (51 centimeters) |

f. Generator Repair and Replacement Standard.

(1) Alternator rotor.

Resistance of connected 15.5 ohms ± 5% windings at 77°F. (25 °C.)

(2) Exciter rotor.

Resistance between lead 5.84 ohms ± 10% pairs at 77°F. (25 °C.)

(3) AC unit alternator stator.

Resistance between lead 1.32 ohms ± 10% pairs (T1-T2 and T3-T4) at 77°F. (25°C.)

(4) DC unit alternator stator.

Resistance between lead -0.031 ohms ±20% pairs (T11-T12, T12-T13, T-14-T15, T15-T11) at 77°F, (25°C.)

(5) Excitation windings.

Resistance (T1-T2) at 8.2 ohms ± 10% (77°F. (25°C.))

(6) Exciter stator.

Resistance of winding at 215 ohms ± 10% 77°F. (25°C.)

(7) Voltage regulator.

| | | |
|---|------------------------------|----------------|
| Winding resistance at 77°F. (25°C.) | | |
| Coil C1A-C2B | | 36 ohms ± 10% |
| Coil C2A-C2B | | 12.2 ohms ±10% |
| Coil C3A-C3B | | 36 ohms ± 10% |
| Voltage Operating Range | AC | DC |
| Minimum range from no load to rated load, ambient temp. | 110 to 130 V 225 to 255 V | 23-36 V |
| At extreme temperatures -65°F. (-54°C.) and 125°F. (52°C.) | 120V±5% 220 v ± 5% | 28 V ± 4% |
| Regulation | | |
| No load to rated load and rated load to no load | 120 v ± 4% 220 v ± 5% | 28 V ± 4% |
| Steady State Regulation | AC | |
| At constant load from no load to rated load | 120 v ± 170 220 V ± 1% | 28 V ± 1% |

g. Generator Assembly Nut and Bolt Torque Data.

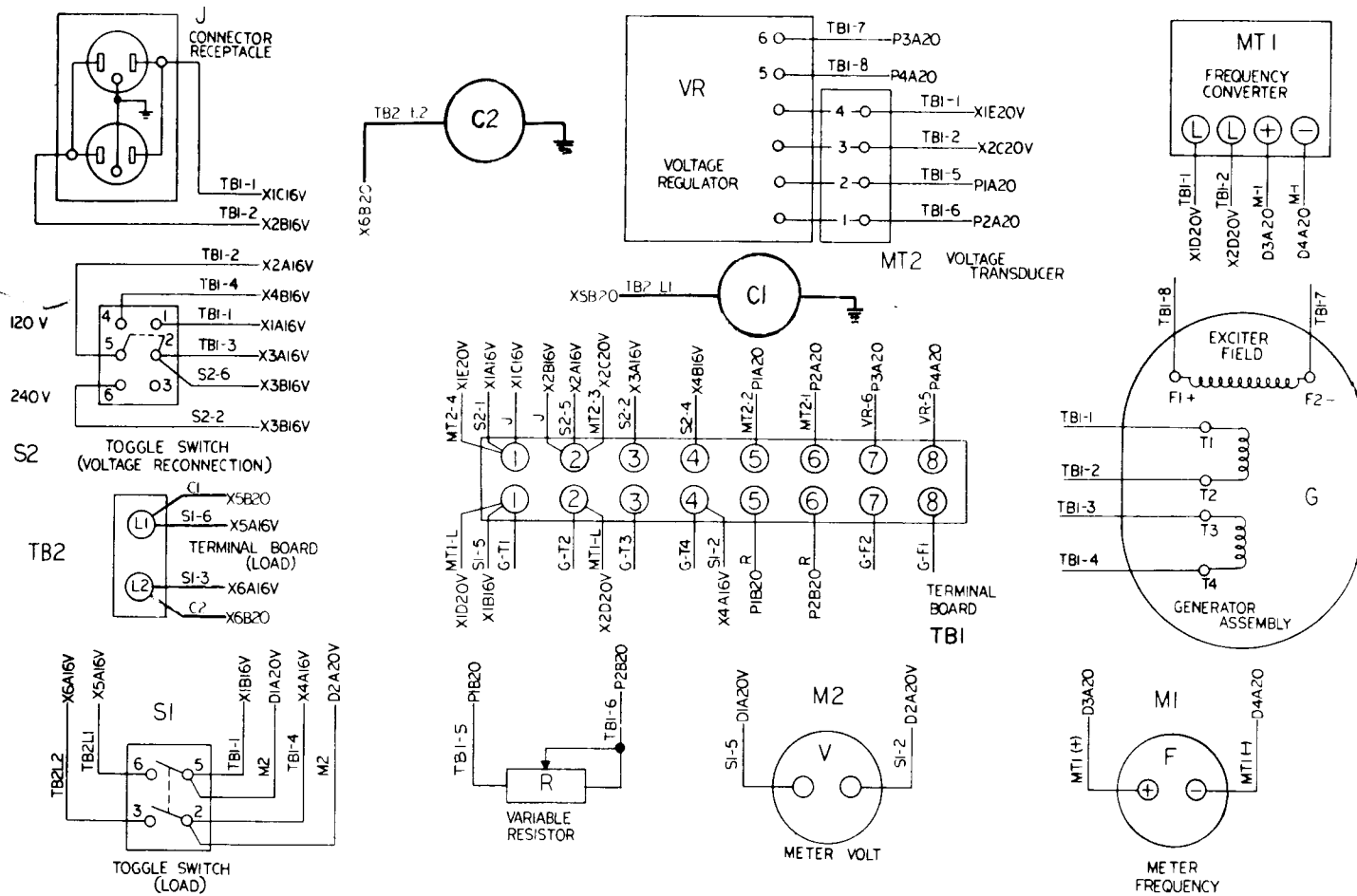
| | |
|-----------------------------------|-------------------|
| Generator-to-adapter plate screws | 8 to 10 ft. lbs. |
| Through stud | 16 to 18 ft. lbs. |
| Baffle-to-generator screws | 8 to 10 ft. lbs, |
| Rectifiers | 20 to 25 ft. lbs. |

h. Wiring Diagrams. Figures 1-5 and 1-6 show the wiring diagrams that are applicable to the generator sets.

i. Schematic Diagrams. Figures 1-7 and 1-8 show the schematic diagrams that are applicable to the generator sets.

1-11. Differences Between Models

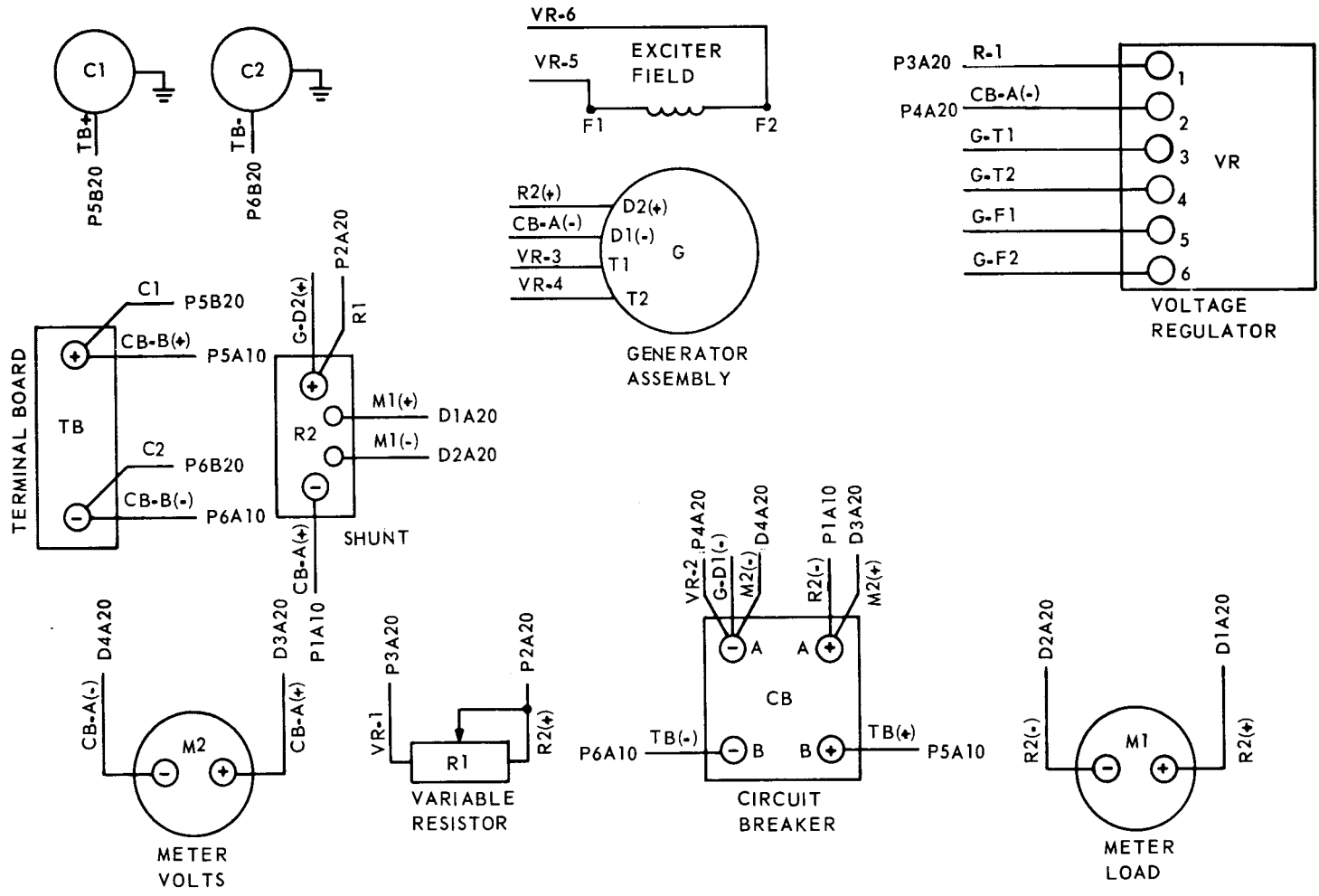
The differences between the Model MEP-015A (AC Unit) and the Model MEP-025A (DC Unit) are minor differences in the design of the control box, a change in the windings of the stator, and the addition of rectifiers and heat sinks in the DC generator. Where differences exist, each model is covered separately in the applicable maintenance sections of this manual.



| | |
|---------|------------------------------------|
| C1 & C2 | CAPACITORS, RF SUPPRESSION |
| G | GENERATOR ASSEMBLY |
| J | CONNECTOR RECEPTACLE |
| M1 | FREQUENCY METER |
| M2 | VOLTAGE METER |
| MT1 | FREQUENCY CONVERTER |
| MT2 | VOLTAGE TRANSDUCER |
| R | VARIABLE RESISTOR |
| S1 | LOAD TOGGLE SWITCH |
| S2 | VOLTAGE RECONNECTION TOGGLE SWITCH |
| TB1 | TERMINAL BOARD |
| TB2 | LOAD TERMINAL BOARD |
| VR | VOLTAGE REGULATOR |

TS 013555

Figure 1-5. Generator set wiring diagram (Model MEP-015A) (AC unit).



| | |
|---------|----------------------------|
| C1 & C2 | CAPACITORS, RF SUPPRESSION |
| CB | CIRCUIT BREAKER |
| M1 | LOAD METER, DC |
| M2 | VOLTMETER, DC |
| R1 | VARIABLE RESISTOR |
| R2 | SHUNT |
| TB | TERMINAL BOARD (INSULATOR) |
| VR | VOLTAGE REGULATOR |

Figure 1-6. Generator set wiring diagram (Model MEP-025A) (DC Unit).

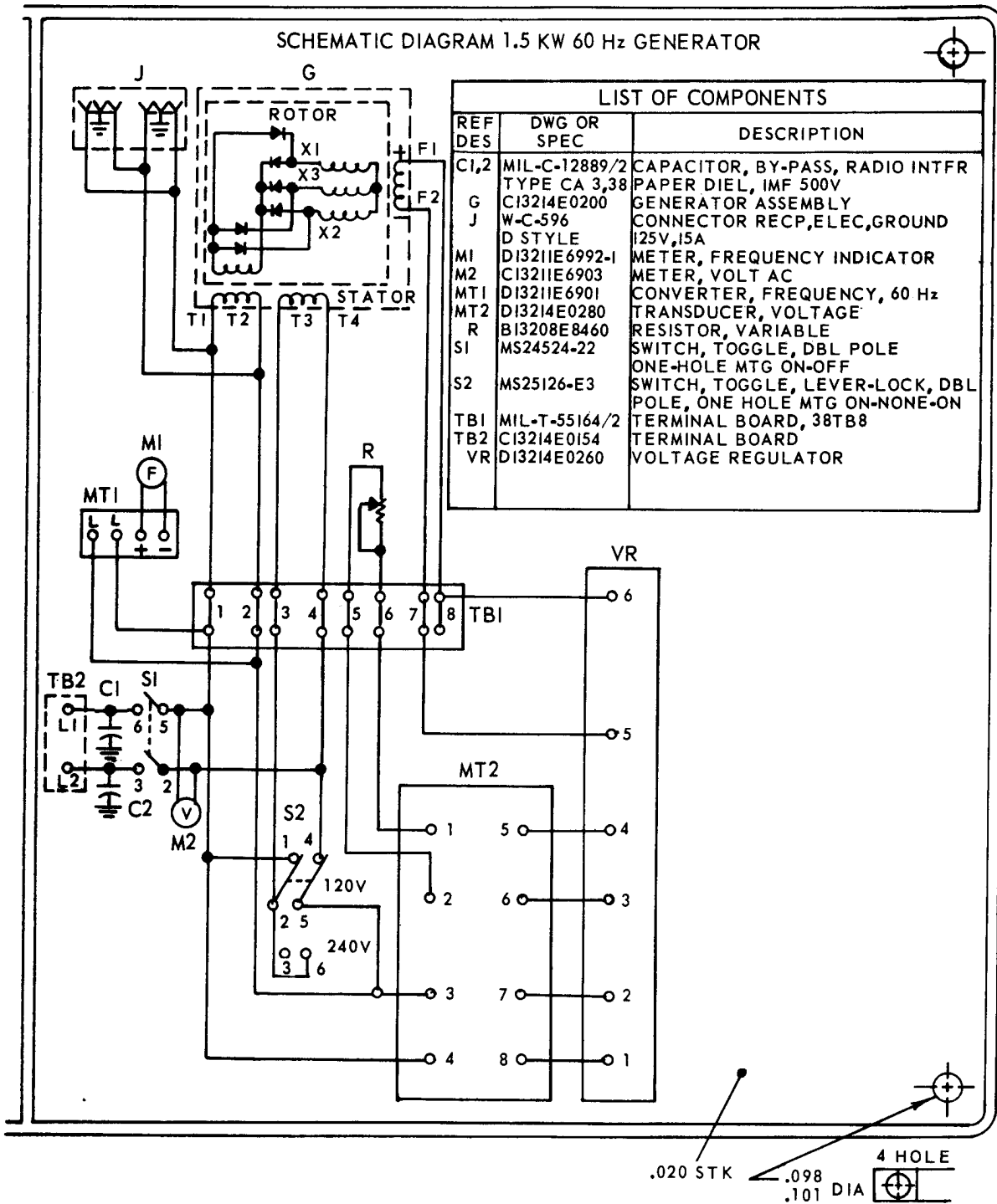
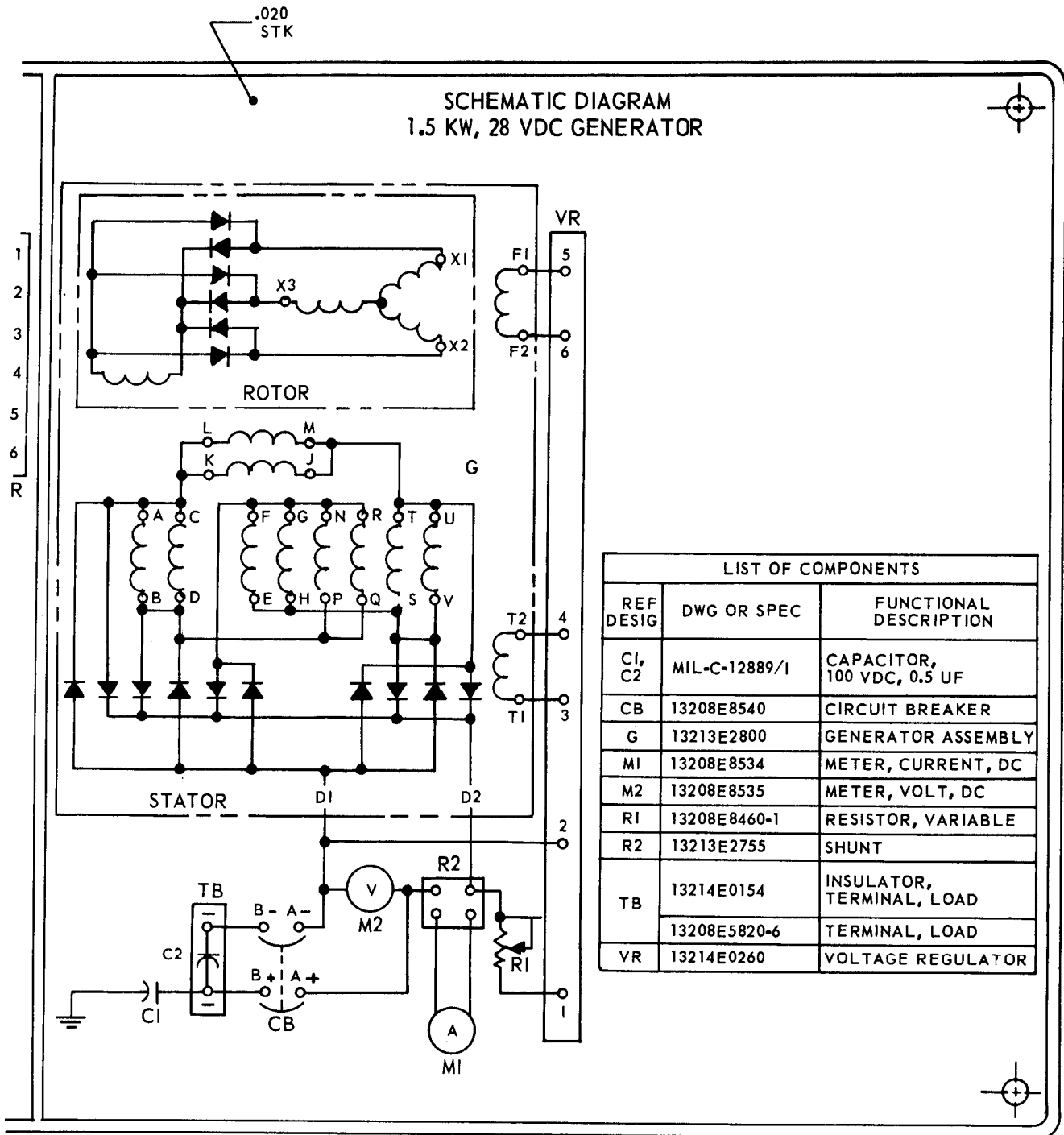
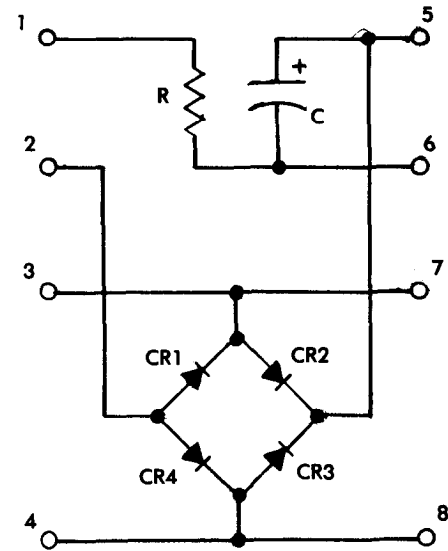
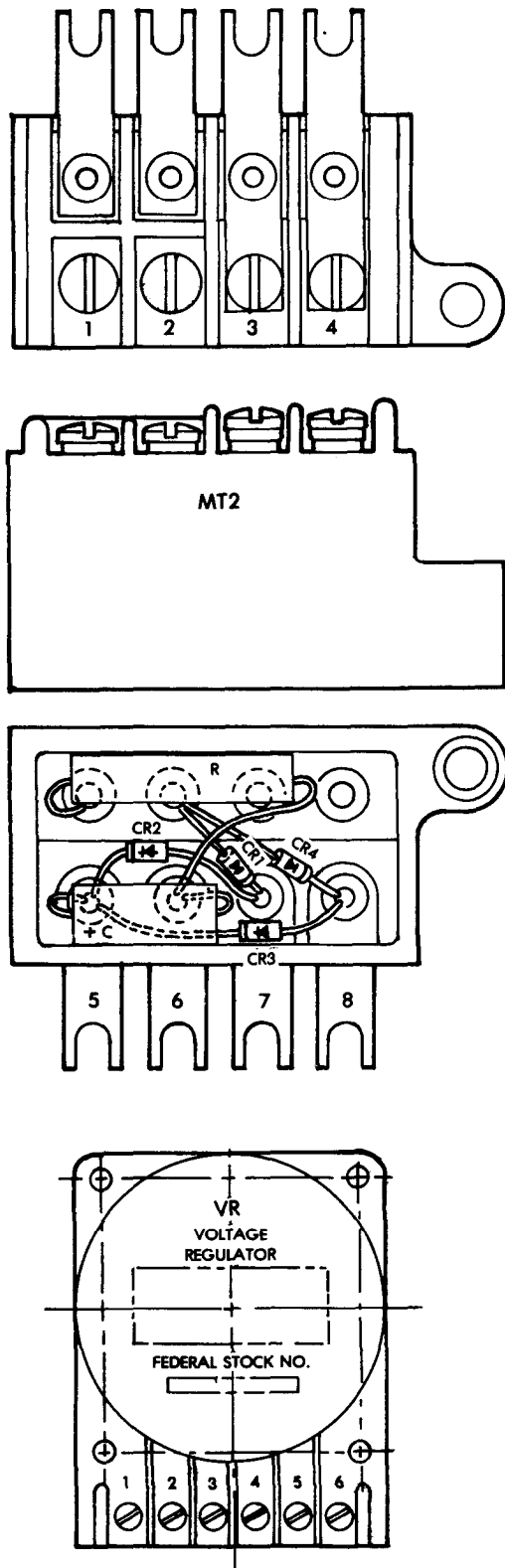


Figure 1-7. Generator Set Schematic Diagram (Model MEP-015A)(AC Unit).



TS 013558

Figure 1-8. Generator set schematic diagram (Model MEP-025A) (DC Unit).



MT2 TRANSDUCER SCHEMATIC DIAGRAM.

- I. INPUT:
 - A. VOLTAGE (VOLTS RMS) 110-130
 - B. FREQUENCY HZ 57-63
 - C. PHASE 1
- II. LOAD RESISTANCE (OHMS):
 - A. $R_{max} = 230 [1 + (T_a - 77).0022]$
 - B. $R_{min} = 210 [1 + (T_a - 77).0022]$
 - $T_a =$ AMBIENT TEMPERATURE ($^{\circ}$ F)
- III. OUTPUT:
 - A. VOLTAGE RANGE (VOLTS DC) 5-70
 - B. CURRENT (AMPS) MAX (-65° TO $+175^{\circ}$ F AMBIENT)
 - 1. CONTINUOUS 0.2
 - 2. FROM T_o - T_{is} 0.45
 - $T_o =$ TIME, STARTUP (MINUTES)
- IV. AFTER POTTING AND BEFORE INSTALLATION OF COMPONENTS THE WINDINGS OF THE SATURABLE REACTOR (ITEM 2) SHALL WITHSTAND FOR ONE MINUTE A TEST VOLTAGE OF 500 VOLTS RMS, 60 HZ BETWEEN TERMINALS E_5 - E_2 , E_5 - E_1 , & E_2 - E_7 .

Figure 1-9. Transducer and Voltage Regulator.

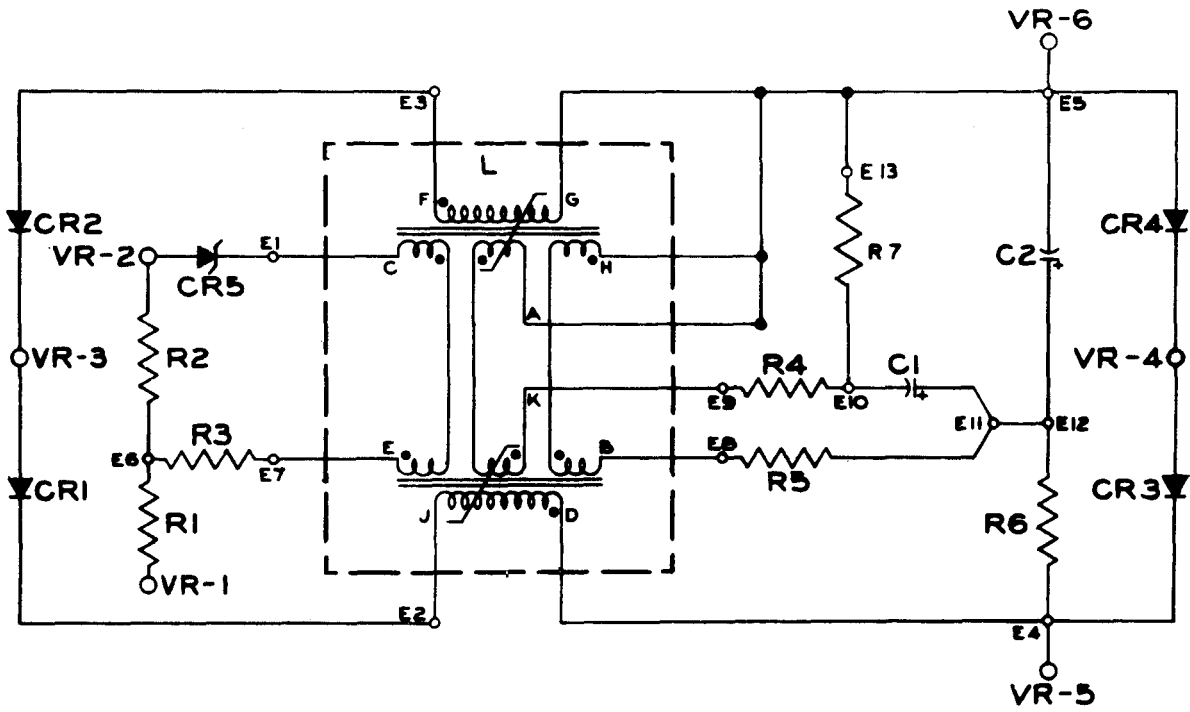


Figure 1-10. Voltage Regulator Schematic Diagram.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. OPERATING PROCEDURES

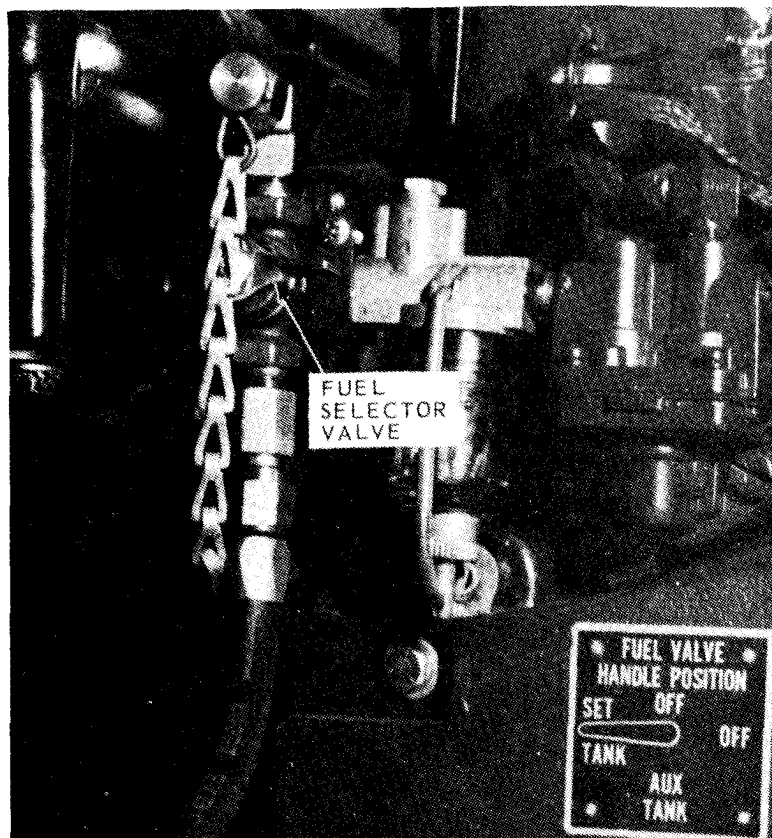
2-1. Controls and Instruments

a. General. This paragraph provides information about the various controls and instruments for proper operation of the generator sets.

b. Fuel Selector Valve. The fuel selector valve (fig. 2-1) is a four-position, rotary-type valve that is used to turn the fuel supply off, or to select between an external fuel supply and the on-set tank. It is located in front of the fuel tank on the right side of the generator set.

c. Engine Off-Run Switch. The engine off-run switch (fig. 2-2), a two position, toggle-type switch, is used to stop the engine when the switch has been positioned in the OFF position. The engine can be started after the switch has been positioned in the RUN position.

d. Choke Lever. The choke lever (fig. 2-2), a double-armed lever, is secured to the choke shaft at the front of the carburetor. It is normally kept in the OPEN position. To choke the engine, rotate the lever in a counterclockwise direction.



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Figure 2-1. Fuel selector valve

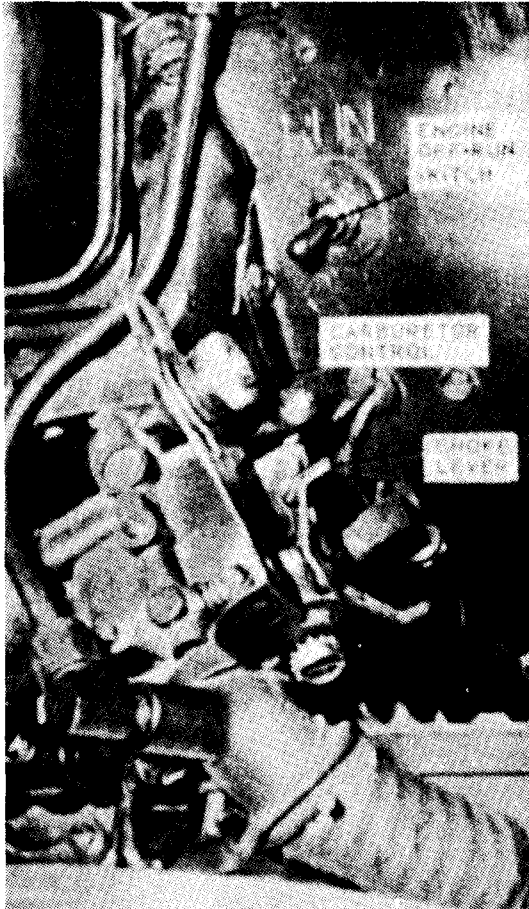


Figure 2-2. Engine starting controls.

- Step 1. Set the circuit breaker to OFF or OPEN position.
- Step 2. Set the fuel selector valve to the TANK or AUX position—whichever fuel source you are using.
- Step 3. Set the output selector switch—it is inside the control box—to the generator (voltage) output that matches the connected load.
- Step 4. Turn the voltage adjusting rheostat all the way to the left.
- Step 5. Set the carburetor throttle control in GOVERN or RUN position.
- Step 6.
 - a. Set the engine RUN-OFF switch to RUN position.
 - b. Put the choke in about a 3/4-closed position.

WARNING

Serious eye injury can result from the starter rope knot. Wear eye protection when pull starting engine.

- c. Make one pull of the starter rope with a quick, steady motion.
- d. If the engine starts, open choke as steady engine operation permits.

- e. If the engine does not start, close choke to full. Take one pull of starter rope. If engine starts, run engine at 1/2-choke, then open choke as steady engine operation permits.

CAUTION

Unnecessary or excessive use of the choke can cause the lubricating oil to dilute.

e. Carburetor Control. The carburetor control (fig. 2-2) is a lever that is held in the selected position by a springloaded, knurled nut. The control assembly is located at the top front of the carburetor at the right front of the engine. Engine speed can be increased by moving the lever away from the engine and can be decreased by moving the lever toward the engine.

f. AC Voltmeter (AC Unit). The AC voltmeter (A, fig. 2-3), located on the rear face of AC control box, indicates the voltages at end load toggle switch (S1). The meter is graduated from 0 to 250 volts. It normally should read either 120 V or 240 V.

g. Frequency Meter (AC Unit). The frequency meter (A, fig. 2-3) located next to the voltmeter on the rear face of the control box, indicates the frequency of the generator output. The frequency meter is graduated from 55 to 65 CPS (cycles per second) = hertz. The normal reading should be 60 CPS (hertz).

h. Load Switch (AC Unit). The load switch (A, fig. 2-3) is a toggle-type, two-position switch that is located on the left side of the rear face of the control box. It is used to connect and disconnect the generator set to and from the load.

i. Variable Resistor (AC Unit). The variable resistor (A, fig. 2-3) is located on the rear face of the control box. A rotary-type control, it is used to control the output voltage of the generator set.

j. Voltage Change Switch (AC Unit). The voltage change switch (A, fig. 2-3) is a two-position, pull-release, toggle-type switch. It is located at the top left center of the control box under the cover. It is used only when setting up the equipment to adapt the unit either to a 120 volt or 240 volt load.

k. DC Voltmeter (DC Unit). The DC voltmeter (B, fig. 2-3), located on the left rear face of the DC control box, indicates the voltage at the circuit breaker. The meter is graduated from 0 to 50 volts. It should normally read 28 volts.

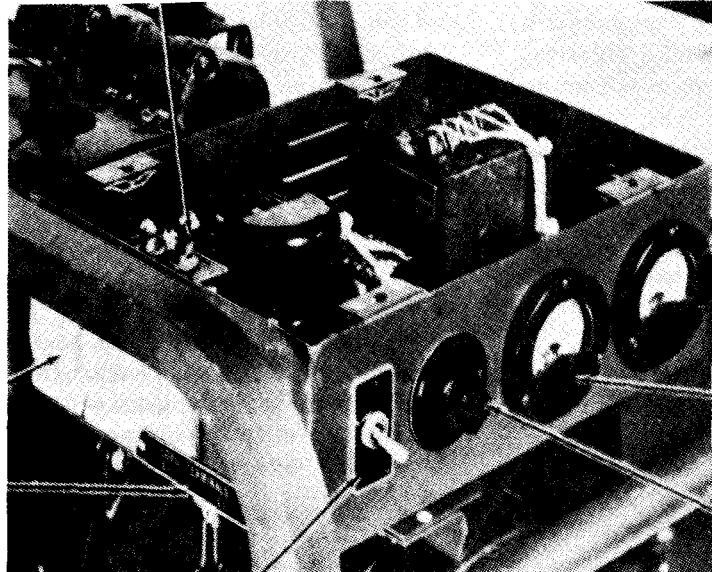
l. DC Ammeter (DC Unit). The DC ammeter (B, fig. 2-3, located on the right rear face of the DC control box, indicates the percentage of full-load current that the unit is supplying. It is graduated from 0 to 125 percent. It should normally read between 0 and 100 percent.

m. Circuit Breaker (DC Unit). The circuit breaker (B, fig. 2-3) is located to the left of the DC

ammeter on the rear of the DC control box. The circuit breaker is used to connect and disconnect the unit to and from the load. The circuit breaker is designed to trip when 125% of maximum load is applied.

n. Variable Resistor (DC Unit). The variable resistor (B, fig. 2-3) is located to the right of the DC voltmeter on the rear face of the control box.

VOLTAGE RECONNECTION SWITCH
SETS LOAD VOLTAGE TO 120 OR 240V.
DOES NOT AFFECT UTILITY OUTLETS.



UTILITY OUTLETS.
ALWAYS 120V AC.

LOAD TERMINALS
120V OR 240V

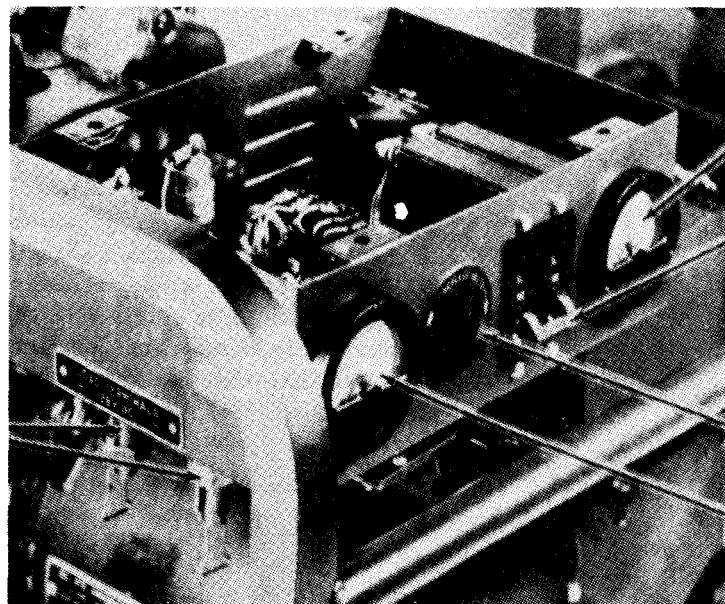
FREQUENCY METER (0-65CPS).
INDICATES FREQUENCY.
NORMAL READING 60CPS.

AC VOLTMETER (0-250V).
INDICATES VOLTAGE AT LOAD
TERMINALS. NORMAL READING
120V OR 240V.

VARIABLE RESISTOR
CONTROLS LOAD VOLTAGE
BUT NOT UTILITY VOLTAGE.

LOAD SWITCH TURNS
LOAD POWER ON AND OFF.
DOES NOT AFFECT UTILITY
OUTLETS.

A. AC CONTROL BOX



LOAD
TERMINALS
28V DC

DC AMMETER (0-25-50-75-100-125)
INDICATES LOAD CURRENT.
READING DEPENDS ON LOAD

CIRCUIT BREAKER TURNS LOAD
POWER ON AND OFF. TRIPS AT
125% OF MAXIMUM LOAD.

VARIABLE RESISTOR
CONTROLS LOAD VOLTAGE

DC VOLTMETER (0-50V)
INDICATES VOLTAGE AT
LOAD TERMINALS
NORMAL READING 28V

B. DC CONTROL BOX

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Figure 2-3. Generator set, controls and instruments.

A rotary-type control, it is used to control the output voltage of the generator set.

2-2. Operation Under Usual Conditions

a. General.

(1) The instructions in this paragraph are published for the information and guidance of personnel responsible for operation of the generator sets.

(2) The operator must know how to perform every operation of which the generator sets are capable. This section gives instructions on starting and stopping the generator sets and regulating them to perform the specific task for which the equipment is designed.

WARNING

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

b. Starting.

(1) *Preparation for Starting*

(a) (A, F, N, MC) Perform the daily preventive maintenance checks and services (Table 3-2).

(b) Check the load cable connections, position arrow on knob of variable resistor so it points UP, set the load switch (S1) on the AC unit or the circuit breaker (CB) on the DC unit in the OFF position.

(c) On the AC unit only, remove the cover of the control box and see that the voltage change switch (S2) is in the desired position (120 or 240 volts), Install the cover.

(b) Position the fuel selector valve in position for either the on-set tank or for an auxiliary fuel supply.

(2) *Starting.* Refer to figure 2-2 and start the engine.

c. Operation. Position the load switch (AC Unit) (A, fig. 2-3) or circuit breaker (DC Unit) in the ON position and turn the knob of the variable resistor to set the output voltage to the proper value, either 120 volts or 240 volts AC, or 28 volts DC.

d. Stopping.

- (1) Set the circuit breaker/load switch to OFF position.
- (2) Turn the voltage adjusting rheostat all the way to the left.
- (3) Run the generator set at rated speed for three to five minutes to cool down the set.
- (4) Move the engine RUN switch to OFF.

Section II. OPERATION OF AUXILIARY EQUIPMENT

2-3. Heating Torch Description

The heating torch is a 1-pint (.47 liters), gasoline, pump-type torch. It is used to preheat the engine to a point where the moving parts will operate freely.

2-4. Heating Torch Operation

Operate the heating torch as shown by figure 2-4.

CAUTION

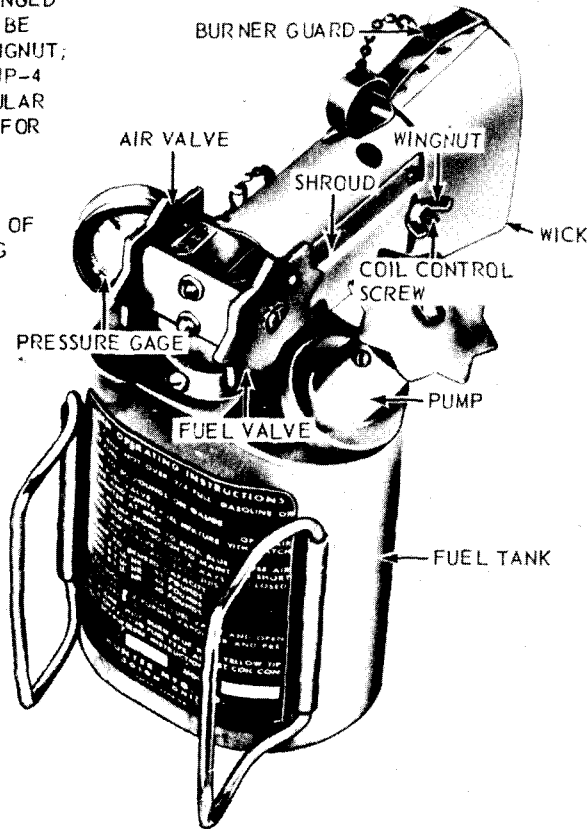
Move heating torch continuously while heat is being applied. This will prevent damage to the engine crankcase from overheating any single spot thereon. Do not apply direct heat or flame to the nylon fuel tank, fuel lines, and fuel filter system.

NOTE

The heating torch should be applied at the **apertures** (four on each side) beneath both sides of the engine.

NOTE: WHEN TYPE OF FUEL IS CHANGED COIL CONTROL SCREW MUST BE REPOSITIONED. LOOSEN WINGNUT; PLACE SCREW AT TOP FOR JP-4 FUEL, IN CENTER FOR REGULAR GASOLINE, AND AT BOTTOM FOR ARCTIC GASOLINE.

WARNING: DO NOT STAND IN FRONT OF TORCH WHILE IT IS BEING IGNITED.



1. TURN PUMP COUNTERCLOCKWISE AND REMOVE FROM FUEL TANK.
 2. FILL FUEL TANK TWO-THIRDS FULL WITH FUEL.
 3. INSTALL PUMP AND TIGHTEN SECURELY.
 4. CLOSE AIR VALVE AND FUEL VALVE.
 5. OPERATE PUMP UNTIL PRESSURE GAGE READS 50 PSI (POUNDS PER SQUARE INCH).
 6. OPEN FUEL VALVE MOMENTARILY TO SATURATE WICK. CLOSE FUEL VALVE.
 7. REMOVE BURNER GUARD FROM SHROUD.
 8. IGNITE WICK.
 9. OPEN FUEL VALVE; THEN OPEN AIR VALVE.
 10. SLOWLY CLOSE AIR VALVE AS TORCH FLAME BEGINS TO TURN BLUE.
- NOTE: AIR VALVE MUST BE CLOSED EXCEPT WHEN IGNITING AND EXTINGUISHING TORCH.
11. LOOSEN WINGNUT, MOVE CONTROL SCREW UP OR DOWN UNTIL FLAME BURNS BLUE WITH YELLOW TIP, AND TIGHTEN WINGNUT.
- NOTE: FLAME MUST HAVE SOME YELLOW TIP TO KEEP AIR-FUEL MIXTURE AT PROPER TEMPERATURE.
12. HEAT OUTPUT OF TORCH IS DETERMINED BY FUEL TANK PRESSURES LISTED BELOW.
 REPUMP AS REQUIRED.
 - 55 PSI - 50,000 BTU/HR (BRITISH THERMAL UNITS PER HOUR)
 - 40 PSI - 25,000 BTU/HR
 - 20 PSI - 15,000 BTU/HR
 13. TO EXTINGUISH TORCH; CLOSE FUEL VALVE AND OPEN AIR VALVE.
 14. INSTALL BURNER GUARD ON SHROUD.

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Figure 2-4. Heating torch operation

Section III. OPERATION UNDER UNUSUAL CONDITIONS

2-5. Operation in Extreme Cold (Below 0°F.
(- 18°C.))

a. General. The generator sets are designed for use in outdoor temperatures as low as -65°F. (-5°C.). Even so, when possible, provide shelter from winds, freezing rain, and drifting snow. Erect a wind shield or position the unit behind a building, equipment, or natural wind barrier such as a rock or earth mound. If possible, operate the unit in a location that will provide protection for the operator so as to permit easier servicing and better observation of the unit's performance. However, when the unit is operated in an inclosed area, be sure that proper provisions are made for removal of exhaust gases. Remove accumulated snow or ice, if possible, by moving the unit to a heated inclosure and allowing the accumulation to melt after first wiping or brushing away loose deposits. When use of a heated inclosure is not practical, remove the deposits by wiping, brushing, or carefully picking the deposits away. Be careful not to scrape, scratch, gouge, or in any other way damage the unit. Avoid moving wiring as much as possible. Any time ice or snow is removed by melting, as described above, change the oil in the crankcase and dry electrical parts thoroughly.

b. Engine (-25°F. to -65°F.) (32°C. to -54°C.).

(1) Lubricate the engine in accordance with LO 5-2805-257-12. Air Force will use the lubrication section of applicable T.O. 35C2-3-1-426 Series work cards.

WARNING

Use extreme care, when using a torch, to keep flame away from the fuel tank. Do not use a torch, if any fuel leaks are evident, until leaks have been corrected and both the unit and the surrounding area is dry of fuel that has leaked.

(2) To aid in starting, apply heat to the engine with a suitable torch, such as a torch that conforms to MIL-H-52112, Type I (para 2-4). Play the torch flame back and forth over the intake manifold, oil pan, valve covers and air intake. Do not hold the flame in one spot. Keep flame and heat away from nonmetallic parts.

(3) When the engine has been warmed, attempt to start. If it fails to start, reapply heat, as necessary.

(4) After the engine has been started, keep it running for at least 30 minutes in order to reduce condensation of moisture in the crankcase. Avoid operation for short periods of time.

c. Generator and Controls.

- (1) Remove the end cover and clean the cover.
- (2) Carefully remove any accumulations of ice or snow from around the rotor.
- (3) When using the generator in extreme cold, allow at least a 15-minute stabilization period before applying load to the unit.
- (4) Keep generator controls and instruments free of snow and ice. Avoid moving wiring, to prevent cracking of insulation.

d. Fuel System.

- (1) Keep snow and ice out of the fuel supply.
- (2) Keep the fuel tank full when the unit is not in operation.
- (3) Use the proper fuel.
- (4) Inspect the bowl of the fuel filter frequently for accumulated moisture and if any is seen, clean as necessary.
- (5) Avoid unnecessary bending of fuel hoses.

2-6. Operation in Extreme Heat

a. General. Whenever possible, operate the unit in a shaded location that is away from sources of heat. If the unit must be used in an area that is adjacent to a heat source, erect a heat shield or in some way block the direct source of heat. Provide plenty of ventilation and vent the exhaust gases to the outside when the unit is to be operated in an inclosed area.

b. Engine.

- (1) Lubricate the engine in accordance with LO 5-2805-257-12. Air Force will use the lubrication section of applicable T.O. 35C2-3-1-426 Series workcards.
- (2) Keep all engine air passages clean and free of obstructions.

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

d. Generator Controls and Instruments. Keep openings in the control box clean, so as to provide for free air flow. However, operate the unit with the control box cover installed.

e. Fuel System. Fill fuel tank only to within one inch of the top to allow for expansion of the fuel.

2-7. Operation in Dusty or Sandy Areas

a. General. If the installation is expected to be lengthy, erect a protective shield for the unit to protect it from dust and sand. If the installation is temporary, utilize a natural or improvised barrier when possible. Clean dust and dirt from the unit at frequent intervals.

b. Engine. Clean the air cleaner and fuel filter more frequently. Clean the engine at more frequent intervals to remove accumulated dust and dirt.

c. Generator. Keep the end cover clean.

d. Generator Controls and Instruments. Carefully clean dust and sand out of the control box. Do not allow dust to accumulate around terminals or voltage regulator.

e. Fuel system. Keep the area around the fuel tank cap clean and free from dust and sand. Keep all fuel supplies capped to prevent the entrance of dust.

2-8. Operation Under Rainy or Humid Conditions

a. General. When the generator set is to be operated outdoors, provide a shelter, if possible, to protect the unit. If shelter is not available and erection of one is not practical, keep the unit, when inoperative, covered with waterproof material. Remove the cover during dry periods to allow the unit to dry out.

b. Fuel. Keep the fuel tank as full as possible to prevent condensation.

c. Electrical System. Humid conditions can cause corrosion and deterioration of electrical components. Keep electrical components and wiring clean and dry.

2-9. Operation in Salt Water Areas

a. General. Wipe the generator set with a clean cloth dampened with clean, fresh water at frequent intervals. Use care not to contaminate the fuel supply or damage the electrical system with water.

b. Lubrication. Use care to keep salt water from entering the engine when adding or changing oil. Lubricate more frequently than specified in LO 5-2805-257-12. Air Force will use the lubrication section of applicable T.O. 35C2-3-1-426WC Series workcards.

c. Preservation. Paint all exposed non-polished surfaces. Coat exposed parts of polished steel or other ferrous material with standard issue rust-proofing material if available or cover parts with one light coat of grease. Refer to the appropriate service manual (See Appendix A).

2-10. 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 overheat at high altitudes. It may be necessary to change the fuel-air ratio of the engine; if so, refer to organizational maintenance. To calculate the output capability at altitudes above 8,000 feet, use the following formula and round figures to the nearest tenth:

$$\frac{7\% \times \text{actual altitude} - 8,000 \times 1.5 \text{ kw}}{1000} = \text{kw derating}$$

Example: $\frac{0.07 \times 13,000 - 8,000}{1000} \times 1.5 \text{ kw} = .525 \text{ kw derating}$
 $1.5 \text{ kw} - .525 \text{ kw} = .975 \text{ kw derated power at 13,000 ft.}$

CHAPTER 3

OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Section I. CONSUMABLE OPERATING AND MAINTENANCE SUPPLIES

3-1. General

This section contains a table listing the consumable maintenance and operating supplies required to operate and maintain the generator set. This table includes only items peculiar to and required for maintenance and operation.

3-2. Explanation of Columns

An explanation of columns in the tabular list follows:

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

b. National Stock Number. This column indi-

cates the National Stock Number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the item name and brief description.

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

e. Quantity Required for Eight Hours Operation. This column indicates the estimated quantities required for an average 8 hours of operation.

f. Notes. This column indicates informative notes keyed to data appearing in a preceding column.

Table 3-1 Consumable Operating and Maintenance Supplies

| (1) Component application | (2) Federal stock number | (3) Description | (4) Quantity required F/initial operation | (5) Quantity required F/8 hrs operation | (6) Notes |
|------------------------------|--|---|--|--|--|
| 01—Crankcase (1) | 9150-00-265-9433 9150-00-265-9425 9150-00-242-7602 | Oil, Lubricating: 1 qt. can | | (3) | (1) Includes quantity of oil to fill engine oil system as follows: 1 qt. crankcase. (2) See FSC C9100IL for additional data for requisitioning. (3) See LO 5-2805-257-12 for grade, application and replenishment intervals. |
| | | OE-30 (2) | 5/8 qt. (.6 liters) | (3) | |
| | | OE-10 (2) | 5/8 qt. (.6 liters) | (3) | |
| Air Cleaner (3) | | OES (2) | 5/8 qt. (.6 liters) | (3) | |
| | | Oil, Lubricating, Bulk | 1/8 qt. (.12 liters) | | |
| 02—Fuel Tank | 9130-00-160-1818 | Fuel, Gasoline, Bulk, 91A Automotie, Combat | 1 1/2 gal (5) (5.7 liters) | 5.12 gals (6) (19.4 liters) | (4) Use oil, for oil bath type only, as prescribed in Item 1. (5) Tank capacity. (6) Average fuel consumption is 0.64 gal per hour of continuous operation under full load. |
| | | Fuel, Gasoline, Unleaded, Bulk | 1 1/2 gal (5) (5.7 liters) | 5.12 gals (6) (19.4 liters) | |

Section II. LUBRICATING INSTRUCTIONS

Lubrication is not required for the generator. For general lubrication information on the engine, refer to

LO 5-2805-257-12. Air Force will use the applicable T.O. 35C2-3-1-426 Series workcards.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-3. 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 daily preventive maintenance services to be performed are listed and described in paragraph 3-4. 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 which would damage the equipment if operation were continued.

3-4. Daily Preventive Maintenance Checks and Services

Table 3-2 contains a tabulated listing of preventive maintenance checks and services which shall be performed by the Operator/Crew personnel. The item numbers are listed consecutively and indicate the sequence of minimum requirements.

NOTE

Leakage definitions for operator/crew PMCS shall be classified as follows:

- Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
- Class II Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.
- Class III Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, you must consider the fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor.

When operating with Class I or Class II leaks, continue to check fluid levels as required in your PMCS.

Table 3-2. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - BEFORE OPERATION
D -DURING OPERATION

A - AFTER OPERATION

| Item No. | Interval | | | Item to be inspected | Procedures Check for and have repaired or adjusted as necessary | Equipment is not ready/ available if: |
|----------|----------|---|---|-----------------------|---|--|
| | B | D | A | | | |
| 1 | • | | | Generator set | a. Check generator set for tight ground connections and proper ground rod installation. | Generator set is not grounded properly. |
| | • | | • | | b. Check for fuel and Oil leaks. | Class I fuel leak detected or class III oil leak detected. |
| | • | | | | c. Inspect for loose, damaged, or missing parts and unusual wear or deterioration. | Any loose, damaged, or missing parts; (i.e., spark plugs, manifolds, starter, or other items). |
| 2 | • | | | Oil gage rod | Check crankcase oil level. Add oil as required | |
| 3 | • | | | Gages and Instruments | Check for proper generator operation | |
| | | | • | a. Voltmeter | Adjust for desired voltage. Rotate voltage selector switch to monitor the various output voltage combinations (120 or 240). | Voltage cannot be adjusted. |
| | | | • | b. Frequency meter | Normal indication: MEP-015A, 60 Hz (59 to 61 Hz). | Indicates frequency too high or too low. |
| | | | • | c. Load meter | Indicates percentage of applied load. Rotate current selector switch to monitor the load applied to each phase. Not to exceed 125%. | Meter indication exceeds 125%. |
| 4 | | | | Fuel tank | WARNING When handling gasoline, always provide a metal-to-metal contact between the container and fuel tank. This will prevent a spark from being generated as gasoline flows over the metallic surfaces. Never service generator set when in operation. | |
| | | | • | | After operation, fill tank to prevent moisture condensation. | |

Table 3-2. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES-Continued

B-BEFORE OPERATION
D-DURING OPERATION

A-AFTER OPERATION

| Item No. | Interval | | | Item to be inspected | Procedures Check for and have repaired or adjusted as necessary | Equipment is not ready/ available if: |
|----------|----------|---|---|----------------------|---|--|
| | B | D | A | | | |
| | | • | | Air Cleaner | This unit is equipped with an air cleaner indicator that will turn red when the filter becomes restricted. When the indicator shows red contact organizational maintenance. | Air cleaner is missing or unserviceable. |

Section IV. TROUBLESHOOTING

3-5. General

This section contains troubleshooting or malfunction information and tests for locating and correcting most of the troubles which may develop in the generator sets. Each malfunction or trouble symptom for an individual component, unit, or system is followed by a list of tests or inspections necessary for you to determine probable causes and suggested correc-

tive actions for you to remedy the malfunction.

3-5. Troubleshooting

s. This manual cannot list all possible malfunctions that may occur or all tests or inspections and corrective actions. If a malfunction is not

listed (except when malfunction and cause are obvious), or is not corrected by listed corrective actions, you should notify higher level maintenance.

b. Table 3% lists the common malfunctions that you may find during the operation or maintenance of the generator sets or their components. You should perform the tests/inspections and corrective actions in the order listed.

NOTE

Before you use this table, be sure you have performed all normal operational checks. If you have a malfunction which is not listed in this table, notify the next higher level of maintenance.

Air Force users may perform maintenance within the scope of their capabilities.

Table 3-3. TROUBLESHOOTING

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|---|---|---|
| 1. ENGINE FAILS TO START OR MALFUNCTIONS | | |
| | <i>Step 1. Check the fuel tank (figs. 4-12 and 4-14) for the proper fuel level.</i> | Fill the fuel tank (figs. 4-12 and 4-14) only to within one inch of the top to allow for expansion of the fuel. |
| | <i>Step 2. Visually inspect the position of the fuel selector valve (fig. 2-1).</i> | Place the fuel selector valve in the correct position which can be determined by reading the instruction plate (fig. 2-1) located on the right side of the generator set. |
| | <i>Step 3. Check the auxiliary fuel hose for an air leak.</i> | Tighten any loose connections. |
| | <i>Step 4. Inspect the auxiliary fuel supply valve for the correct positioning.</i> | Position the auxiliary fuel supply valve in the proper position. |
| | <i>Step 5. Inspect the fuel filter for dirt.</i> | Clean the fuel filter. Refer to Appendix A for the appropriate service document. |

Table 3-3. TROUBLESHOOTING—Continued

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--|---|---|
| 2. NO POWER AT LOAD | | |
| | <i>Step 1. Check the load lines for improper connections or breaks.</i> | Connect load lines properly or if broken, repair by replacing as follows: a. Model MEP-015A (AC Unit). Use cable with a minimum wire size of No. 12 AWG. b. Model MEP-025A (DC Unit). Use, as a minimum size, cable of No. 4 AWG for distances up to 25 ft. For longer distances, No. .3, No. 2, or No. 1 AWG sizes should be used. |
| | <i>Step 2. Check the circuit breaker (B, fig. 2-3) or load switch (A, fig. 2-3) to see if it is in the OFF position.</i> | Place the circuit breaker or load switch in the ON position. If the circuit breaker will not stay in the ON position, refer the malfunction to the next higher maintenance level. |
| 3. OUTPUT VOLTAGE HIGH OR LOW | | |
| | <i>Step 1. Check to see if the variable resistor (fig. 2-3) is correctly adjusted. The voltmeter reading will change as the variable resistor knob is turned.</i> | Turn the variable resistor knob (labeled "adjust volts" and "increase volts") until the required voltage is attained. |
| | <i>Step 2. Inspect the total load, it may be too large for the generator.</i> | Reduce the load and see if the malfunction is corrected. If not, refer to next higher level of maintenance. |
| 4. UNIT CAUSES RADIO INTERFERENCE | | |
| | <i>Step 1. Inspect the load lines for loose connections.</i> | Tighten all load lines connections securely. |
| | <i>Step 2. Inspect established ground for loose connection.</i> | Tighten all ground connections securely. |

Section V. MAINTENANCE PROCEDURES

3-7. General

This section contains information on the maintenance of the equipment that is the responsibility of the operator.

WARNING

Before servicing any part of the generator set, make certain that the engine is

stopped. Failure to observe this safety precaution could result in severe electrical shock or death by electrocution.

3-8. Fuel Strainer, Fuel Filter, and Air Cleaner

a. *General.* The fuel tank is equipped with a removable strainer (5, fig. 4-16) that will strain

out the larger particles that could be found in the fuel supply. There are no other specific maintenance functions allocated to the operator on the generator, its controls, or on the structural components of the generator unit. However, the air cleaner and fuel filter, both components of the engine, will be serviced as required by the engine maintenance allocation chart. For instructions relative to these components, refer to the engine technical manual. (See Appendix A for the appropriate service manual.)

b. Fuel Strainer. To service the fuel strainer (5, fig. 4-16), remove the fuel tank cap (4, fig. 4-16)

and using the fingers, withdraw the fuel strainer from the fuel tank. Flush all foreign material from the inside of the strainer using clean fuel. Insert the strainer into the fuel tank and install the cap.

3-9. Fuel Tank Cap and Chain Assembly

a. Inspect. Inspect the fuel tank cap and chain assembly (figs. 4-12 and 4-14) for cracks, breaks, loose fittings, and other obvious damage.

b. Removal and Installation. Refer to figure 4-16 to remove and install the fuel tank cap and chain assembly.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

4-1. Inspecting and Servicing the Equipment

a. Preparation. Prepare the generator set for inspection and operation as outlined in the following paragraphs. For Army users, refer to DA Form 2258 (Depreservation Guide for Vehicles and Equipment).

b. Inspection.

(1) Inspect the identification plate for positive identification of the generator set.

(2) Make a thorough inspection of the generator set for any damage that may have occurred during shipment.

(3) Compare the equipment with the packing list to make certain that all items are accounted for and are in serviceable condition.

(4) Inspect the entire unit carefully for loose and missing hardware.

(5) Turn the engine over by hand to make certain that all moving parts in the engine and generator move freely.

(6) Make a thorough visual inspection of the entire generator set for loose or missing mounting hardware, or damaged or missing parts. Report all damaged or missing parts on DD Form 6.

c. Servicing.

(1) Perform the Daily Preventive Maintenance Services (Table 3-2).

(2) Remove all tags and tape, cloth, and other packaging material.

(3) Lubricate the generator set in accordance with LO 5-2805-257-12. Air Force will use the lubrication section of applicable T.O. 35C2-3-1-426 Series workcards.

(4) Correct all deficiencies that are found or report the condition to intermediate (field), (direct support and general support) and depot maintenance.

4-2. Installation

WARNING

Do not operate the generator set in an inclosed area unless the exhaust gases are piped to the outside. Inhalation of the exhaust fumes can result in serious illness or death.

a. General. The generator set is normally shipped from the manufacturer, depot, or supply point in an operationally ready condition, except that it is drained and preserved. Before the unit is operated, however, service it as prescribed in paragraph 4-1 above. Pay particular attention to any attached tags or notices. Set up the unit for operation, as described in the subparagraphs that follow.

b. Site Selection. Consider the following factors when selecting and preparing an installation site for the generator set.

(1) *Distance to Load.* To reduce transmission line voltage losses, position the generator set as close as is reasonably possible to the load.

(2) *Shelter.* Even though the generator set is weather resistant, it should be located in an adequate shelter that will protect it from inclement weather. Provide a shelter that is ventilated to allow heated air and exhaust fumes to escape. Depending upon the ambient temperature range and upon whether the installation is to be temporary, semi-permanent, or permanent, provide facilities to maintain a reasonable temperature. If the unit is used in a closed building or other closed shelter, pipe the exhaust gases to the outside.

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

(4) *Fuel Supply.* Provide an adequate supply of clean fuel to meet requirements based on oper-

ating times. Consider installation of the tanks underground if the installation will be longer than temporary. Locate the tanks as near the shelter as practicable and be certain that the bottoms of the tanks are not lower than four feet (120 centimeter) from the fuel pump on the installed generator set. Connect the fuel line from the external source to the auxiliary fuel valve.

(5) *Support.* Be certain that the bearing surface used can support the weight of the generator set.

(6) *Foundation.* Since the unit is of the portable type, no foundation should normally be required. However, position the unit on reasonably firm, dry ground using planks, timbers, or a suitable gravel base, as available conditions warrant. Provide for water drainage away from the unit.

(7) *Mounting.* Position the unit so that it is situated in a level plane and so that the frame is supported on its entire bottom surface. If necessary, the frame may be secured to a suitable base.

c. *Grounding Procedure.*

WARNING

Do not rely on grounding or safety devices to prevent accidents. Electrical circuits and equipment are potentially hazardous. Personnel should always exercise caution to prevent injury or possible death due to electrical shock. Generator sets shall be grounded in order to prevent shock due to defective insulation, or external electrical faults. Poor grounding can endanger personnel, may damage equipment, and can create interference in communication or electronic circuits.

(1) Install one of the following items as a grounding device:

(a) Drive a ground rod to a depth of at least 8 feet.

(b) Drive a ground pipe, 3/4 inch copper or steel, to a depth of at least 8 feet. An existing underground pipe may be used in an emergency.

(c) Bury a 1/4 inch thick iron or steel plate, approximately 18 inch x 18 inch size, with ground cable attached, to a depth of at least 4 feet.

(d) Bury a 1/16 inch thick aluminum or copper plate approximately 18 inch x 18 inch size, with ground cable attached, to a depth of at least 4 feet.

(e) Position a 1/4 inch thick iron or steel

plate, or 1/16 inch thick aluminum or copper plates, approximately 18 inch x 18 inch size, on the hard ground or bedrock beneath the trailer stand or roll the wheel of a trailer or truck until it comes to rest on top of the grounding plate.

(f) Saturate the area around the grounding device with water to increase conductivity.

(2) Ground cables should be copper. Braided cable is the best, but No. 6 AWG gauge (or larger) copper wire will suffice.

(3) Connect the ground cable from the grounding device to the generator set frame ground stud (figs. 1-1 and 1-3) and tighten the nut securely.

d. *Electrical Connections.* All internal electrical connections for proper operation of the generator sets have been made by the manufacturer. If it appears that changes have been made in the wiring, refer the matter to Direct Support (Intermediate) maintenance.

(1) *Power transmission cables (model MEP-015A) (AC unit).* Use cable with a minimum wire size of No. 12 AWG. This size will give a voltage drop of about 1 volt per 25 ft. (750 centimeters) of cable when the unit is operated at full load. If the distance to the load is great, increase the wire size to No. 10 or No. 8 to minimize voltage drop.

(2) *Power transmission cables (model MEP-025A) (DC unit).* When the DC unit is used for battery charging, the battery cables will normally be both adequately sized and short. However, other installations may at some time be made. Use, as a minimum size, cable of No. 4 AWG for distances up to 25 ft. (750 centimeters). For longer distances, No. 3, No. 2, or No. 1 AWG sizes should be used.

(3) *Power output connections.* Turn the load switch (AC Unit) or circuit breaker (DC Unit) to the OFF position and connect the power transmission cables at the load terminals. Refer to figure 2-3.

CAUTION

When connecting the power cables on the DC unit, observe the polarity markings on both the load and the generator set and make the connections in the correct relationship (+ to + and - to -). When connecting the AC Unit, the terminal relationship (L1 and L2) to the equipment may be important to some equipment with which the unit may be used. When the relationship is important, match the terminals to the load (L1

to L1 and L2 to L2), as above. With most equipment with which the AC unit may be used, and with all ordinary lighting, the relationship is unimportant.

4-3. Equipment Conversion (AC Unit)

Position the voltage change switch, S2, either for 120 volt or 240 volt operation, as required. Refer to figure 2-3, View A.

4-4. Procedures for Constructing Revetment

a. *General.* This equipment is designed to operate in the open with unrestricted ventilation. In some situations it may be necessary to operate the equipment from the protection of a revetment. This paragraph provides information on the construction of a revetment to protect the equipment should it become necessary.

b. *Dimensions.* The minimum allowable inside dimensions are shown in figures 4-1 and 4-2. The entrance to the revetment is shown in figure 4-3. These minimum dimensions are based solely on consideration of engine cooling and ventilation allowing a minimum practical amount of space for service and maintenance.

c. *Foundation and Drainage.* If the generator set is attached to a shipping platform, this will provide an adequate foundation. Otherwise, use planks, timbers, logs, ammunition boxes, or other available material to prevent the skids from sinking into soft earth or sand. In no case should the foundation exceed a height of six inches; the generator set should be situated on a level plane not to exceed a tilt of 15° in any direction. Drainage must be provided to insure run-off of water away from the generator set and out of the revetment through drain holes at inside ground level. Where there is no natural slope for the water to run away from the revetment, a sump and drainage trench must be provided outside of the revetment for each required drain hole.

d. *Wall Constructwn.* The walls of the revetment may be constructed with sandbags, ammunition boxes filled with sand or dirt, or any other material available. The wall height should not exceed 3 feet (0.91 meters) and should be constructed as shown in figures 43 and 44.

e. *Roof Construction.* The roof can be supported by any means possible, but should be 1 foot (0.31 meters) above the wall of the revetment and provide as much open space around the top as possible. Refer to figures 4-2,4-3,4-4,4-5, and 4-6.

The materials used in the roof construction consist of two pieces of lumber (4 inches by inches) or logs (4 inches in diameter) about 10 feet (3.1 meters) long and the necessary cross pieces of lumber, logs, or steel planking to cover the entire roof as shown in figure 4-6. These cross pieces should be about 8 feet (2.44 meters) long. If the above materials are not readily available, any available material of a like nature may be used. The thickness of the roof (figs. 4-3 and 4-5) will depend upon the amount and type of protection desired. Caution should be taken when adding protection to the roof to insure that the roof is supported properly to carry the additional weight.

f. *Miscellaneous Construction.* A compartment should be constructed for fuel storage outside of the revetment as shown in figure 4-1. The size of the fuel storage area will depend upon the size of the fuel container being used. Since air temperatures within the revetment will build up considerably above the outside ambient when the generator set is operating, always locate the fuel supply outside the revetment to minimize safety hazards associated with gasoline at high temperatures. For the same reason, it is recommended that the integral fuel tanks, with which some generator sets are equipped, not be used. The exhaust from the generator set is to be ducted out of the revetment. The installation should be similar to that shown in figure 4-7. If flexible pipe is not available to use for an exhaust extension, a piece of exhaust pipe or any other similar material may be utilized. The point at which the exhaust discharges goes through the revetment wall depends entirely upon the equipment that is available. The exhaust may be discharged into an external exhaust chimney constructed as shown in figure 4-1. This chimney will aid in ducting the exhaust gases away from the revetment and will reduce the noise level. A revetment doorway shield must be constructed as shown in figures 4-1, 4-2, and 4-6. This shield is a wall 3 feet (0.91 meters) high and 7.5 feet (2.26 meters) long, constructed in a manner similar to the revetment walls to prevent direct entrance of projectiles or fragments through the doorway into the revetment.

g. *Alignment Instructions.* When constructing the revetment, the orientation of the revetment will be such that its entrance is facing into the direction of the prevailing wind (fig. 4-1). Each generator set will be located within the revetment so that its long axis is parallel to the long axis of the revetment and is centered within the revet-

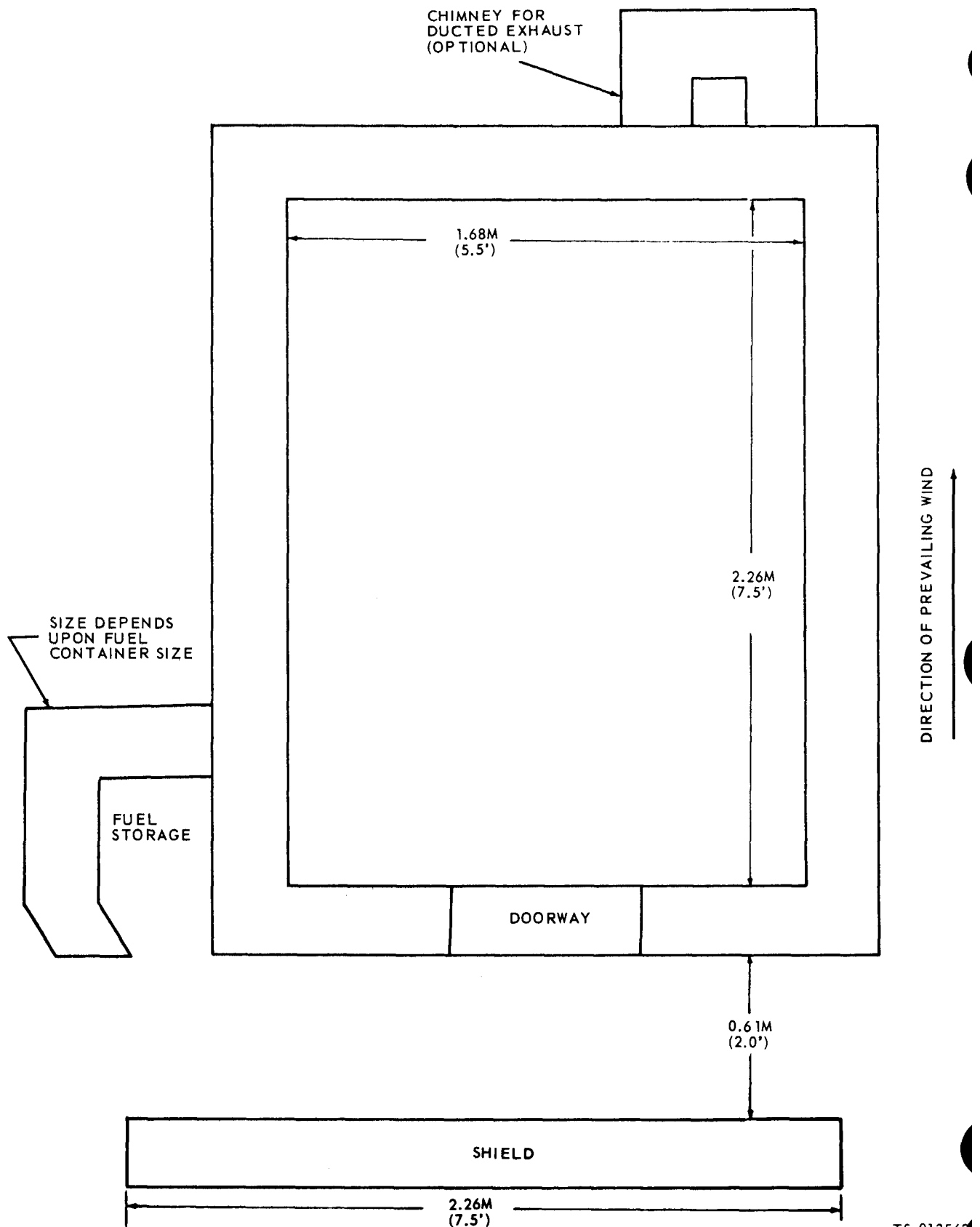


Figure 4-1 Revetment, top plan view.

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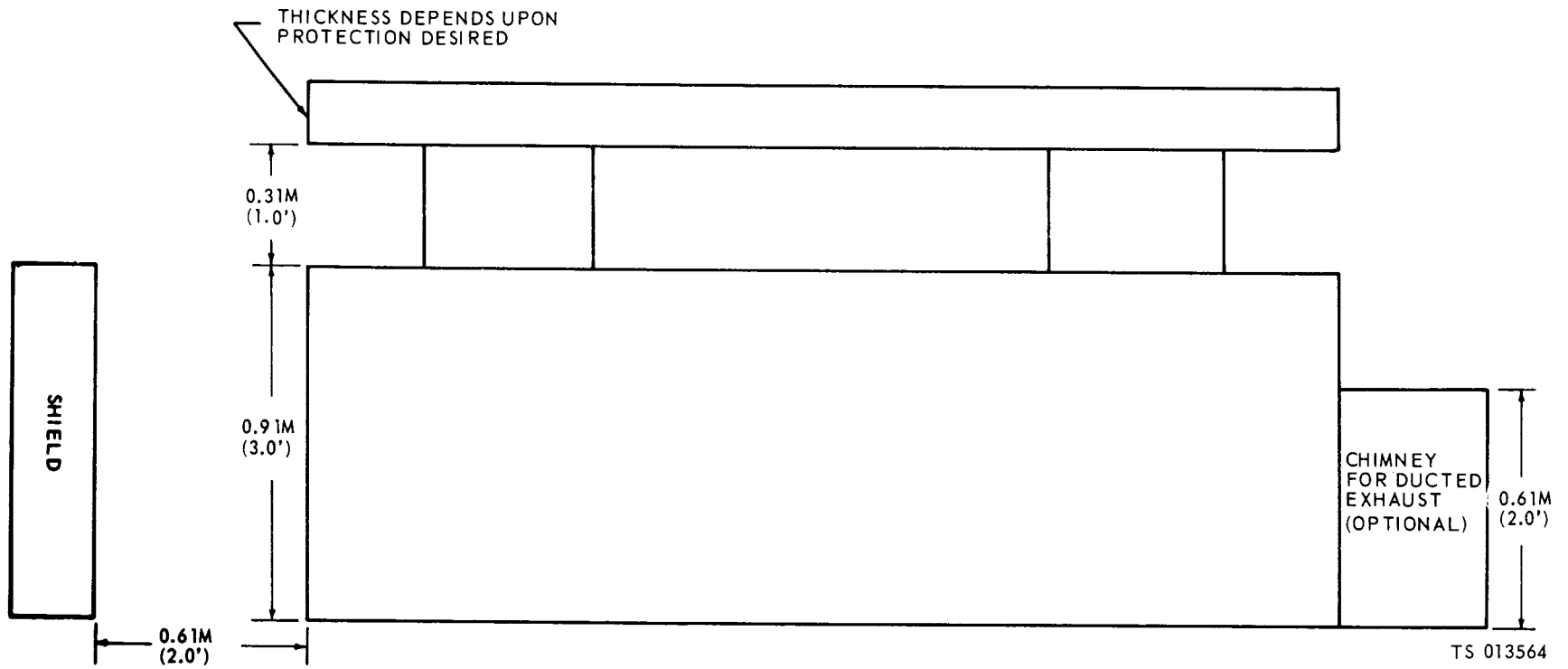
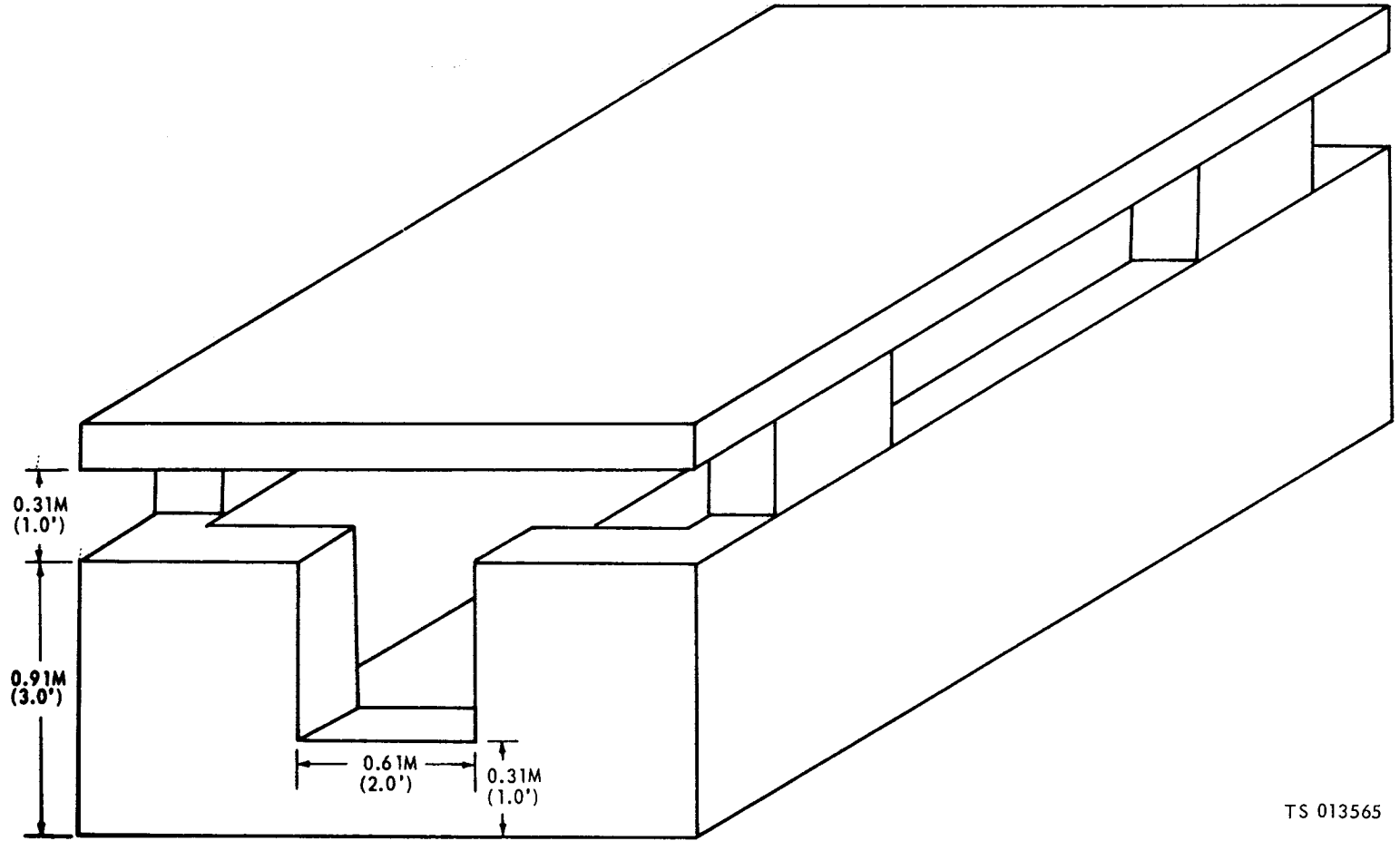


Figure 4-2. Revetment, side plan view.



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Figure 4-3. Revetment, isometric plan view.

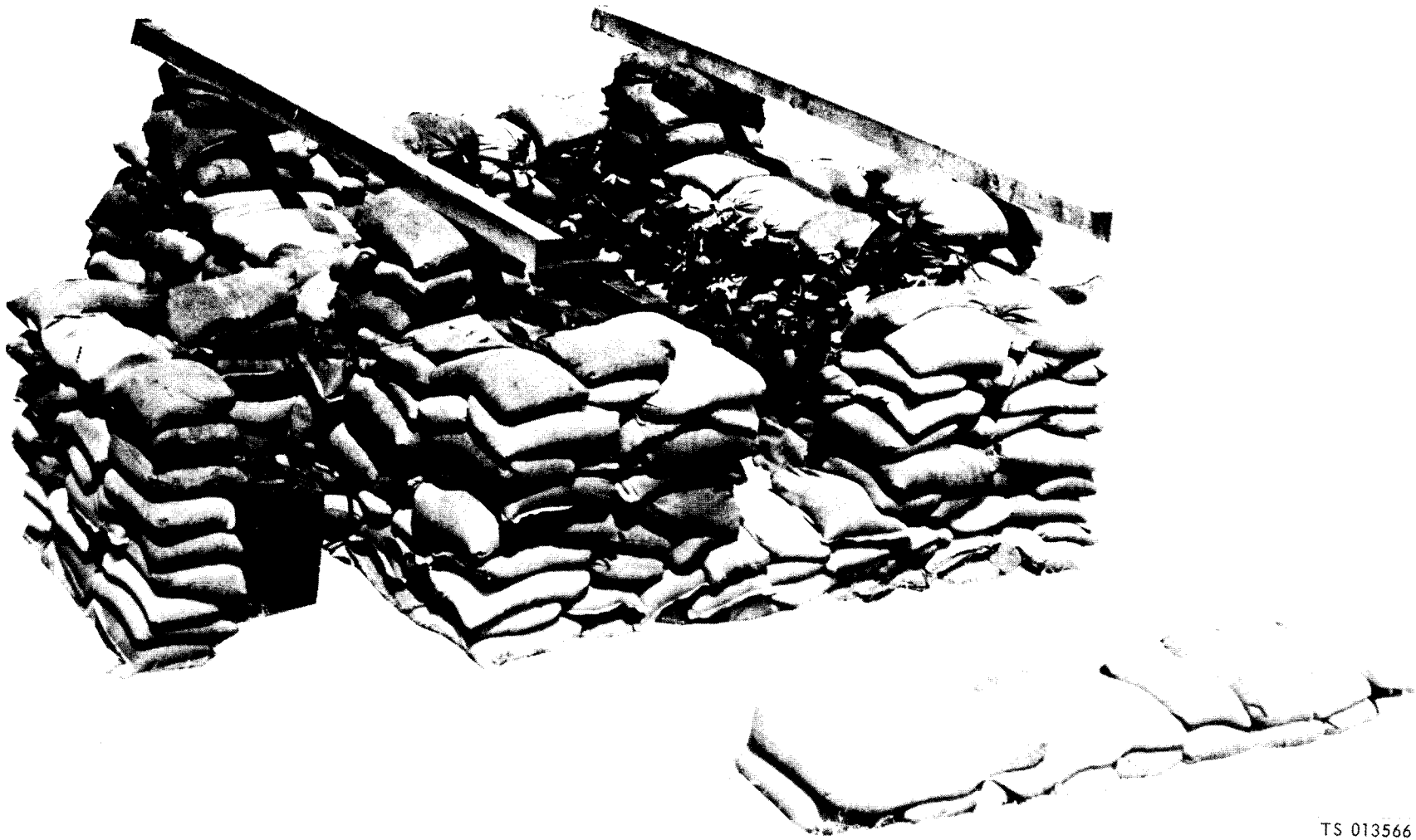


Figure 4-4. Revetment, perspective without roof.

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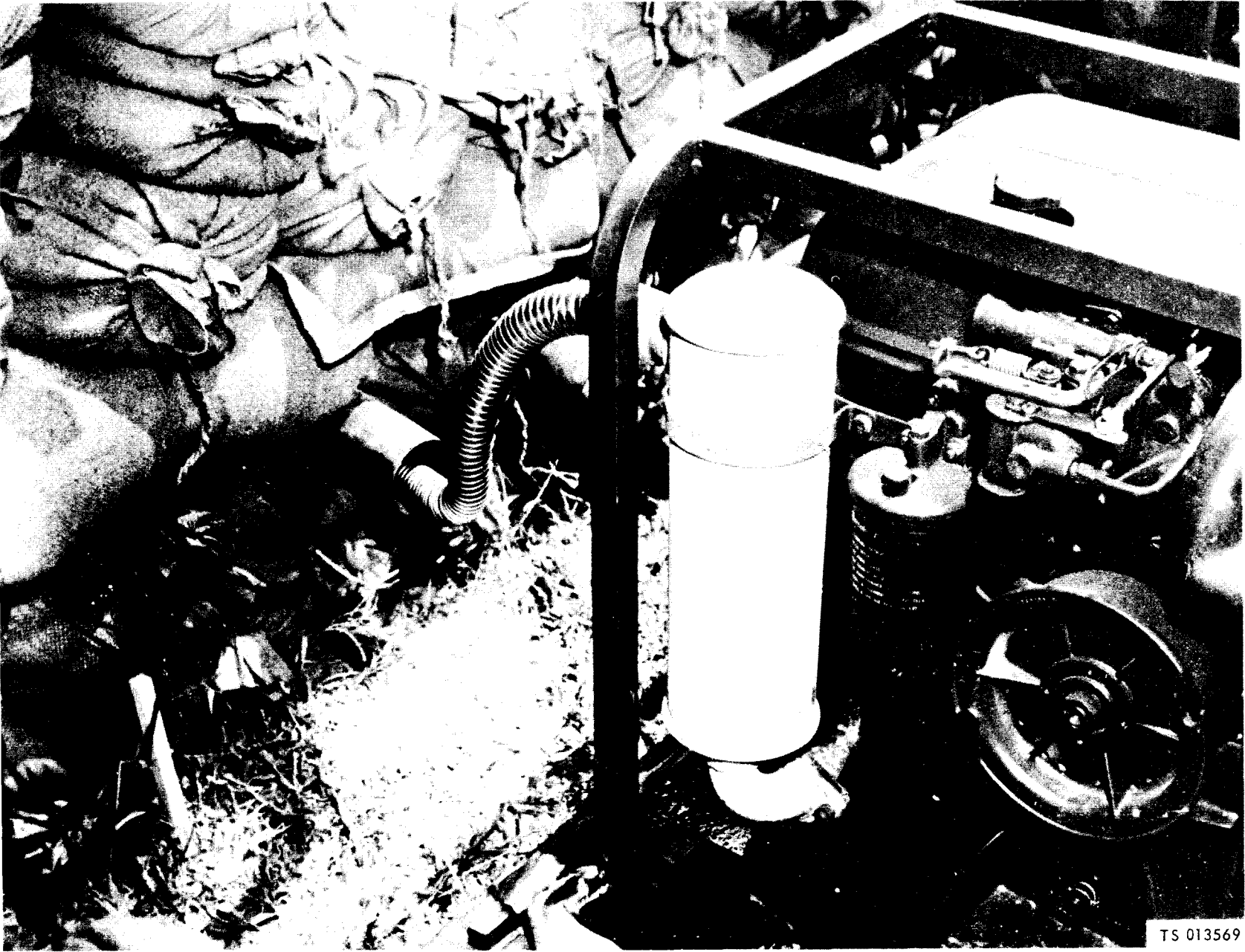
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Figure 4-5. Revetment, front view.



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Figure 4-6. Revetment, left side view.



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Figure 4-7. Revetment exhaust piping.

ment. In addition, the generator end will be towards the doorway. These instructions are very important and must be observed to obtain maximum ventilation and cooling benefits when operating in a revetment.

h. Multiple Installations. No more than one generator set will be installed within each revetment. Also, no other heat generating equipment will be placed in the revetment with a generator set.

Section II. MOVEMENT TO A NEW WORKSITE

4-5. Dismantling for Movement

a. General. The generator set, being self-contained and lightweight, is readily portable. Disconnect any exhaust piping which may have been installed and remove all holddown bolts. Lift it at the four upper corners of the frame. If it is to be transported; block or tie it to the carrier to prevent damage by shifting during transit.

b. Load and Ground Cables. Refer to paragraph 4-2d and disconnect load and ground cables.

c. Fuel System. Remove the auxiliary fuel line, if used, and drain the fuel line. Drain the fuel filter bowl.

4-6. Reinstallation After Movement

Reinstall the generator set in the same manner as described in paragraph 4-2.

Section III. REPAIR PARTS, SPECIAL TOOLS, SPECIAL TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE), AND SPECIAL SUPPORT EQUIPMENT

4-7. Tools and Equipment

No special tools or equipment are required to perform organizational maintenance on the generator set.

4-8. Maintenance Repair Parts (A)

Repair parts and equipment are listed and illustrated in the repair parts and special tools list manual covering organizational maintenance (See Appendix A).

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-9. 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 3-4 and 4-10. 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 which would damage the equipment if operation were continued. Air Force users shall refer to the applicable inspection manuals and work card sets in

T.O. 35C2-3-1-426 Series for periodic preventive maintenance requirements and Table 4-1 for detailed procedures.

4-10. Preventive Maintenance Checks and services

The preventive maintenance checks and services to be performed are in Table 4-1. This table shows the inspection that must be performed by organizational personnel. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to Table 4-1 for checks and services.

Table 4-1. Organizational Preventive Maintenance Checks and Services

| ITEM NO. | INTERVAL | | ITEM INSPECTED | PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY | EQUIPMENT IS NOT READY AVAILABLE |
|----------|----------|----|-----------------|---|----------------------------------|
| | W | H | | | |
| 1 | | 50 | Lubricating Oil | Change oil every 50 hours of operation. | |
| 2 | | 50 | Fuel Filter | Inspect fuel filter every 50 hours of operation. Clean as necessary (para 4-17 and Fig. 4-7, TM 5-2805-257-14). | |

Section V. Troubleshooting

4-11. General

This section contains troubleshooting or malfunction information and tests for locating and correcting most of the troubles which may develop in the generator sets. Each malfunction or trouble symptom for an individual component unit or system is followed by a list of test or inspections necessary for you to determine probable causes and suggested corrective actions for you to remedy the malfunction.

4-12. Troubleshooting

a. This manual cannot list all possible malfunctions that may occur or all tests or inspections, and corrective actions. If a malfunction is not listed (except when malfunction and cause are obvious), or is not corrected by listed corrective actions you should notify higher level maintenance

b. Table 4-2 lists the common malfunction that you may find during the operation or maintenance of the generator sets or their components. You should perform the test/inspections and corrective actions in the order listed.

NOTE

Before you use this table, be sure you have performed all normal operational checks. If you have a malfunction which is not listed in this table, notify the next higher level of maintenance.

Air Force Users may perform maintenance within the scope of their capabilities.

Table 4-2. Troubleshooting

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|---|--|---|
| 1. ENGINE FAILS TO START OR MALFUNCTIONS | | |
| | <i>Inspect the engine for electrical or mechanical failure, refer to the appropriate service manual in Appendix A.</i> | |
| 2. NO OUTPUT VOLTAGE SHOWN BY VOLTMETER | | |
| | <i>Step 1 Inspect the voltmeter for signs of burning, broken or cracked glass, water or other damage. Test the voltmeter as follows:</i> | |
| | | Voltmeter (Ac Unit) |
| | | a. Remove load cables from load terminals. |
| | | b. Start the generator set. |
| | | c. Position load switch to ON position. |
| | | d. With a multimeter measure the output voltage across the load terminals to verify voltage on the set voltmeter should not vary more than 9% |
| | | Voltmeter (DC Unit) |
| | | a. Remove load cables from load terminals. |
| | | b. Start the generator set. |

Table 4-2. TROUBLESHOOTING – Continued

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

2. NO OUTPUT VOLTAGE SHOWN BY VOLTMETER—Continued

- c. Position the circuit breaker to the ON position.
 - d. With a multimeter, measure the output voltage across load terminals to verify the voltage on the set voltmeter. Voltage should not vary more than 4 volts.
- If voltage variation exceeds 5%, replace the voltmeter (AC Unit) (para 4-25). If voltage variation exceeds 4 volts, then replace the voltmeter (DC Unit) (para 4-26).

Step 2. Inspect the voltage changeover toggle switch (AC Unit) for proper operation, signs of burning, loose wire contacts, stripped threads, and other damage. Test the voltage changeover toggle switch as follows:

- a. With the power off, disconnect the voltage changeover switch.
 - b. Position switch on 120 V setting and check continuity between the center terminal and the 120 V terminal.
 - c. Position switch on 240 V setting and check continuity between the center terminal and the 240 V terminal.
- If a malfunction is indicated on either position, replace the switch (para 4-25).

Step 3. Inspect the terminal boards for cracks or burned areas.

Replace defective terminal boards (paras 4-25 and 4-26).

Step 4. Inspect the load switch (AC Unit), for proper operation, signs of burning, loose wire contacts, stripped threads, or other damage. Test the load switch as follows:

- a. Stop generator set and disconnect terminals to load switch.
- b. With a multimeter, check the continuity of the load switch. OFF position will indicate an open circuit; ON position will indicate a short circuit.

Section VI. RADIO INTERFERENCE SUPPRESSION

4-13. General Methods Used to Attain Proper Suppression

Essentially, suppression is attained by providing a low-resistance path to ground for stray currents. The methods used include shielding the ignition and high frequency wires, grounding the frame with bonding straps, and using capacitors and resistors. For general information on radio interference suppression, see Appendix A for the appropriate service manual.

Table 4-2. TROUBLESHOOTING - Continued

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

2. NO OUTPUT VOLTAGE SHOWN BY VOLTMETER—Continued

If the above readings are not obtained, replace the load switch (para 4-25).

Step 5. Manually flash the fields as follows:

- a. Connect two 1.5 volt flashlight batteries in series and connect a wire to each end.
- b. Connect the positive wire from the batteries to terminal No. 5 on the voltage regulator.
- c. Start the generator set.
- d. Momentarily touch the negative wire to terminal No. 6 on the voltage regulator to flash the field.

If the field cannot be flashed, refer to intermediate (field), (direct support and general support) maintenance personnel.

Step 6 Inspect the shunt (DC Unit) for burnt areas and other damage.

Replace a defective shunt (para 4-26).

3. OUTPUT VOLTAGE SHOWN ON VOLTMETER AS HIGH OR LOW

Step 1. Inspect the voltmeter for signs of burning, broken or cracked glass, water or other damage. Test the voltmeter. (See Malfunction 2, Step 1.)

Replace a defective voltmeter (paras 4-25 and 4-26).

Step 2. Inspect the ground strap for burned areas, frayed spots, broken strands, loose connectors, and other damage.

Replace a defective ground strap (para 4-19).

4. FREQUENCY NOT SHOWN ON FREQUENCY METER OR CANNOT BE STABILIZED AT 60 HZ (AC Unit).

Inspect the frequency meter for signs of burning broken or cracked glass, water or other damage.

Replace a defective frequency meter (para 4-25).

4-14. Interference Suppression Components

The generator set is not provided with any primary radio interference components that are the responsibility of organizational maintenance. For information covering secondary radio interference components on the engine, refer to the appropriate engine manual in Appendix A.

Section VII. MAINTENANCE OF THE ENGINE ASSEMBLY

4-15. General

The engine of the generator set is provided with an exhaust extension that directs the flow of exhaust gases in a direction away from the engine and the frame of the generator set. This section provides instructions for maintenance of the exhaust extension that are the responsibility of organizational maintenance personnel.

4-16. Exhaust Extension

a. Removal. Refer to figure 4-8 and remove the exhaust extension.

b. Cleaning and Inspection.

(1) Clean and dry the exhaust extension and attaching hardware thoroughly.

(2) Inspect the exhaust extension for cracks, breaks, distortion, and excessive rust.

(3) Inspect the gasket for breaks, burned through spots and other signs of failure.

(4) Replace defective parts.

c. Installation. Refer to figure 4-8 and install the exhaust extension.

CAUTION

The United States Forestry Service requires that any engine driven equipment operating within National Forests or Parks be provided with spark arrestors for the avoidance of forest fires.

Section VIII MAINTENANCE OF THE FRAME ASSEMBLY

4-17. General

The frame assembly of the generator set consists of the frame, rails, shock mounts, ground terminal and ground strap. This section provides instructions for maintenance of the ground terminal and ground strap that are the responsibility of organizational maintenance personnel.

4-18. Ground Terminal

a. Removal. Refer to figure 4-9 and remove the ground terminal.

b. Cleaning and Inspection.

(1) Clean and dry the ground terminal thoroughly

(2) Inspect the ground terminal for evidence of burning and for cracks, damaged threads, and other damage.

(3) Replace a defective ground terminal.

(4) Replace lost or broken terminal clip (retainer, safety clip). For fabrication procedures, see Chapter

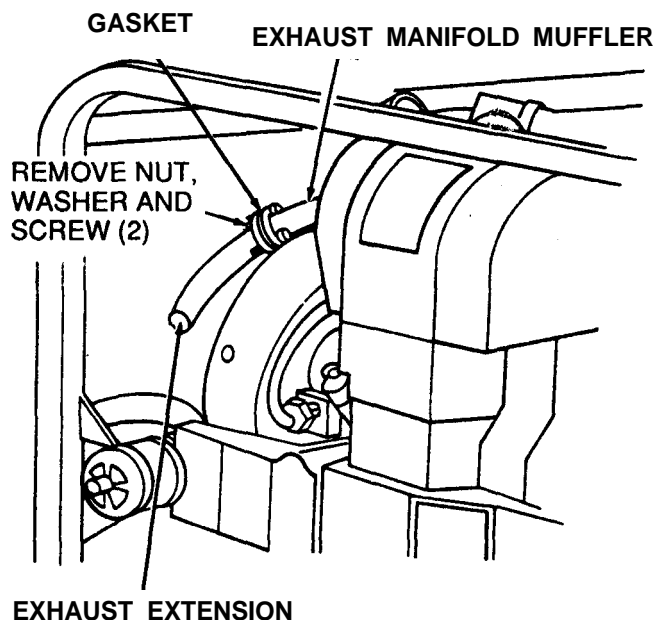


Figure 4-8. Exhaust extension, removal and installation.

d. Spark Arrestor. When a spark arrestor is required, the installation procedure will be on the instruction sheet furnished with the spark arrestor kit located on page B-2.

4, Section X Maintenance of the Control Box Assembly, paragraph 4-27.

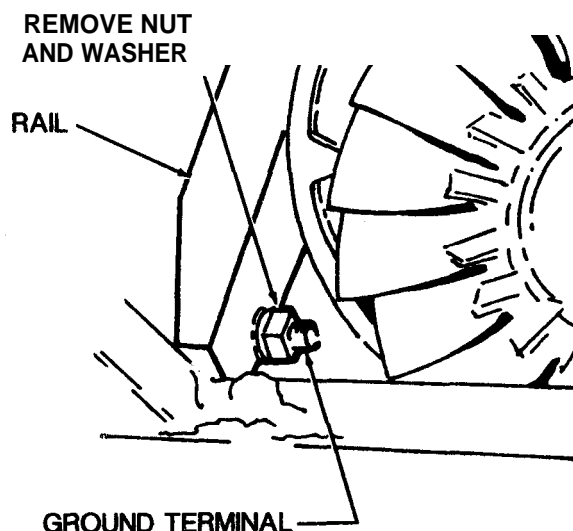


Figure 4-9. Ground terminal, removal and installation.

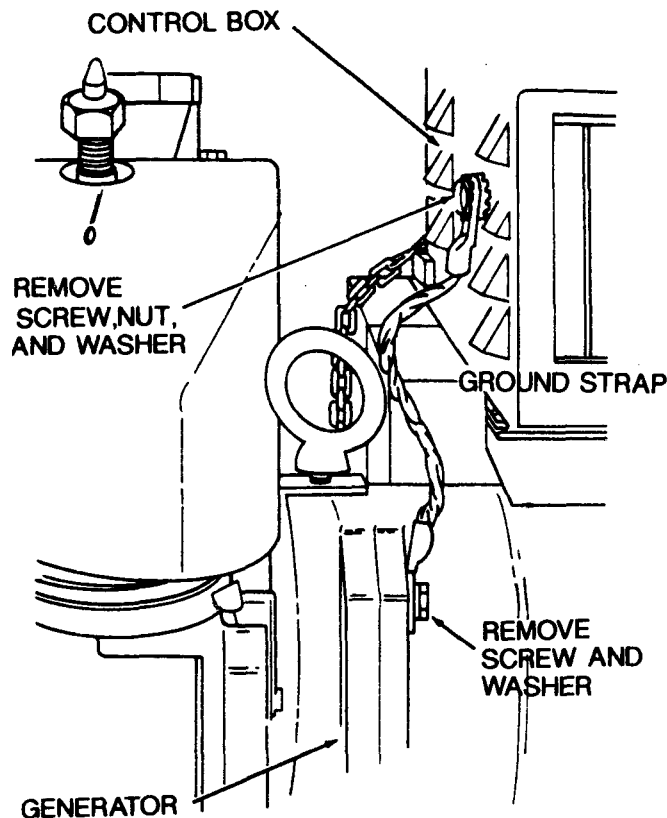


Figure 4-10. Ground strap, removal and installation.

(2) Inspect the ground terminal for evidence of burning and for cracks, damaged threads, and other damage.

(3) Replace defective ground terminal.

(4) Replace lost or broken terminal clip (retainer, safety clip). For fabrication procedures, see Chapter 4, Section X Maintenance of the Control Box Assembly, paragraph 4-27.

c. *Installation.* Refer to figure 4-9 and install the ground terminal.

4-19. Ground Strap

a. *Removal.* Refer to figure 4-10 and remove the ground strap.

b. *Cleaning and Inspection.*

(1) Clean and dry the ground strap thoroughly.

(2) Inspect the ground strap for burned areas, frayed spots, broken strands, loose connectors, and other damage.

(3) Replace a defective ground strap.

c. *Installation.* Refer to figure 4-10 and install the ground strap.

Section IX. MAINTENANCE OF THE FUEL SYSTEM

4-20. General

The generator set is provided with an on-set fuel tank. Fuel from the tank flows, by means of a hose and the necessary fittings and adapters, to the fuel selector valve. The fuel selector valve and fuel filter are both mounted directly on the engine fuel pump by means of a pipe nipple. All of the generator sets that have been manufactured on or before May 1969 have been equipped with stainless steel fuel tanks. Some subsequent sets have nylon fuel tanks and a different mounting arrangement. If replacement of a steel tank is required, replace with a nylon tank (NSN 2910-00-401-4264).

4-21. Fuel Selector Valve, Fuel Filter, and Hose

a. *Removal.* Refer to figure 4-11 and remove the fuel selector valve, fuel filter and hose.

b. *Cleaning and Inspection.*

(1) Thoroughly clean and dry all parts.

(2) Inspect the hose for cracks and for a frayed cover. Inspect the fittings on the ends for cracks and damaged threads.

(3) Inspect the fuel selector valve for cracks, distortion, damaged threads, and other damage.

(4) Inspect the fuel filter for cracks and damaged threads. Inspect the bowl for chipped areas, especially at the top seating surface. Inspect for cracks in the side of the bowl. Inspect the bowl for distortion.

(5) Replace all damaged or defective parts.

c. *Installation.* Refer to figure 4-11 and install fuel selector valve, fuel filter, and hose.

4-22. Fuel Tank and Bracket (stainless Steel Tank)

a. *Removal.*

(1) Disconnect the fuel hose (para 4-21).

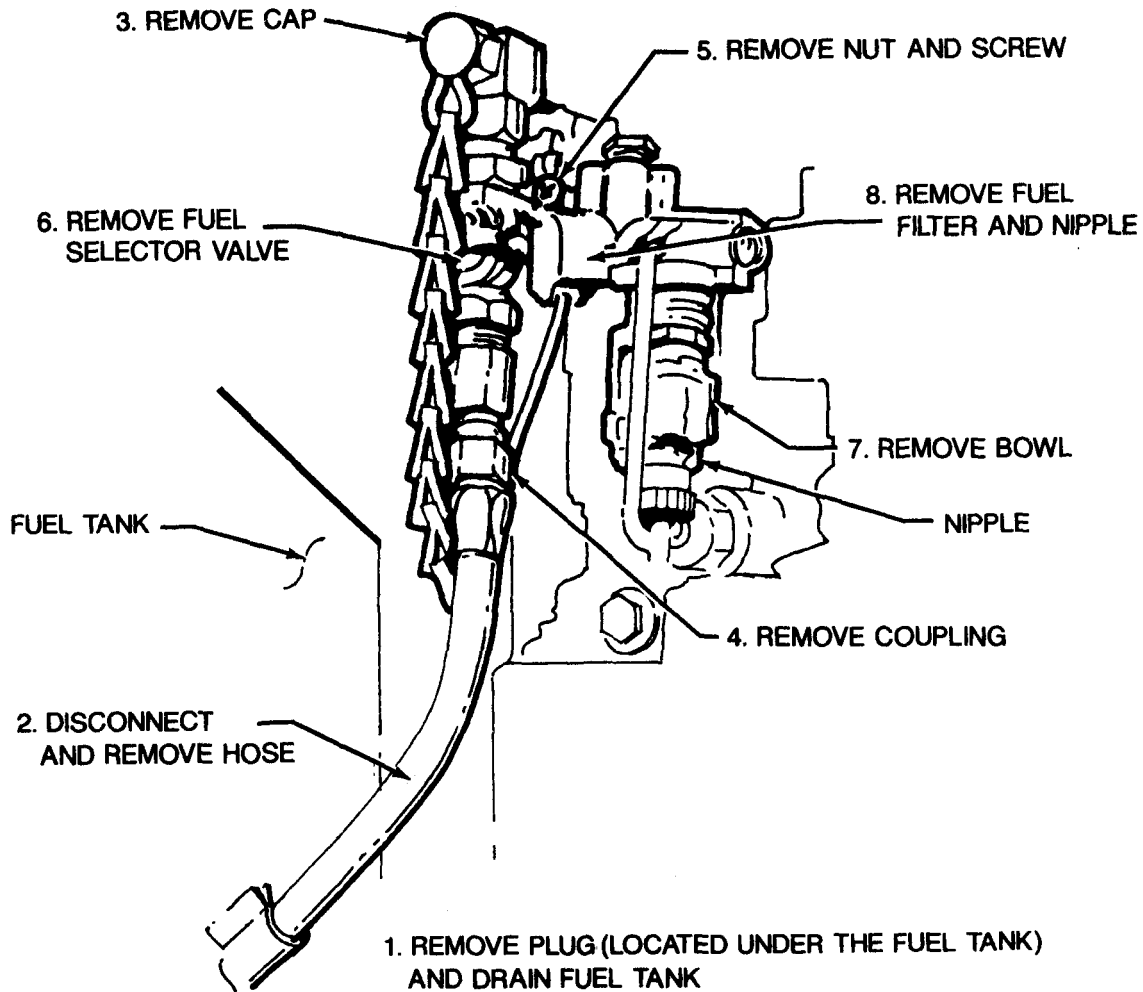


Figure 4-11. Fuel selector valve, fuel filter, and hose, removal and installation.

(2) Refer to figure 4-12 and remove the fuel tank.

(3) Refer to figure 4-13 and remove the bracket.

b. Cleaning and Inspection

(1) Clean and dry the fuel tank thoroughly.

(2) Inspect the fuel tank for distortion, dents, cracks, damaged threads, and broken welds.

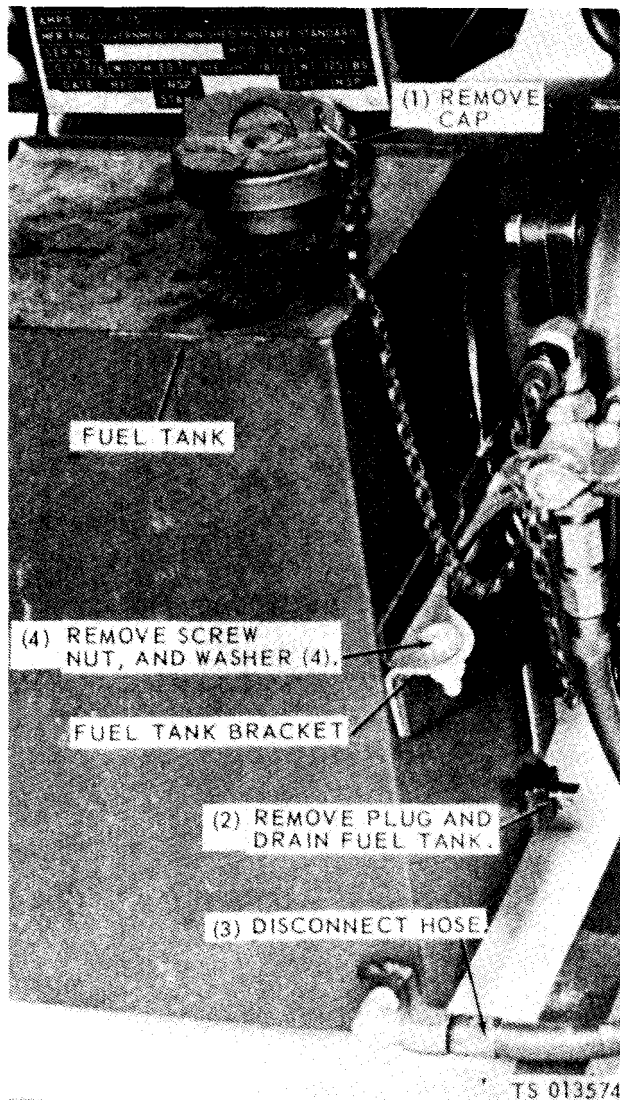


Figure 4-12. Fuel tank, removal and installation (stainless steel tank).

(3) Make a particularly close inspection of the welds that secure the hangar brackets to the sides of the tanks.

(4) Inspect the fuel tank bracket for cracks and distortion.

5) Replace defective parts.

(6) If the steel fuel tank is defective, replace with nylon fuel tank (NSN 2910-00-401-4264).

c. *Installation.* Refer to figure 4-13 and install the fuel tank bracket.

4-23. Fuel Tank and Bracket (Nylon Tank)

NOTE

In order to avoid exertion due to excessive force on the fittings of a fuel tank, recommend using two wrenches to loosen/tighten the fitting; one for holding the fitting and the other for turning the plug.

a. *Removal.*

(1) Disconnect the fuel hose (fig. 4-14).

(2) Refer to figures 4-14, 4-15, and 4-16 and remove the fuel tank and bracket.

b. *Cleaning and Inspection.*

(1) Clean and dry the fuel tank carefully.

(2) Inspect the fuel tank for abraided or gouged areas.

(3) Inspect for cracks.

(4) Inspect the outlet opening or hole to see that it is not stripped out. This opening was not originally threaded, but was left blank so that a fitting, when installed, would form its own thread in the relatively soft nylon.

(5) Inspect the straps and brackets for cracks and breaks.

(6) Replace all defective parts.

c. *Installation.*

(1) Refer to figures 4-14, 4-15, and 4-16 and install the fuel tank and brackets.

(2) Connect the fuel hose (fig. 4-14).

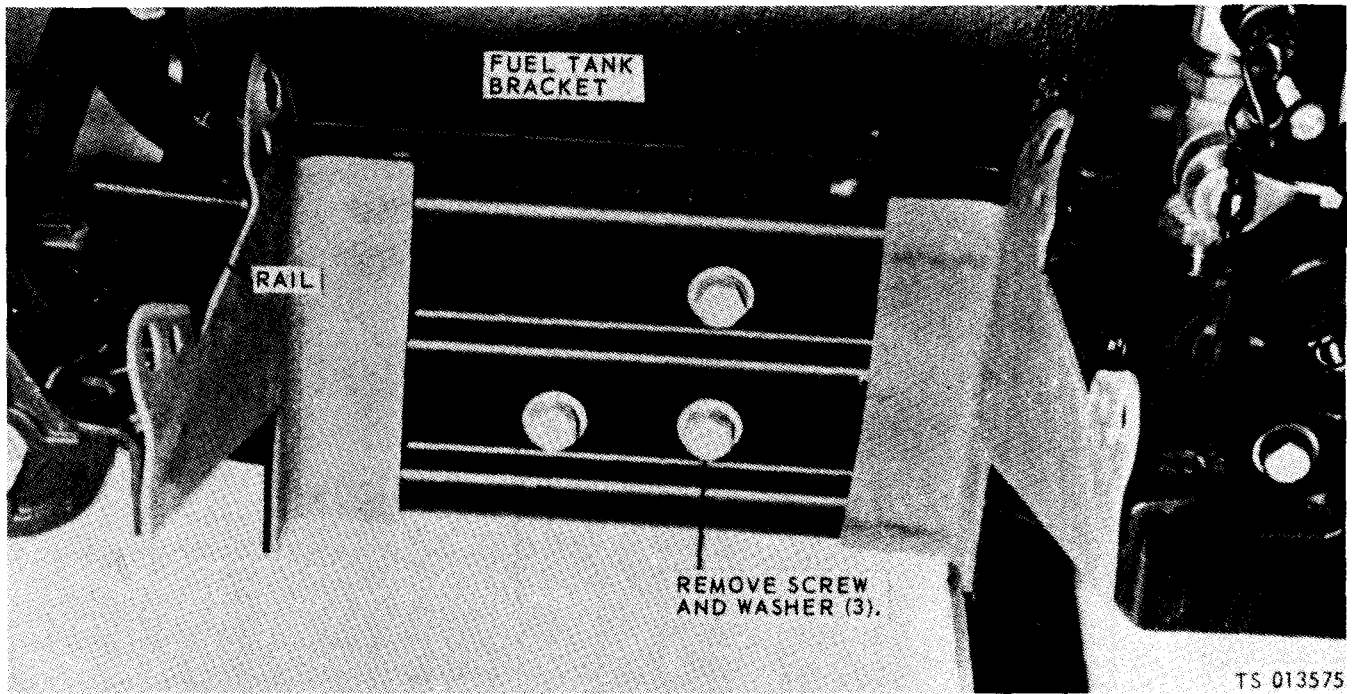


Figure 4-13. Fuel tank bracket, removal and installation (stainless steel tank).

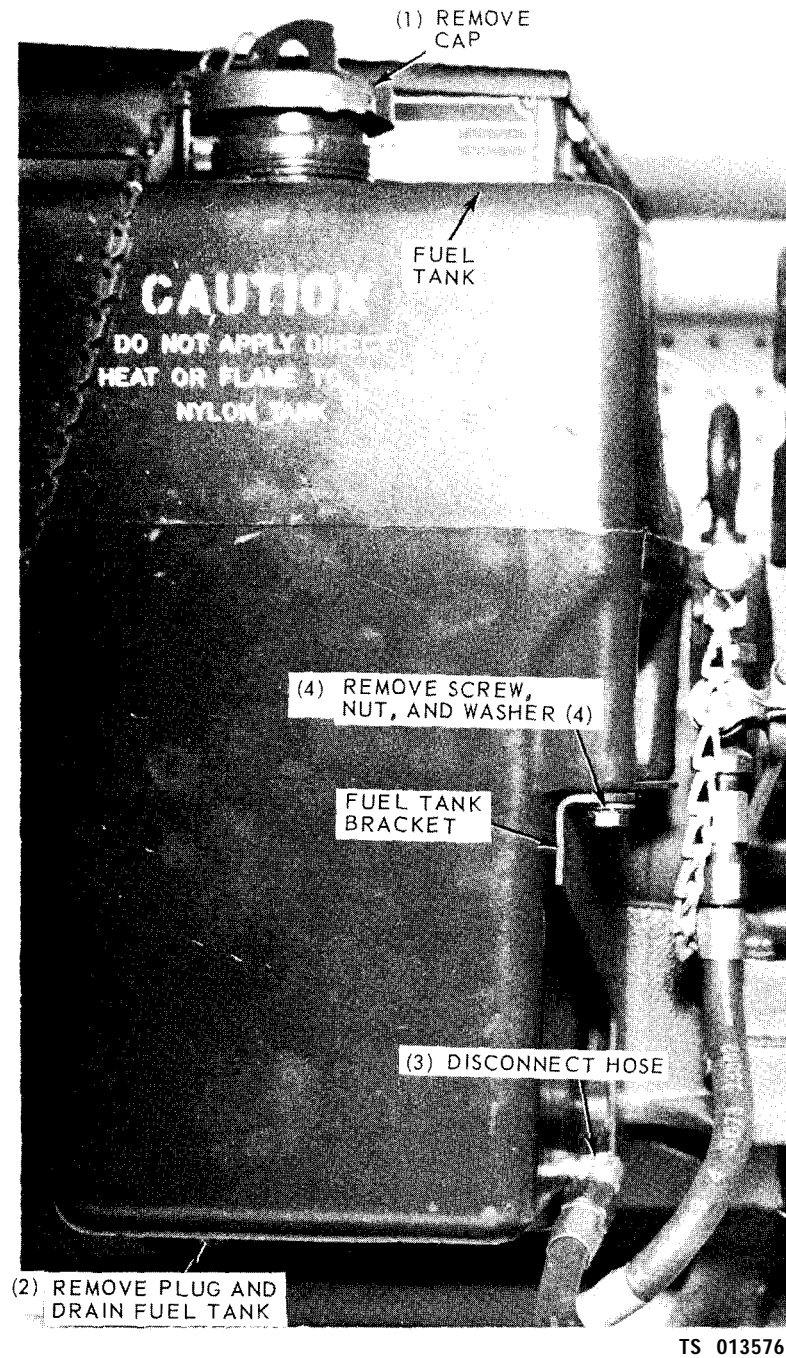
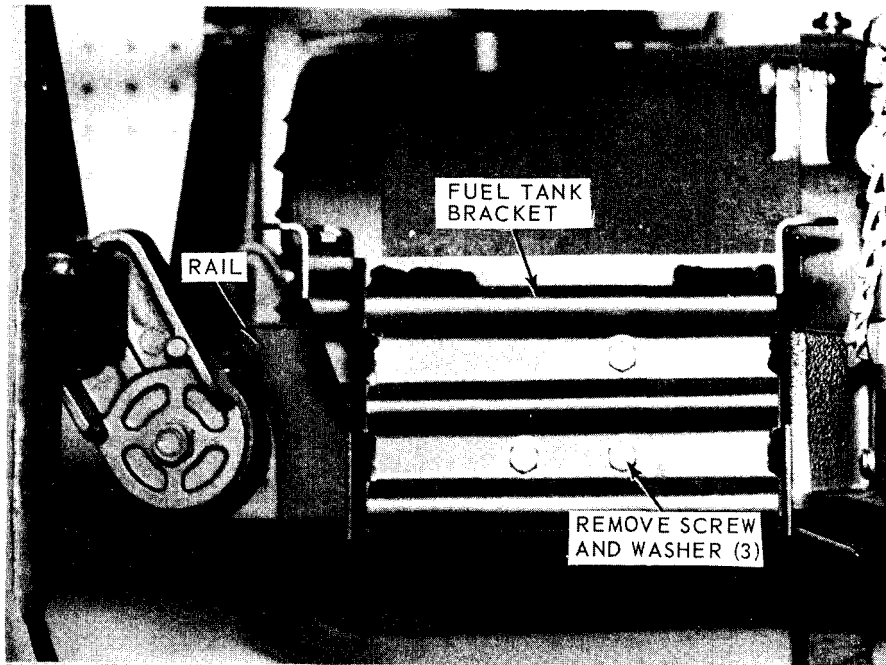


Figure 4-14. Fuel tank, removal and installation (nylon tank).



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Figure 4-15. Fuel tank bracket, removal and installation (nylon tank).

| | | |
|--------------------------|------------------|------------|
| 1 Cap and chain assembly | 11 Hose assembly | 21 Elbow |
| 2 Hook | 12 Connector | 22 Screw |
| 3 Chain | 13 Valve | 23 Washer |
| 4 Cap | 14 Nut | 24 Washer |
| 5 Strainer | 15 Screw | 25 Tank |
| 6 Plug | 16 Screw | 26 Screw |
| 7 Cap and chain assembly | 17 Washer | 27 Washer |
| 8 Hook | 18 Washer | 28 Washer |
| 9 Chain | 19 Brace | 29 Bracket |
| 10 Elbow | 20 Nipple | |

Figure 4-16. Fuel tank and bracket, removal and installation (nylon tank).

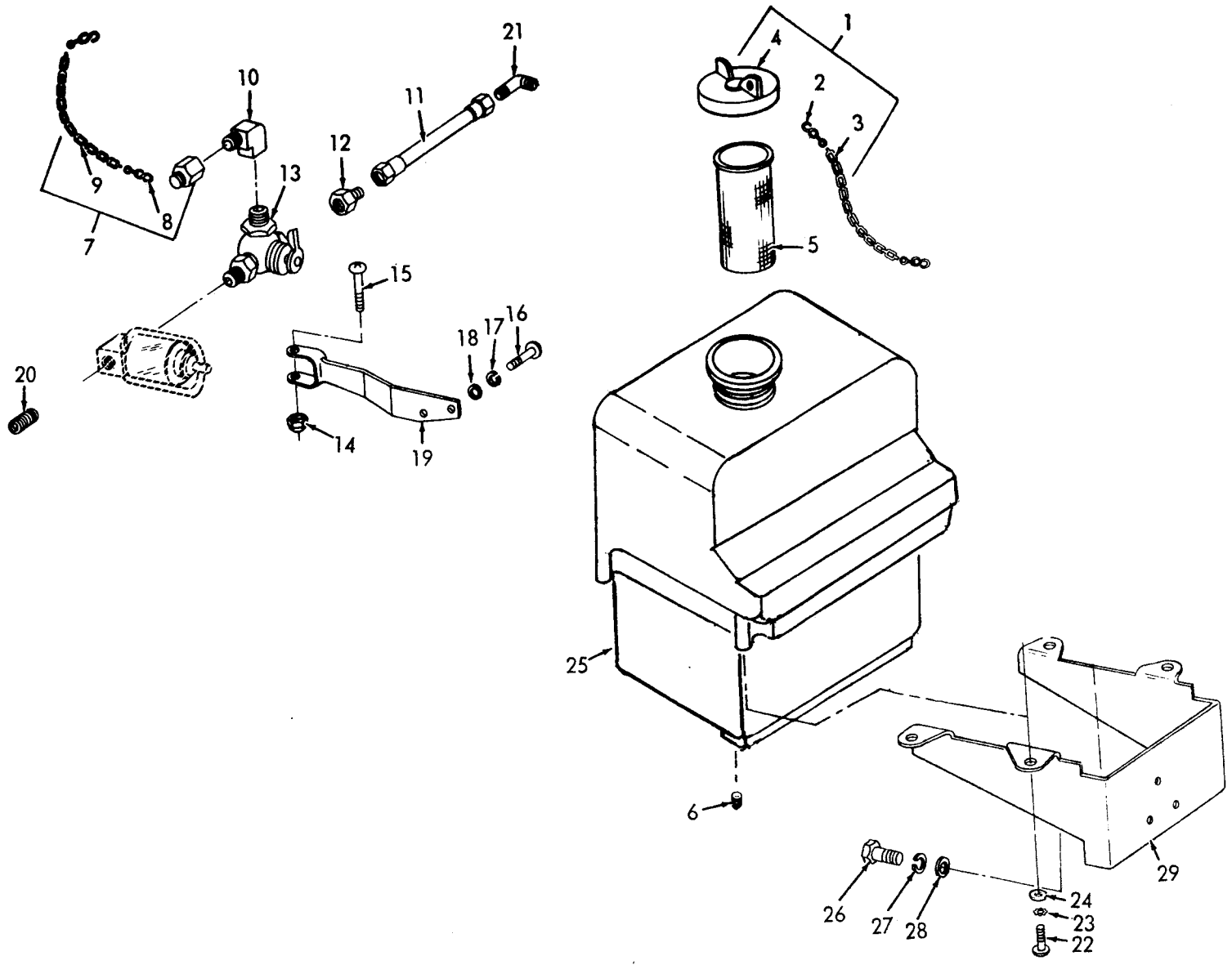


Figure 4-16—Continued.

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Section X. MAINTENANCE OF THE CONTROL BOX ASSEMBLY

4-24. General

The generator sets, both the AC and DC units, are each equipped with a control box mounted over the generator. They provide a housing for the components required to control the electrical functions of the generator and they provide a mounting point for the operator's controls and instruments and the power output terminals. The control boxes are similar in general appearance and function. However, several of the components, within, differ between the two units. Also, the AC unit control box contains several more components than is contained in the DC units. The components within the two control boxes that are the responsibility of organizational maintenance are covered separately, for the AC and DC units, by paragraphs in this section.

4-25. Control Box Components (AC Unit)

a. *Test.* Test the AC control box components as follows:

(1) *Voltmeter.*

(a) Remove load cables from load terminals.

(b) Start the generator set.

(c) Position load switch to ON position.

(d) With a multimeter, measure the output voltage across the load terminals to verify voltage on the set voltmeter. Voltage should not vary more than 5%.

(e) If voltage variation exceeds 5%, replace the voltmeter.

(2) *Voltage Changeover Switch.*

(a) With the power off, disconnect the voltage changeover switch.

(b) Position switch on 120 V setting and check continuity between the center terminal and the 120 V terminal.

(c) Position switch on 240 V setting and check continuity between the center terminal and the 240 V terminal.

(d) If a malfunctioning open circuit is indicated on either position, replace the switch.

(3) *Load Switch.*

(a) Stop generator set and disconnect terminals to load switch.

(b) With a multimeter, check the continuity of the load switch. OFF position will indicate an open circuit; ON position will indicate a short circuit.

(c) If the above readings are not obtained, replace the load switch.

b. *Removal.* Refer to figure 4-17 and remove the control box components.

c. *Cleaning and Inspection.*

(1) Clean all parts thoroughly.

(2) Inspect the variable resistor knob for cracks and stripped thread.

(3) Inspect the voltmeter and frequency meter for signs of burning, broken or cracked glass, water damage, and other damage.

(4) Inspect the terminal boards for cracks and burned areas.

(5) Inspect the load and voltage changeover toggle switches for proper operation, signs of burning, loose wire contacts, stripped threads, and other damage.

(6) Inspect the receptacle connector for loose connections, signs of burning and other damage.

(7) Replace all defective parts.

d. *Installation.* Refer to figure 4-17 and install the control box components.

4-26. Control Box Components (DC Unit)

a. *Test.* Test the DC control box components as follows:

(1) *Voltmeter.*

(a) Remove load cables from load terminals.

(b) Start the generator set.

(c) Position the circuit breaker to the ON position.

(d) With a multimeter, measure the output voltage across load terminals to verify the voltage on the set voltmeter. Voltage should not vary more than 4 volts.

(e) If voltage variation exceeds 4 volts, then replace the voltmeter.

(2) *Load Meter.*

(a) Connect a load of known wattage and proper voltage output terminals of the generator set. Maximum load is 1500 watts.

(b) Start the generator and place circuit breaker in ON position. Observe the reading on the set load meter. Meter should indicate according to the load attached, i.e., 375 watts-25%; 750 watts-50%, etc.

(c) If the load meter does not read within specifications, replace it.

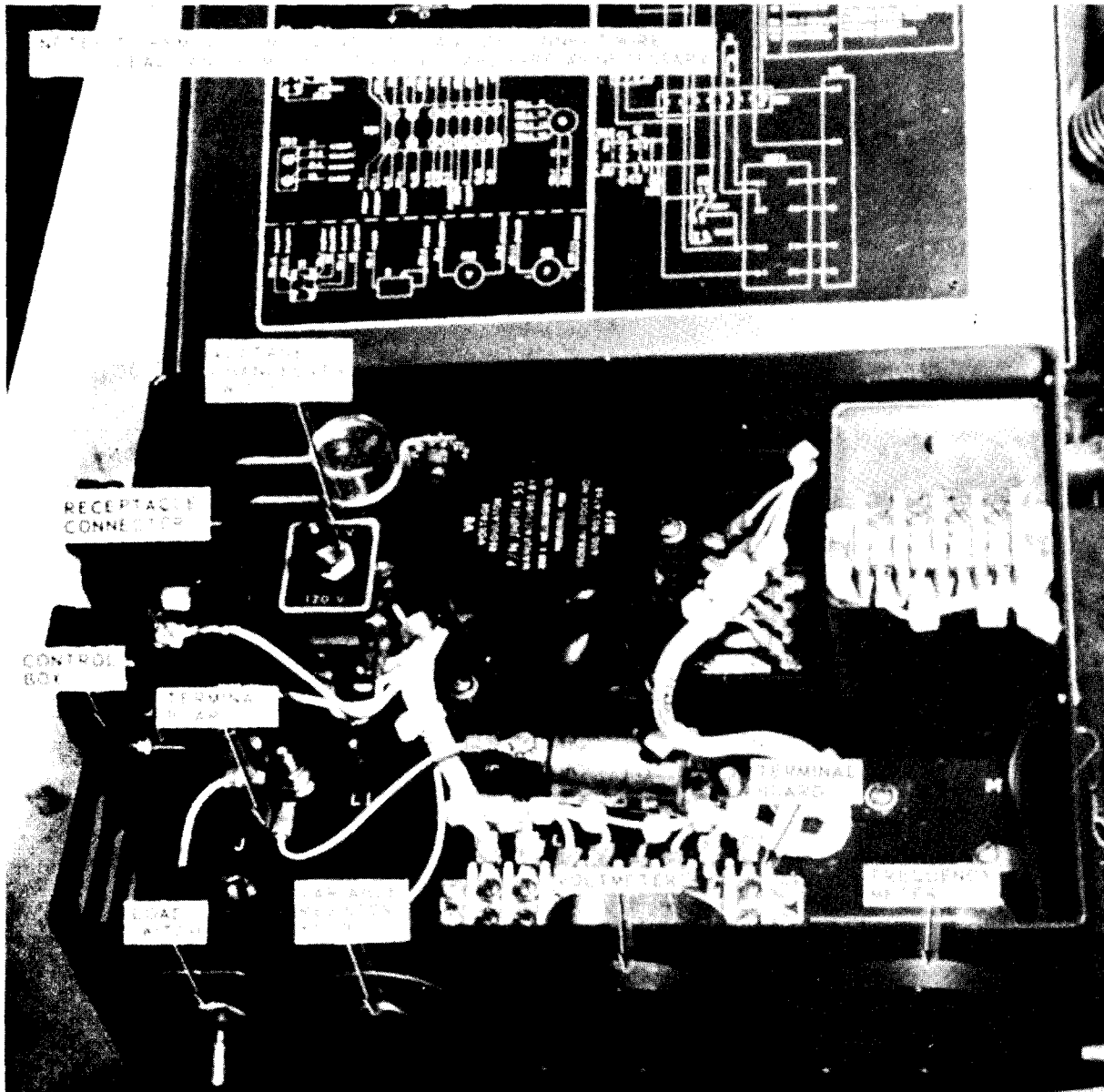


Figure 4-17. Control box components, removal and installation (AC Unit).

b. *Removal.* Refer to figure 4-18 and remove the control box components.

c. *Cleaning and Inspection.*

- (1) Clean all parts thoroughly.
- (2) Inspect the variable resistor knob for cracks and stripped threads.

- (3) Inspect the voltmeter, loadmeter and ammeter for broken, missing, or cracked glass, signs of burning, water or moisture damage, stripped threads, and other damage.

- (4) Inspect the terminal boards and terminal load insulator for cracks and burned areas.

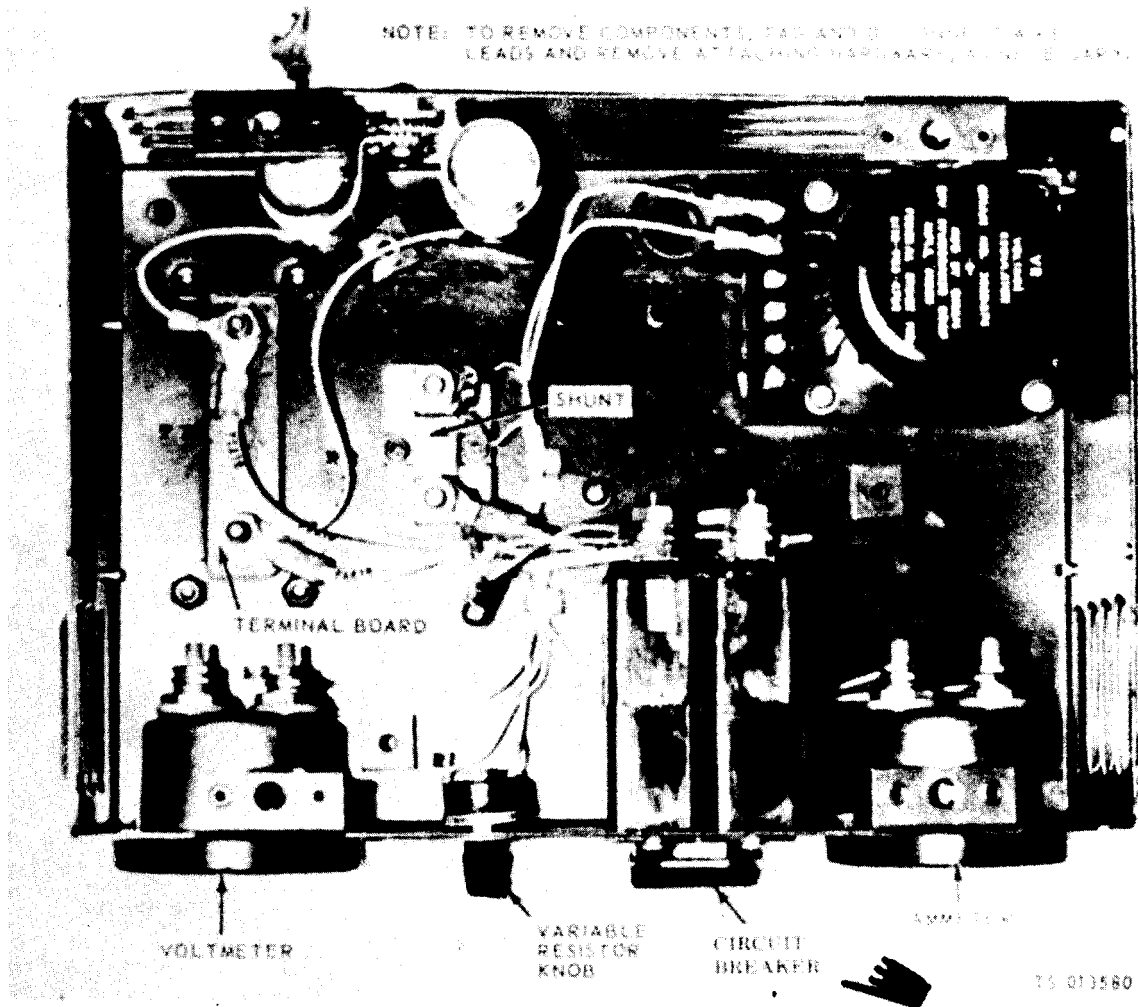


Figure 4-18. Control box components removal and installation (DC Unit).

(5) Inspect the shunt for burnt areas and other damage.

(6) Replace all defective parts.

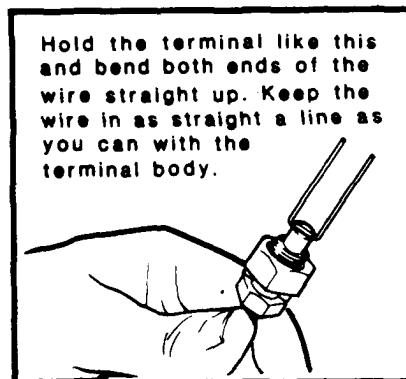
d. Installation. Refer to figure 4-18 and install the control boxes components.

**4-27. Replace Lost or Broken Terminal Clip
(Retainer, Safety Clip)**

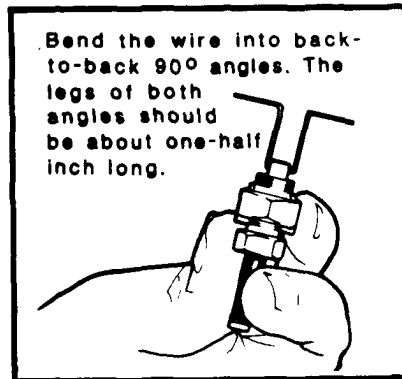
The terminal clip is a component of both the load terminal and the ground terminal. If the terminal clip is lost or broken, fabricate as follows: Requisition bulk wire as stated in the chart. Cut off about 3 inches of the wire. Cut the wire short enough to keep the clips from touching another terminal or the generator frame in the open or closed position. Slip the wire through the hole in the terminal and proceed as shown in the views below:

| | | |
|-----------------------------|----------------|----------|
| NSN 9505- | MEP-015A | MEP-025A |
| 00-804-3814 (0.042 inch) | Load Ground | Ground |
| 01-049-0144 (0.050 inch) | | Load |

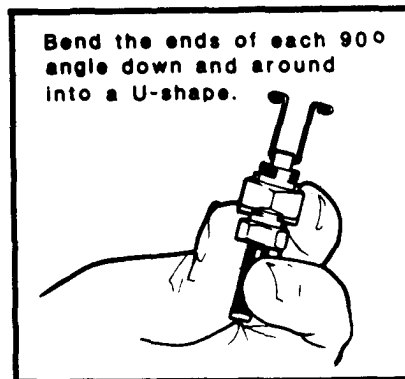
BULK WIRE CHART



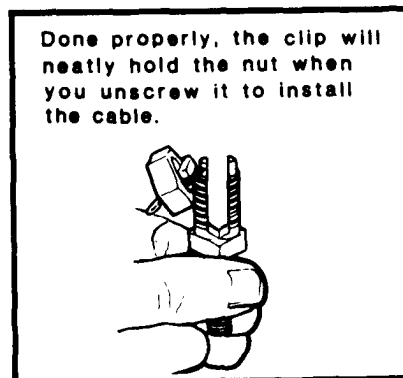
VIEW 1.



VIEW 2.



VIEW 3.



VIEW 4.

CHAPTER 5

INTERMEDIATE (FIELD), (DIRECT SUPPORT AND GENERAL SUPPORT) AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

5-1. Tools and Equipment

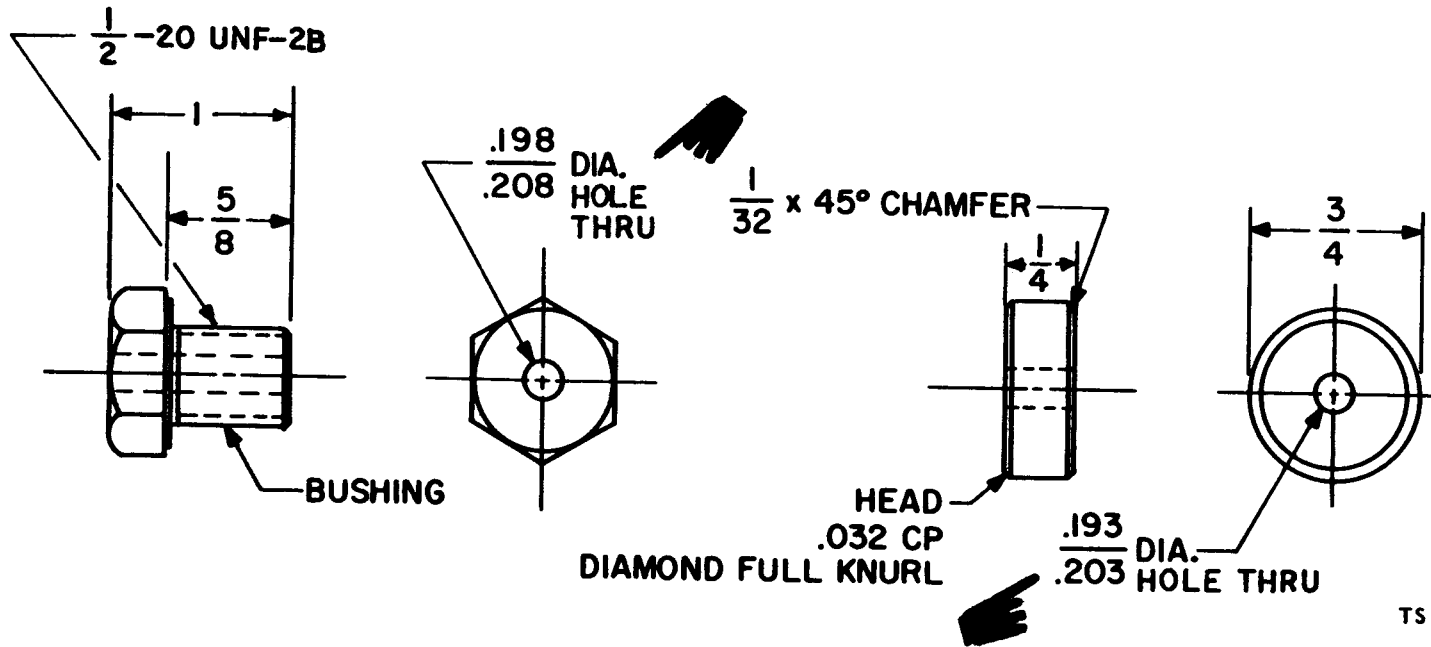
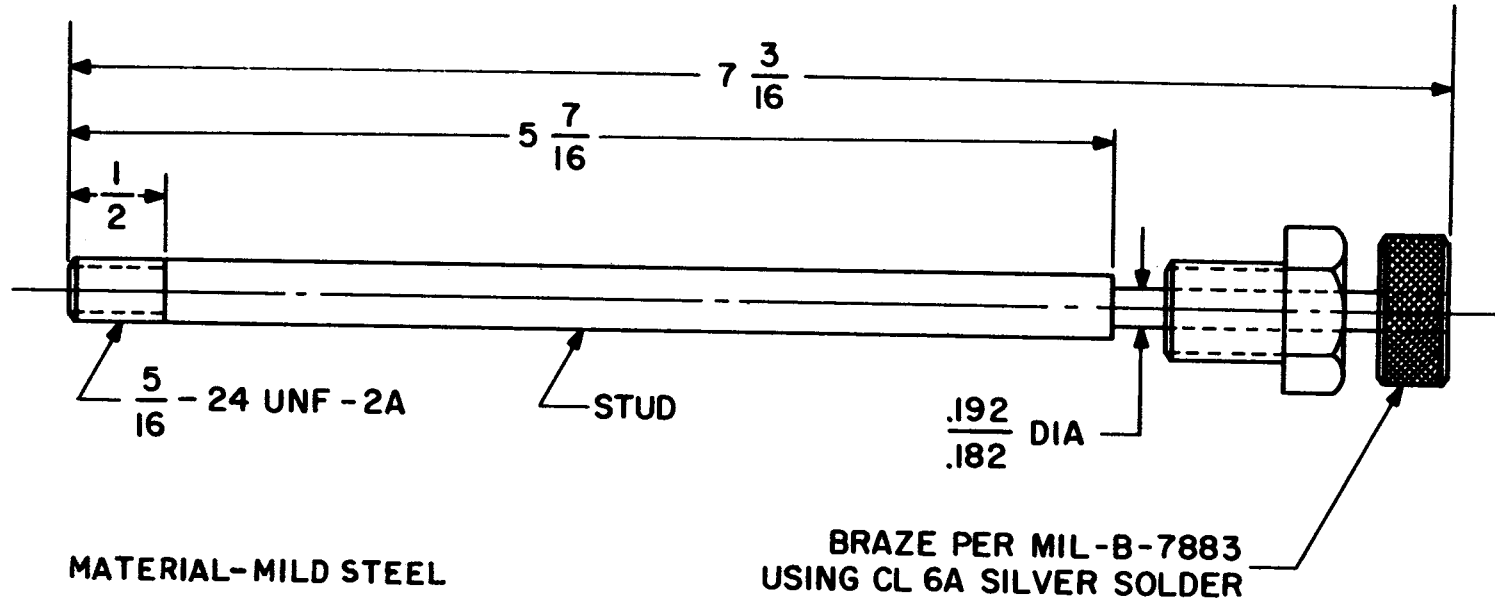
The special tool required for intermediate (field), (direct support and general support) and depot maintenance is listed in Table 5-1.

5-2. Intermediate (Field) (Direct Support and General Support) and Depot Maintenance Repair Parts and Special Tools

Intermediate (field) (direct support and general support) and depot maintenance repair parts are listed and illustrated in the appropriate generator manuals (See Appendix A). Parts applicable to the engine are listed and illustrated in the appropriate engine manuals (See Appendix A).

Table 5-1. Special Tools, Test, and Support Equipment (Including Fabricated Items)

| Item | NSN or reference no. | Reference | | Use | Figure |
|--------------------------------|----------------------|---------------|------------------|------------------------------------|--------|
| | | Figure Number | Paragraph Number | | |
| PULLER, generator rotor | (fabricate) | | | Use to pull rotor from crankshaft. | 5-1 |



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Figure 5-1. Generator rotor puller, fabrication details.

Section II. TROUBLESHOOTING

5-3. General

This section contains troubleshooting or malfunction information and tests for locating and correcting most of the troubles which may develop in the generator sets. Each malfunction or trouble symptom for an individual component, unit, or system is followed by a list of test or inspections necessary for you to determine probable causes and suggested corrective actions for you to remedy the malfunction.

5-4. Troubleshooting

a. This manual cannot list all possible malfunctions that may occur or all tests or inspections, and corrective actions. If a malfunction is not listed (except when malfunction and cause are obvious), or is not corrected by listed corrective actions, you should notify higher level maintenance.

b. Table 5-2 lists the common malfunctions that you may find during the operation or maintenance of the generator sets or their components. You should perform the tests/inspections and corrective actions in the order listed.

NOTE

Before you use this table, be sure you have performed all normal operational checks. If you have a malfunction which is not listed in this table, notify the next higher level of maintenance. Air force users may perform maintenance within the scope of their capabilities.

Table 5-2. TROUBLESHOOTING

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|---|--|---|
| 1. ENGINE FAILS TO START OR MALFUNCTIONS | <i>Inspect the engine for an electrical or mechanical failure.</i> | Refer to the appropriate service manual (See Appendix A). |
| 2. GENERATOR FAILS TO BUILD UP RATED VOLTAGE | <i>Step 1. Manually flash the field as follows:</i> | |
| | (1) Connect two 1.5 volt flashlight batteries in series and connect a wire to each end. | |
| | (2) Connect the positive wire from the batteries to terminal No. 5 on the voltage regulator. | |
| | (3) Start the generator set. | |

Table 5-2. TROUBLESHOOTING - Continued

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|---|--|---|
| 2. GENERATOR FAILS TO BUILD UP RATED VOLTAGE-Continued | | (4) Momentarily touch the negative wire to terminal No. 6 on the voltage regulator to flash the field. If the field cannot be flashed, proceed to Step 2. |
| | <i>Step 2. Inspect the voltage regulator for cracks, signs of overheating and other damage. Test the voltage regulator as follows:</i> | |
| | (1) Voltage Regulator (AC Unit). | (a) Select desired voltage setting on the voltage changeover switch (120 V or 240 V) and start the generator set. Load cables should not be attached to the output terminals. (b) Using a multimeter, check voltage across output terminals to verify reading on set voltmeter. If the voltage is low and adjustment of the variable resistor will not correct the deficiency, check the exciter voltage across terminals 5 or 6 of the voltage regulator. This voltage will vary, but should be about 25 volts DC. If no voltage appears on the regulator terminals, the voltage regulator is defective and should be replaced. (c) If voltage across regulator terminals 5 and 6 is satisfactory, stop the generator set, attach the load cables, and restart the set. |
| | (2) Voltage Regulator (DC Unit). | (a) Disconnect load cables and start generator set. (b) Trip the circuit breaker to "ON" position, and observe reading on set voltmeter. (c) Using a multimeter, check the voltage across the output terminals to verify the reading on the set voltmeter. If the voltage is low and adjustment of the variable resistor will not correct the deficiency, check the exciter voltage across terminals 5 and 6 of the voltage regulator. This voltage will vary but should be about 25 volts DC. If no voltage appears on the regulator terminals the voltage regulator is defective and should be replaced. |

Table 5-2. TROUBLESHOOTING—Continued

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

| | | |
|--|---|--|
| 2. GENERATOR FAILS TO BUILD UP RATED VOLTAGE —Continued | (2) With the multimeter, check output voltage across load terminals. Then check input voltage across terminals 3 and 4 of the transducer. These readings should have about the same value (120 V AC approximately). | |
| | (3) Check input voltage from variable resistor across terminals 1 and 2 of transducer. This reading will vary but should be approximately 20 V. | |
| | (4) Check transducer output to voltage regulator. Terminals 5 and 6 should be about 25 volts. Terminals 7 and 8 should be about 120 volts. If output voltages do not meet specifications replace voltage transducer (para 8-2). | |
| | CAUTION Remove all voltage before taking resistance measurements. | |

Step 4. Inspect the variable resistor for proper operation and for proper resistance. Resistance should vary smoothly from 0 to 1,500 ohms \pm 20% when the unit is turned through its range. Replace a defective variable resistor (para 8-2 and 8-3).

Step 4.1. Exciter Stator Winding resistance should be 215 ohms \pm 10%.

Step 5. Inspect the wiring and wiring harness for breaks, poor connections at the terminals, broken or frayed insulation, and other damage.

Repair or replace defective wiring and wiring harness (para 8-5).

Step 6. Test the AC and DC generator sets as follows:

(1) AC Unit.

(a) Start the generator set and allow it to warm up.

(b) Observe the voltmeter on the front of the control box. If the exciter or stator is defective, there will be no voltage reading on the set voltmeter.

(c) If no voltage appears on the set voltmeter, stop the set and disconnect terminals 2 and 4 of TB 1. Measure resistance between stator leads T1 and T2, and T3 and T4. This reading should be 1.32 ohms \pm 10%.

If resistance readings do not meet specifications, replace stator (para 9-1). If readings are as prescribed, replace rotor (para 9-1).

(2) DC Unit.

(a) Start the generator set and allow it to warm up.

Table 5-2. TROUBLESHOOTING—Continued

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|--------------------|-------------------|
|-------------|--------------------|-------------------|

| | | |
|--|--|--|
| 2. GENERATOR FAILS TO BUILD UP RATED VOLTAGE —Continued | (b) Observe the voltmeter on the front of the control box. If the exciter or stator is defective, there will be no voltage reading on the set voltmeter. | |
| | (c) If no voltage appears on the set voltmeter, stop the set and disconnect terminals 3, 4, 5, and 6 at voltage regulator. With a multimeter, measure resistance across disconnected leads F1 and F2 (wires from terminals 5 and 6 of voltage regulator) to exciter, and leads T1 and T2 (wires from terminals 3 and 4 of voltage regulator) to stator. These resistances should be 215 ohms \pm 10% and 8.2 ohms \pm 10%, respectively. | |
| | If resistance readings do not meet specifications, replace the stator (para 9-2). If resistance readings are as prescribed, replace the rotor (para 9-2). | |

| | | |
|--|--|--|
| 3. FREQUENCY METER FAILS TO SHOW PROPER FREQUENCY WHEN METER IS KNOWN TO BE GOOD | <i>Inspect the frequency converter (AC Unit) by comparing with a unit known to be good. Test the frequency converter as follows:</i> | |
| | (1) Stop the generator set and disconnect either the positive or negative lead from the frequency converter output to the frequency meter. | |

(2) Start the generator set and measure input voltage across terminals L1 on the frequency converter with a multimeter. This voltage will normally be 120 volts AC.

(3) Observing polarity with the multimeter, measure DC microampere current output on + and - terminals at the converter. This microampere DC should be within the 0 to 200 microampere range, and at 120 volts, 60 Hz; during operation this reading should be close to 100 microamperes.

If measurements do not meet specifications above, replace the frequency converter (para 8-2)

| | | |
|--|---|--|
| 4. CIRCUIT BREAKER CONTINUES TO TRIP (DC Unit) | <i>Step 1. Inspect the circuit breaker for cracks, breaks or other damage. Test the circuit breaker as follows:</i> | |
| | (1) Attach a variable load to the output terminals and start the generator. | |

Table 5-2. TROUBLESHOOTING—Continued

| MALFUNCTION |
|--------------------|
| TEST OR INSPECTION |
| CORRECTIVE ACTION |

4. CIRCUIT BREAKER CONTINUES TO TRIP (DC Unit)—Continued

(2) Move circuit breaker to ON position and observe the load meter and voltmeter. Reading should be 28 V at 100% load.

(3) Adjust the variable load until a reading of 125% is obtained on the load meter. The circuit is designed to trip at 125% maximum load.

If the circuit breaker trips below 125% maximum load, replace it (para 8-3).

Step 2. Inspect the voltage regulator for cracks, signs of overheating and other damage. Refer to Malfunction 1, Step 2, and test the voltage regulator.

Replace a defective voltage regulator (para 8-3).

CAUTION

Remove all voltage before taking resistance measurements.

Step 3. Inspect the wiring and wiring harness for breaks, poor connections, broken or frayed insulation and other damage.

Repair or replace defective wiring and wiring harness (para 8-5).

5. GENERATOR OUTPUT VOLTAGE ERRATIC

Step 1. Inspect the voltage regulator for cracks, signs of overheating, and other damage. Refer to Malfunction 1, Step 2, and test the voltage regulator.

Replace a defective voltage regulator (paras 8-2 and 8-3).

Step 2. Inspect the transducer (AC Unit) for cracks, signs of overheating and other damage. Refer

Table 5-2. TROUBLESHOOTING—Continued

| MALFUNCTION |
|--------------------|
| TEST OR INSPECTION |
| CORRECTIVE ACTION |

5. GENERATOR OUTPUT VOLTAGE ERRATIC—Continued

to Malfunction 2, Step 2, and test the transducer.

Replace the defective transducer (para 8-2).

Step 3. Inspect the variable resistor for proper operation and for proper resistance. Resistance should vary smoothly from 0 to 1,500 ohms ± 20% when the unit is turned through its range (para 8-2 and 8-3).

Replace a defective variable resistor (para 8-2 and 8-3).

Step 4. Inspect the wiring and wiring harness for breaks, poor connections, broken or frayed insulation and other damage.

Repair or replace defective wiring and wiring harness (para 8-5).

6. GENERATOR OVERHEATS

Step 1. After disassembly (para 9-1 and 9-2), visually inspect the stator windings for loose or corroded wiring, metal to metal contact, or burnt wiring. Refer to Malfunction 2, Step 6, and test the stator.

Replace the defective stator (para 9-1 and 9-2).

Step 2. After disassembly (para 9-1 and 9-2), visually inspect exciter stator windings for loose or corroded wiring, metal to metal contact or burnt wiring. Refer to Malfunction 2, Step 6 and test the stator.

Replace the defective stator (para 9-1 and 9-2).

Step 3. After disassembly (para 9-1 and 9-2), visually inspect the rotor for loose or corroded wiring, metal to metal contact or burnt wiring. Refer to Malfunction 2, Step 5, and test the rotor.

Replace the defective rotor (para 9-1 and 9-2).

Section III. GENERAL MAINTENANCE

The maintenance to be performed by intermediate (fields), (direct support and general support) and depot maintenance personnel on this equipment is limited to repair of the frame, wiring harness, and the generator housing assembly. Repair is accomplished on the frame by straightening bends using

the furnished cutting and welding torch outfit or by replacement. The wiring harness is repaired by soldering and wrapping with electrical tape. The repair of the generator housing assembly is accomplished by straightening, knocking out dents, welding or replacement.

CHAPTER 6

REMOVAL/INSTALLATION OF MAJOR COMPONENTS

Section I. GENERAL

This chapter contains removal and installation instructions for the major components. The three ma-

ajor components are the engine, the control box assembly and the generator.

Section II. ENGINE

6-1. Engine

a. Removal.

(1) Remove the winterization hose from the engine (See military standard engine manual TM 5-2805-257-24P, Appendix A).

(2) Remove the generator (para 6-4 and 6-5).

(3) Refer to figure 6-1 and remove the engine.

b. Installation.

(1) Refer to figure 6-1 and install the engine.

(2) Install the generator (para 6-4 and 6-5).

(3) Install the winterization hose on the engine (See military standard engine manual TM 5-2805-257-24P, Appendix A).

NOTE

When changing the spark plug cables, the engine end of the generator set must be elevated to have access for removing the screws that are holding the engine flywheel fan cover (pull cover loose but let it remain in place). Refer to TM 5-2805-257-14, paragraph 4-40 for loosening of the flywheel fan. Remove both the flywheel fan and the flywheel fan cover together, sliding both up between the engine and generator frame and lay on top of the engine. Referring to TM 5-2805-257-14, Figure 4-6, remove and replace the spark plug cables. Reassemble the engine in reverse procedure of the above instructions.

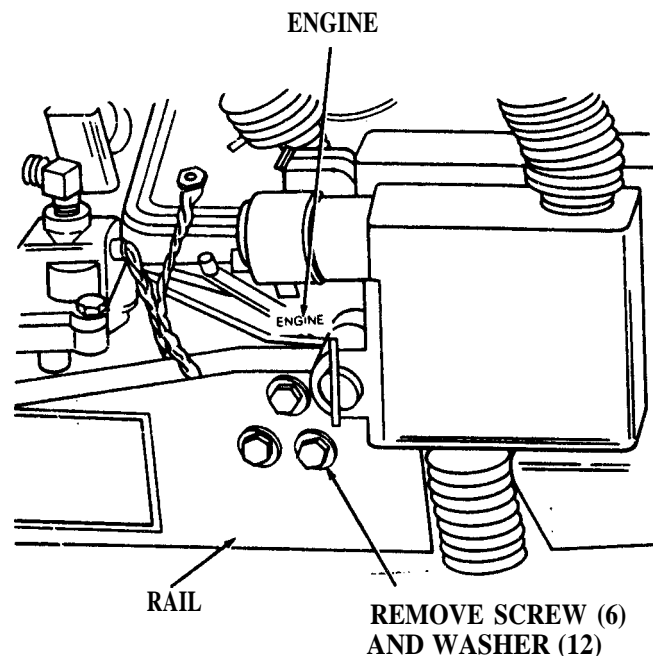


Figure 6-1. Engine, removal and installation.

Section III. CONTROL BOX ASSEMBLY

6-2. General

All the controls and instruments necessary for the operation of the generator are contained in the control box. These controls and instruments include the voltage regulator, frequency converters, variable resistor, interference suppression components, terminal board, and the necessary wiring harness.

6-3. Control Box and Bracket

a. Removal.

(1) Disconnect the ground strap at the generator (fig. 4-10).

(2) Tag and disconnect the wire leads from the generator at their connecting points inside the control box.

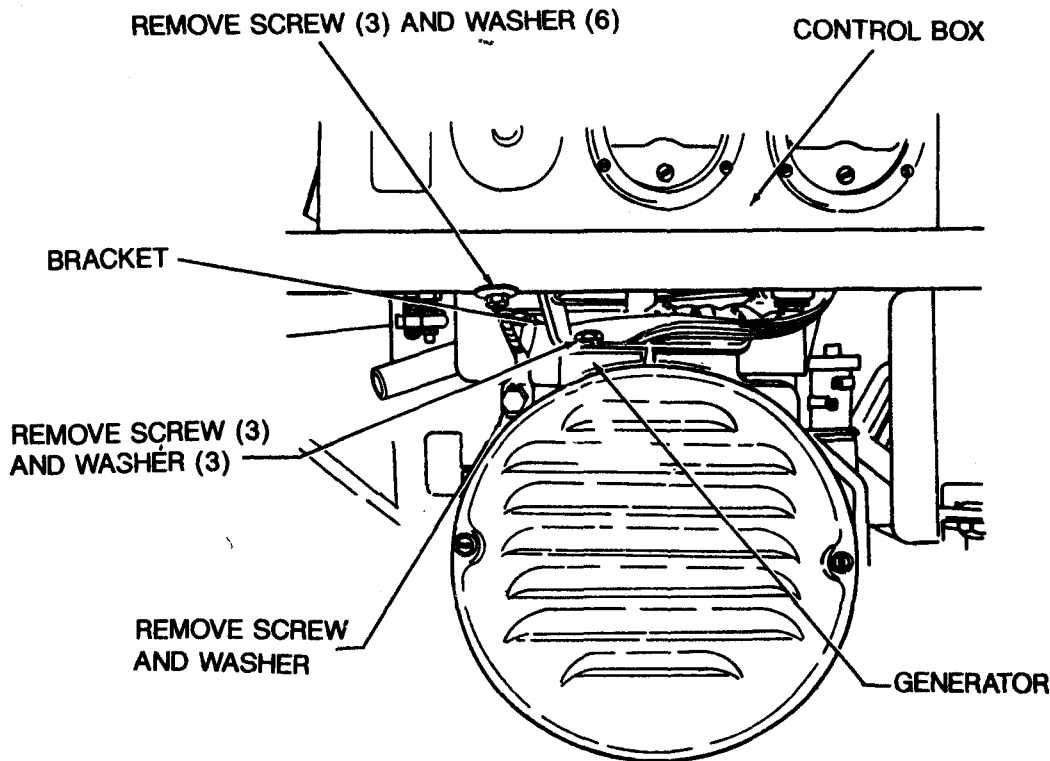
(3) Refer to figure 6-2 and remove the control box and bracket.

b. Installation.

(1) Refer to figure 6-2 and install the control box and bracket.

(2) Connect the tagged wire leads to the proper points in the control box.

(3) Connect the ground strap at the generator (fig. 4-10).



NOTE: TAG AND DISCONNECT WIRE LEADS AND HARNESS, AS NECESSARY

Figure 6-2. Control box and bracket, removal and installation.

Section IV. GENERATOR

6-4. Generator (AC Units)

a. Removal.

- (1) Remove the control box (para 6-3).
- (2) Remove the fuel tank and bracket (paras 4-22 and 4-23).
- (3) Remove the generator and cover.
- (4) Refer to figure 6-3 and remove the generator fan.
- (5) Using figure as a guide, remove the generator stator housing.
- (6) Use a proper pulling tool (fig. 5-1) and remove the generator rotor (14, fig. 9-1) from the crankshaft of the engine.
- (7) Refer to figure 6-5 and remove the generator adapter from the engine.

b. Installation.

- (1) Refer to figure 6-5 and install the generator adapter on the engine.

- (2) Position the generator rotor (14, fig. 9-1) on the crankshaft of the engine.

- (3) Using figure 6-4 as a guide, install the generator stator housing.

- (4) Refer to figure 6-3 and install the generator fan.

- (5) Install the generator and cover.

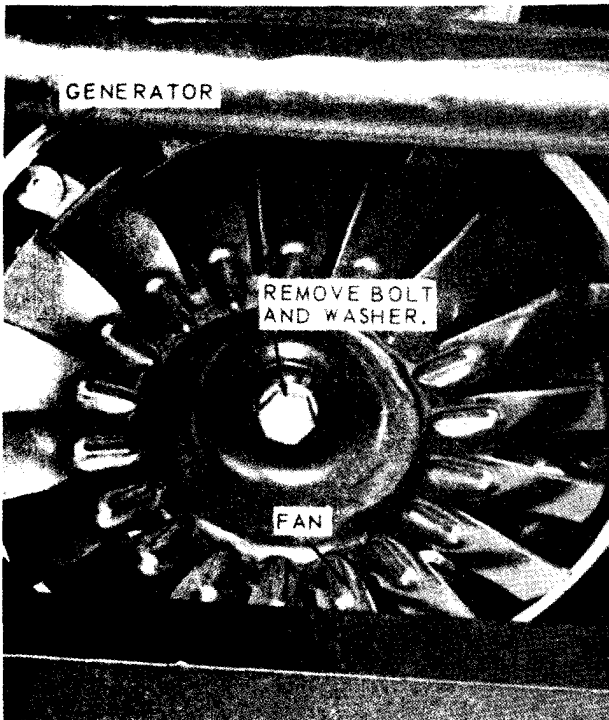
- (6) Install the fuel tank and bracket (paras 4-22 and 4-23).

- (7) Install the control box (para 6-3).

6-5. Generator (DC Unit)

a. Removal.

- (1) Remove the control box (para 6-3).
- (2) Remove the fuel tank and bracket (paras 4-22 and 4-23).
- (3) Remove the generator end cover.



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Figure 6-3. Generator fan, removal and installation.

(4) Using figure 6-3 as a guide, remove the generator fan.

(5) Remove the generator stator housing (fig. 6-4).

(6) Remove the generator rotor (item 27, figure 9-2) using the proper pulling tool (figure 5-1). Insert the 7-3/16 stud through center of rotor and screw into end of crankshaft. Screw the bushing into rotor and tighten until rotor is free of crankshaft.

(7) Using figure 6-5 as a guide, remove the generator adapter from the engine.

b. Installation.

(1) Using figure 6-5 as a guide, install the generator adapter on the engine.

(2) Position the generator rotor (27, fig. 9-2) on the chankshaft of the engine.

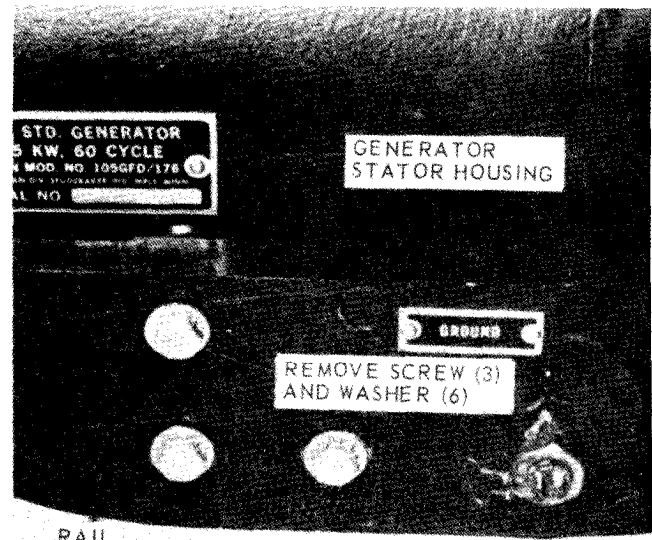
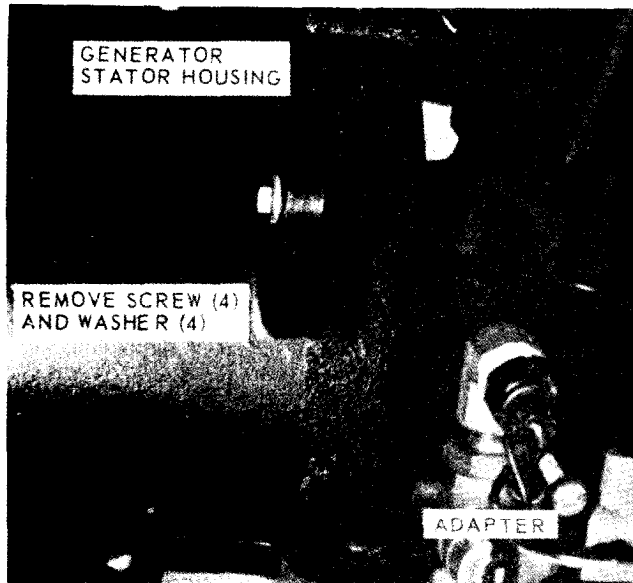
(3) Using figure 6-4 as a guide, install the generator stator housing.

(4) Refer to figure 6-3 and install the generator fan.

(5) Install the generator end cover.

(6) Install the fuel tank and bracket (para 4-22 and 4-23).

(7) Install the control box (para 6-3).



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Figure 6-4. Generator stator housing, removal and installation.

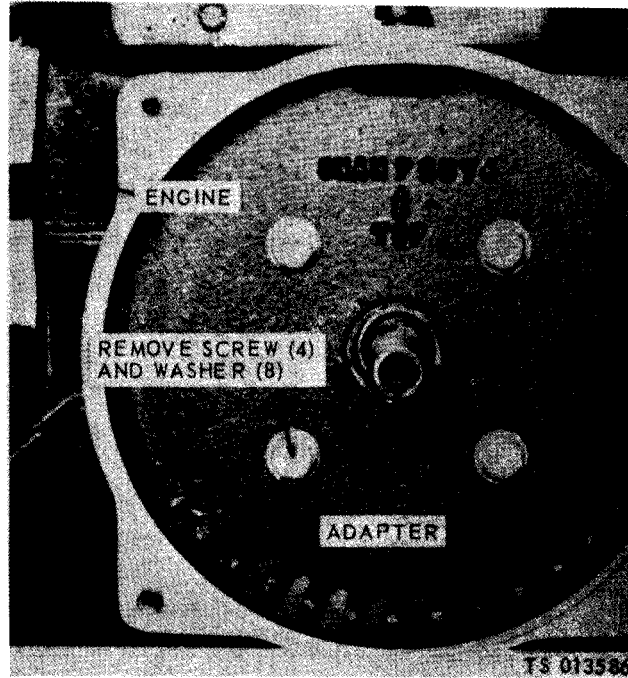


Figure 6-5. Generator adapter, removal and installation.

CHAPTER 7

MAINTENANCE OF THE FRAME ASSEMBLY

7-1. General

The frame serves as the mounting base for all components of the generator set. In addition to its use as the base, its design is such that it affords protection for the components mounted within, and it provides an easy means of carrying the unit when movement is required. This paragraph provides intermediate (field) (direct support and general support) and depot maintenance for the frame assembly.

7-2. Frame Assembly

a. Removal and Disassembly

(1) Remove the engine (para 6-1) and generator (para 6-4 and 6-5).

(2) Refer to figure 7-1 and disassemble the frame.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts thoroughly.

(2) Inspect the frame for distortion, cracks, dents and broken welds.

(3) Inspect the rails for cracks and elongated holes.

(4) Inspect the shock mounts for loose or deteriorated inserts.

(5) Repair the frame and rail as necessary by straightening, using the cutting and welding equipment.

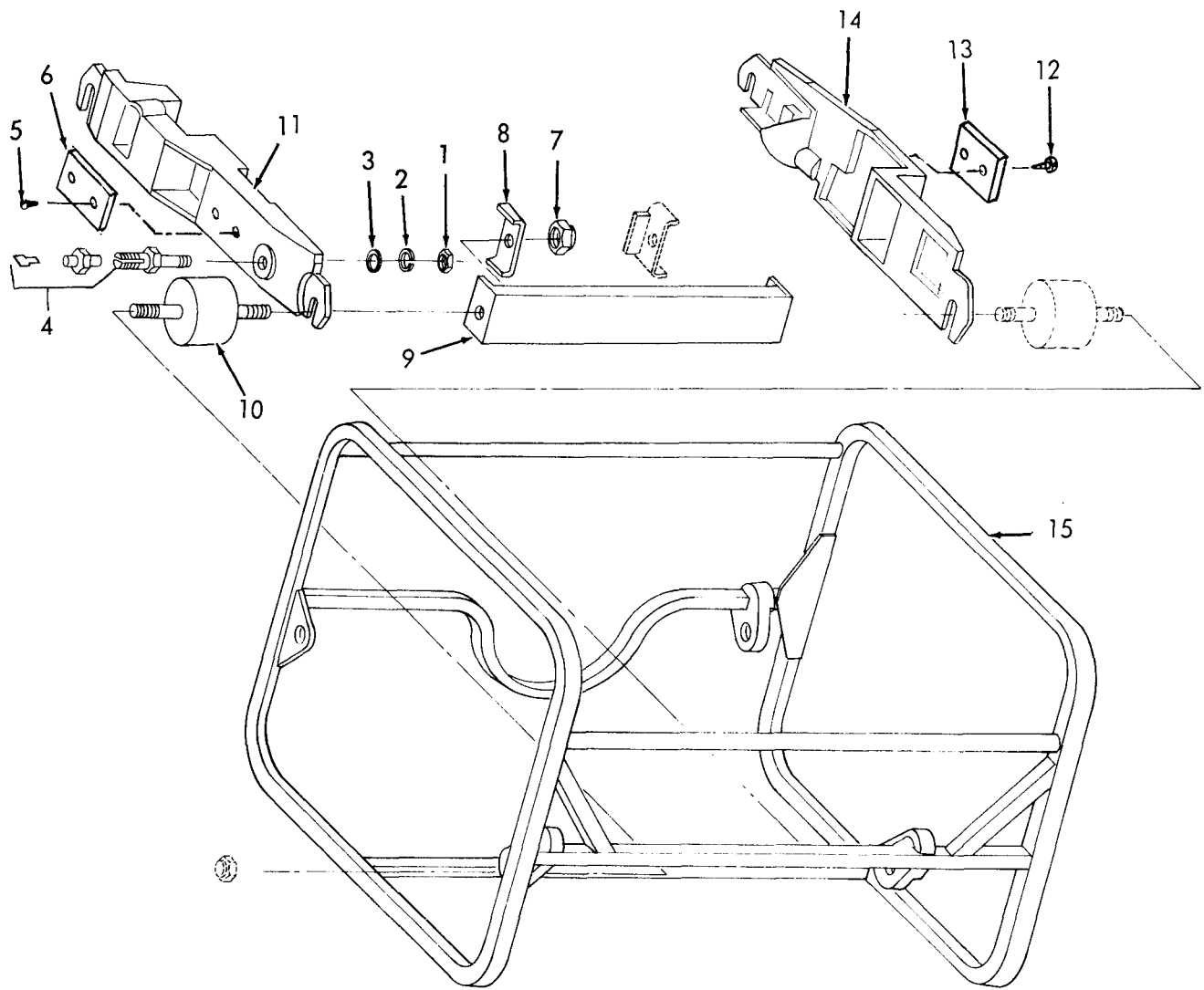
(6) Replace an unrepairable frame or rail.

(7) Replace all other defective parts.

c. Assembly and Installation.

(1) Refer to figure 7-1 and assemble the frame.

(2) Install the engine (para 6-1) and generator (para 6-4 and 6-5).



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- | | | | |
|------------|--------------|---------------|--------------|
| 1 Nut | 5 Drivescrew | 9 Brace | 13 Nameplate |
| 2 Washer | 6 Nameplate | 10 Mount | 14 Rail |
| 3 Washer | 7 Nut | 11 Rail | 15 Frame |
| 4 Terminal | 8 Plate | 12 Drivescrew | |

Figure 7-1. Frame, disassembly and reassembly.

CHAPTER 8

MAINTENANCE OF THE CONTROL BOX ASSEMBLY

8-1. General

All the controls and instruments necessary for the operation of the generator are contained in the control box. These controls and instruments include the voltage regulator, frequency converter, variable resistor, interference suppression components, terminal board, and the necessary wiring harness.

8-2 Control Box (AC Unit)*a. Removal and Disassembly.*

- (1) Remove the control box (para 6-3).
- (2) Refer to figure 8-1 and disassemble the control box.

b. Cleaning and inspection.

- (1) Clean all parts thoroughly.
- (2) Inspect all parts for signs of burning or overheating and for cracks, breaks, defective threads, and other damage.
- (3) Inspect the variable resistor for proper operation and for proper resistance. Resistance should vary smoothly from 0 to 1,100 ohms \pm 20% when the unit is turned through its range. Replace a defective variable resistor.
- (4) inspect wire leads for breaks, poor connections at the terminals and for broken or frayed insulation. Replace defective wire leads.
- (5) Inspect the voltage regulator and transducer for cracks, signs of overheating, and other damage. Replace a defective voltage regulator or transducer.

NOTE

Apply one coat of clear varnish meeting specification MILV-173 to the exposed circuit area of the voltage regulator and transducer.

- (6) Inspect the frequency converter by comparing with a unit known to be good.
- (7) Replace all defective parts.

c. Assembly and Installation.

- (1) Refer to figure 8-1 and assemble the control box.

(2) After the assembly of the control box, apply one coat of clear varnish meeting specification MILV-173, Type II.

- (3) Install the control box (para 6-3).

d. Test. Test the AC control box components as follows:

(1) Frequency meter.

(a) Remove load cables and start the generator set.

(b) With a multimeter, measure DC current across the terminals of the frequency meter. This reading will be in DC micro amps. Reading at minimum deflection of the frequency meter (55 Hz) should be 0 micro amps. Reading at maximum deflection of the frequency meter should be 200 micro amps. Normal reading at 60 Hz should be 100 micro amps \pm 10% (90 to 110 micro amps).

(c) If reading is not within specifications, stop the generator set and connect a frequency meter of known accuracy in series with the set frequency meter. Be sure to observe polarity.

(d) Restart the generator set and compare reading on the set meter and test meter. Frequency variation of test meter and set meter should not exceed 1%.

(e) If frequency variation exceeds 1% of full scale valve (1 Hz), replace the frequency meter.

(f) Disconnect frequency meter used for test.

(2) Voltage regulator.

(a) Select desired voltage setting on the voltage changeover switch (120 V or 240 V) and start the generator set. Load cables should not be attached to the output terminals.

(b) Using a multimeter, check voltage across output terminals to verify reading on set voltmeter. If the voltage is low and adjustment of the variable resistor will not correct the deficiency, check the exciter voltage across terminals 5 and 6 of the voltage regulator. This voltage will vary but should be about 25 volts. If no voltage appears on

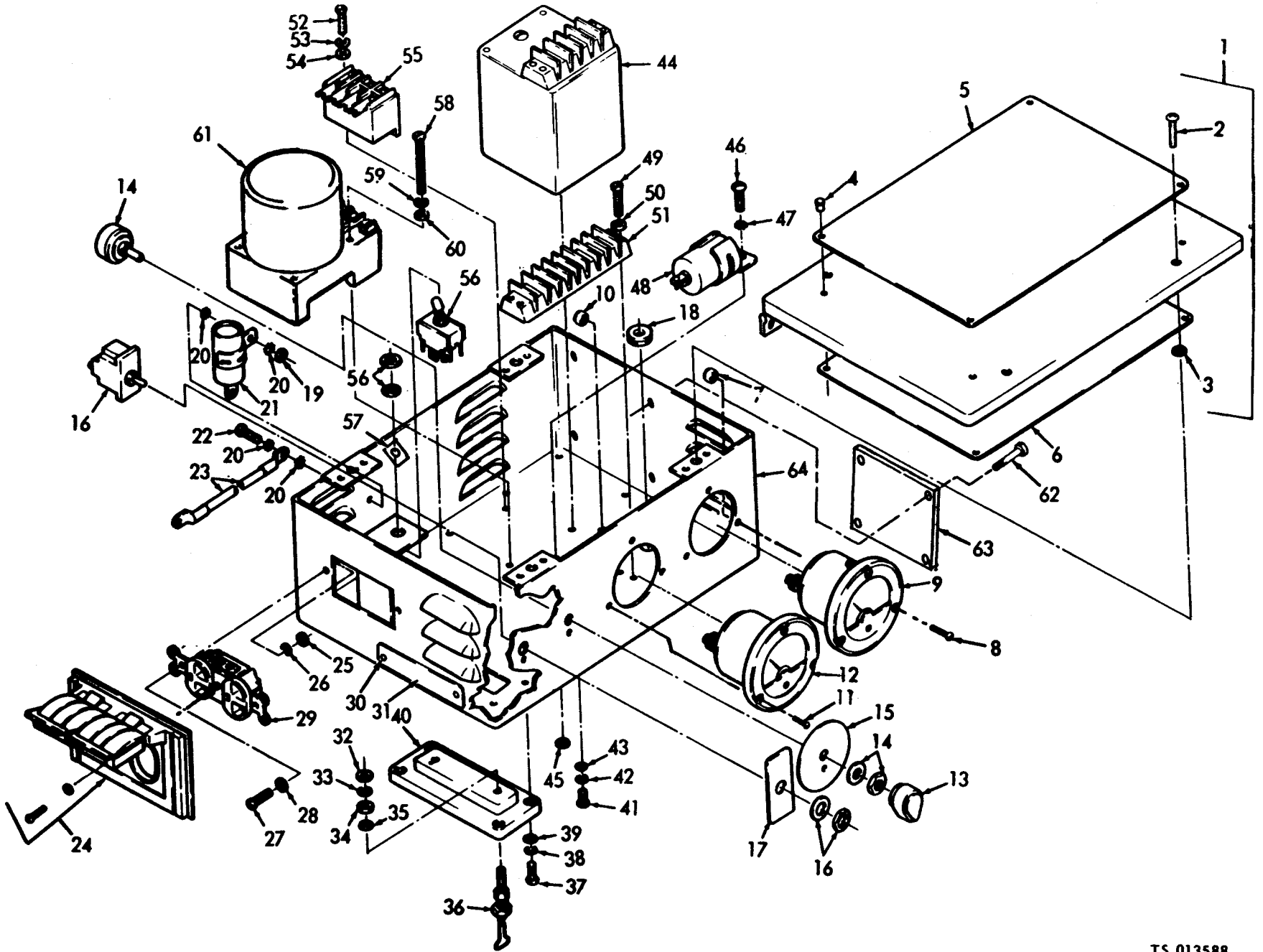


Figure 8-1. Control box, disassembly and reassembly (AC Unit).

| | | | |
|-------------------|--------------|------------------------|----------------------|
| 1 Cover assembly | 17 Plate | 33 Washer | 49 Screw |
| 2 Screw | 18 Grommet | 34 Nut | 50 Washer |
| 3 Nut | 19 Nut | 35 Washer | 51 Terminal board |
| 4 Rivet | 20 Washer | 36 Terminal | 52 Screw |
| 5 Plate | 21 Capacitor | 37 Screw | 53 Washer |
| 6 Plate | 22 Screw | 38 Washer | 54 Washer |
| 7 Nut | 23 Strap | 39 Washer | 55 Transducer |
| 8 Screw | 24 Plate | 40 Insulator | 56 Switch |
| 9 Frequency meter | 25 Nut | 41 Screw | 57 Plate |
| 10 Nut | 26 Washer | 42 Washer | 58 Screw |
| 11 Screw | 27 Screw | 43 Washer | 59 Washer |
| 12 Voltmeter | 28 Washer | 44 Frequency converter | 60 Washer |
| 13 Knob | 29 Connector | 45 Nut | 61 Voltage regulator |
| 14 Resistor | 30 Rivet | 46 Screw | 62 Drivescrew |
| 15 Plate | 31 Nameplate | 47 Washer | 63 Plate |
| 16 Switch | 32 Nut | 48 Capacitor | 64 Box |

Figure 8-1—Continued.

the regulator terminals, the voltage regulator is defective and should be replaced.

(c) If voltage across regulator terminals 5 and 6 is satisfactory, stop the generator set, attach the load cables, and restart the set.

(d) If voltage is still not satisfactory replace the voltage regulator and repeat steps (a) thru (d).

(3) *Transducer.*

(a) Disconnect load cables and start generator set.

(b) With the multimeter, check output voltage across load terminals. Then check input voltage across terminals 3 and 4 of the transducer. These readings should have about the same value (120 V approximately).

(c) Check input voltage from variable resistor across terminals 1 and 2 of transducer. This reading will vary but should be approximately 20 V.

(d) Check transducer output to voltage regulator. Terminals 5 and 6 should be about 120 V. Terminals 7 and 8 should be about 25 volts.

(e) If output voltages do not meet specifications, replace voltage transducer.

(4) *Capacitor (noise suppression).*

NOTE

The only accurate way to test a capacitor is by putting it on a capacitor tester. However, you can tell if a capacitor is working by the following method.

(a) Stop the generator and disconnect the lead-in terminal to the capacitor.

(b) With the multimeter on ohms setting, touch test probes to input terminal and capacitor metal case, then reverse the probes. The multimeter will give a momentary reading then fall back to zero.

(c) If this reading does not occur, replace the capacitor.

(5) *Frequency converter.*

(a) Stop the generator set and disconnect either the positive or negative lead from the frequency converter output to the frequency meter.

(b) Start the generator set and measure input voltage across terminals L1 on the frequency converter with a multimeter. This voltage will normally be 120 volts AC.

(c) Observing polarity with the multimeter, measure DC microamper current output on + and - terminals at the converter. This microamper DC should be within the 0 to 200 microamper range, and at 120 volts, 60 Hz, during operation this reading should be close to 100 microamper.

(d) If measurements do not meet specifications above, replace the frequency converter.

(6) *Variable resistor (AC).*

(a) Stop generator set and disconnect terminal 5 of TB 1 (fig. 1-5).

(b) Insert multimeter probes to this disconnected wire and terminal 6 in TB 1 (fig. 1-5). With the variable resistor in the full counterclockwise position slowly turn the control knob to the full clockwise position. This reading should move smoothly from 0 to 1100 ohms \pm 20%, as the variable resistor is rotated to the full clockwise position.

(c) If the reading is not within specifications, replace the variable resistor.

8-3. Control Box (DC Unit)

a. *Removal and Disassembly.*

- (1) Remove the control box (para 6-3).
- (2) Refer to figure 8-2 and disassemble the control box.

b. *Cleaning and Inspection.*

- (1) Clean all parts thoroughly.
- (2) Inspect all parts for signs of burning or

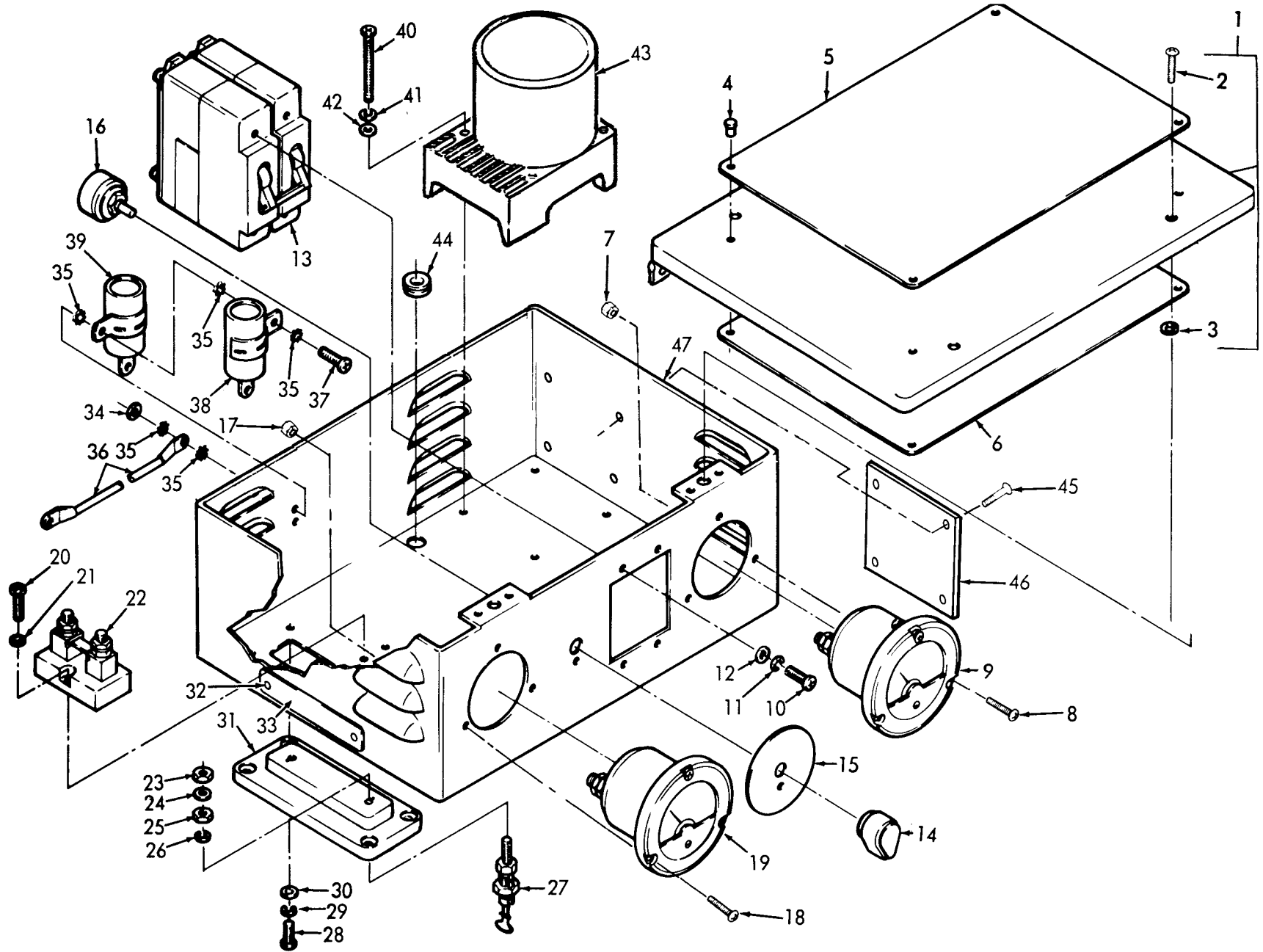


Figure 8-2. Control box assembly and reassembly (DC Unit).

| | | | |
|------------------|--------------------|------------------|----------------------|
| 1 Cover assembly | 13 Circuit breaker | 25 Nut | 37 Screw |
| 2 Screw | 14 Knob | 26 Washer | 38 Capacitor |
| 3 Nut | 15 Plate | 27 Terminal stud | 39 Capacitor |
| 4 Rivet | 16 Resistor | 28 Screw | 40 Screw |
| 5 Plate | 17 Nut | 29 Washer | 41 Washer |
| 6 Plate | 18 Screw | 30 Washer | 42 Washer |
| 7 Nut | 19 Voltmeter | 31 Insulator | 43 Voltage regulator |
| 8 Screw | 20 Screw | 32 Rivet | 44 Grommet |
| 9 Load meter | 21 Washer | 33 Nameplate | 45 Rivet |
| 10 Screw | 22 Shunt | 34 Nut | 46 Plate |
| 11 Washer | 23 Nut | 35 Washer | |
| 12 Washer | 24 Washer | 36 Strap | |

Figure 8-20—Continued.

overheating and for cracks, breaks, defective threads, and other damage.

(3) Inspect the variable resistor for proper operation and for proper resistance. Resistance should vary smoothly from 0 to 1,500 ohms when the unit is turned through its range. Replace a defective variable resistor.

(4) Inspect wire leads for breaks, poor connections at the terminals and for broken or frayed insulation. Replace defective wire leads.

(5) Inspect the voltage regulator for cracks, breaks, signs of overheating, and other damage. Replace a defective voltage regulator.

NOTE

Apply one coat of varnish meeting specification MIL-V-173 to the exposed circuit area of the voltage regulator.

c. Assembly and Installation.

(1) Refer to figure 8-2 and assemble the control box.

(2) After assembly of the control box, apply one coat of clear varnish meeting specification MIL-V-173, Type II.

(3) Install the control box (para 6-3).

d. Test. Test the DC control box components as follows:

(1) *Voltage regulator.*

(a) Disconnect load cables and start generator set.

(b) Trip the circuit breaker to "ON" position, and observe reading on set voltmeter.

(c) Using a multimeter, check the voltage across the output terminals to verify the reading on the set voltmeter. If the voltage is low and adjustment of the variable resistor will not correct the deficiency, check the exciter voltage across terminals 5 and 6 of the voltage regulator. This voltage will vary but should be about 25 volts. If no voltage appears on the regular terminals, the voltage regulator is defective and should be replaced.

(d) If voltage across regulator terminals 5 and 6 is satisfactory, stop the generator set, attach the load cables, and restart the set.

(e) If voltage is still not satisfactory, replace the voltage regulator and repeat steps (a) thru (d) above.

(2) *Circuit breaker.*

(a) Attach a variable load to the output terminals and start the generator.

(b) Move circuit breaker to ON position and observe the load meter and voltmeter. Reading should be 28 V at 100% load.

(c) Adjust the variable load until a reading of 125% is obtained on the load meter. The circuit is designed to trip at 125% maximum load.

(d) If the circuit breaker trips below 125% maximum load, replace it.

(3) *Capacitor (noise suppression).*

NOTE

The only accurate way to test a capacitor is by putting it on a capacitor tester. However, you can tell if a capacitor is working by the following method.

(a) Stop the generator set and disconnect the lead-in terminal to the capacitor.

(b) With multimeter on the high scale ohms setting, touch the test probes to the input terminal and the capacitor metal case, then reverse the probes. The multimeter will give a momentary reading then fall back to 0.

(c) If this reading does not occur, then replace the capacitor.

(4) *Variable resistor (DC).*

(a) Stop generator set and disconnect terminal 1 on the voltage regulator.

(b) Insert multimeter probes across the two outside connected terminals of the variable resistor. With the variable resistor in the full counterclockwise position, slowly turn the control knob to the full clockwise position. This reading should move smoothly from 0 to 1500 ohms \pm 20% as the variable resistor is rotated to the full clockwise position.

(c) If the reading is not within specifications, then replace the variable resistor.

8-4. Radio Interference Suppression

a. *General.* This paragraph contains information applicable to the primary suppression components that are the responsibility of intermediate (field), (direct support and general support), and depot maintenance. For general information on radio interference suppression, refer to paragraph 4-13. For radio interference suppression information that applies to the engines, refer to the appropriate service manual for engines (See Appendix A).

b. *Interference Suppression Components.*

(1) *AC Unit.* The control box of the AC unit is equipped with two capacitors that are provided for interference suppression. They are rated at 0.1 MFD, 500 V, AC/DC. These capacitors are shown by figure 8-3.

(2) *DC Unit.* The DC Unit control box is equipped with two capacitors that provide suppression of radio interference. They are rated

at 0.5 MFD, 100 V DC. These capacitors are shown by figure 8-4.

c. *Replacement of Suppression Components.*

(1) *AC Unit.* For replacement of interference suppression components on the AC unit, refer to figure 8-3.

(2) *DC Unit.* For replacement of interference suppression components on the DC unit, refer to figure 8-4.

d. *Testing of Radio Interference Suppression Components.*

NOTE

The only accurate way to test a capacitor is by putting it on a capacitor tester. However, you can tell if a capacitor is working by the following method.

(1) Stop the generator set and disconnect the lead-in terminal to the capacitor.

(2) With the multimeter on the high scale ohms setting, touch the test probes to the input terminal and the capacitor metal case, then reverse the probes. The multimeter will give a momentary reading, then fall back to 0.

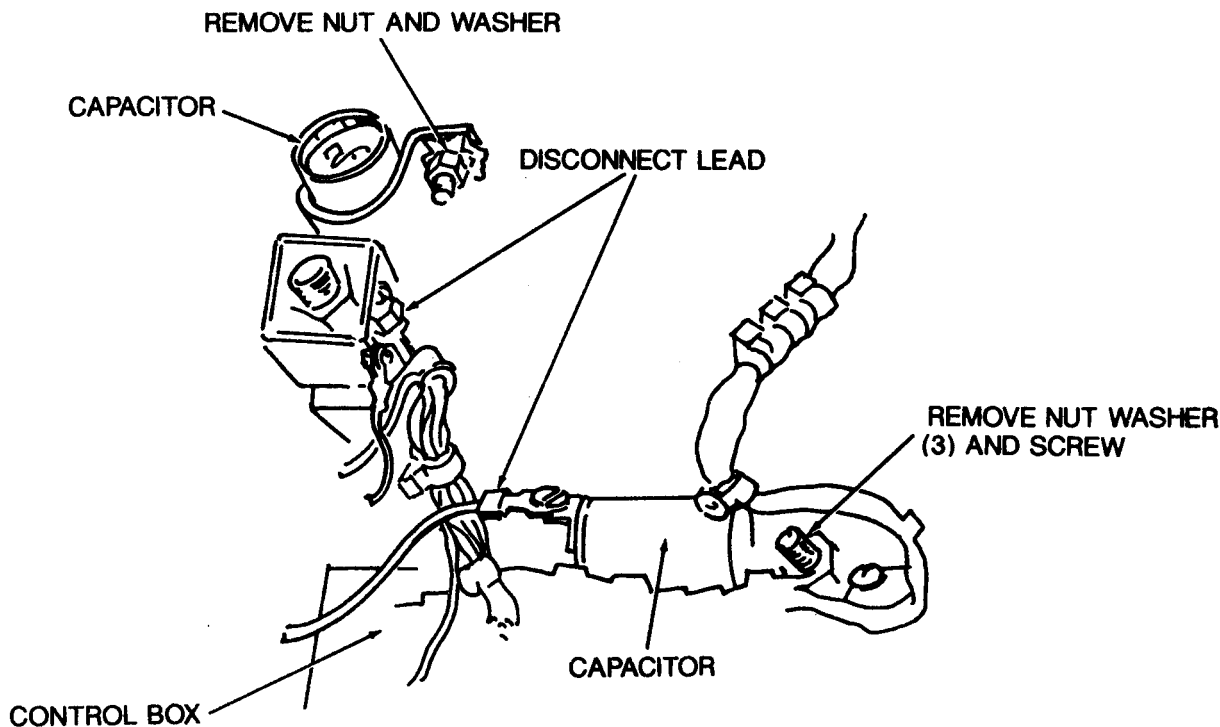


Figure 8-3. Radio interference suppression components, removal and installation (AC Unit).

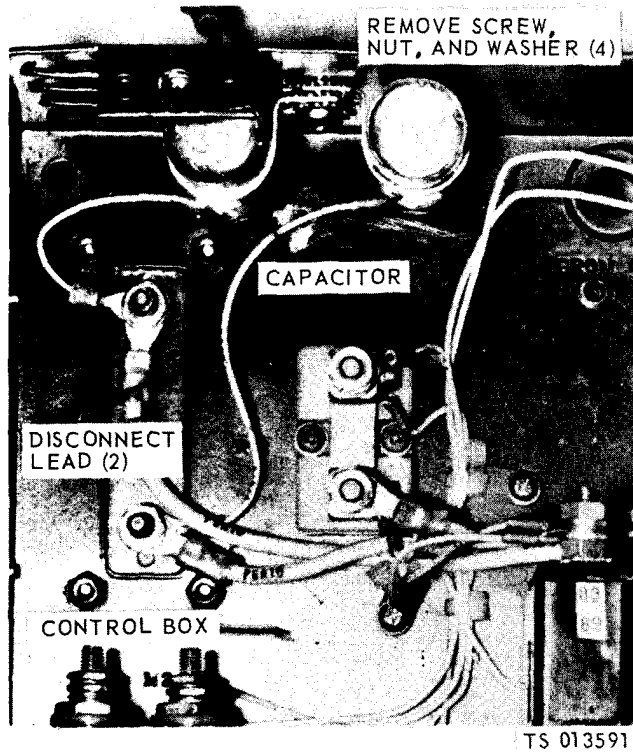


Figure 8-4. Radio interference suppression components, removal and installation (DC Unit).

(3) If this reading does not occur, then replace the capacitor.

8-5. Wiring Harness

a. Inspection. Inspect the wiring and wiring harness for breaks, poor connections at the terminals, broken or frayed insulation, and other damage.

b. Test. Test the wiring for continuity using a multimeter.

c. Repair.

(1) Wrap slight insulation deterioration with electrical tape.

(2) Make soldering connections wherever possible.

d. Removal. Tag each wire and corresponding terminal to insure correct installation and replacement.

e. Installation. Install wires in the reverse order of removal and remove all tags.

CHAPTER 9

MAINTENANCE OF THE GENERATOR ASSEMBLY

9-1. Generator (AC Unit)*a. Removal.*

- (1) Remove the control box (para 6-3).
- (2) Remove the fuel tank and bracket (paras 4-22 and 4-23).
- (3) Remove the generator end cover.
- (4) Using figure 6-3 as a guide, remove the generator fan.
- (5) Refer to figure 6-4 and remove the generator stator housing.
- (6) Use a proper pulling tool (fig. 5-1) and remove the generator rotor (14, fig. 9-1) from the crankshaft of the engine.
- (7) Refer to figure 6-5 and remove the generator adapter from the engine.

b. Disassembly. Refer to figure 9-1 and disassemble the generator.

c. Cleaning and Inspection.

- (1) Clean all parts thoroughly.
- (2) Inspect the stator housing for cracks, distortion, damaged threads, elongated holes, worn bearing seat, and other damage.
- (3) Inspect the installed stators for signs of burning, overheating, broken insulation and other damage.
- (4) Inspect the alternator rotor for scored or burned bearing seat, distortion, and other damage.
- (5) Inspect the bearing for signs of heat, rough spots when burned, fatigue or chipping, and other damage.
- (6) Replace all defective parts.

d. Assembly. Refer to figure 9-1 and assemble the generator.

e. Installation.

- (1) Refer to figure 6-5 and install the generator adapter on the engine.
- (2) Position the generator rotor (14, fig. 9-1) on the crankshaft of the engine.
- (3) Refer to figure 6-4 and install the generator stator housing.
- (4) Refer to figure 6-3 and install the generator fan.

(5) Install the generator end cover.

(6) Install the fuel tank and bracket (paras 4-22 and 4-23).

(7) Install the control box (para 6-3).

f. Test

(1) Start the generator set and allow it to warm up.

(2) Observe the voltmeter on the front of the control box. If the exciter or stator is defective, there will be no voltage reading on the set voltmeter.

(3) If no voltage appears on the set voltmeter, stop the set and disconnect terminals 2 and 4 of TB 1. Measure resistance between stator leads T1 and T2, and T3 and T4. This reading should be 1.32 ohms + 10%.

(3.1) Exciter stator winding resistance should be 215 ohms \pm 10% at 25° C.

(4) If resistance readings do not meet specifications, replace stator. If readings are as prescribed, replace rotor.

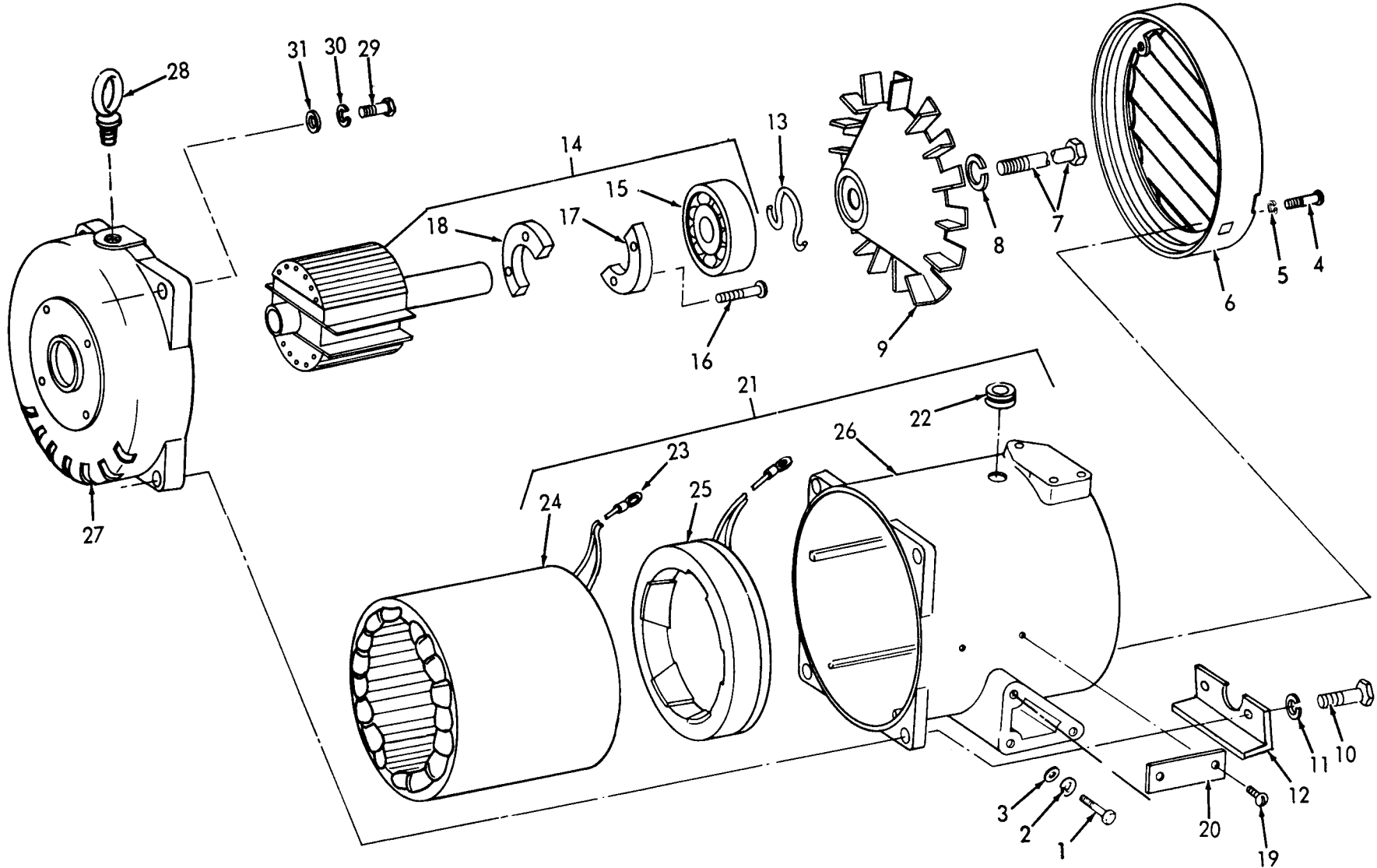
9-2. Generator (DC Unit)*a. Removal.*

- (1) Remove the control box (para 6-3).
- (2) Remove the fuel tank and bracket (para 4-22 and 4-23).
- (3) Remove the generator end cover.
- (4) Using figure 6-3 as a guide, remove the generator fan.
- (5) Refer to figure 6-4 and remove the generator stator housing.
- (6) Use a proper pulling tool (fig. 5-1) and remove the generator rotor (27, fig. 9-2) from the crankshaft of the engine.
- (7) Refer to figure 6-5 and remove the generator adapter from the engine.

b. Disassembly. Refer to figure 9-2 and disassemble the generator.

c. Cleaning and Inspection.

- (1) Clean all parts thoroughly.



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Figure 9-1. Generator, disassembly and reassembly (AC Unit).

| | | | |
|----------|-------------------|---------------------|-------------|
| 1 Screw | 9 Fan | 17 Rectifier | 25 Stator |
| 2 Washer | 10 Screw | 18 Rectifier | 26 Housing |
| 3 Washer | 11 Washer | 19 Screw | 27 Adapter |
| 4 Screw | 12 Baffle | 20 Plate | 28 Eye bolt |
| 5 Washer | 13 Clip | 21 Housing assembly | 29 Bolt |
| 6 Cover | 14 Rotor assembly | 22 Grommet | 30 Washer |
| 7 Screw | 15 Bearing | 23 Terminal lug | 31 Washer |
| 8 Washer | 16 Screw | 24 Stator | |

Figure 9-1—Continued.

(2) Inspect stator housing for cracks, distortion, damaged threads, elongated holes, a worn bearing seat, and other damage.

(3) Inspect the installed stators for signs of burning, overheating, broken insulation and other damage.

(4) Inspect the positive and negative heat sinks for cracks, burned areas, and other damage.

(5) Inspect the DC unit alternator rotor for a scored or burned bearing seat, for distortion, and other damage.

(6) Inspect the bearing for signs of heat, rough spots when burned, fatigue or chipping, and other damage.

(7) Replace all defective parts.

d. Assembly. Refer to figure 9-2 and assemble the generator.

e. Installation.

(1) Refer to figure 6-5 and install the generator adapter on the engine.

(2) Position the generator rotor (27, fig. 9-2) on the crankshaft of the engine.

(3) Refer to figure 6-4 and install the generator stator housing.

(4) Refer to figure 6-3 and install the generator fan.

(5) Install the generator end cover.

(6) Install the fuel tank and bracket (para 4-22 and 4-23).

(7) Install the control box (para 6-3).

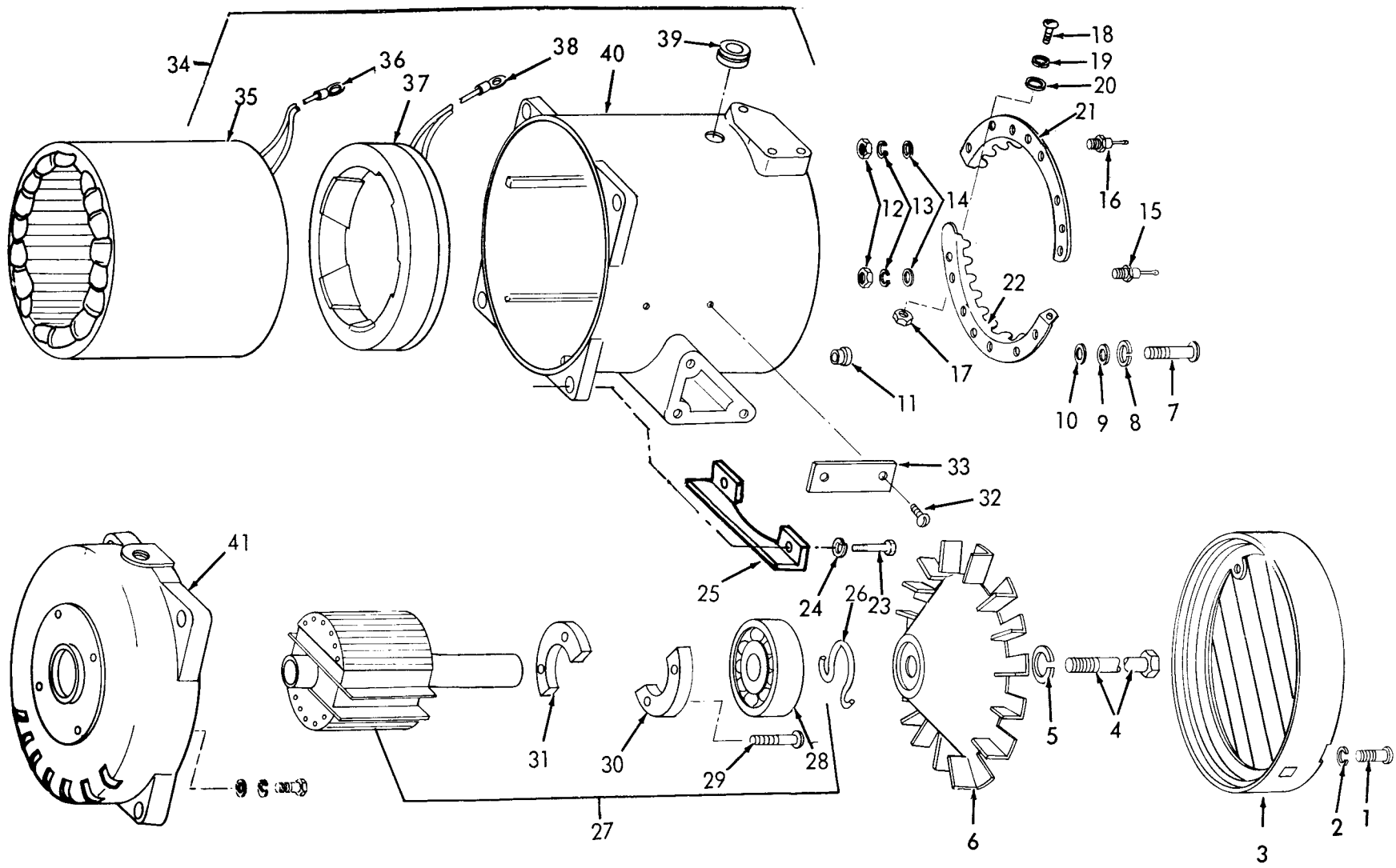
f. Test.

(1) Start the generator set and allow it to warm up.

(2) Observe the voltmeter on the front of the control box. If the exciter or stator is defective there will be no voltage reading on the set voltmeter.

(3) If no voltage appears on the set voltmeter, stop the set and disconnect terminals 3, 4, 5, and 6 at voltage regulator. With a multimeter, measure resistance across disconnected leads F1 and F2 (wires from terminals 5 and 6 of voltage regulator) to exciter, and leads T1 and T2 (wires from terminals 3 and 4 of voltage regulator) to stator. These resistances should be 215 ohms \pm 10% and 8.2 ohms \pm 10%, respectively.

(4) If resistance readings do not meet specifications, replace the stator. If resistance readings are as prescribed, replace the rotor.



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Figure 9-2. Generator, disassembly and reassembly (DC Unit).

| | | | | |
|----------|------------------|-------------------|---------------------|-----------------|
| 1 Screw | 10 Washer | 19 Washer | 28 Bearing | 37 Stator |
| 2 Washer | 11 Bushing | 20 Washer | 29 Screw | 38 Terminal lug |
| 3 Cover | 12 Nut | 21 Heat sink | 30 Rectifier | 39 Grommet |
| 4 Screw | 13 Washer | 22 Heat sink | 31 Rectifier | 40 Housing |
| 5 Washer | 14 Washer | 23 Screw | 32 Screw | 41 Adapter |
| 6 Fan | 15 Semiconductor | 24 Washer | 33 Plate | |
| 7 Screw | 16 Semiconductor | 25 Baffle | 34 Housing assembly | |
| 8 Washer | 17 Nut | 26 Clip | 35 Stator | |
| 9 Washer | 18 Screw | 27 Rotor assembly | 36 Terminal lug | |

Figure 9-2—Continued.

APPENDIX A

REFERENCES

This appendix contains a list of reference manuals that may be used in conjunction with this TM in the operation and maintenance of the 1.5 KW DOD Generator. Those manuals not coded are applicable for use by all services. The manuals are coded (A), for Army use; and (F), for Air Force use.

A-1. Fire Protection

TB 5-4200-200-10 Hand Portable Fire Extinguishers Approved for Army Use

A-2. Lubrication

C9100-IL (A) Identification List for Fuels, Lubricants, Oils and Waxes
LO 5-2805-257-12 (A) Engine, Gasoline: 3 HP; Military Standard Models 2A016-1, 2A016-2, and 2A016-3
TB 703-1 (A) Specification List of Standard Liquid Fuels, Lubricants, Preservatives, and Related Products Authorized for Use by U. S. Army
T.O. 35C2-3-1-426WC-3-5-1 (F) Preventive Maintenance Wordcards

A-3. Painting

AR 740-1 (A) Color, Marking, and Preparation of Equipment for Shipment
AR 746-5 (A) Color and Marking of Army Materiel
T.O. 35-1-3 (F) Painting and Marking of USAF Aerospace Ground Equipment
MIL-V-173 (A) Varnish, Moisture and Fungus Resistant (For Treatment of Communications, Electronic, and Associated Equipment)

A-4. Radio Suppression

TM 11-483 (A) Radio Interference Suppression
MIL-STD-461 (A, F) Radio Interference Suppression

A-5. Maintenance

TM 5-2805-257-14 (A) Operator, Organizational, DS, and GS Maintenance Manual for Engine, Gasoline, 3 HP Military Standard Models 2A016-1, 2A016-2 and 2A016-3
T.O. 38G2-103-2 (F)
TM 5-764 (A) Electric Motor and Generator Repair
T.O. 34Y19-1-111 (F) Electric Motor and Generator Repair
TM 38-750 (A) The Army Maintenance Management System (TAMMS)
AFM 66-1 (F) Maintenance Management
TM 5-2805-257-24P (A) Organizational, Direct and General Support Maintenance Repair Parts and Special Tool Lists: Engine, Gasoline, 3 HP Military Standard Models 2A016-1, 2A016-2 and 2A016-3
T.O. 38G2-103-4 (F)
T.O. 35C2-3-1-426 (F) Inspection and Maintenance Manual
T.O. 35C2-3-1426WC-3-5-1 (F) Preventive Maintenance Workcards
TM 5-6115-323-24P (A) Organizational, Direct and General Support Repair Parts and Special Tool Lists for Generator Set, GED, 1.5 KW, Military Design (less engine); AC, 60 HZ, DOD Model MEP-015A; DC, 28 V, DOD Model MEP-025A
T.O. 35C2-3-385-4 (F)
T.O. 00-5-1 (F) Air Force Technical Order System

TM 5-6115-323-14

A-6. Shipment and Storage

| | |
|-----------------|---|
| TM 740-90-1 (A) | Administrative Storage of Equipment |
| TB 740-97-2 (A) | Preservation of TROSCOM Mechanical Equipment for Shipment and Storage |
| T.O. 35-14 (F) | Processing and Inspection of Aerospace Ground Equipment |
| T.O. 38-1-5 (F) | Processing and Inspection of Non-Mounted, Non-Aircraft Gasoline and Diesel Engines for Storage and Shipment |

A-7. Operation

| | |
|----------------|---------------------------------------|
| TM 5-766 (A) | Electric Power Generator in the Field |
| TB MED 251 (A) | Noise and Conservation of Hearing |

A-8. Demolition of Equipment

| | |
|------------------|--|
| TM 750-244-3 (A) | Procedures for Destruction of Equipment to Prevent Enemy Use (Troop Support Command) |
|------------------|--|

**APPENDIX B
BASIC ISSUED ITEMS LIST AND ITEMS TROOP INSTALLED
OR AUTHORIZED**

B-1. Scope

(A) This appendix lists items required by the operator for operation of the generator set.

B-2. General

This list is divided into the following sections:

a. Basic Issue Items List — Section II. Not applicable.

b. Items Troop Installed or Authorized List — Section III. A list of items in alphabetical sequence which at the discretion of the unit commander may accompany the generator set. These items are NOT subject to turn-in with the generator set when evacuated.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Items Troop Installed or Authorized, Section III.

a. National/NATO Stock Number. This column indicates the National/NATO stock number assigned to the item and will be used for requisitioning purposes.

b. Description. This column indicates the Federal item name and may additional description of the item required.

c. Unit of Measure (U/M). A two-character alphabetic abbreviation indicating the amount or quantity of the items upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Authorized. This column indicates the quantity of the item authorized to be used with the equipment.

f. When a spark arrester is required, the installation procedure will be on the instruction sheet furnished with the spark arrester kit located on page B-2, TM 5-6115-323-14.

WARNING

The United States Forestry Service requires that any engine driven equipment operating within National Forests or Parks be provided with spark arresters for the avoidance of forest fires.

Section III. Items Troops Installed or Authorized List

| National Stock Number | Description | U/M | Qty Auth |
|-----------------------|---|-----|----------|
| 2910-00-066-1235 | ADAPTER, Drum | EA | 1 |
| 7520-00-559-9618 | CASE, Maintenance and Operation Manuals | EA | 1 |
| 6115-00-941-1655 | COVER, Canvas | EA | 1 |
| 4210-00-555-8837 | EXTINGUISHER, Fire HOSE ASSY, Auxiliary, Fuel-Make from: | EA | 1 |
| 4720-00-540-1962 | HOSE, Bulk | FT | AR |
| 4730-00-497-4281 | ADAPTER, Straight | EA | 1 |
| 5330-00-248-3838 | PACKING, O Ring | EA | 1 |
| 5120-00-243-2957 | Hammer, Hand, Engineers 8 lb. (3.6kg) (81348) GGG-H-86 | EA | 1 |
| 5975-00-878-3791 | Rod, Ground, Driven, Sectional, (2.7 m) (81349) MIL-R-11461 | EA | 2 |
| 5120-01-013-1676 | Hammer, Slide (97403) 13226E7741 | EA | 1 |
| 5990-00-186-3912 | CLAMP, Electrical; P/N 70-801074 (04655) or P/N J-AB 5/8H (81790) | EA | 1 |
| 5940-00-271-9504 | TERMINAL LUG; P/N CBA-70 (01667) or P/N 332-142 (44940) | EA | 1 |
| 6145-01-226-9164 | WIRE, Electrical; P/N QQW343C06B1B | FT | 6 |
| 4730-00-391-3771 | ADAPTER, Straight | EA | 1 |
| 2990-01-032-0755 | Arrester, Spark, Exhaust 13215E4080 97403 | EA | 2 |

B-2 Change 10

APPENDIX C

MAINTENANCE ALLOCATION CHART (Army Only)

Section I. INTRODUCTION

C-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II.

C-2. Explanation of Columns in Section II

a. Column (1), Group Number. Column 1 lists group numbers to identify related components, assemblies, subassemblies, and modules with their next higher assembly. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

b. Column (2), Component/Assembly. This column contains the noun names of components, assemblies, subassemblies and modules for which maintenance is authorized.

c. Column (3), Maintenance Functions. This column lists the functions to be performed on the item listed in Column 2. The maintenance functions are defined as follows:

(1) *Inspect.* To determine serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

(2) *Test.* To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and compar-

ing those characteristics with prescribed standards.

(3) *Service.* Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

(4) *Adjust.* To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

(5) *Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.

(6) *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

(7) *Install.* The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

(8) *Replace.* The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

(9) *Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

(10) *Overhaul.* That maintenance effort (service/action) necessary to restore an item to a com-

pletely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to a like new condition.

(11) *Rebuild*. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

d. Column (4), Maintenance Category. This column is made up of subcolumns for each category of maintenance. Work time figures are listed in these subcolumns for the lowest level of maintenance authorized to perform the function listed in Column 3. These figures indicate the average active time required to perform the maintenance function at the indicated category of maintenance under typical field operating conditions.

e. Column (5), Tools and Equipment. This column is provided for referencing by code, the com-

mon tool sets (not individual tools), special tools, test and support equipment required to perform the designated function.

C-3. Explanation of Columns in Section III

a. Column (1), Reference Code. This column consists of an arabic number listed in sequence from Column 5 of Section II. The number references the common tool sets, special tools and test equipment requirements.

b. Column (2), Maintenance Category. This column shows the lowest category of maintenance authorized to use the special tools or test equipment.

c. Column (3), Nomenclature. This column lists the name or identification of the common tool sets, special tools or test equipment.

d. Column (4), National/NATO Stock No. (NSN). This column is provided for the NSN of common tool sets, special tools and test equipment listed in the nomenclature column.

e. Column (5), Tool Number. This column lists the manufacturer's code and part number of tools and test equipment.

Section II. MAINTENANCE ALLOCATION CHART

**GENERATOR, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TUBULAR FRAME, 1.5KW,
SINGLE PHASE, AC, 120/140 VOLTS, 28 V DC (LESS ENGINE) (Army Only)**

| (1) Group Number | (2) Component/Assembly | (3) Maintenance function | (4) Maintenance Category* | | | | | (5) Tools And Equipment |
|---------------------|-------------------------------------|-------------------------------|------------------------------|-------------------|------------|---|---|----------------------------|
| | | | C | O | F | H | D | |
| 01 | FRAME ASSEMBLY | | | | | | | 3 |
| | Frame | Inspect Replace Repair | 0.1 | 1.0 1.0 | | | | |
| | Shock Mounts | Inspect Replace | 0.1 | 0.8 | | | | |
| 02 | CONTROL BOX ASSEMBLY Control Box | Inspect Replace Repair | | 0.2 | 1.0 2.0 | | | 4 |
| | | Screw and Nut, Cover Retainer | Inspect Replace | | 0.1 0.2 | | | |
| | Resistor, Variable | Inspect Test Replace | | 0.1 0.1 0.1 | | | | |
| | Meter, Voltage | Inspect Test Replace | | 0.1 0.1 0.4 | | | | |
| | Switch, Load/Voltage | Inspect Test Replace | | 0.1 0.1 0.2 | | | | |
| | Meter, Load | Inspect Test Replace | | 0.1 0.1 0.4 | | | | |
| | Voltage Regulator | Inspect Test Replace | | 0.2 0.1 0.4 | | | | |
| | Connector, Receptacle | Inspect Replace | | 0.1 0.3 | | | | |

Section II. MAINTENANCE ALLOCATION CHART (Cont)

**GENERATOR, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TUBULAR FRAME, 1.5KW,
SINGLE PHASE, AC, 120/140 VOLTS, 28 V DC (LESS ENGINE) (Army Only)**

| (1) Group Number | (2) Component/Assembly | (3) Maintenance function | (4) Maintenance Category* | | | | | (5) Tools And Equipment |
|---------------------|---------------------------|--------------------------------------|------------------------------|--------------------------|-----|---|------------|----------------------------|
| | | | C | O | F | H | D | |
| 03 | Terminal, Load Block | Inspect Replace | 0.1 | 0.3 | | | | |
| | Wiring Harness | Inspect Test Replace Repair | | 0.1 0.1 0.4 1.0 | | | | 4 |
| | Meter, Frequency | Inspect Test Replace | | 0.2 0.1 0.4 | | | | 4 |
| | Transducer | Inspect Test Replace | | 0.2 0.1 0.4 | | | | 4 |
| | Terminal Load Insulator | Inspect Replace | | 0.1 0.3 | | | | |
| | GENERATOR ASSEMBLY | | | | | | | |
| | Rotor Assembly | Inspect Test Replace | | 0.4 0.1 | 1.0 | | | 2 4 |
| | Bearing | Inspect Replace | | 0.4 | 1.2 | | | |
| | Cooling Fan | Inspect Replace | | 0.2 | 0.3 | | | |
| | Housing Assembly | Inspect Replace Repair | | 0.4 | 1.5 | | 2.0 | 3 |
| | Stator, Exciter | Inspect Test Replace Repair | | 0.1 | 0.4 | | 2.0 2.0 | 4 |

Section II. MAINTENANCE ALLOCATION CHART (Cent)

**GENERATOR, GASOLINE ENGINE DRIVEN, SKID MOUNTED, TUBULAR FRAME, 1.5KW,
SINGLE PHASE, AC, 120/140 VOLTS, 28 V DC (LESS ENGINE) (Army Only)**

| (1) Group Number | (2) Component/Assembly | (3) Maintenance function | (4) Maintenance Category* | | | | | (5) Tools And Equipment |
|---------------------|---------------------------|--|------------------------------|-----|-----|-----|------------|----------------------------|
| | | | C | O | F | H | D | |
| 04 | Housing | Replace Repair | | | | | 2.0 1.0 | 3 |
| | Stator, Alternator | Inspect Test Replace Repair | | 0.1 | 0.4 | | 2.0 2.0 | 4 |
| | FUEL SYSTEM | | | | | | | |
| | Tank | Inspect Replace | 0.1 | 0.5 | | | | |
| | Cap and Chain Assembly | Inspect Replace | 0.1 | 0.2 | | | | |
| | Strainer, Fuel Tank | Inspect Replace | 0.1 0.1 | | | | | |
| | Fuel Filter | Inspect Replace | 0.1 0.1 | | | | | |
| | Fuel Line | Inspect Replace | 0.1 | 0.5 | | | | |
| | Valve, Three Way | Inspect Replace | 0.1 | 0.4 | | | | |
| | 05 | ENGINE ASSEMBLY See TM5-2805-257-14 | Replace | | | 1.0 | | |

***SUBCOLUMNS ARE AS FOLLOWS: C-OPERATOR/CREW O-ORGANIZAITONAI F-DIRECT SUPPORT;
H-GENERAL SUPPORT; D-DEPOT**

****INDICATES WORKTIME/MANHOURS REQUIRED**

Section III. TOOL AND TEST EQUIPMEIW REQUIREMENTS

| (1) Reference Code | (2) Maintenance Category | (3) Nomenclature | (4) National Stock Number (NSN) | (5) Tool Number |
|-----------------------|-----------------------------|---|------------------------------------|--------------------|
| 1 | F | Refer to TM 5-2805-257-14 for Engine Tool and Test Equipment Requirements. Engine Model MIL-STD 2A016-3. | | |
| 2 | F | See Table 5-1, Chapter 5, and Figure 5-1. No other special tools or test equipment, required for listed generator sets. | | |
| 3 | F | TORCH OUTFIT, CUTTING AND WELDING (Tool Set L/IW 67706) | 3433-090-357-6311 or equal | |
| 4 | O | MULTIMETER | 6625-00-581-2036 or equal | |

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The Adjutant General

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 CoA, 3^d ENGINEER BN
 FT. LEONARD WOOD MO 63108
 DATE 16 DEC 74

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 NSN 6115-00-231-7286

BE EXACT... PIN-POINT WHERE IT IS IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

| PAGE NO. | PARAGRAPH | FIGURE NO. | TABLE NO. | |
|----------|-----------|------------|-----------|--|
| 6 | 2-1 a | | | In line 6 of paragraph 2-1a the manual states the engine has <u>6</u> cylinders. The engine on my set only has <u>4</u> cylinders. Change the manual to show <u>4</u> cylinders |
| 81 | | 4-3 | | Callout <u>16</u> on figure 4-3 is pointing at a <u>bolt</u> . In the key to fig. 4-3, item 16 is called a <u>shim</u> . Please correct one or the other. |
| 125 | line 20 | | | I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN |

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FOLD BACK

TELEPHONE BUILT IN UNIT

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces

Liquid Measure—Continued

1 liter = 10 deciliters = 33.82 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meters = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

| <i>To change</i> | <i>To</i> | <i>Multiply by</i> | <i>To change</i> | <i>To</i> | <i>Multiply by</i> |
|------------------|--------------------|--------------------|--------------------|---------------|--------------------|
| inches | centimeters | 2.540 | centimeters | inches | .394 |
| feet | meters | .305 | meters | feet | 3.280 |
| yards | meters | .914 | meters | yards | 1.094 |
| miles | kilometers | 1.609 | kilometers | miles | .621 |
| square inches | square centimeters | 6.451 | square centimeters | square inches | .155 |
| square feet | square meters | .093 | square meters | square feet | 10.764 |
| square yards | square meters | .836 | square meters | square yards | 1.196 |
| square miles | square kilometers | 2.590 | square kilometers | square miles | .386 |
| acres | square hectometers | .405 | square hectometers | acres | 2.471 |
| cubic feet | cubic meters | .028 | cubic meters | cubic feet | 35.315 |
| cubic yards | cubic meters | .765 | cubic meters | cubic yards | 1.308 |
| fluid ounces | milliliters | 29.573 | milliliters | fluid ounces | .034 |
| pints | liters | .473 | liters | pints | 2.113 |
| quarts | liters | .946 | liters | quarts | 1.057 |
| gallons | liters | 3.785 | liters | gallons | .264 |
| ounces | grams | 28.349 | grams | ounces | .035 |
| pounds | kilograms | .454 | kilograms | pounds | 2.205 |
| short tons | metric tons | .907 | metric tons | short tons | 1.102 |

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