DEPARTMENT OF THE ARMY TECHNICAL MANUAL **TM 5-6115-293-12**

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER **TO 35C2-3-329-1**

OPERATOR AND ORGANIZATIONAL

MAINTENANCE MANUAL

GENERATOR SET, DIESEL ENGINE:

PRECISE POWER; 100 KW, AC

120/208V, 240/416V, 3 PHASE

60 CYCLE, AT 1800 RPM

83.3 KW, 120/208V, 240/416V
3 PHASE 50 CYCLE AT 1500 RPM

SKID MOUNTED

(DETROIT DIESEL, GENERAL MOTORS

MODEL 6910A) FSN 6115-798-3444

This copy is a reprint which includes current pages from Changes 1 through 4.

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

APRIL 1961

AGO 5806A

SAFETY PRECAUTIONS

Before Operation

When lifting the generator set, be sure that the lifting device has a capacity of at least 8,000 pounds. Do not allow the unit to swing while suspended. Failure to observe this warning may result in damage to the unit or severe injury to personnel.

When the unit is operated in an inclosed area, exhaust gases must be piped to the outside. These gases contain carbon monoxide. Continued breathing of exhaust fumes is dangerous and may be fatal.

Do not smoke or use an open flame in the vicinity when servicing the batteries. Batteries generate hydrogen, a highly explosive gas.

Do not fill the fuel tank while the engine is in operation. Fuel spilled on a hot engine may explode and cause injury to personnel. When filling the fuel tank, always provide a metal-to-metal contact between the container and the fuel tank. This will prevent a spark from being generated as fuel flows over the metallic surface.

Exercise extreme caution when using a carbon tetrachloride fire extinguisher in an enclosed area. A deadly gas is generated by the contact of carbon tetrachloride with a heated metallic surface. Provide adequate ventilation before entering an inclosed area where carbon tetrachloride has been used.

Do not operate the generator set without a suitable ground connection. Electrical defects in the unit can cause death by electrocution when contact is made with an ungrounded system.

Exercise care in the use of test lamp circuits of 110 volts or higher. Death by electrocution can result from contact with the test lamp circuit or the circuit under test.

When a malfunction of the selenium rectifier occurs, thoroughly ventilate the area to prevent, inhalation of poisonous fumes. Do not handle the damaged selenium rectifier. Selenium oxide may be absorbed through the skin, especially when the rectifier is hot. Failure to observe this warning can result in severe illness or death.

During Operation

Do not attempt to make or break load connections or perform maintenance on the generator while it is in operation. Always make sure it is not connected to an energized line before performing maintenance.

Exercise extreme caution when using a carbon tetrachloride fire extinguisher in an enclosed area. A deadly gas is generated by the contact of carbon tetrachloride with a heated metallic surface. Provide adequate ventilation before entering an inclosed area where carbon tetrachloride has been used.

Exercise care in the use of test lamp circuits of 110 volts or higher. Death by electrocution can result from contact with the test lamp circuit or the circuit under test.

When a malfunction of the selenium rectifier occurs, thoroughly ventilate the area to prevent inhalation of poisonous fumes. Do not handle the damaged selenium rectifier. Selenium oxide may be absorbed through the skin, especially when the rectifier is hot. Failure to observe this warning can result in severe illness or death.

After Operation

Do not smoke or use an open flame in the vicinity when servicing the batteries. Batteries generate hydrogen, a highly explosive gas.

Exercise extreme caution when using a carbon tetrachloride fire extinguisher in an enclosed area. A deadly gas is generated by the contact of carbon tetrachloride with a heated metallic surface. Provide adequate ventilation before entering an enclosed area where carbon tetrachloride has been used.

Do not attempt to make or break load connections or perform maintenance on the generator set while it is in operation. Always make cure that it is not connected to an energized line before performing maintenance.

Exercise care in the use of test lamp circuits of 110 volts or higher. Death by electrocution can result from contact with the test lamp circuit or the circuit under test.

When a malfunction of the selenium rectifier occurs, thoroughly ventilate the area to prevent inhalation of poisonous fumes. Do not handle the damaged selenium rectifier. Selenium oxide may be absorbed through the skin, especially when the rectifier is hot. Failure to observe this warning can result in severe illness or death.

Changes In Force: C 1, C 2, C 3, C 4

TM 5-6115-293-12
C 4

CHANGE } No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 27 November 1974

Operator and Organizational Maintenance Manual

GENERATOR SET, DIESEL ENGINE: PRECISE POWER; 100KW, AC 120/208V, 240/416V, 3 PHASE 60 HERTZ; AT 1800 RPM 83.3KW, 120/208V, 240/416V 3 PHASE 50 HERTZ AT 1500 RPM SKID MOUNTED (DETROIT DIESEL, GENERAL MOTORS MODEL 6910A) FSN 6115-798-3444

TM 5-6115-293-12, 18 April 1961, is changed as follows:
The title is changed as shown above.
Inside Front Cover. The following warnings are added:

WARNING

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

WARNING

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

Throughout this manual, wherever the word "CYCLE" appears, is changed to read "HERTZ".
Page 2. Paragraph 1d is superseded as follows:

d. You can improve this manual by calling attention to errors and by recommending improvements, using DA Form 2028 (Recommended Changes to Publications and Blank Forms), or by a letter, and mailing the form direct to Commander, U.S. Army Troop Support Command, ATTN: AMSTS-MPP. A reply will be furnished direct to you.

Page 5. Paragraph z is rescinded.

Page 8. Paragraph 11d is superseded as follows:

d. Grounding. Generator sets will be grounded in order to prevent electrical shock, caused by defective insulation, or external electrical faults, defective grounding can endanger personnel or damage equipment, and can create interference of communication in electronic circuits.

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

(a) Drive a ground rod to depth of at least 8 feet. This is the preferred device which is available in the Army supply system.

(b) Drive a ground pipe, 3/4 inch, copper or steel, to depth of at least 8 feet. An existing under

ground 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 plate, 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 terminal (fig. 5.B), and tighten the nut securely.

By Order of the Secretary of the Army:

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

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25D, (qty rqr block No. 1066) Organizational maintenance requirements for Generator maintenance requirements Sets, 100 KW, 60 HZ, Precise Power.

CHANGE
No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 15 June 1973

Operator and Organizational Maintenance Manual
GENERATOR SET, DIESEL ENGINE: PRECISE POWER
100 KW, AC, 120/208V, 240/216V, 3 PHASE 60 CYCLE AT
1800 RPM: 83.3 KW, 120/208V, 240/416V, 3 PHASE
50 CYCLE AT 1500 RPM, SKID MOUNTED
(DETROIT DIESEL, GENERAL MOTORS MODEL 6910A)
FSN 6115-798-3444

TM 5-6115-293-12, 18 April 1961, is changed as follows:

Page 111. APPENDIX III is superseded as follows:

APPENDIX III
BASIC ISSUE-ITEMS-LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Section I. INTRODUCTION

1. Scope

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

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.

3. Explanation of Columns

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

a. *Source, Maintenance and Recoverability Code(s) (SMR)*: (Not applicable).

b. *Federal Stock Number*. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. *Description*. This column indicates the Federal item name and any additional description of the item required.

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

e. *Quantity Furnished with Equipment (BIIL)*. (Not applicable).

f. *Quantity Authorized (Items Troop Installed or Authorized)*. This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR Code	(2) Federal Stock Number	Ref No. & Mfr Code	(3) Description	Usable on Code	(4) Unit of Meas	(5) Qty Auth
	7520-559-9618	Case, Manual			EA	1
	4210-555-8837	Extinguisher, Fire			EA	1
	5975-878-3791	Rod Assy., Ground			EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed -in accordance with DA Form 12-25D (qty rqr block 1066) organizational maintenance for Generator Sets, 100 KW, 60 HZ Precise Power.

GPO 902-354

TM 5-6115-293-12
C 2

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *19 June 1969*

Operator and Organizational Maintenance Manual

GENERATOR SET, DIESEL ENGINE: PRECISE POWER; 100 KW, AC, 120/208V, 240/416V, 3 PHASE, 60 CYCLE AT 1800 RPM; 83.3 KW, 120/208V, 240/416V, 3 PHASE, 50 CYCLE AT 1500 RPM, SKID MOUNTED (DETROIT DIESEL, GENERAL MOTORS MODEL 6910A) FSN 6115-798-3444

TM 5-6115-293-12, 18 April 1961, is changed as follows:

Page 2. Paragraph 1*d* is superseded as follows:

d. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Paragraph 5 is superseded as follows:

5. Differences in Models

a. The differences existing in the two generating sets are as follows:

(1) Model 6910 utilizes a model 5548842 main generator regulator, and a model 5548841 exciter assembly.

(2) Model 6910A utilizes a model 5551983 main generator regulator, and a model 5550468 exciter assembly.

b. Serial number ranges are 001 thru 1077 and 1A thru 237A respectively.

Page 3. Paragraph 6c, add model 21-4676, effective with engine serial 6A133350 up.

Page 5. Paragraph 6m, add model 1113847, effective with engine serial 6A144938 up.

Paragraph 6*z* is superseded as follows:

z. Maintenance and Operating Supplies. Refer to appendix III for a complete list of Maintenance and Operating Supplies required for initial operation.

Page 6. Table I is deleted.

Page 24, paragraph 25b. In line 2, TM 9-2851 is changed to read TM 9-213.

Paragraph 29 deleted.

Page 33. Paragraph 33 is superseded as follows:

33. General

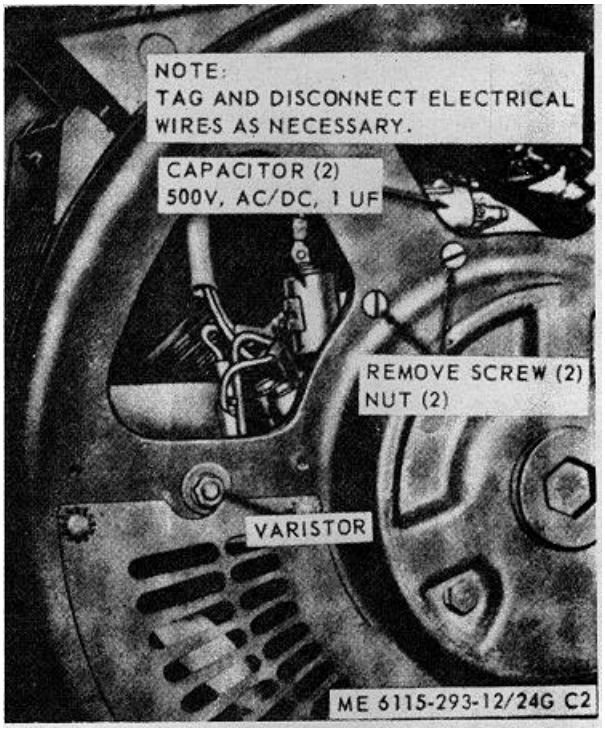
To insure that the generator set is ready for operations at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed are listed and described in paragraphs 34, 35 and 36. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

Page 37. Under Inspection column, item 4, Fire extinguisher, line 11, TM 9-1799 is changed to read TB 5-4200-200-10.

Under Inspection column, item 7, Modifications, is superseded as follows:

Modifications. See that all available modification work orders, applying to this unit, have been completed and recorded on DA Form 2408-5.

Page 45. Figure 24G is superseded as follows:



G. MAIN GENERATOR BRUSH CAPACITORS. Figure 24–Continued.

Page 72. Paragraphs 101*a* and *b* are superseded as follows:

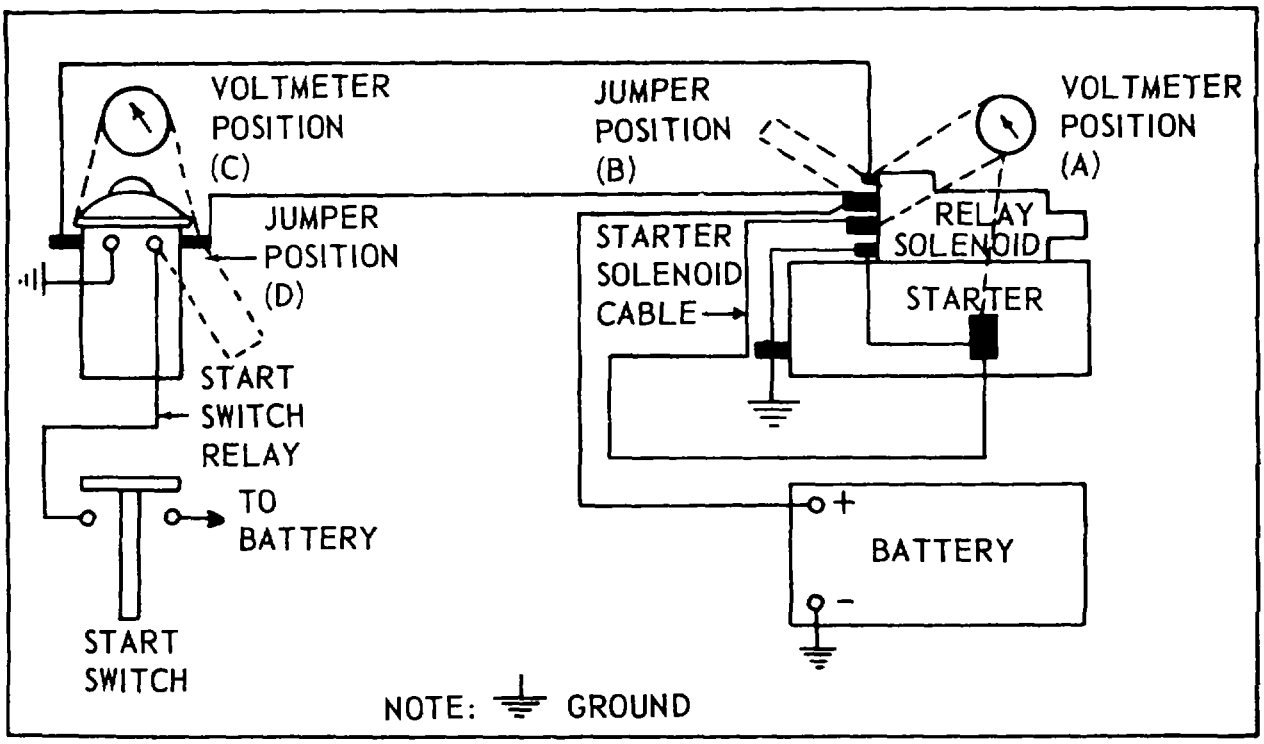
a. For generator sets having starters with part number 1113809, refer to figure 56 and perform starter and solenoid on-engine test; for starters with part number 1113847, refer to figure 56A to perform test.

b. For generator sets with starters having part numbers 1113809, refer to figure 57 for removal and installation instructions; for starters with part number 1113847, refer to figure 57A for removal and installation.

Page 75. Figure 56 caption is superseded as follows:

Figure 56. Starter (P/N 1113809) and solenoid relay, on-engine testing.

After figure 56 add the following figure:



STEP 1. DETERMINE THAT BATTERY IS FULLY CHARGED AND THAT ALL BATTERY AND STARTER CABLES ARE SERVICABLE AND PROPERLY INSTALLED.

STEP 2. REMOVE STARTER SOLENOID CABLE. CONNECT A VOLTMETER AS SHOWN AT POSITION A ABOVE. IF VOLTAGE IS INDICATED, STARTER RELAY IS DEFECTIVE AND MUST BE REPLACED.

STEP 3. INSTALL THE STARTER SOLENOID CABLE. WITH THE VOLTMETER INSTALLED AS IN POSITION A ABOVE, BATTERY VOLTAGE (24-V) MUST BE INDICATED. IF NOT, THE STARTER IS DEFECTIVE AND MUST BE REPLACED.

STEP 4. WITH THE VOLTMETER CONNECTED AS IN POSITION A ABOVE, MOMENTARILY CONNECT A JUMPER WIRE AS IN POSITION D ABOVE. THE VOLTMETER SHOULD DROP TO ZERO AND THE STARTER SHOULD CRANK THE ENGINE. IF VOLTMETER DOES NOT DROP TO ZERO, STARTER SOLENOID IS DEFECTIVE AND MUST BE REPLACED. IF THE VOLTMETER DROPS TO ZERO BUT STARTER FAILS TO CRANK ENGINE, STARTER IS DEFECTIVE AND MUST BE REPLACED.

STEP 5. REMOVE THE JUMPER WIRE FROM POSITION D ABOVE AND INSTALL THE VOLTMETER AT POSITION C ABOVE. BATTERY VOLTAGE WILL BE INDICATED. MOMENTARILY CONNECT A JUMPER WIRE AS SHOWN AT POSITION D ABOVE. THE VOLTMETER SHOULD DROP TO ZERO. IF NOT, THE START SWITCH RELAY IS DEFECTIVE AND MUST BE REPLACED.

ME 6115-293-12/56A/C2

Figure 56A. Starter (P/N 1113847) and solenoid relay, on-engine testing.

Page 76. Figure 57 caption is superseded as follows:

Figure 57. Starter (P/N 1113809) and solenoid relay, removal, and installation.

After figure 57 add the following figure:

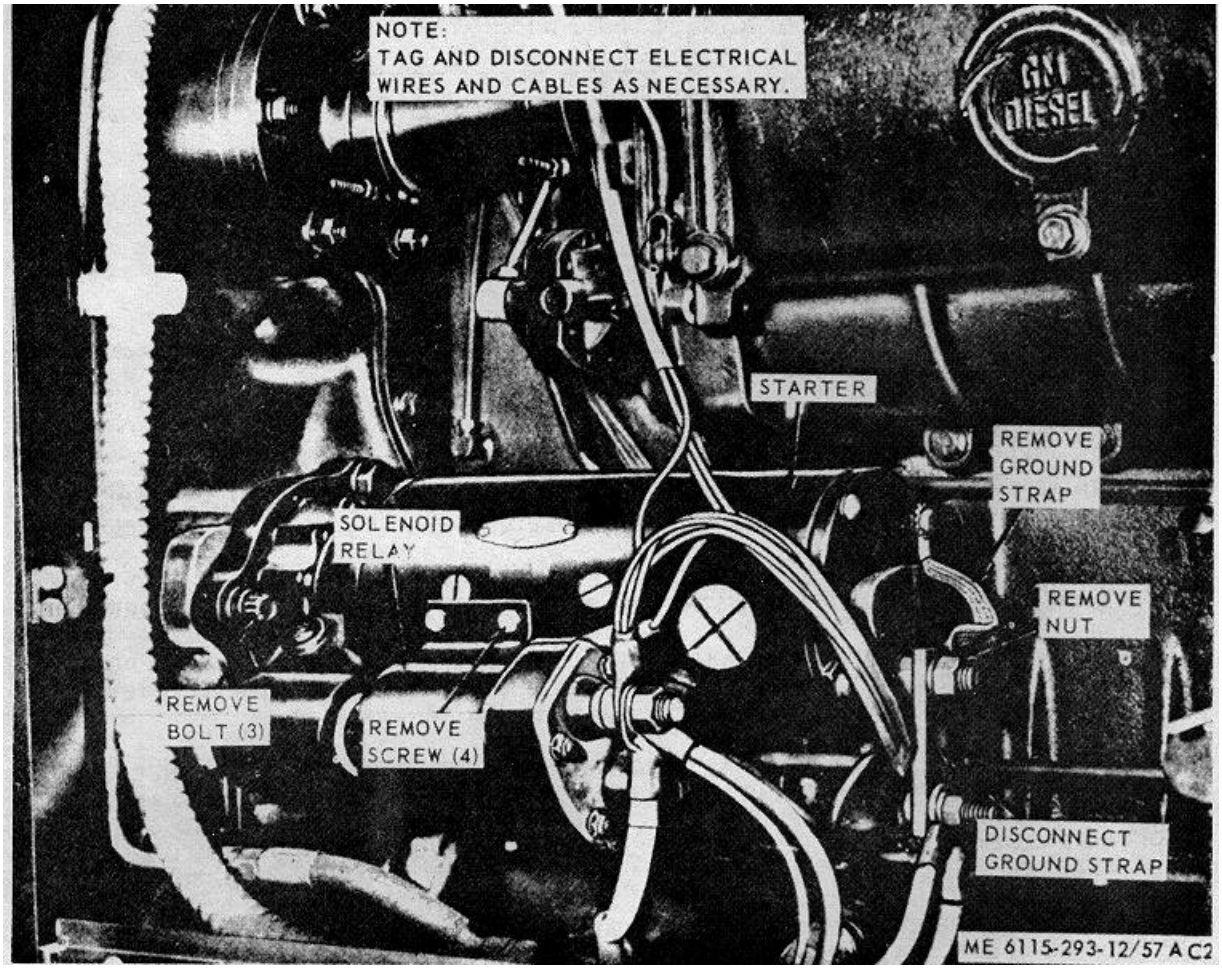


Figure 57A. Starter (P/N 1113847) and solenoid relay, removal and installation.

Page 99, paragraph 138i. In line 1, TM 9-200 is changed to read, TM 740-90-1 and TB 740-93-2.

Paragraph 140*b*. In line 7, TM 9-2851 is changed to read TM 9-213.

Paragraph 141*b*. In lines 1 and 2, DA Form 464 is changed to read, Log books will *** for immediate use.

Page 100. Appendix I is superseded as follows:

APPENDIX I

REFERENCES

1. Fire Protection	
TB 5-4200-200-10	Hand Portable Fire Extinguishers for Army Users
2. Lubrication	
C9100IL	Fuels, Lubricants, Oils and Waxes
LO 5-6115-293-12	Lubrication Order
3. Painting	
TM 9-213	Painting Instructions for Field Use
4. Radio Suppression	
TM 11-483	Radio Interference Suppression
5. Maintenance	
TM 5-6115-293-20P	Organizational Maintenance Repair Parts and Special Tools List
TM 9-6140-200-15	Operation and Organizational Field and Depot Maintenance, Storage Batteries, Lead-Acid Type
TM 38-750	Army Equipment Record Procedures
6. Shipment and Storage	
TB 740-93-2	Preservation of USAMECOM Mechanical Equipment for Shipment and Storage
TM 740-90-1	Administrative Storage of Equipment

Page 111. Appendix III is superseded as follows:

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists items which accompany the generator set or are required for installation, operation, or operator's maintenance.

2. General

This Basic Issue Items List is divided into the following sections:

a. Basic Issue Items–Section II. A list of items which accompany the generator set and are required by the operator/crew for installation, operation, or maintenance.

b. Maintenance and Operating Supplies–Section III. A listing of maintenance and operating supplies required for initial operation.

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items, section II.

a. Source, Maintenance, and Recoverability Codes (SMR).

(1) Source code, indicates the selection status and source for the listed item. Source codes are:

Code	*Explanation*
P	Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system and authorized for use at indicated maintenance categories.
P2	Repair parts which are procured and stocked for insurance purposes because the combat or military essentially of the end Item dictates that a minimum quantity be available In the supply system.
M	Repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.
A	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry Individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at Indicated maintenance categories.
X	Parts and assemblies which are not procured or stocked and the mortality of which normally Is below that of the applicable end Item or component. The failure of such part or assembly should result in retirement of the end Item from the supply system.
X1	Repair parts which are not procured or stocked. The requirement of such items will be filled by use of the next higher assembly or component.
X2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.
C	Repair parts authorized for local procurement. Where such repair parts are not obtainable from local procurement, requirements will be requisitioned through normal supply channels accompanied by a supporting statement of nonavailability from local procurement.
G	Major assemblies that are procured with PEMA funds for initial Issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above GS and DS level or returned to depot supply levels.

(2) Maintenance code, indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	*Explanation*
C	Operator/crew

(3) Recoverability code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	*Explanation*
R	Repair parts and assemblies which are economically reparable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

Code	*Explanation*
S	Repair parts and assemblies which are economically reparable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically reparable they will be evacuated to a depot for evaluation and analysis before final disposition.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.
U	Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value reusable casings or castings.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit. This column indicates the quantity of the item used in the assembly group. A"V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc.).

f. Quantity Furnished With Equipment. This column indicates the quantity of an item furnished with the equipment.

g. Illustration. This column is divided as follows:

(1) *Figure number*. Indicates the figure number of the illustration in which the item is shown.

(2) *Item number*. Indicates the callout number used to reference the item in the illustration.

4. Explanation of Columns in the Tabular List of Maintenance and Operating Supplies–Section III

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

b. Federal Stock Number. This column indicates the Federal 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 8 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.

Section II. BASIC ISSUE ITEMS

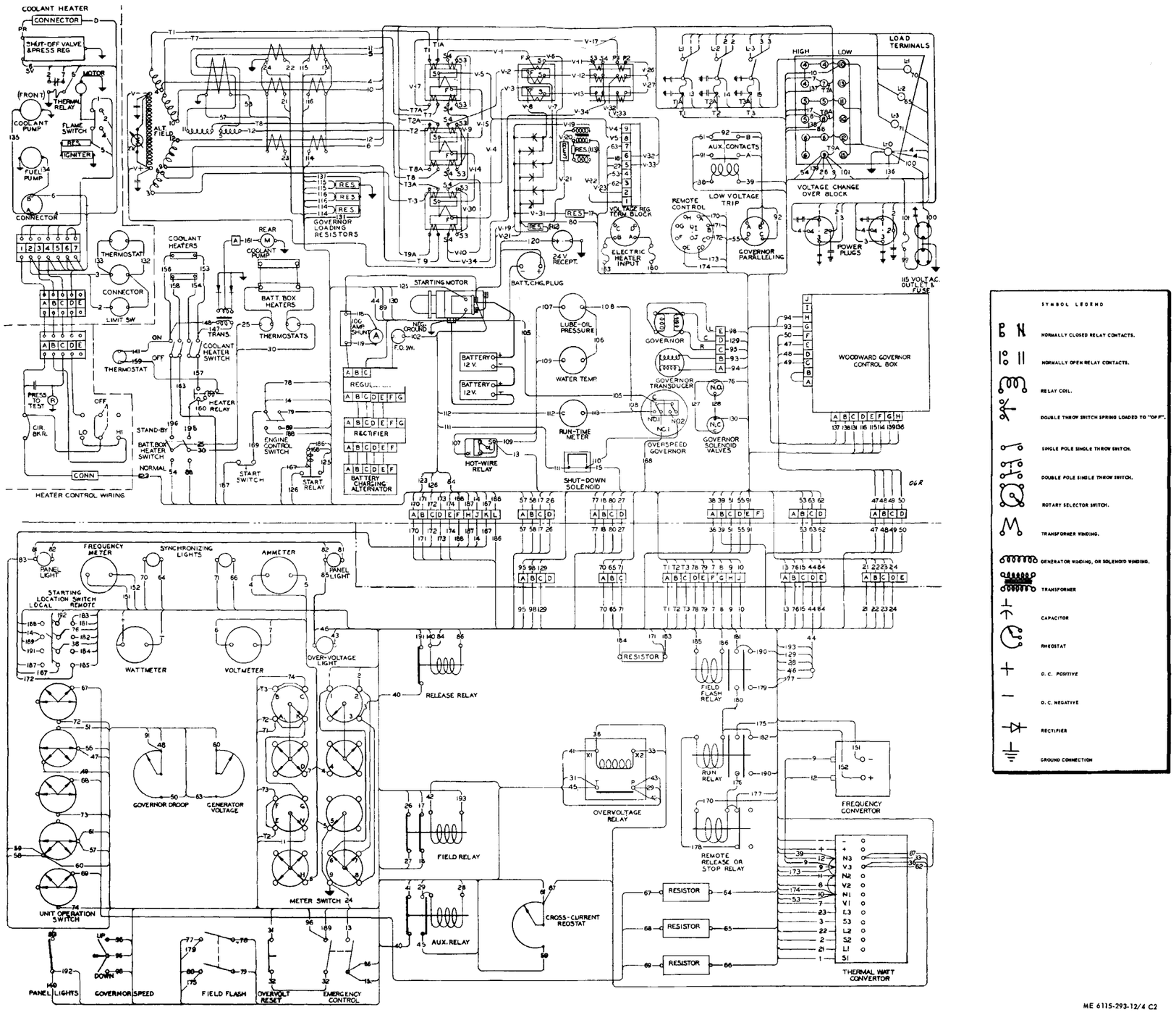
(1) SMR Code	(2) Federal Stock Number	(3) Description Ref No & Mfr Code / Usable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration (a) Fig No.	(7) Illustration (b) Item No.
PC	2910-066-1225	ADAPTER, DRUM	ea		*		
PC	7510-889-3494	BINDER, LOG BOOK	ea		1		
PC	7520-559-9618	CASE, OPERATIONAL AND MAINTENANCE PUBLICATIONS	ea		1		
		DA TECHNICAL MANUAL TM 5-6115-293-12	ea		1		
PC	5935-258-9156	PLUG, CONNECTOR	ea		*		
PC	597-878-3791	ROD ASSEMBLY, GROUND	ea		*		

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1)	(2)	(3)	(4)	(5)	(6)
Component Application	**Federal Stock Number**	**DESCRIPTION**	**Quantity Required F/Initial Operation**	**Quantity Required F/8 Hrs Operation**	**NOTES**
0101 - CRANKCASE		OIL, LUBRICATING: 5 gal drums as follows:			(1) Includes quantity of oil to fill engine oil system as follows:
	9150-265-9435 (2)	OE 30	37 3/4 qt (1)	(3)	29 qt - crankcase
	9150-265-9428 (2)	OE 10	37 3/4 qt (1)	(3)	4 qt - oil filters.
	9150-242-7603 (2)	OES	37 3/4 qt (1)	(3)	3 qt - air cleaners 1 qt - oil filter, governor 3/4 qt - hydraulic gov-
0106.2 - OIL FILTER ENGINE	(4)	OIL, LUBRICATING			ernor reservoir
0106.2 - OIL FILTER GOVERNOR	(4)	OIL, LUBRICATING			(2) See C9100IL for additional data and requisitioning procedure.
0106.6 - HYDRAULIC GOVERNOR RESERVOIR	(4)	OIL, LUBRICATING			(3) See current LO for grade application and replenishment intervals.
0304 - AIR CLEANER	(4)	OIL, LUBRICATING			(4) Use oil as prescribed in 0101 above.
0306 - TANK		FUEL OIL, DIESEL: Bulk as follows:			(5) Tank capacity.
	9140-286-5294 (2)	Regular grade (DF-2)	87 gal (5)	48 gal (6)	(6) Average fuel consumption Is 5.86 gal per hour of continuous operation at 1,800 rpm.
	9140-286-5286 (2)	Winter grade (DF-1)	87 gal (5)	48 gal (6)	(7) Radiator capacity.
	9140-286-5283 (2)	Artic grade (DF-A)	87 gal (5)	48 gal (6)	(8) Minimum protection obtained at 60 percent by volume, i.e., 4.8 pints of antifreeze per gal of solution.
0311 - PRIMER PUMP		STARTING AID			

Section III. MAINTENANCE AND OPERATING 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
	6810-200-2407	Ether (Reagent) 4 oz. can	As req.	As req. (9)	
0501 - RADIATOR		COOLING SYSTEM; Water	16 gal (7)	As req. (3)	Pure artic type anti-freeze is used where temperatures are below -40°F.
	6850-224-8730	ANTIFREEZE Ethylene glycol, 5 gal can	8 1/4 gal (8)		
	6850-174-1806	ANTIFREEZE; ARTIC: 55 gal drum	(9)	(9)	(10) Winterization fuel tank capacity.
2207 - WINTER-IZATION HEATER		STARTING AID:			(11) Fuel consumption high fire; 3/4 gal. per hr; low fire; 1/2 gal. per hr.
	9130-160-1818 (2)	Gasoline, automotive bulk	2 1/2 gal (10)	6 gal (11)	



ME 6115-293-12/4 C2

Figure 4. Practical wiring diagram.

***Page 119*. Immediately after page 119, figure 4, (fold-in, fold-out) is superseded as follows:**

Figure 4. Practical wiring, diagram.

(Located in back of manual)

By Order of the Secretary of the Army:

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

Official:

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

Distribution:

To be distributed in accordance with DA Form 12-25, Sec IV (qty rqr Block No. 750), Organizational maintenance requirements for Generator Sets, Engine Driven, 100 kw, 60 cycles.

TECHNICAL MANUAL

Operator and Organizational Maintenance GENERATOR SET, DIESEL ENGINE: PRECISE POWER; 100 KW, AC, 120/208V, 240/416V, 3 PHASE, 60 CYCLE, AT 1800 RPM, 83.3 KW, 120/208V, 240/416V, 3 PHASE, 50 CYCLE AT 1500 RPM; SKID MOUNTED (DETROIT DIESEL, GENERAL MOTORS MODEL 6910A) FSN 6115-798-3444

TM 5-6115-293-12

CHANGES NO. 1

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *16 Jul 1963*

TM 5-6115-293-12, 18 April 1961, is changed as follows:

Page 2, paragraph 1.

d. (Superseded) Report all deficiencies in this manual on DA Form 2428, Recommended Changes .to DA Technical Manual Parts Lists or Supply 7, 8, or 9). Submit recommendations for changes, additions, or deletions to the Commanding Officer, U. S. Army Mobility Support Center, ATTN: SMOS-MM, P 0. Box 119, Columbus 16, Ohio. Direct communication is authorized.

e. (Added) Report all equipment improvement recommendations as prescribed by TM 38-750.

2. Record and Report Forms

(Superseded)

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

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

Note

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

Page 33.

33. General

(Superseded)

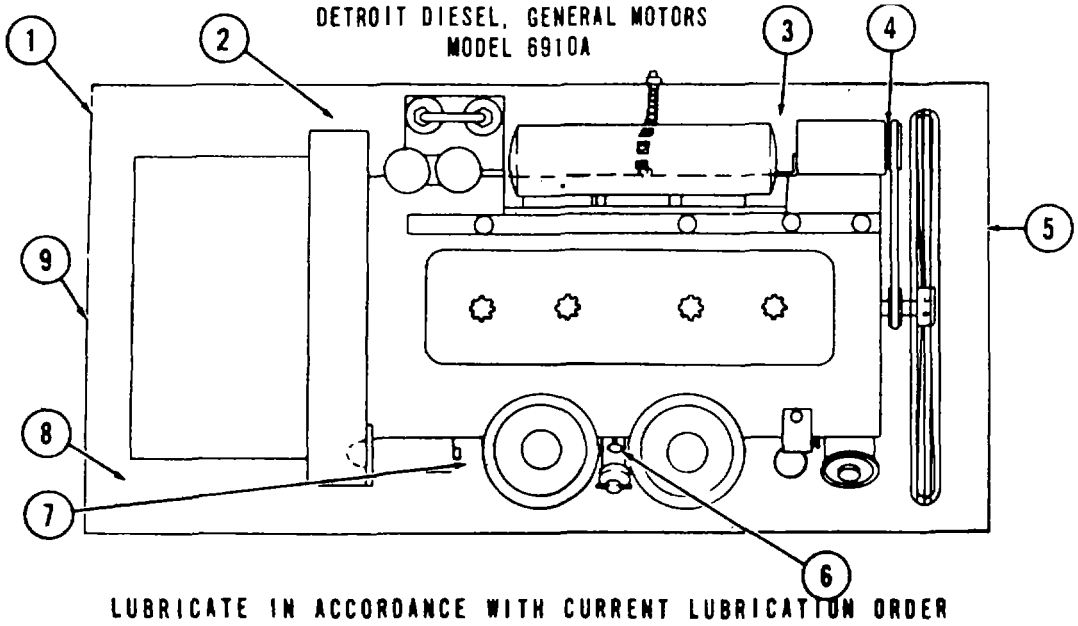
To insure that the generator set is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary Preventive Maintenance Services to be performed are listed and described in paragraphs 34 and 36. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

Page 63.

34. Daily Preventive Maintenance Services

(Superseded)

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements Refer to figure 23 for the Daily Preventive Maintenance Services.



ITEM		PAR REF
1	FIRE EXTINGUISHER. Inspect for broken seal	
2	GROUND TERMINAL. Check for proper ground. A proper ground will consist of a 3 4-inch-dia. hollow rod or 5,'8-inch-dia. solid rod, 9 feet long. The cable will be No. 6 AWG copper wire, bolted or clamped to the rod and attached to the ground terminal of the generator set.	1
3	BATTERIES. Tighten loose cables and mountings. Remove corrosion. Inspect for cracks and leaks. fill to 3 8 inch above the plates. Clean venthole in filler cap before installing. In freezing weather run engine a minimum of 1 hour after adding water (Weekly).	
4	V-BELTS. Check for worn, frayed, or cracked belt.	
5	RADIATOR. Proper coolant level is 2 inches below filler neck.	
6	OIL LEVEL GAGE. Add oil as indicated by level gage. Reference current L.O.	
7	FUEL FILTER AND STRAINER. Check for leaks and loose connections. Drain 1/4 pint of fuel from filter daily.	
8	FUEL TANK. Add fuel as required.	

Figure 23. (Superseded) Daily preventive maintenance services.

ITEM				PAR REF
9	CONTROLS ANO INSTRUMENTS. Inspect for damage and loose mounting. With unit operating, check for proper operation. Normal operating readings for instruments are as follows:			
	Water temperature gage		180°F	
	Oil pressure gage		5-15 psi, minimum. Idle speed; 30-50 psi, operating speed	
	Battery charging ammeter		Slight charge	
	Ac ammeter		Indicates percent of rated current, 100% maximum	
	Frequency meter	50 cycle operation	50 cycle	
		60 cycle operation	60 cycle	
	Voltmeter	4 wire, single-phase operation	120 208 volt	
		4 wire, 3 phase operation	240 416 volt	
		3 wire operation	120 240 volt	
	Wattmeter	50 cycle operation	83.3 KW maximum	
		60 cycle operation	100 KW maximum	
	NOTE 1. OPERATION. During operation observe for any unusual noise or vibration.			

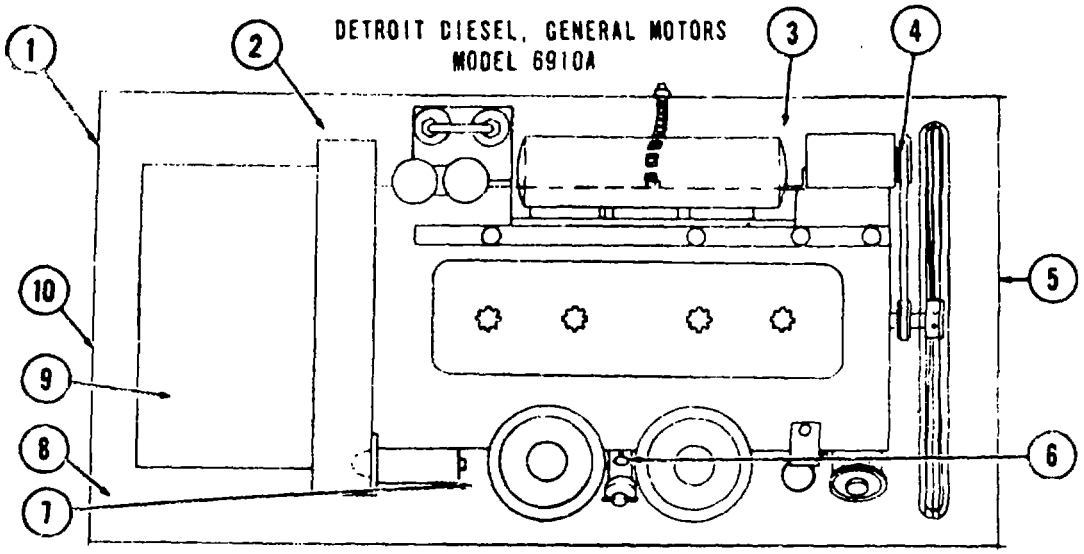
Page 36, paragraph 35. Rescinded

Page 36.

36. Quarterly Preventive Maintenance Services
(Superseded)

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

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 23.1 for the Quarterly Preventive Maintenance Services.



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	FIRE EXTINGUISHER. Inspect for broken seal. Inspect for full charge by shaking for sound or weight.	
2	GROUND TERMINAL. Check for proper ground. A proper ground will consist of a 3 4-inch-dia. hollow rod or 5 8-inch-dia. solid rod. 9 feet long. The cable will be No. 6 AWG copper wire, bolted or clamped to the rod and attached to the ground terminal of the generator set.	11 115
3	BATTERIES. Tighten loose cables and mountings. Remove corrosion. Fill to 3/8 inch above the plates. Clean venthole in filler cap before Installing. In freezing weather run engine minimum of I hour after adding water. Replace a cracked or leaking battery.	100
4	V-BELTS. Proper adjustment of tan drive belts is a deflection of 3 4 inch midway between crankshaft pulley and fan pulley. Proper adjustment of generator drive belt is a deflection of 3 4 inch midway between crankshaft pulley and generator pulley. Replace worn, frayed, or cracked belts.	97 and 102
5	RADIATOR. Proper coolant level is 2 inches below filler neck. Replace defective radiator. Remove obstructions in the air passages. Tighten all mounting and leaking connections.	93

Figure 23.1. (Added) Quarterly preventative maintenance services.

ITEM		PAR REF
6	OIL LEVEL GAGE. Add oil as indicated by level gage. Reference current L.O.	
7	FUEL FILTER AND STRAINER. Tighten loose connections. Drain water from filter.	78 79
8	FUEL TANK. Add fuel as required. Tighten loose mounting. Replace defective cap gasket. Clean cap vent.	
9	MAIN GENERATOR, BRUSHES, AND SLIPRINGS. Check the main generator for worn or frayed wiring. Clean dirty or rough sliprings. Replace brushes if worn to less than 3/4 inch. Correct brush spring tension is 8 to 10 ounces.	114
10	CONTROLS AND INSTRUMENTS. Replace damaged instruments. Tighten loose mounting. With the unit operating, check for proper operation. Normal operating readings for instruments are as follows: Water temperature gage — 180°F Oil pressure gage — 5-15 psi, minimum idle speed; 30-50 psi, maximum operating speed Battery charging ammeter — Slight charge Ac ammeter — Indicates percent of rated current, 100% maximum. Frequencymeter — 50 cycle operation 50 cycle; 60 cycle operation 60 cycle Voltmeter — 4-wire, single-phase operation 120 208 volt 4-wire, 3-phase operation 240 416 volt 3-wire operation 120 240 volt Wattmeter — 50 cycle operation B3.3 KW maximum; 60 cycle operation 100 KW maximum	16
	NOTE 1. OPERATIONAL TEST. During operation observe for any unusual noise or vibration.	
	NOTE 2. ADJUSTMENTS. Make all necessary adjustments during operational test.	

Page 99.

141. Inspection and Maintenance of Equipment in Storage

(Superseded)

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

b. Worksheet and Preventive Maintenance. Applicable forms listed in TM 38-750 shall be prepared for each major item of equipment when initially placed in limited storage, in accordance with the scheduled interval contained in AR 743-505. Perform required maintenance promptly to make sure equipment is mechanically sound and ready for immediate use.

c. Operation. Operate equipment in limited storage long enough to bring it up to operating temperature and insure complete lubrication of all bearings, gears, and the like, in accordance with the scheduled interval contained in AR 743-505. Equipment must be serviced and in satisfactory operating condition before it is operated.

Page 100, paragraph 5. Delete the following references:

AR 700-38 Unsatisfactory Equipment Report
TM 5-505 Maintenance of Engineer Equipment
Add: TM 38-750 The Army Equipment Record System and Procedures.

Page 112.

4. Comments and Suggestions

(Superceded)

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

By Order of the Secretary of the Army:

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

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

Distribution:

To be distributed in accordance with DA Form 12-32, Section II (Unclas) requirements for Missile Monitor—TM—Power Generating Equipment (Eng).

TECHNICAL MANUAL
No. 5-115-293-12
TECHNICAL ORDER
No. 35C2-3-329-1

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE

WASHINGTON 25, D. C., *18 April 1961*

Operator and Organizational Maintenance Manual
GENERATOR SET, DIESEL ENGINE: PRECISE POWER; 100 KW, AC, 120/208V, 240/416V, 3 PHASE, 60 CYCLE, AT 1800 RPM, 83.3 KW, 120/208V, 240/416V, 3 PHASE, 50 CYCLE AT 1500 RPM; SKID MOUNTED (DETROIT DIESEL, GENERAL MOTORS MODEL 6910A) FSN 6115-798-3444

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of the personnel to whom the General Motors Models 6910 and 6910A Generator Sets are issued. This manual contains information on the operation and organizational maintenance of the equipment. This manual also provides a description of the main units and their functions in relationship to other components.

b. Appendix I contains a standard list of all publications applicable to this-manual. Appendix II contains the maintenance allocation chart. Appendix III contains the basic issue items authorized for use of the operator of this equipment. The organizational maintenance repair parts and special tool lists are contained in TM 5-6115-293-20P.

c. The numbers placed in parentheses on the illustrations used within this manual indicate quantity.

d. Report all deficiencies as specified in AR 700-38. Submit recommendations for changes, additions, or deletions to the Commanding General, U.S. Army Engineer Maintenance Center, Corps of Engineers, ATTN: EMCDM, P. O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

2. Record and Report Forms

For record and report forms applicable to the first and second echelons of maintenance, refer to TM 5-505.

Section II. DESCRIPTION AND DATA

3. Description

a. General. The General Motors Generator Sets Models 6910 and 6910A (figs. 1 and 2) are self-contained, skid-mounted, canopy-covered, winterized, portable units. They are powered by a six-cylinder diesel engine (fig. 2) that is directly coupled to the main generator (fig. 1). The generator control panel (fig. 1), the engine control panel (fig. 1), and the winterization control panels (fig. 1) contain the controls and instruments necessary for single or parallel operation and remote control. Doors and panels are provided for easy access to all components.

b. Engine. The General Motors Corporation series 6-71 diesel engine (fig. 2), is a 425 cubic inch displacement engine, which is governed at a speed of 1,800 rpm (revolutions per minute) at 60 cycles; 1,500 rpm for 50 cycles.

c. Main Generator. The Delco Products Main Generator Model 1-4676 (fig. 1), is driven directly from the engine flywheel. It is a 3-phase, 50/60cycle, 100 KW (kilowatt) unit. The generator has 12 stator leads which can be connected at the conversion block (fig. 2) for 120 single phase and 208 or 240/416-volts, 3-phase, 4-wire operation. The full load rating is 100 kw at 60 cycles or 83.3 kw at 50 cycles.

4. Identification

The generator set has two identification plates, the data on these plates can be found in the tabulated data section of the technical manual (para. 6).

5. Differences in Models

This manual covers the General Motors Generator Set Models 6910 -and 6910A. The differences existing in the two models are that Generator Set Model 6910 utilizes a Model 5548842 main generator regulator, and a Model 5548841 exciter assembly. Generator Set Model 6910A is equipped with a Model 5551983 main generator regulator, and a Model 5550468 exciter assembly.

6. Tabulated Data

a. General.

Manufacturer.....	General Motors Corp.
Model.....	6910 and 6910A
Type.....	Skid mounted, diesel driven

b. Engine.

Manufacturer.....	Detroit Diesel Division of General Motors Corp.
Type.....	Diesel

Model.....6910 and 6910A
Series 6-71
Cooling .....Liquid
Number of cylinders 6
Cycle..... 2
Bore .....4.25 in. (inch)
Stroke .....5 in.
Piston displacement ..... 425 cu in. (cubic inch)
Compression ration .....17 to 1
Firing order 1-5-3-6-2-4
Crankshaft rotation Counterclockwise
(view from generator end).
Governor speed ..... 1,500 and 1,800 rpm

c. Generator.
Manufacturer..... Delco-Remy Division of General Motors Corp.
Model..... 1-4676
Phase.....1 and 3
Type.....Ac (alternating current) 50/60 cycle
Voltage (4 wire)..120 single phase and 208 or 240/416 3 phase
Voltage (3 wire).....120/240

d. Air Cleaner.
Manufacturer.....Donaldson Company
Type.....Oil bath
Number..... 2

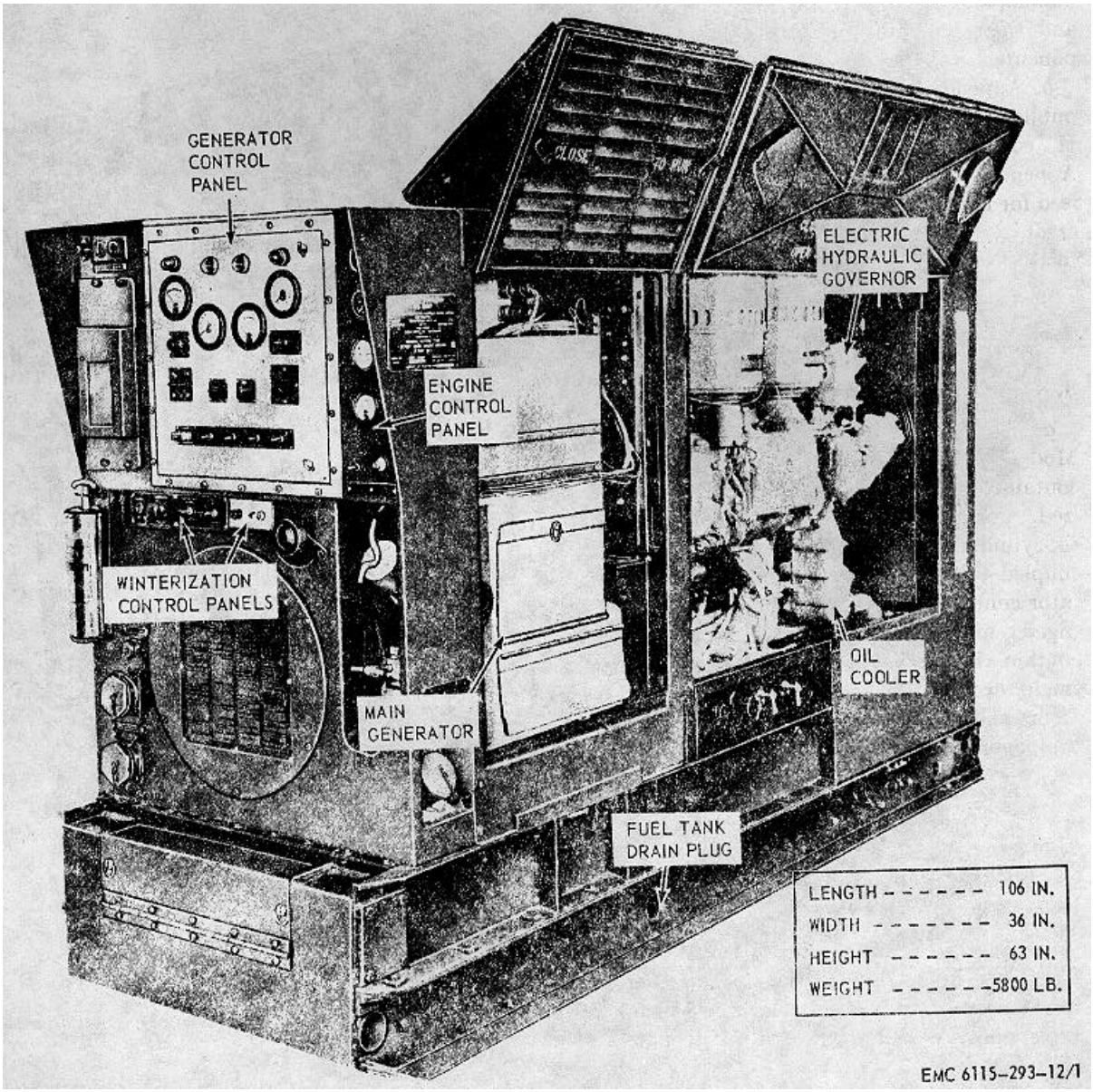


Figure 1. Generator set, right rear, three-quarter view, with shipping dimensions.

e. Fuel Transfer Pump.
Manufacturer.....Tut Hill Corp.
Model.....00L35
Type..... Direct drive

f. Injector Pump.
Manufacturer.....General Motors Corp.
Type.....Gear driven
Output pressure .....40 lb (pound)

g. Governor.
Manufacturer.....Woodward Governor Company
Serial number 557723
Model..... LSG-1
Type..... Hydraulic load sensing

h. Engine Oil Filter.
Manufacturer .....AC Spark Plug Company, Division of General Motors Corp.
Model S-2
Type .....By pass
Element.....117

i. Governor Oil Filter.
Manufacturer ..... Purolator Products Corp.
Model P92-07
Element..... P-92

j. Overspeed Governor.
Manufacturer ..... Synchro Start Products, Inc.
Model GW-2
Governor speed..... 1,800 to 2,100 rpm

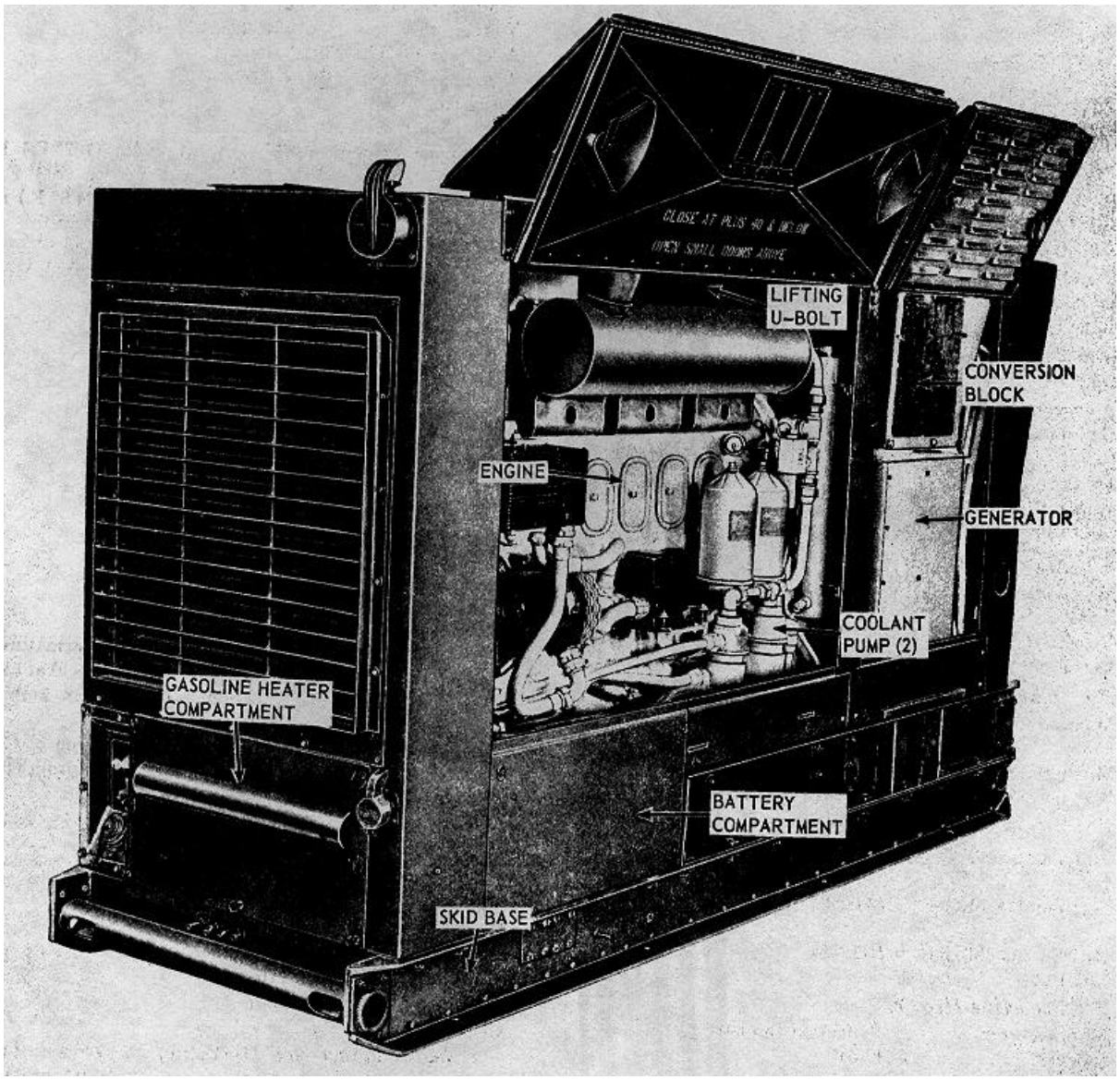


Figure 2. Generator set, left front, three-quarter view.

AGO 5806A

k. Batteries.

Manufacturer	Delco-Remy Division of General Motors Corp.
Model	US-ST
Volts	12
Quantity	2
Ground	Negative

l. Circulation Pump.

Manufacturer	Robbins and Myers Company
Model	GM-20124
Volts	24
Serial	C 18 LS

m. Starter.

Manufacturer	Delco-Remy Division of General Motors Corp.
Model	1113809
Volts	24

n. Battery-Charging Generator.

Manufacturer	Leece-Neville Company
Type	5300 GP
Volts	28
Amperes	100
Ordnance number	7954720

o. Generator Regulator.

Manufacturer	Leece-Neville Company
Type	R0013392RP
Volts	28
Amperes	100
Ordnance number	8699744

p. Rectifier.

Manufacturer	Leece Neville Company
Type	C0011029CP
Volts	28
Amperes	100
Ordnance number	7954343

q. Governor Computer.

Manufacturer	Woodward Governor Company
Volts	208
Cycle	50-60
Part number	379002

r. Static Exciter.

Manufacturer	Delco-Remy Division of General Motors Corp.
Part number	5550468 for Model 6910A
Part number	5548841 for Model 6910

s. Main Generator Regulator.

Manufacturer	Delco-Remy Division of General Motors Corp.
Part number Model 6910.	5548842
Part number Model 6410A	5551983

t. Gasoline Heater.

Manufacturer	Perfection Industries
Model	E-511
Volts	24
Fuel	Gasoline
Output	60,000 Btu (British thermal unit) per hr (hour).
Fuel Consumption:	
Hi-fire	0.75 gph (gallons per hour)
Lo-fire	0.5 gph

u. Ethel Primer.

Manufacturer	Automotive and Marine Products Corp.
Model	A-52
Type	Ether

v. Generator Data Plate (60 Cycles).

Model	1-4676
Kw.	100
P f (power factor)	80 percent
Kva (Kilovolt ampere)	125
Phase	3
Cycle	60
Rpm	1,800
Ampere excitation	27
Voltage	120/208, 240/416
Amperage (at 120/208)	347
Amperage (at 240/416)	173.5
Serial No.	
Exciter volts	45
Continuous temperature rise	75° C. (centigrade) (167° F.) Fahrenheit) and 95° C. (203° F.) on field at 51.6° C. (124.8° F.) maximum ambient temperature
Manufacturer	Delco Products Division of General Motors Corp. at Dayton, Ohio

w. Generator Data Plate (50 Cycles).

Model	1-4676
Kw	83.3
P f	80 percent
Kva	104
Phase	3
Cycle	50
Rpm	1,500
Ampere excitation	27
Voltage	120/208, 240/416
Amperage (at 120/208)	289
Amperage (at 240/416)	144.5
Serial No.	
Exciter volts	45
Continuous temperature rise	75° C. (167° F.) on armature and 95° C. (203° F.) on field at 51.6° C. (124.8° F.) maximum ambient temperature
Manufacturer	Delco Products Division of General Motors Corp. at Dayton, Ohio

x. Adjustment Data.

V-belts	¾ in. depression between pulleys
Valves	0.009 in. (cold)

y. Capacities.

Fuel tank	87 gal (gallon)
Engine crankcase	29 qt (quart)
Air cleaners	2 qt
Cooling system	16 gal
Oil filters	3 qt
Gasoline tank	2 gal

z. Maintenance and Operating Supplies. Table I provides a list of all oils, greases, fuels, and antifreeze solutions required for the initial operation of the generator set.

Table I. Maintenance and Operating Supplies

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	0101-CRANK-CASE (1)			OIL, LUBRICAT-ING: 5 gal drums as follows:			(1) Includes quantity of oil to fill engine oil system as follows:
		10	9150-265-9435 (2)	OE30	37 3/4 qt. (1)	(3)	29 qt. crankcase 4 qt. oil filters
		10	9150-265-9428 (2)	OE10	37% qt. (1)	(3)	3 qt. air cleaners 1 qt. oil filter, governor 3/4 qt. hy-
		10	9150-242-7603 (2)	OES	37% qt. (1)	(3)	draulic governor reservoir,
2	0106.2-OIL FIL-TER ENGINE (4)			OIL, LUBRICAT-ING: (Draw from engine supply).			(2) See SM 10-1-C4-1 for additional data and requisitioning procedure.
3	0106.2-OIL FIL-TER GOVER-NOR (4)			OIL, LUBRICAT-ING: (Draw from engine supply).			(3) See LO 5-6115-293-12 for grade application and replenishment intervals.4444
4	0.06.6-HY-DRAULIC GOVERNOR RESERVOIR (4)			OIL, LUBRICAT-ING: (Draw from engine supply)			(4) Use oil as prescribed in item 1 above. (5) Tank capacity.
5	0304-AIR CLEANER (4)			OIL, LUBRICAT-ING: (Draw from engine supply).			(6) Average fuel consumption is 5.86 gal per hour of continuous operation at 1,800 rpm.
6	0306-TANK			FUEL OIL DIESEL: Bulk as follows:			(7) Radiator
		10	9140-286-5294 (2)	Regular grade (DF-2) or	87 gal. (5)	48 gal. (6)	capacity. (8) See table II for
		10	9140-286-5286 (2)	Winter grade (DF-I) or	87 gal. (5)	48 gal. (6)	quantities, ambient temperatures, specific gravity end replenish-
		10	9140-286-5283 (2)	Arctic grade (DF-A)	87 gal. (5)	48 gal. (6)	ment data. (9)Minimum pro-
7	0311-PRIMER PUMP	10	6810-200-2407	STARTING AID: Ether, (reagent) 4 oz. can.	As required.	As required.	tection obtained at 60 percent by volume I.E. 4.8 pints of anti
8	0501-RADIATOR			COOLING SYS-TEM: Water.	16 gal. (7)	As required (8)	freeze per gal of solution.
		9	6850-224-8730	ANTIFREEZE: Ethylene glycol 5 gal. can.	8 1/4 gal. (9)		(10) Pure arctic type antifreeze is used where temperatures
		9	6850-174-1806	ANTIFREEZE ARCTIC: 55 gal. drum.	(10)	(10)	are below--40°F. (11) Winterization fuel tank capacity.
9	2207-WINTERI-ZATION HEATER.	10	9130-160-1817 (2)	STARTING AID: Gasoline unleaded-bulk or	2 1/2 gal. (11)	6 gal. (12)	(12)Fuel consumption High fire; 3/4 gal. per hr. Low fire; 1/2
		10	9130-160-1816 (2)	Gasoline, Automotive Bulk.	2 1/2 gal. (11)	6 gal. (12)	gal. per hr.

aa. Dimensions and Weight.

Length, overall	106 in.
Width, overall	36 in.
Height, overall	63 in.
Weight, dry	5,800 lb.

ab. Base Plan. Refer to figure 3 for an illustrated base plan for the generator set.

ac. Nut and Bolt Torque Data.

	Size	Torque (ft-lb) (foot pound)
Fuel injector tube and lever assembly	1/4--20	12 to 15
Blower drive coupling	5/16--24	10 to 12
Air inlet housing to blower bolt	3/8--16	16 to 20
Handhole cover	3/8--16	10 to 15
Injector clampnut	3/8--24	20 to 25
Water manifold nut	3/8--24	25 to 30
Exhaust manifold to head	7/16--20	30 to 35
Lifting bracket to cylinder head	7/16--14	55 to 60
Blower to cylinder block	7/16--14	55 to 60
Fuel connector and nut	7/16--20	30 to 35
Front cover bolt to frame	1/2--13	80 to 9.0
Cylinder head nut	5/8--18	165 to 175
Studs:		
Water manifold stud		10 to 25
Exhaust manifold stud		15 to 30
Cylinder head stud		35 to 75

ad. Wiring Diagram. A practical wiring diagram of the generator set electrical system is shown by figure 4. (Located in back of manual)

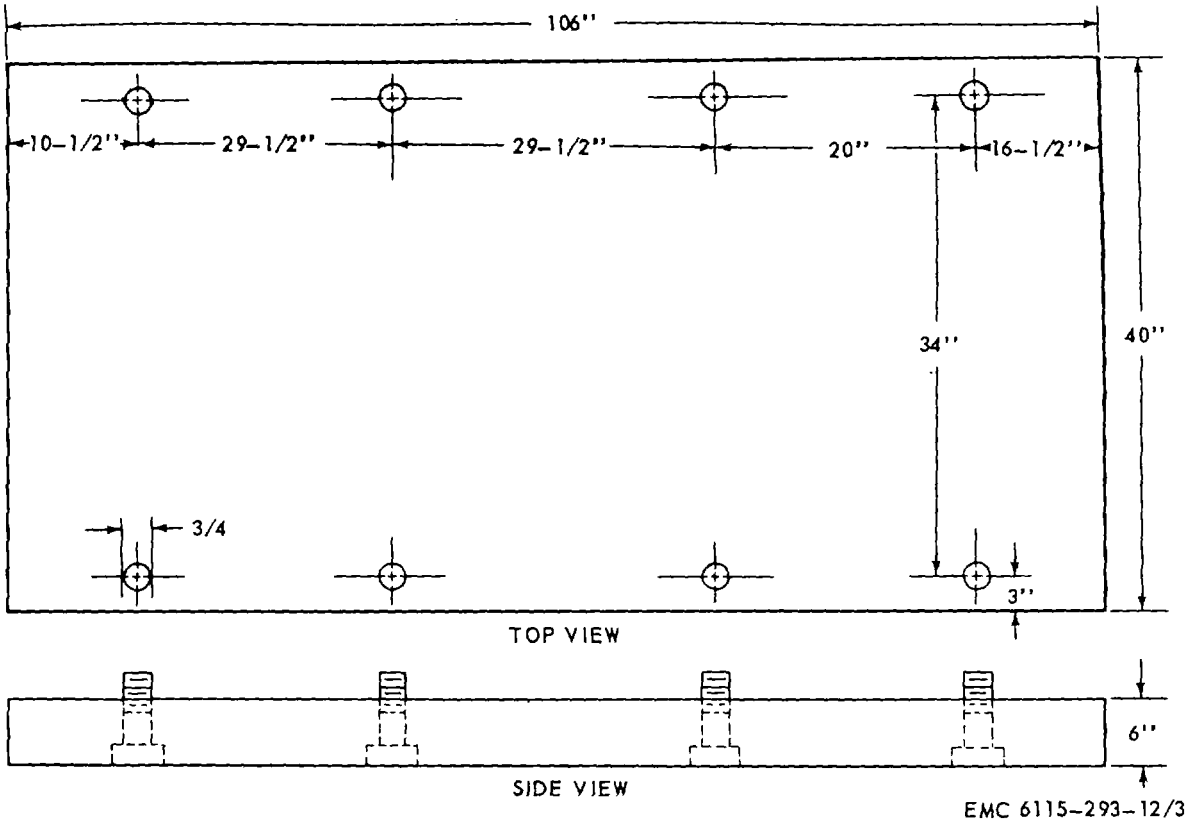


Figure 3. Base plan

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

7. Unloading of Equipment

a. Remove all tiedown straps and blocks that secure the generator set to the bed of the carrier.

b. Remove the generator set from the bed of the carrier with either a forklift truck or crane, or skid the unit down a ramp. Attach the cables of the crane to the lifting **U**-bolt (fig. 2).

> ***Warning*: When lifting the generator set, be sure that the lifting device has a capacity of at least 8,000 pounds. Do not allow the unit to swing while suspended. Failure to observe this warning may result in damage to the unit or severe injury to personnel.**

8. Unpacking New Equipment

a. Position tile generator set as near the worksite as possible. Remove any protective material that may be on the unit.

b. Cut the bonding straps that secure the electrolyte and other separately packed components to the skid base and remove them from the unit. Do not uncrate the electrolyte until it is to be used.

9. Inspection of New and Used Equipment

a. Inspect the packing list and make sure that all equipment listed has been received. Examine the identification plate for positive identification of the equipment.

b. Inspect the generator set for damaged or missing parts. Be especially careful when inspecting used equipment.

c. Refer to paragraph 36 for a guide to inspecting the unit.

10. Installation of Separately Packed Components

Remove the caps from the batteries and fill each cell with electrolyte. Be sure the plates are covered by three-eighths of an inch of electrolyte. Refer to TM 9-6104-200-15.

> **Warning: Do not smoke or use an open flame in the vicinity when servicing the batteries. Batteries generate hydrogen, a highly explosive gas.**

11. Installation of Setting-Up Instructions

a. General. The generator set may be installed either outdoors or indoors, with temporary or permanent mounting. Locate the unit as near as possible to the load. Make sure the generator set is as level as possible.

b. Indoor Installation. Make sure the floor of the enclosure is of sufficient strength to support the weight of the unit. If the installation is to be permanent, the unit may be secured to the floor with five-eighths inch bolts. Provide at least 4 feet of space around the unit for servicing and adequate ventilation. Install a flexible exhaust line to carry the exhaust gases to the outside. Use as few bends as possible in the exhaust line and make sure that all connections are gastight.

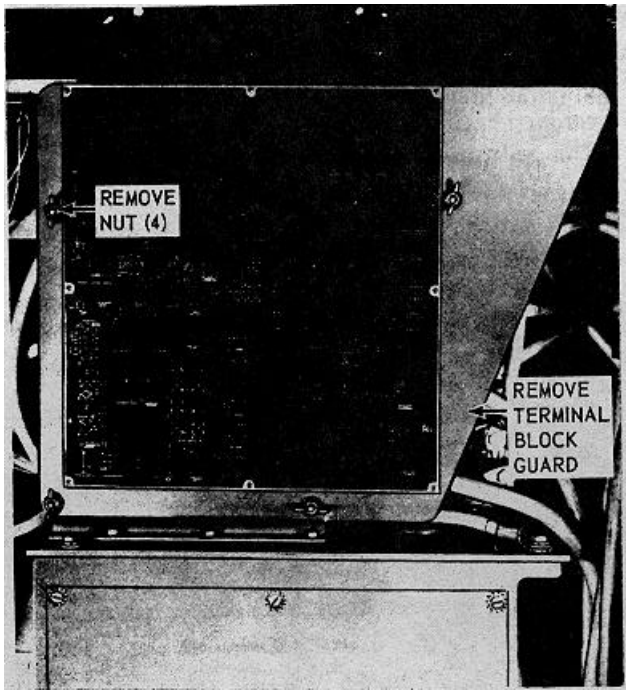
> **Warning: When the unit is to be operated in an enclosed area, exhaust gases must be piped to the outside. These gases contain carbon monoxide. Continued breathing of exhaust fumes is dangerous and may be fatal.**

c. Outdoor Installation. Avoid sandy, muddy, or damp locations if possible. If it is necessary to install the unit on soft ground, refer to figure 3, and construct a foundation of planks, logs, or concrete. Locate the generator set so that it is as level as possible.

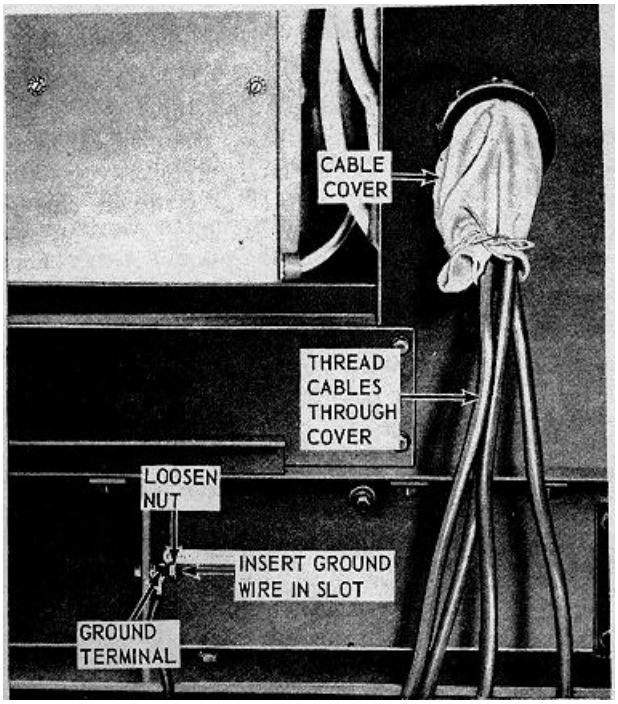
d. Grounding. The generator set must be grounded prior to operation. The ground can be an underground water piping system, driven galvanized rod, or a buried metal plate. A ground rod must be at least 3/4 inch in diameter if hollow, or 5/8 inch if solid, and be driven to a depth of at least 8 feet. A ground plate must have a minimum area of 9 sq ft (square feet) and be buried at a depth of at least 4 feet. The ground lead must be a No. 6 AWG (American Wire Gage) or larger, copper wire and bolted or clamped to the rod, plate, or piping system. Connect the other end of the ground lead to the generator set as shown by figure 5.

> **Warning: Do not operate the generator set without a suitable ground connection. Electrical defects in the unit can cause death by electrocution when contact is made with an ungrounded system.**

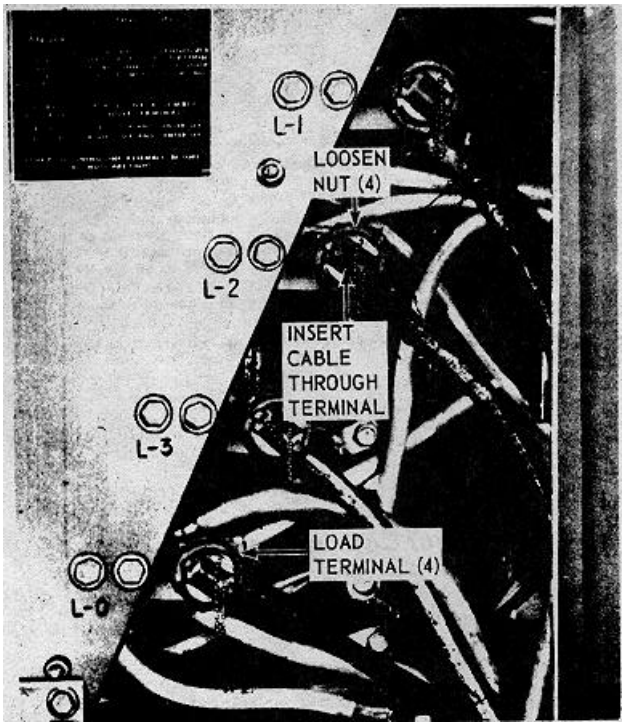
e. Auxiliary Fuel Line Installation. The generator set is equipped with an 87 gallon diesel fuel tank that will operate the engine for approximately 8 hours. If the generator set is operated on standby,



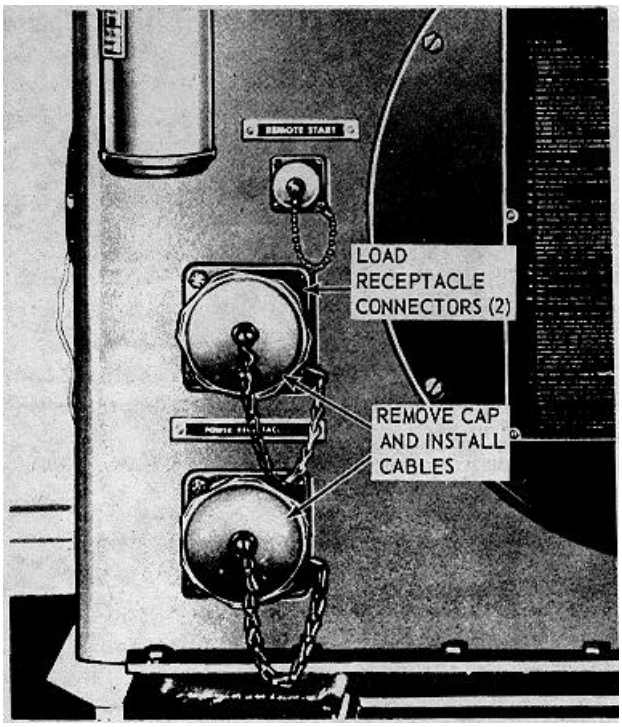
A. TERMINAL BLOCK GUARD.



B. CABLE COVER AND GROUND WIRE.



C. LOAD TERMINALS.



D. LOAD RECEPTACLE CONNECTORS.

EMC 6115-293-12/5

Figure 5. Ground lead and load cables, installation instructions.

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or if it is more practical to operate the unit from an auxiliary fuel source, refer to figure 6 for auxiliary fuel line installation and valve positions.

f. Load Connections. Connect the load cables to the generator set as shown by figure 5.

Warning: Do not attempt to make or change load connections or perform maintenance on the generator set while it is in operation. Always make sure that it is not connected to an energized line before performing maintenance.

12. Servicing New and Used Equipment

a. Servicing. Refer to paragraph 34 and perform the operator's daily services.

b. Lubrication. Lubricate as described in the current lubrication order.

c. Fuel System. Refer to table I and fill the diesel fuel tank and the heater gasoline tank with the proper grade of fuel or gasoline as applicable.

Warning: Do not fill the fuel tank while the engine is in operation. Fuel spilled on a hot engine may explode and cause injury to personnel. When filling the fuel tank, always provide a metal-to-metal contact between the container and the fuel tank. This will prevent a spark from being generated as the fuel flows over the metallic surface.

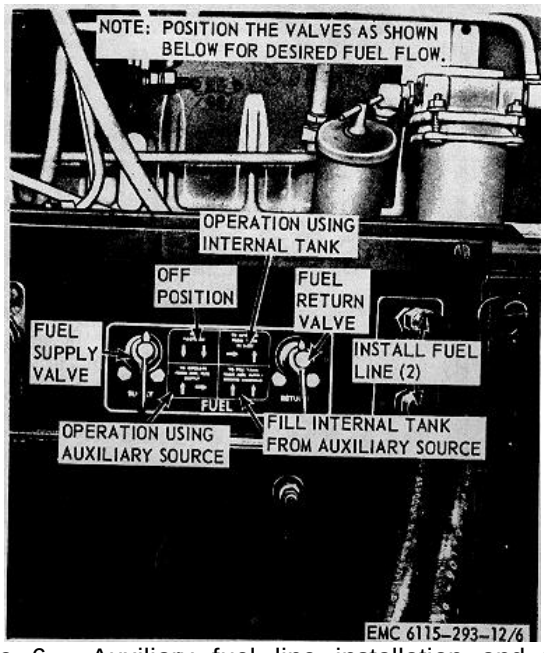


Figure 6. Auxiliary fuel line installation and valve positions.

d. Cooling System. Fill the cooling system with clean, fresh water. When freezing temperatures are expected, be sure that the cooling system contains the proper antifreeze mixture in accordance with table II.

Table II. Freezing Points, Composition, and Specific Gravities of Military Antifreeze Materials

Lowest expected ambient temp. °F	Pints of inhibited glycol per gal of coolant	Compound antifreeze arctic	Ethylene glycol coolant solution specified gravity at 68° F.
+20----	1 ½	Issued full-strength and	1.022
+10----	2	ready mixed for 0° to	1.036
0----	2 ¾	-65° F. Temperatures	1.047
-10----	3 ¼	for both initial instal-	1.055
-20----	3 ½	lation and replenish-	1.062
-30----	4	ment of losses.	1.067
-40----	4 ¼	*Do not dilute with water*	1.073
-50----	Arctic	*or any other substance*.	
-60----	antifreeze		
-75----	preferred.		

1. Maximum protection is obtained at 60 percent by volume, that is 4.8 pints of ethylene glycol per gallon of solution.

2. Military Specifications MIL-C-11755 Arctic type, nonvolatile antifreeze compound is intended for use in the cooling system of liquid cooled internal combustion engines for protection against freezing primarily in Arctic regions where the ambient temperature remains for extended periods of time close to -40° F. Or drops below, to as low as –90° F.

3. Use an accurate hydrometer. To test hydrometer, use 1 part ethylene glycol type antifreeze to 2 parts water. This should produce a hydrometer reading of 0° F.

Note. Fasten a tag near the radiator filler cap indicating the type of antifreeze.

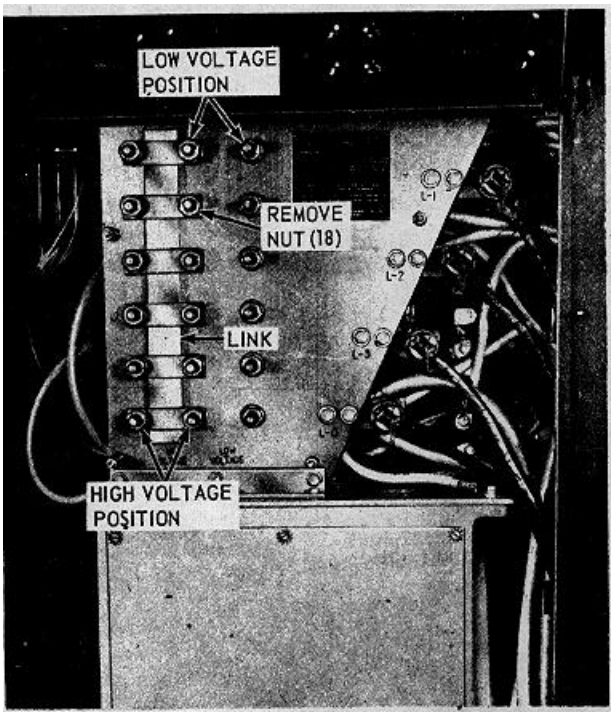
e. Batteries.

(1) Refer to paragraph 10 and fill the batteries with electrolyte.

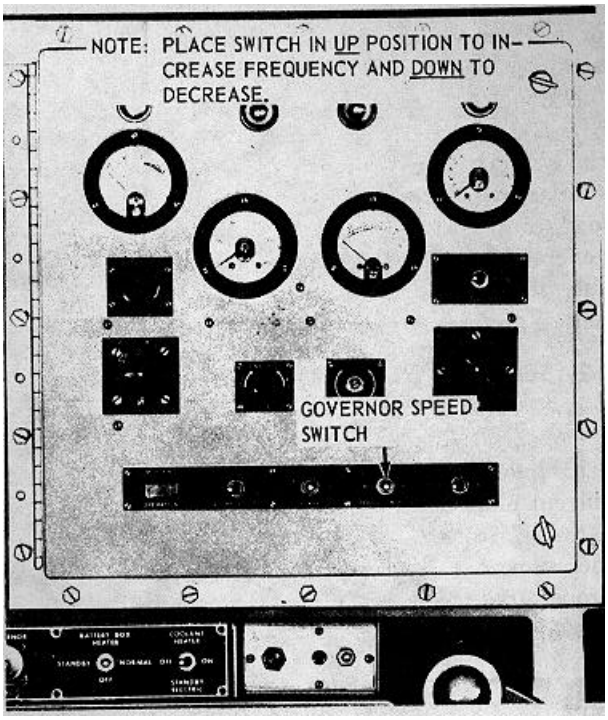
(2) Connect the battery cables (para. 10).

13. Equipment Conversion

Make voltage and frequency conversions and adjustments on the generator set as shown by figure 7.



A. REMOVE TERMINAL BLOCK GUARD FIG. 15). POSITION LINK FOR DESIRED VOLTAGE.



B. ADJUST GOVERNOR SPEED SWITCH FOR DESIRED FREQUENCY.

EMC 6115-293-12/7

Figure 7. Generator set voltage and frequency conversion and adjustment instructions.

Section II. MOVEMENT TO A NEW WORKSITE

14. Dismantling For Movement

a. Disconnecting the Generator Set.

(1) Disconnect all external load cables and the ground wire (fig. 5).
(2) Disconnect exhaust pipe extensions if used.
(3) Disconnect all auxiliary fuel lines (fig. 6) if used.

b. Preparation for Movement.

(1) Refer to the basic issue items list and make sure that all items described are on, or with the generator set.
(2) Close all doors and panels.
(3) The generator set may be skidded or towed for short distances where the terrain permits. Secure a suitable chain or cable to the skid base and tow the generator to the new worksite.

15. Reinstallation After Movement To a New Worksite

Refer to paragraphs 10 and 11 for reinstallation after movement to a new worksite.

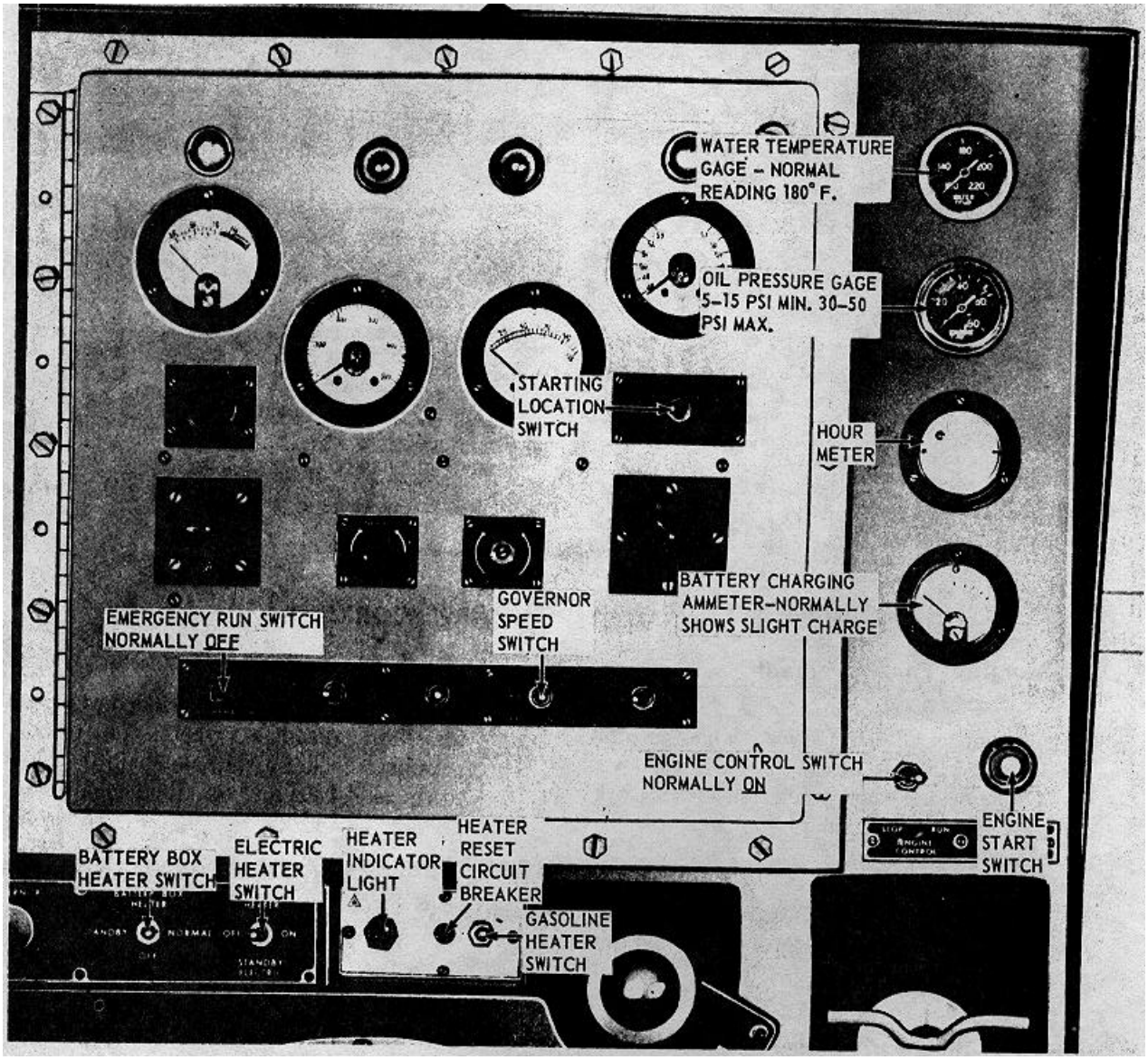
Section III. CONTROLS AND INSTRUMENTS AND OPERATION UNDER USUAL CONDITIONS

16. Controls and Instruments

Refer to figure 8 for normal readings and location of all controls and instruments.

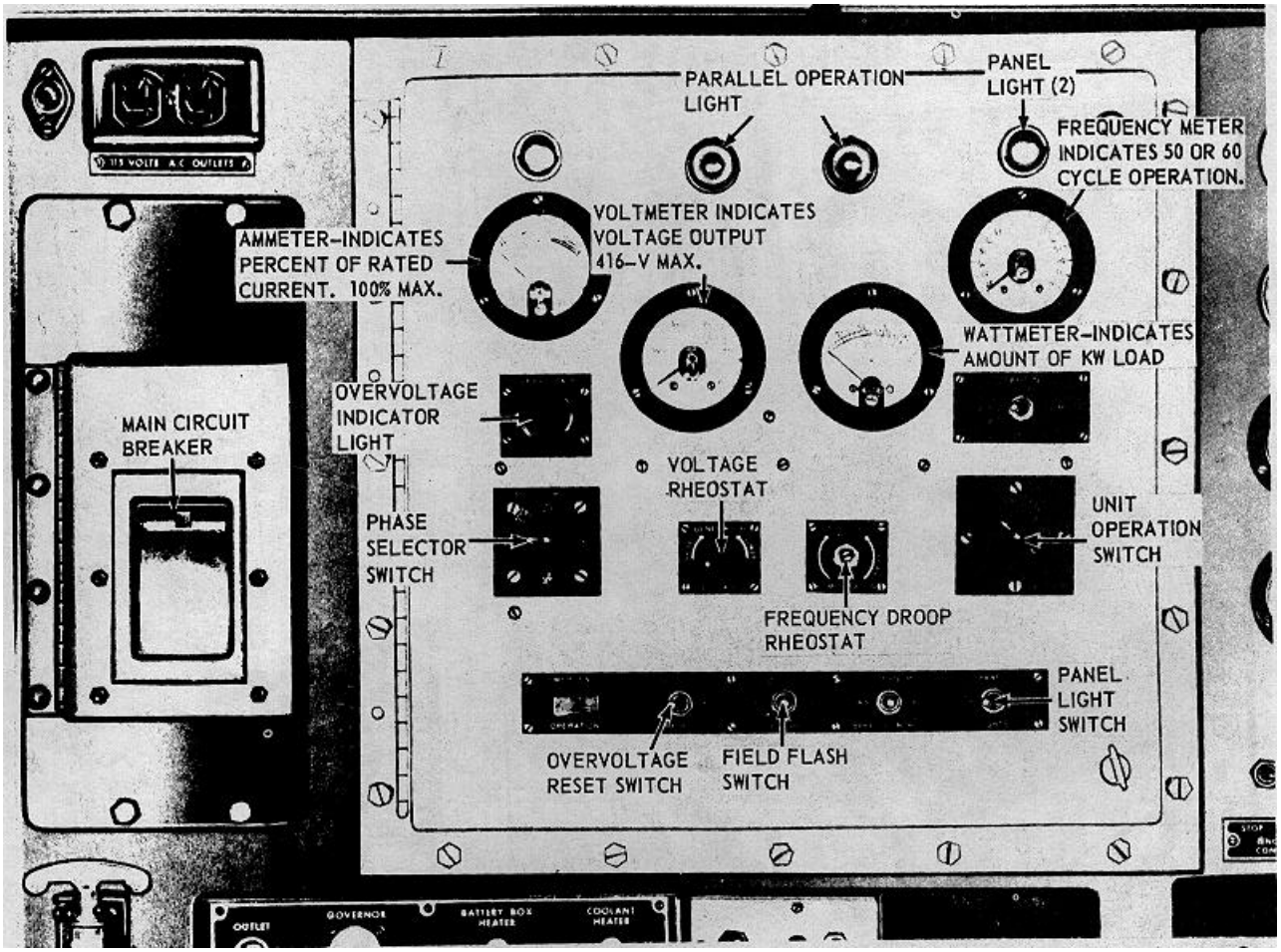
17. Operation Under Usual Conditions

It is essential that the operator know how to perform every operation of which the generator set is capable. Since nearly every job presents a different problem, the operator may have to vary the given procedures to fit the individual job. Refer to paragraphs 18, 19, and 20 for starting, stopping, and operating details.



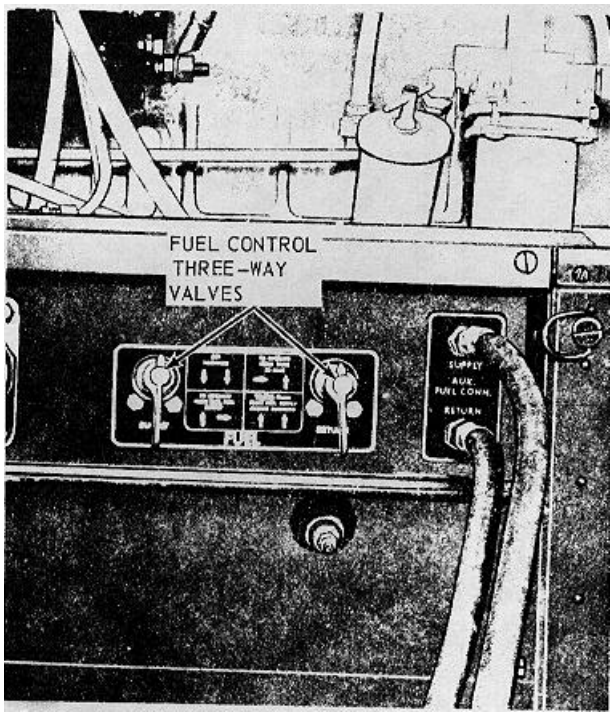
A. ENGINE CONTROLS AND INSTRUMENTS. **EMC 6115-293-12/8 (1)**

Figure 8. Controls and instruments.

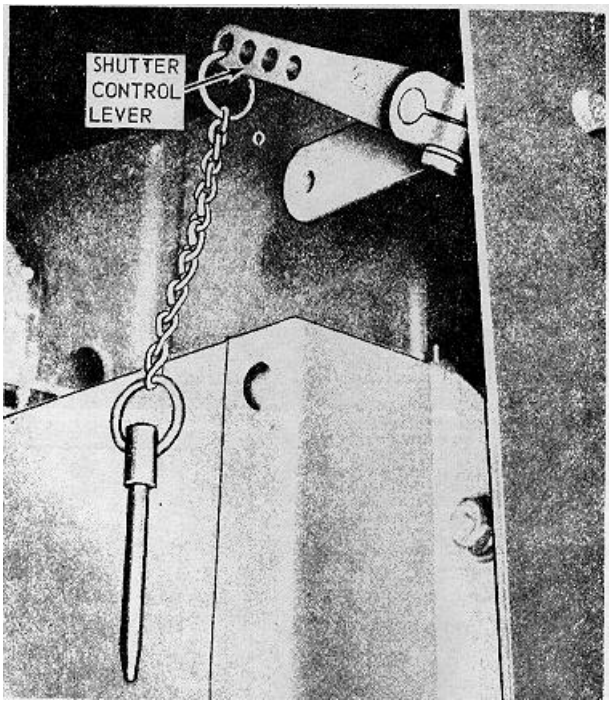


B. MAIN GENERATOR CONTROLS AND INSTRUMENTS. EMC 6115-293-12/8 (2).

Figure 8-Continued

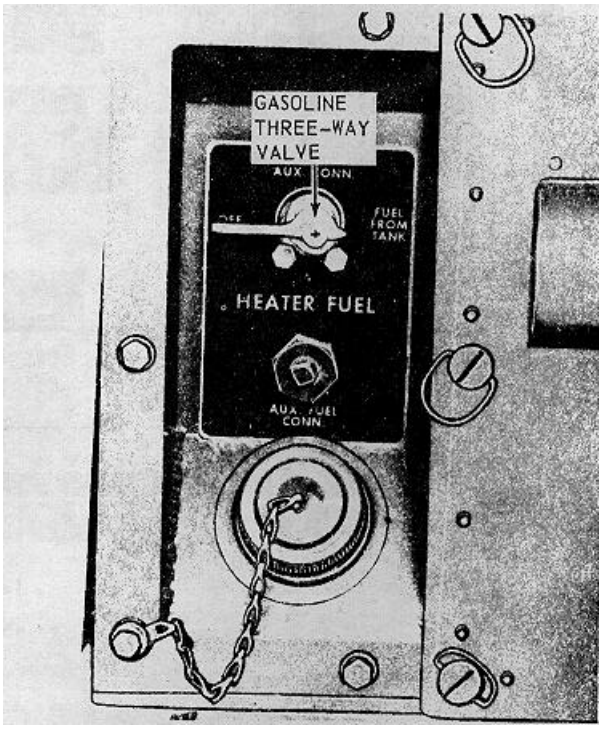


C. DIESEL FUEL CONTROL THREE-WAY VALVES.



D. MANUAL SHUTTER CONTROL LEVER.

E. FUEL QUANTITY GAGE.



F. HEATER GASOLINE CONTROL THREE-WAY VALVE.

18. Engine Starting Instructions

a. Preparation for Starting.

(1) Perform the operator's daily services (para. 34).

(2) Install the auxiliary fuel hoses and position the fuel three-way valves (fig. 6).

(3) Position the control panel switches for starting as shown by figure 9.

(4) If temperature is below 40° F., utilize the starting aid as shown by figure 10.

b. Starting.

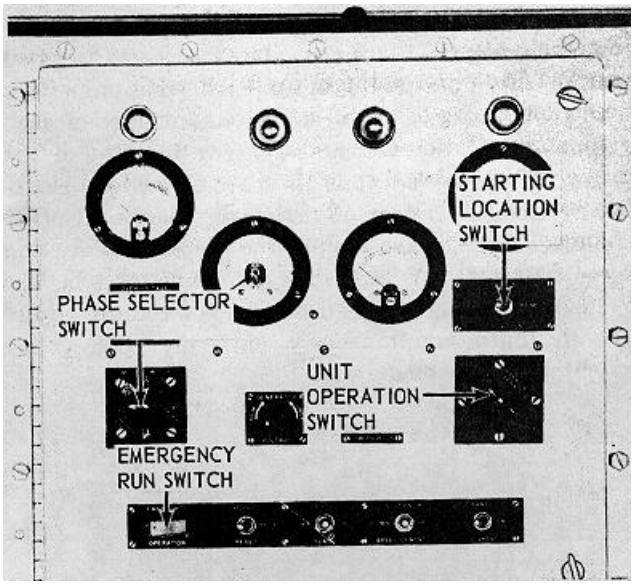
(1) If the temperature is -25° to -65° F., utilize the coolant heaters (paras. 27 and 28).

(2) Start the engine as shown by figure 11.

19. Engine Stopping Instructions

a. Normal Stopping. Stop the engine as shown by figure 12.

b. Stopping by Safety Devices. The generator set is equipped with safety devices which will shut down the engine in the event of a loss of oil pressure, high-coolant temperature, or engine over-speed. These devices, when energized, will in turn, energize the shutdown solenoid to close the air box damper.



STEP 1 PLACE EMERGENCY RUN SWITCH IN OFF POSITION.

STEP 2. PLACE UNIT OPERATION SWITCH IN SINGLE-UNIT POSITION.

STEP 3. PLACE PHASE SELECTOR SWITCH IN 1-2 VOLTS POSITION.

STEP 4. PLACE STARTING LOCATION SWTICH IN LOCAL POSITION.

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Figure 9. Preparation for starting.

20. Operating Details

a. Attach the load cables (fig. 5).

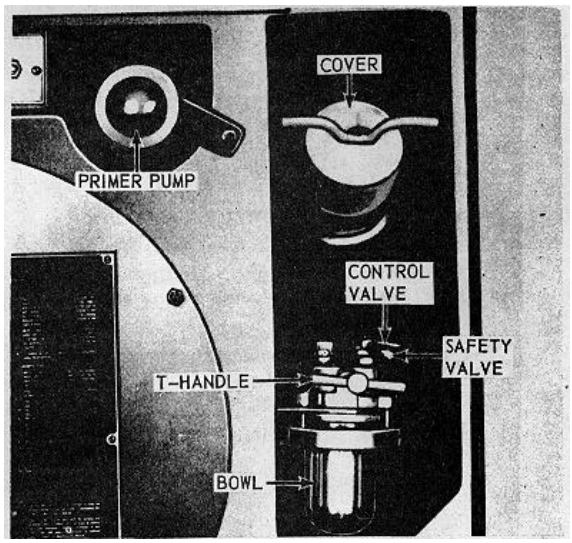
b. Position the conversion bar for the desired voltage (para. 13).

c. Single Unit Operation. Operate the generator set as shown by figure 13.

d. Parallel Operation.

(1) *General.* Generator sets to be operated in parallel must have the same voltage and frequency rating and must be connected for correct phase rotation. Care must be taken to avoid excessive crosscurrents and the motoring of one unit by the other. The voltage regulation characteristics should be similar and the engines must have the same speed regulation characteristics.

***Warning*: Do not attempt to make or break load connections or perform maintenance on the generator set while it is in operation. Always make sure it is not connected to an energized line before performing maintenance.**



STEP 1 REMOVE COVER AND INSERT CARTRIDGE OR BULK MATERIAL. INSTALL COVER AND TIGHTEN.

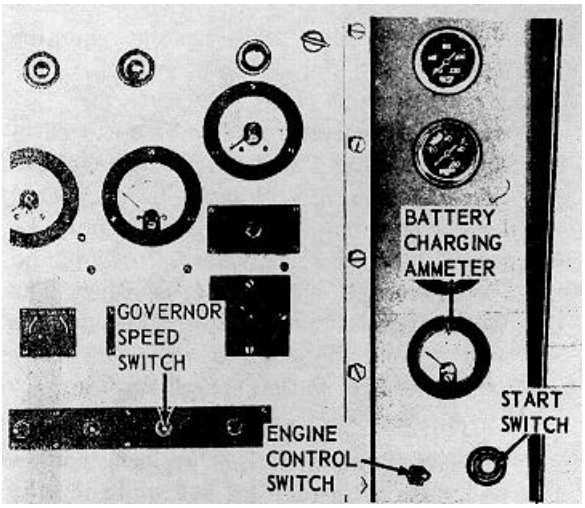
STEP 2. OPEN T-HANDLE AND FILL BOWL. RELEASE T-HANDLE.

STEP 3. PRESSURIZE PRIMER BY OPERATING PUMP. PLACE SAFETY VALVE IN VENT POSITON. (SEE FIG. 11).

STEP 5. AS SOON AS ENGINE OPERATES ON ITS OWN FUEL, CLOSE CONTROL AND SAFETY VALVE.

EMC 6115-293-12/10

Figure 10. Starting aid operating instructions.



STEP 1. REFER TO FIGURE 9 AND PERFORM STEPS 1 THROUGH 4.

STEP 2. PLACE ENGINE CONTROL SWITCH IN RUN POSITION.

STEP 3. DEPRESS START SWITCH. IF ENGINE DOES NOT FIRE WITHIN 10 TO 15 SECONDS, RELEASE SWITCH AND HOLD GOVERNOR SPEED SWITCH IN UP POSITION FOR 2 SECONDS. DEPRESS START SWITCH.

NOTE: IF TEMPERATURE IS 40°F TO -25°F, OPEN PRIMER CONTROL VALVE AT SAME TIME ENGINE START SWITCH IS DEPRESSED (SEE FIG. 10).

CAUTION: DO NOT OPERATE STARTER LONGER THAN 30 SECONDS. ALLOW 2 MINUTE COOLING-OFF INTERVALS BETWEEN STARTS.

STEP 4. AS SOON AS ENGINE STARTS, CHECK AMMETER. CURRENT SHOULD DROP BELOW 20 AMPS IN 20 MINUTES. IF NOT, STOP THE ENGINE (PAR. 19) AND REPORT THE CONDITION TO ORGANIZATIONAL MAINTENANCE.

EMC 6115-293-12/11

Figure 11. Engine starting instructions.

(2) Both sets must be connected to a common ground. Connect a wire between the ground studs (fig. 5) of both sets.

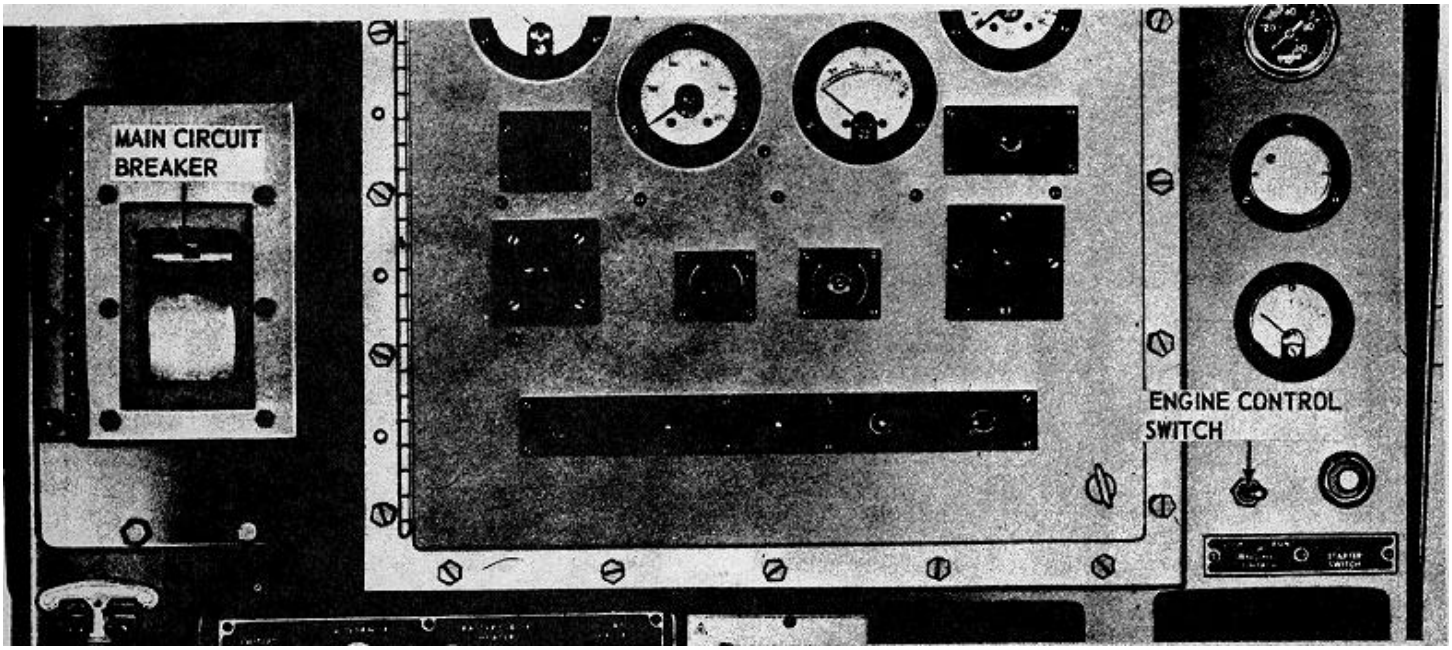
(3) Refer to paragraph 11 and connect the load cables to one set only, which will hereafter be referred to as the operating unit. The other unit will hereafter be known as the incoming unit.

(4) Connect the two generator sets for parallel operation as shown by figure 14.

e. Kilowatt Load Division. Generator sets operated in parallel must divide the kilowatt load in proportion to their ratings. Observe the wattmeter of each unit. Place the governor speed control switch of the unit indicating less than its share of the load in the UP. position and, at the same time, place the governor speed control switch of the unit indicating more than its share of the load in the DOWN position. Adjust the two units until the proper load division is indicated. If the frequency of the system has changed during the load division procedure, adjust both units until the correct line frequency is obtained.

***Note*. If the kilowatt load division changes with change in load, the frequency droop adjustment is incorrect. Report the condition to organizational maintenance.**

f. Ampere Load Division. Generator sets operated in parallel must divide the ampere load in proportion to their ratings. Observe the ac ammeter of each unit. Turn the voltage adjusting rheostat of the unit indicating less than its share of the load clockwise, and the 'voltage adjusting rheostat of the other unit counterclockwise, until the proper load division is indicated. If the voltage of the system has changed during the load division procedure, adjust both units simultaneously until the correct line voltage is obtained.



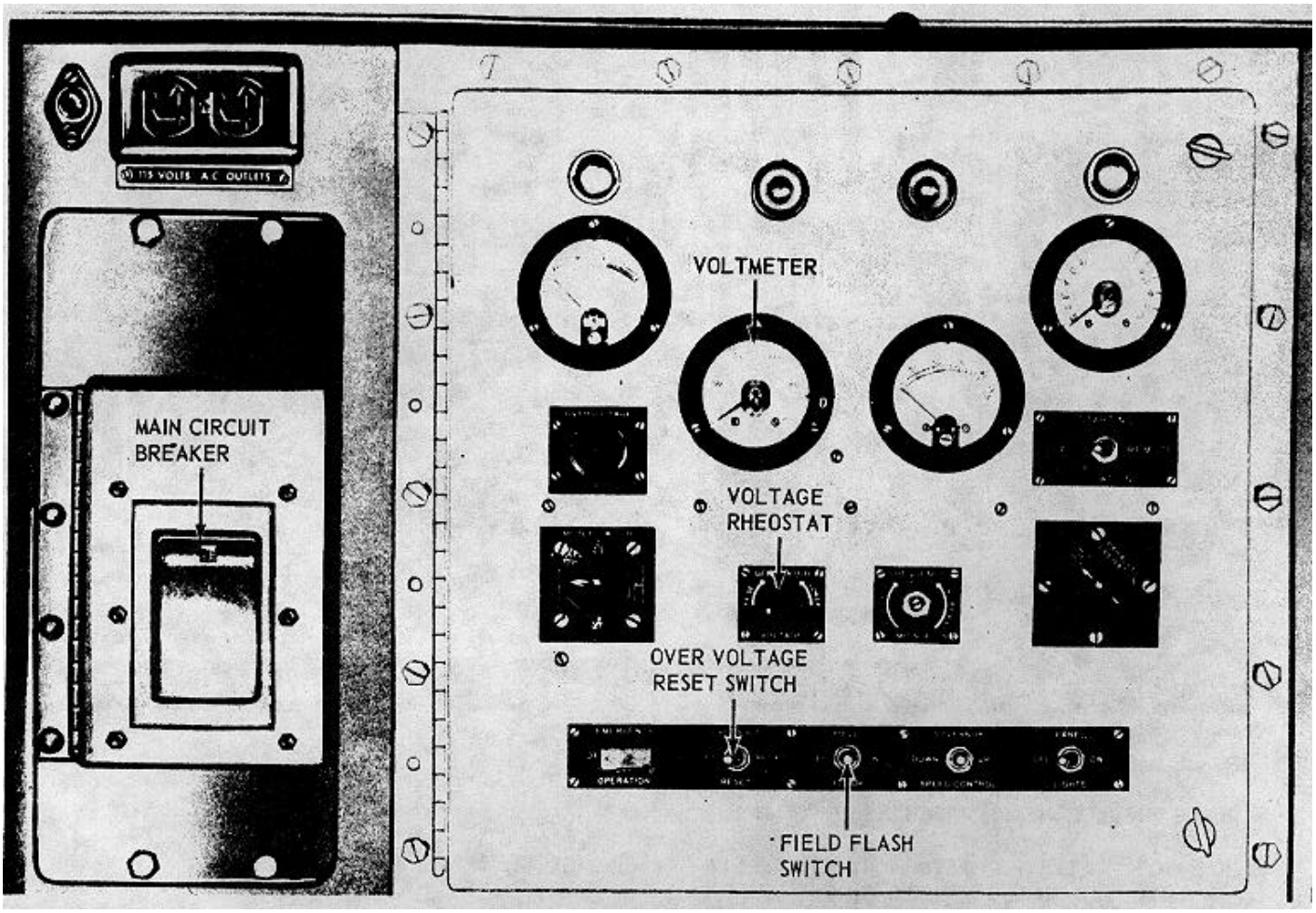
STEP 1 PLACE MAIN CIRCUIT BRAKER IN OFF POSITION.

STEP 2. PLACE ENGINE CONTROL SWITCH IN OFF POSITION.

CAUTION: DO NOT ATTEMPT TO STOP UNIT WITHOUT FIRST PLACING CIRCUIT BREAKER IN OFF POSITION. SERIOUS DAMAGE TO THE LOAD MAY RESULT.

EMC 6115-293-12/12.

Figure 12. Engine stopping instructions.



STEP 1 START ENGINE AND ALLOW IT TO REACH OPERATING TEMPERATUE (PAR 18).

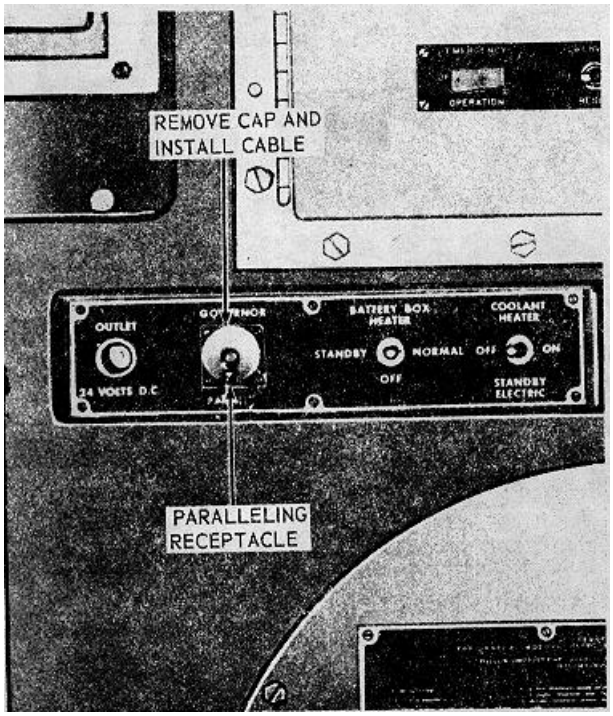
STEP 2. PLACE FIELD FLASH SWITCH IN ON POSITION AND HOLD. PLACE OVERVOLTAGE RESET SWITCH IN RESET POSITON AND HOLD. OBSERVE VOLTMETER; WHEN VOLTAGE BUILDS UP, RELEASE FIELD FLASH SWITCH FIRST THEN OVERVOLTAGE RESET SWITCH.

STEP 3. ADJUST VOLTAGE RHEOSTAT TO THE DESIRED VOLTAGE; CLOCKWISE ROTATION WILL INCREASE VOLTAGE AND COUNTERCLOCKWISE WILL DECREASE VOLTAGE.

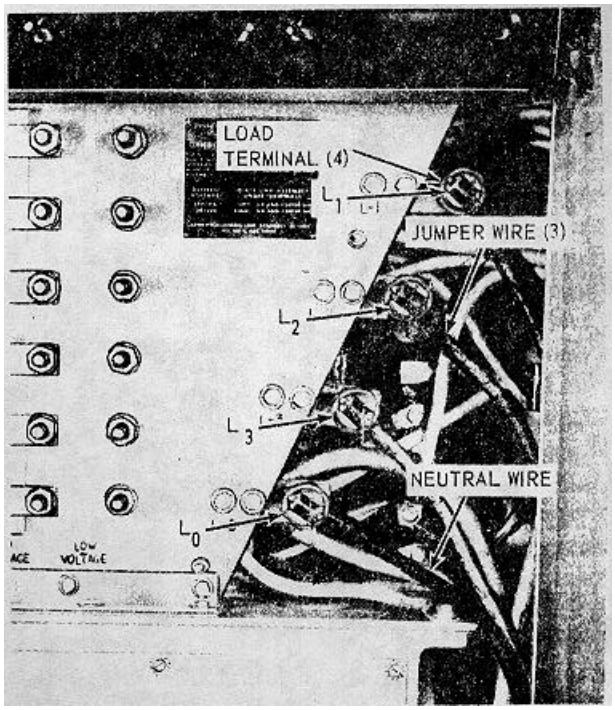
STEP 4. PLACE MAIN CIRCUIT BRAKER IN ON POSITON.

EMC 615-293-12/13

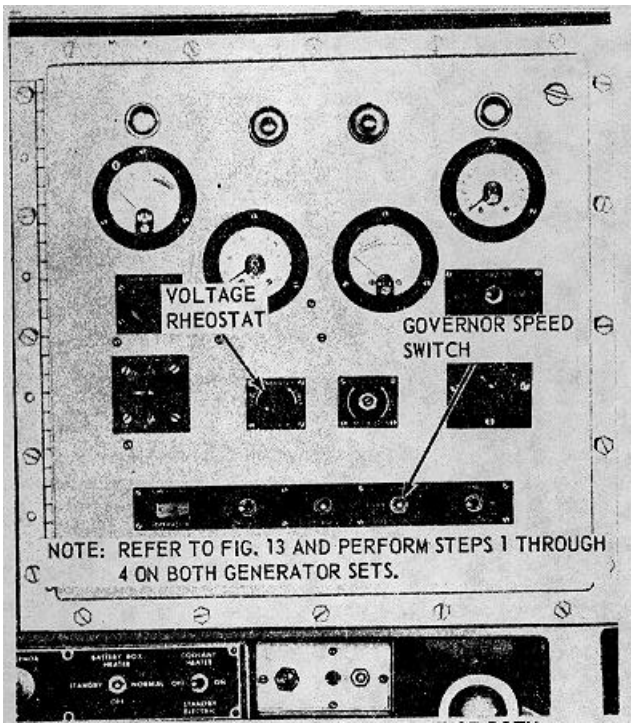
Figure 13. Single unit operating instructions.



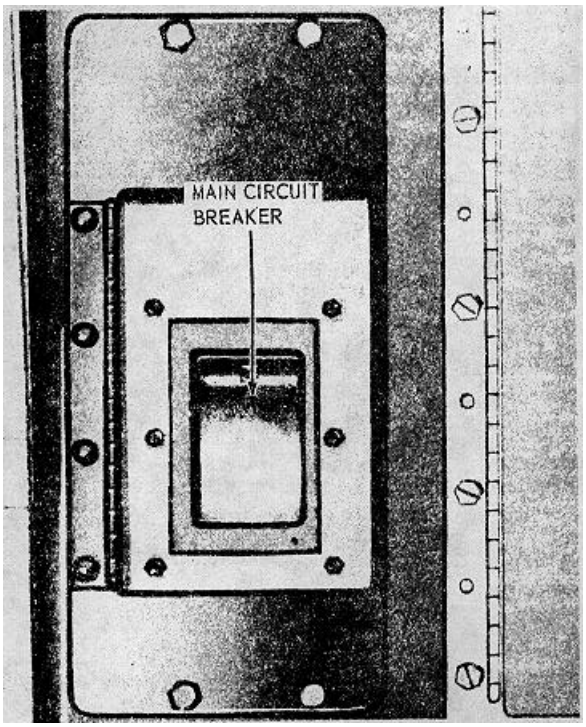
STEP 1. CONNECT PARALLEL CABLE TO BOTH GENERATOR SETS.



STEP 2. CONECT JUMPER WIRES BETWEEN LIKE LOAD TERMINALS OF BOTH GENERATOR SETS.



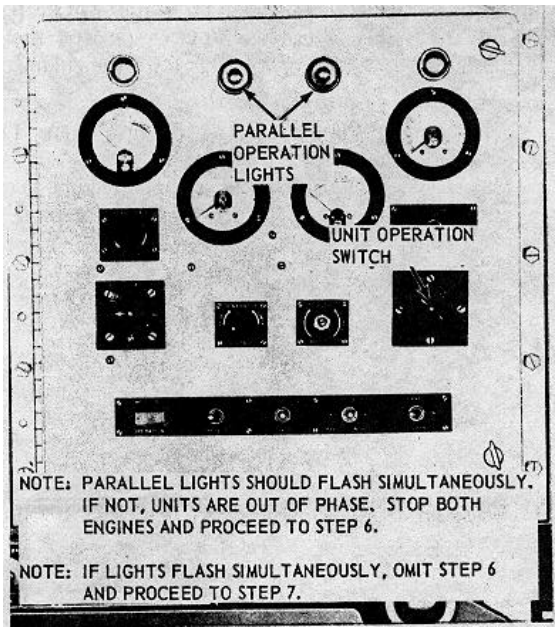
STEP 3. ADJUST REQUENCY AND VOLTAGE OF BOTH SETS UNNTIL THEY ARE AT THE SAME SETTING.



STEP 4. PLACE MAIN CIRCUIT BREAKER OF OPERATING SET IN OFF POSITON.

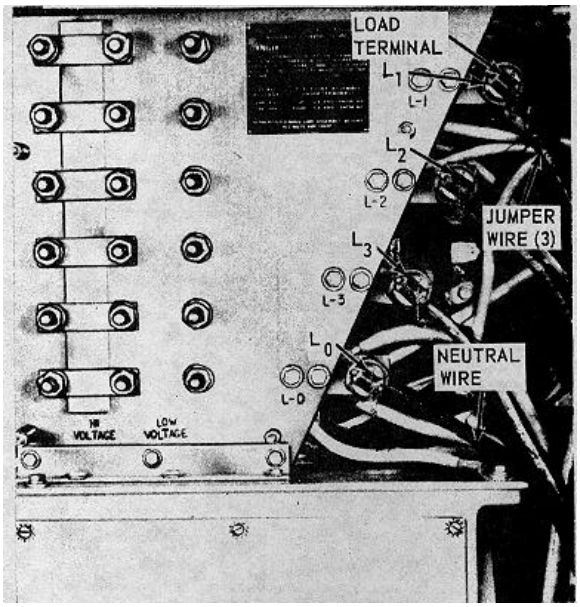
EMC 6115-293-12/14 (1)

Figure 14. Parallel operation instructions.

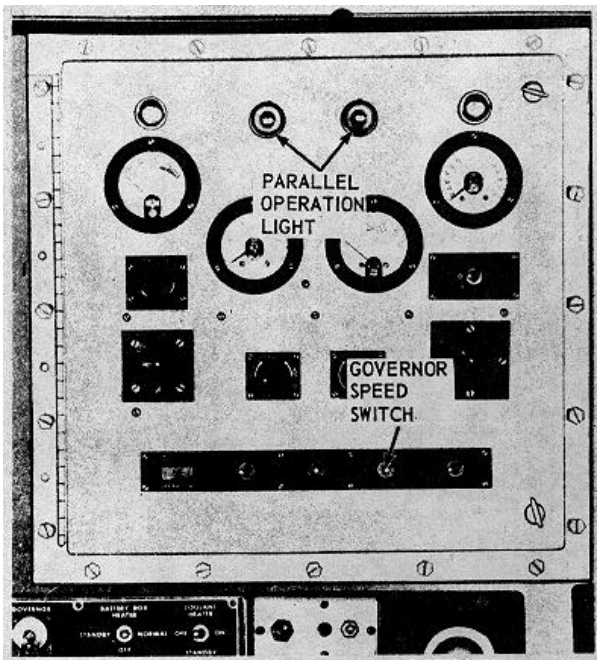


STEP 5. PLACE UNIT OPERATION SWITCH IN PARALLEL POSITION.

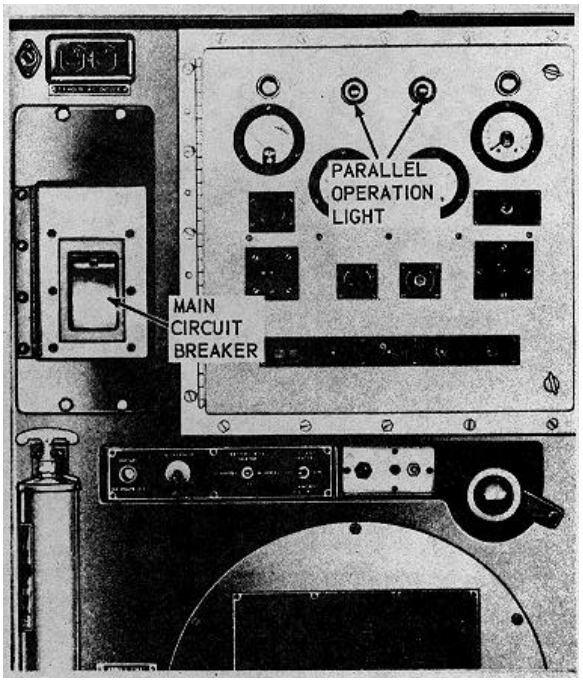
NOTE: IT IS NECESSARY TO PHASE TEST TWO SETS ONLY THE FIRST TIME THEY ARE USED IN PARALLEL.



STEP 6. REVERSE ANY TWO JUMPER WIRES ON LIKE LOAD TERMINALS. REPEAT STEP 3 ABOVE.



STEP 7. ADJUST FREQUENCY OF INCOMING SET UNTIL PARALLEL LIGHTS FLASH AT 2 SECOND INTERVALS OR SLOWER.



STEP 8. PLACE CIRCUIT BREAKER OF INCOMING SET IN ON POSITION AT EXACT INSTANT LIGHTS GO OUT.

EMC 6115-293-12/14 (2)

Figure 14-Continued.

***Note*. If the ampere load division changes with the change in load, the crosscurrent rheostat adjustment is in correct. Report the condition to organizational maintenance.**

g. Removal From Parallel Operation. Remove the unit from parallel operation as shown by figure 15.

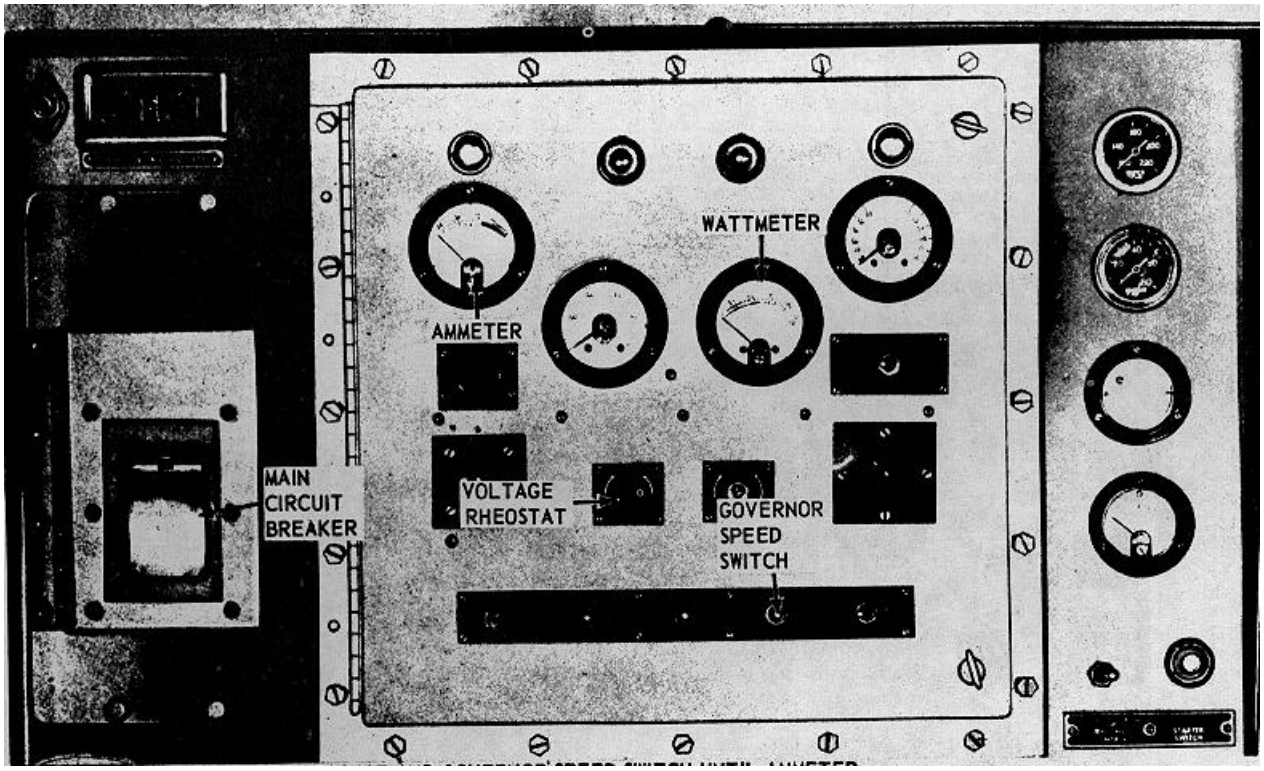
h. Emergency Operation. Under conditions of extreme emergency, the generator set can be operated with overloads or other abnormal conditions. To operate the unit under these conditions, lift the cover and place the emergency run switch (fig. 8) in the RUN position. This switch will keep any of the safety shutdown devices (except the overspeed governor) from shutting down the engine.

i. Preparation for Remote Starting.

(1) Refer to figure 13 and perform steps 1 through 4.

(2) Refer to figure 12 and stop the engine.

(3) Prepare the generator set for remote starting as shown by figure 16.



STEP 1. ADJUST VOLTAGE RHEOSTAT AND GOVERNOR SPEED SWITCH UNTIL AMMETER AND AND WATTMETER SHOW ZERO.

NOTE: BEFORE THE UNIT MAY BE REMOVED FROM PARALLEL OPERATION, THE TOTAL LOAD MUST NOT EXCEED THE FULL LOAD RATING OF REMAINING UNIT OR UNITS.

STEP 2. PLACE MAIN CIRCUIT BREAKER IN OFF POSITION.

STEP 3. STOP THE ENGINE (PAR. 19).

Figure 15. Parallel operation, removal instructions.

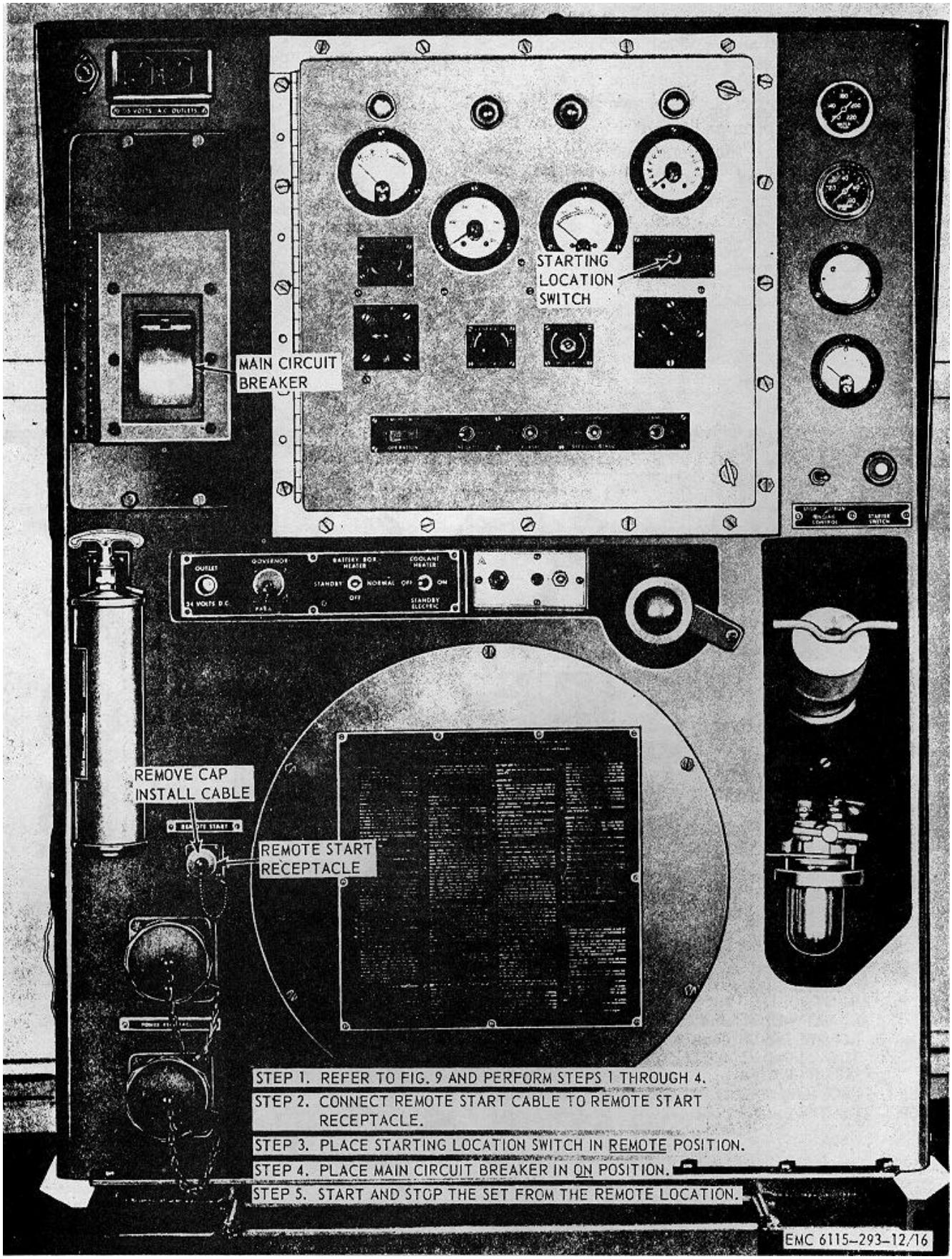


Figure 16. Preparation of the generator set for remote starting.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

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

a. General. This generator set is designed to operate in temperatures as low as -65° F. To operate successfully in cold weather, utilize the engine coolant heaters. Refer to paragraph 18 for cold weather starting instructions.

b. Engine.

(1) *Lubrication*. See that the engine is lubricated for cold weather operation in accordance with the current lubrication order.

(2) *Cooling system*. Inspect the engine coolant to he sure that it contains the correct amount of antifreeze. Prior to adding the initial antifreeze, clean and flush the entire cooling system (para. 93). Inspect cooling system components for signs of leakage and other possible damage. Inspect the shutter control for proper working order.

***Caution*: Do not bend or kink cooling hoses during cold weather. Rubber hoses will become brittle in cold weather and will crack and break with excessive handling.**

(3) *Fuel system*. Keep the fuel tank as full as possible at all times to prevent condensation. Any water that does form in the fuel tank will be carried to the secondary fuel filter. Therefore, it may be necessary to drain the filter more frequently than under normal conditions. Drain 1/4 pint of fuel from the secondary fuel filter daily.

(4) *Electrical system*. Before starting the engine, wipe the engine electrical components free of ice and moisture. Do not disturb the wiring since it becomes brittle with extreme cold. Allow the wiring to warm up before attempting to twist or bend it. Be sure that the batteries are fully charged.

***Caution*: Run the engine for approximately 1 hour after adding water to the batteries. This will permit added water to mix with the electrolyte and prevent freezing.**

c. Generator Assembly.

(1) *Lubrication*. The generator assembly is equipped with life-seal bearings and requires no special lubrication.

(2) *Stabilization period*. When operating in extreme cold, allow at least a 15-minute stabilization period after warmup before applying the load to the generator.

(3) *Field control.* The main generator assembly is designed to operate in a wide range of temperatures without special service.

22. Operation in Extreme Heat

a. Engine.

(1) *Cooling system*. Keep the cooling system free from rust and scale. If necessary, add an approved rust inhibitor. Clean and flush the cooling system at frequent intervals (para. 93). Inspect the fan V-belts for proper adjustment. Be sure that the generator is free of airflow restrictions.

(2) *Lubrication*. Lubricate the engine in accordance with the current lubrication order.

(3) *Fuel system*. Do not, fill the fuel tank too full; allow sufficient room for the expansion of fuel.

(4) *Batteries.* Inspect the electrolyte level of the batteries daily. The plates should be covered by three-eighths of an inch of electrolyte. Add water as necessary.

b. Generator Assembly. Be sure that the generator is free of airflow restrictions. If surrounding air is not dusty or sandy, all doors and panels may be left open. When operating indoors, make provisions for adequate ventilation and the venting of exhaust fumes to the outside.

23. Operation in Dusty or Sandy Areas

a. General. If installation of the generator set is permanent, erect a protective cover for the unit.

In temporary installation, take advantage of natural barriers as much as possible. Where water is available, keep the immediate area wet down. All doors and panels should remain closed. Keep the unit as clean as possible, paying special attention to screens and radiator cores.

b. Lubrication. In sandy or dusty areas, filters and strainers must be cleaned more frequently than under normal conditions. Clean all lubrication points before and after lubrication. Be sure that all lubricant containers are tightly sealed and stored in an area as free as possible from dust and sand.

c. Fuel System. Take all necessary precautions to keep dirt and grit out of the fuel system. Clean the fuel filters at each filling (paras. 78 and 79).

24. Operation Under Rainy or Humid Conditions

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

25. Operation in Salt Water Areas

a. General. Salt water causes corrosive action on metal. Care must be taken to avoid contact of equipment with salt water. If contact is made, or if the unit is exposed to salt spray, wash the unit frequently with fresh, clean water.

b. Painting. Paint all exposed nonpolished surfaces. Refer to TM 9-2851. Coat all exposed polished surfaces with standard-issue rustproofing material, if available, or cover parts with a light coat of grease.

26. Operation at High Altitudes

The generator set is designed to operate at elevations up to 5,000 feet above sea level without special service or adjustment. For maximum efficiency above 5,000 feet, make sure the generator set has an adequate fresh air supply to prevent the engine from overheating.

Section V. OPERATION OF MATERIEL USED IN CONJUNCTION WITH THE GENERATOR SET

27. Gasoline Coolant Heater

a. General. The generator set is equipped with a thermostatically controlled gasoline coolant heater located in the heater compartment (fig. 2). This heater will heat the engine coolant and the battery box to aid in starting at temperatures below 25^{o} F. The gasoline heater works in conjunction with a 24-v (volt) pump (fig. 2) to circulate preheated water through the engine cooling system. The gasoline heater and pump receive electrical power from the batteries and are controlled by a switch located on the heater control panel at the rear of the unit.

b. Operation. Operate the gasoline coolant heater as shown by figure 17.

28. Electric Coolant Heaters

a. General. This unit is equipped with two 220-v electric coolant heaters and a 24-v coolant circulation pump which will be utilized whenever an outside source of power is available. An electric heater is also used to heat the battery box. These heaters can be used as a means to maintain coolant and battery box temperatures when the generator set is used as a standby unit. Thermostats located in the battery compartment (fig. 2) and cooling system automatically control these heaters.

b. Operation. Operate the electric coolant heater and the battery box heater as shown by figure 18.

29. Fire Extinguisher (Carbon Tetrachloride Type)

a. Description. A carbon tetrachloride fire extinguisher may be provided with the equipment. It is a vaporizing, liquid-type, pump-operated extinguisher, having a one quart capacity.

b. Operation. Remove the fire extinguisher from its location; turn the handle and work the handle like a pump. Direct the stream at the base of the fire.

***Warning*: Be extremely careful when using a carbon tetrachloride fire extinguisher in an enclosed area. A poisonous gas is generated by the contact of carbon tetrachloride with a heated metallic surface. Provide adequate ventilation before entering an enclosed area where carbon tetrachloride has been used.**

c. Refilling and Maintenance. For detailed information on refilling and maintenance, refer to TM 5-687 and TM 9-1799.

30. Fire Extinguisher (Monobromotrifloromethane Type)

a. Description. The monobromotrifluoromethane type fire extinguisher replaces the carbon dioxide and carbon tetrachloride type fire extinguishers used in the past. It is generally suitable for use on all types of fire, with exception of fires involved with LOX (liquid oxygen) generating equipment. The fire extinguisher is furnished with a disposable type cylinder.

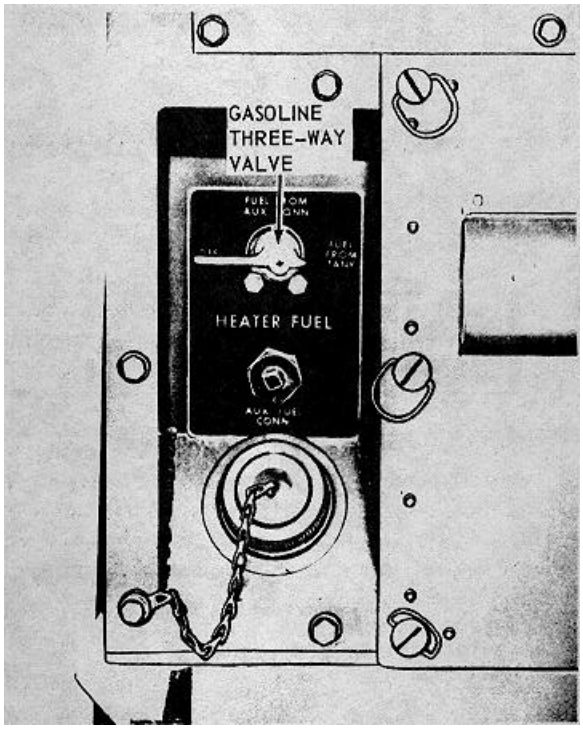
b. Operation. To operate the fire extinguisher, perform the following operations:

(1) Remove the fire extinguisher from its location.

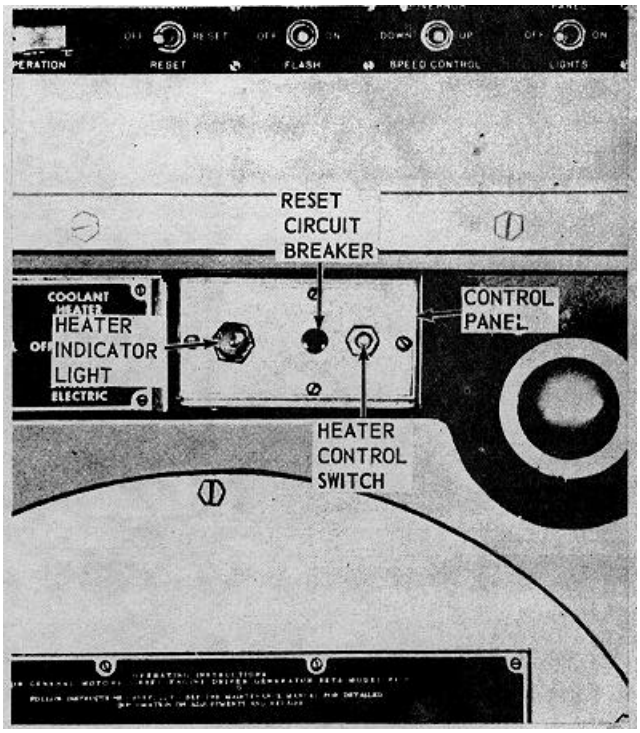
(2) Break the seal by pulling the safety pin from the handle.
(3) Point the horn at the base of the flame.
(4) Depress the trigger for discharge and direct the stream of contents at the base of the fire.
(5) Replace with a new cylinder immediately after using.

c. Replacement of Cylinder. To replace with a new cylinder, perform the following operations:

(1) Press the lever to release pressure from the old cylinder.
(2) Loosen the swivel valve coupling nut and remove the valve assembly from the used cylinder.
(3) Remove the instruction band from the used cylinder.
(4) Place a new cylinder through the instruction band.
(5) Replace the safety pin in the valve and seal the pin with sealing wire.
(6) Attach the valve assembly and tighten the swivel coupling nut on the new cylinder and replace the fire extinguisher in the mounting bracket.
(7) Adjust the instruction band on the cylinder



A. FUEL CONTROL VALVE.



B. HEATER CONTROL PANEL.

STEP 1. POSITION GASOLINE THREE-WAY VALVE IN TANK OR AUX POSITION AS APPLICABLE.
STEP 2. START HEATER BY DEPRESSING CIRCUIT BREAKER.
STEP 3. PLACE CONTROL SWITCH IN ON-HI POSITION. RED LIGHT SHOULD GLOW INDICATING HEATER IS IN OPERATION.
NOTE: HEATER SHOULD START OPERATION WITHIN 30 TO 45 SECONDS. IF HEATER DOES NOT START WITHIN 60 SECONDS RETURN CONTROL SWITCH TO OFF POSITION AND REPORT THE CONDITION TO ORGANIZATIONAL MAIINTENANCE.
STEP 4. ALLOW HEATER TO OPERATE 60 MINUTES OR UNTIL COOLANT TEMPERATURE IS 140^{o} F.
STEP 5. RETURN CONTROL SWITCH TO OFF POSITION.
NOTE: HEATER MAY BE USED FOR STANDBY OPERATION AS THERMOSTAT SWITCH WILL AUTOMATICALLY MAINTAIN COOLANT TEMPERATURE FOR ENGINE STARTING.

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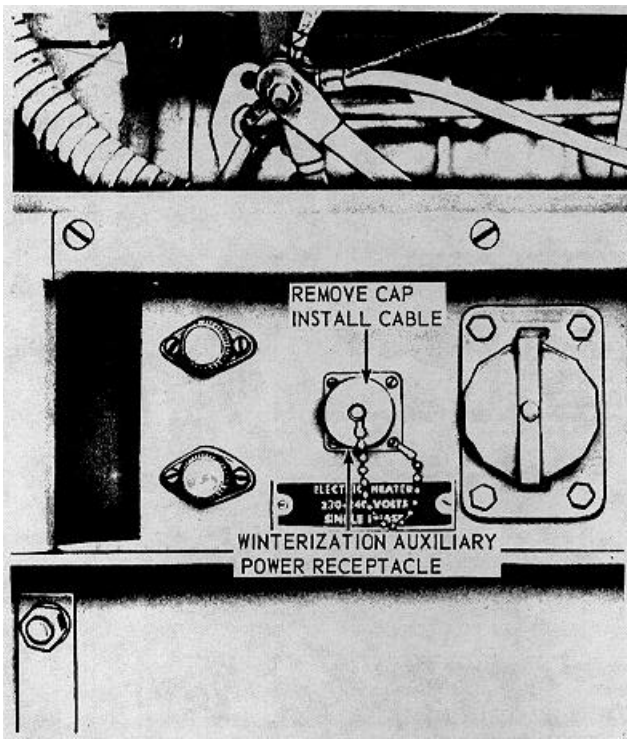
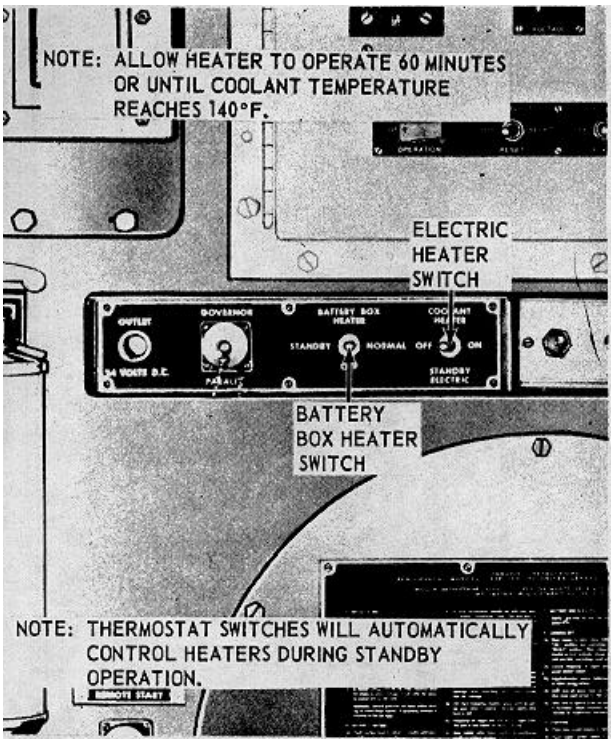
Figure 17. Gasoline coolant heater operating instructions.

to show maintenance and operating instructions.

d. Maintenance. Weigh the fire extinguisher every 6 months and replace the cylinder if gross weight has decreased 4 ounces or more. Lubricate the cylinder neck threads with 1 drop of OE 30 oil before reassembly.



STEP 1. CONNECT A SOURCE OF 208-V SINGLE PHASE POWER TO THE AUXILIARY POWER RECEPTACKLE.



STEP 2. PLACE BATTERY BOX AND ELECTRIC HEATER SWITCHES IN ON OR STANDBY POSITION AS APPLICABLE.

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Figure 18. Electric coolant heater and battery box heater operating instructions.

Note. No special tools and equipment are required by the operator or organizational maintenance personnel for maintenance of this generator set.

Section I. LUBRICATION

31. General Lubrication Information

a. This section contains a reproduction of the lubrication order and lubrication instructions which are supplemental to, and are not specifically covered in, the lubrication order.

b. The lubrication order shown in figure 19 is an exact reproduction of the approved lubrication order for the generator set. For the current lubrication order, always refer to DA Pam 310-4.

32. Detailed Lubrication Information

a. Care of Lubricants. Keep all lubricants in closed containers and store in a clean, dry place away from external heat. Allow no dust, dirt, or other foreign material to mix with the lubricants. Keep all lubrication equipment clean and ready for use.

b. Points of Lubrication. Refer to figure 19 for illustration of the lubrication points.

c. Cleaning. Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating to prevent the accumulation of foreign matter.

d. Operation Immediately After Lubrication. Operate the engine immediately after lubrication. Inspect the oil filter, oil lines, and other connections which might cause oil leakage. If the crankcase oil has been changed, it will be necessary to operate the engine for approximately 5 minutes before checking the oil level.

e. Oil Filters. Service the oil filters as shown by figure 20.

f. Air Cleaner Service. Service the air cleaners as shown by figure 21.

g. Governor Oil Filter. Service the governor oil filter as shown by figure 22.

GENERATOR SET, DIESEL ENGINE: PRECISE POWER; 100 KW, AC, 120/208 V, 60 CYCLE, 240/416 V, 50 CYCLE; SKID MOUNTED (DETROIT DIESEL DIVN. GENERAL MOTORS CORP. MDL. 6910A) W/GENERAL MOTORS ENGINE MODEL 6910A, SERIES 6-71

Reference: SM 10-1-C4-1

Intervals are based on normal operation. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing.

Clean ports with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Drain crankcase only when hot after operation; replenish and check level when cool.

LUBRICANT • INTERVAL **INTERVAL • LUBRICANT**

(1) Fan Bearing (Se note 4)

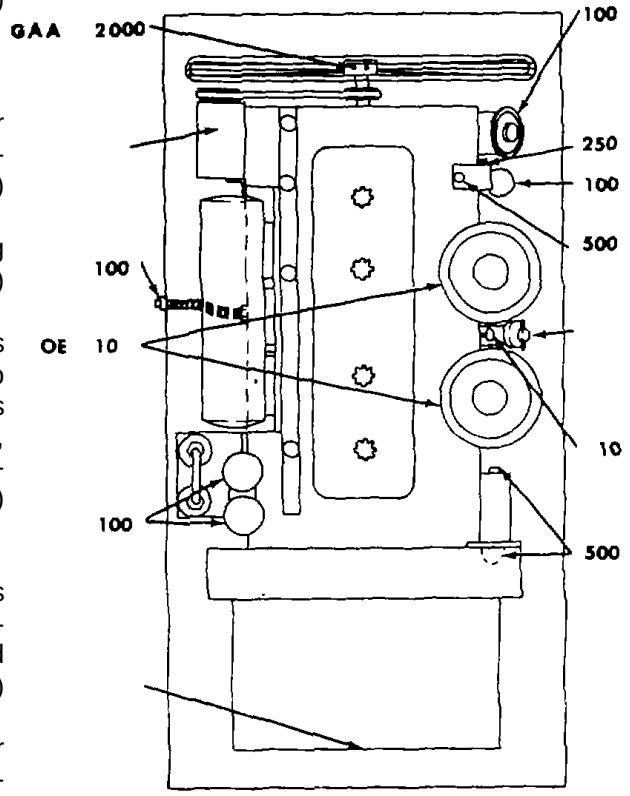
Engine Generator (Sealed bearings, no lubrication required)

(2) Crankcase Drain Plug (Drain and refill)

(3) Air Cleaners (Refill oil reservoir to level mark; every 50 hours disassemble entire unit, clean, re-oil and reassemble) (See key)

(4) Oil Filters (Disassemble, clean housings, renew elements and reassemble) (See note 2.)

Main Generator (Sealed bearings, no lubrication required)



Governor Oil Filler **(5)** (Disassemble, clean housing, renew element and re-) assemble) (See note 2.)

Governor Motor Linkage **(6)**

Governor Oil Reservoir **(7)** (Drain)

Governor Motor **(8)** (Sparingly)

Engine Oil Fill Cap **(9)** (See key)

Engine Oil Level Gage **(10)** (Check level)

Starter **(11)** (sparingly)

CONTINUED ON FOLLOWING PAGE

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Figure 19. Lubrication order - LO 5-61156-293-12.

CONTINUED FROM
PRECEDING PAGE

- KEY -

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to -10°F	0°F to -65°F	
OE - OIL, Engine, Heavy Duty	34-3/4 qt	**OE** 30 Or **9250**	**OE** 10 or **9110**	**OES**	Intervals given are in hours of normal operation.
Crankcase	1 -1/2 qt ea.				
Air Cleaners					
Oil Can Points					
OES - OIL, Engine, Subzero					
GAA - GREASE, Automotive and Artillery		All Temperatures			

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below -10°F.

2. OIL FILTERS. After installing new filter elements, fill crankcase, operate engine 5 minutes, check housings for leaks, check crankcase oil level and bring to full mark.

3. OIL CAN POINTS. Every 50 hours clean and lightly coat the governor and carburetor linkage and all hinges with OE.

4. FAN BEARING. Remove both plugs, insert fitting, lubricate until new grease extrudes from relief plug hole, operate engine at slow idle speed 3 minutes, install both plugs.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF
SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army,
Chief of Staff.

OFFICIAL:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

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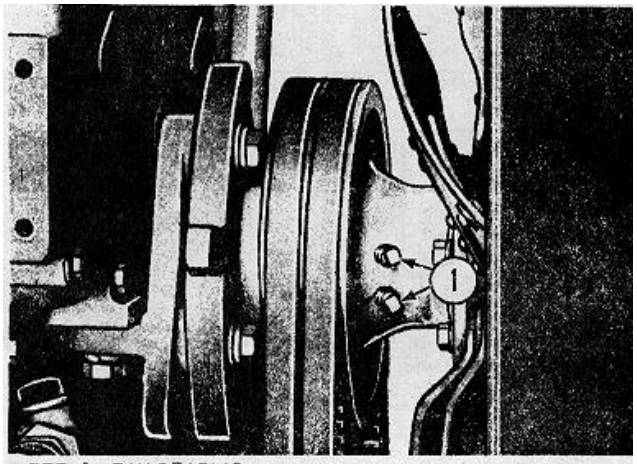
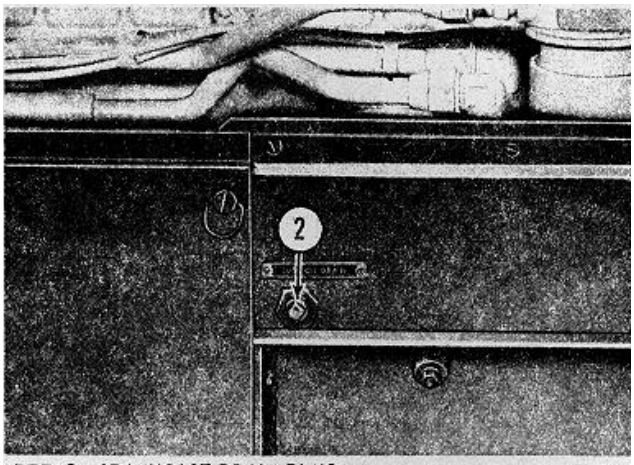
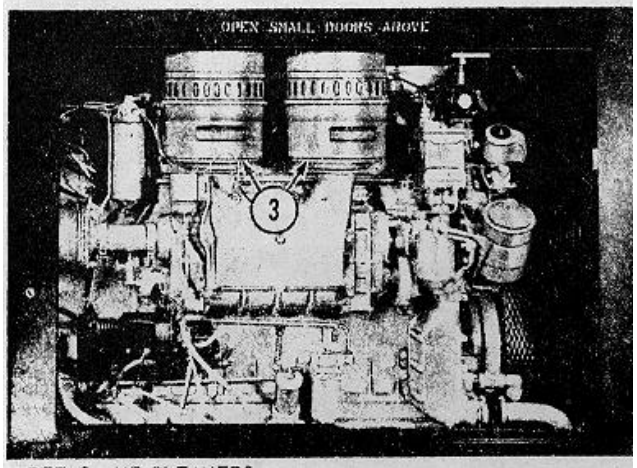
Figure 19 - Continued.



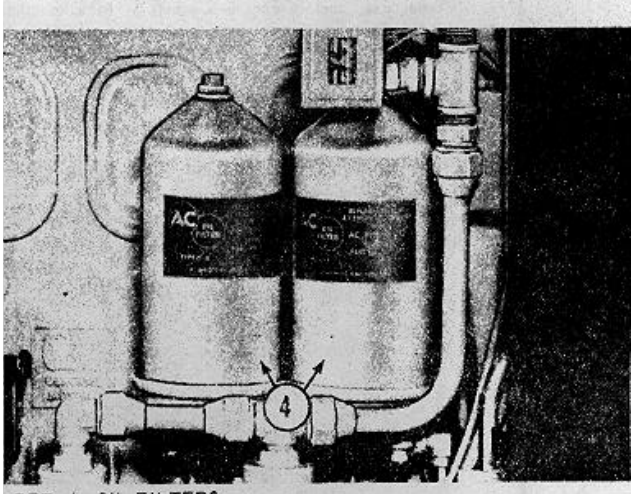
REF. 1. FAN BEARING.



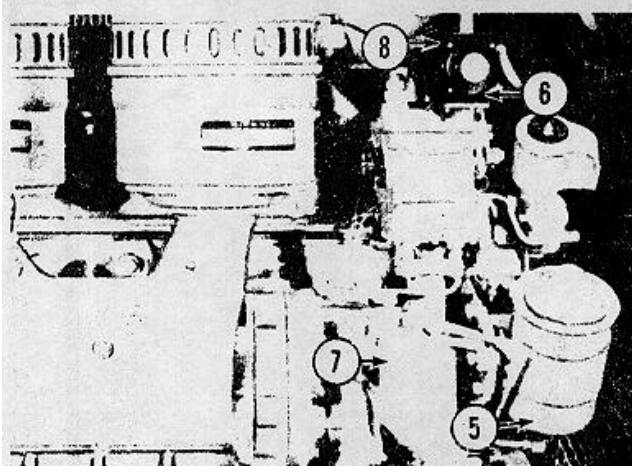
REF. 2. CRANKCASE DRAIN PLUG.

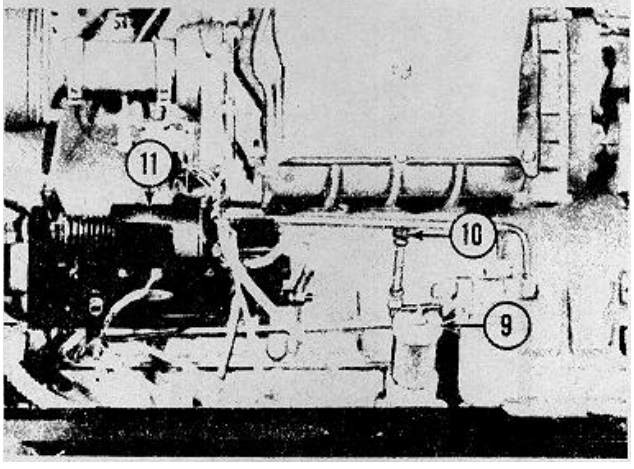


REF. 3. AIR CLEANERS.



REF. 4. OIL FILTERS.





REF. 5 GOVERNOR OIL FILTER.
REF. 6. GOVERNOR MOTOR LINKAGE.
REF. 7. GOVERNOR OIL RESERVOIR.
REF. 8. GOVERNOR MOTOR.
REF. 9. ENGINE OIL FILL CAP.
REF. 10. ENGINE OIL LEVEL GAGE.
REF. 11. STARTER.

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Figure 19 - Continued.

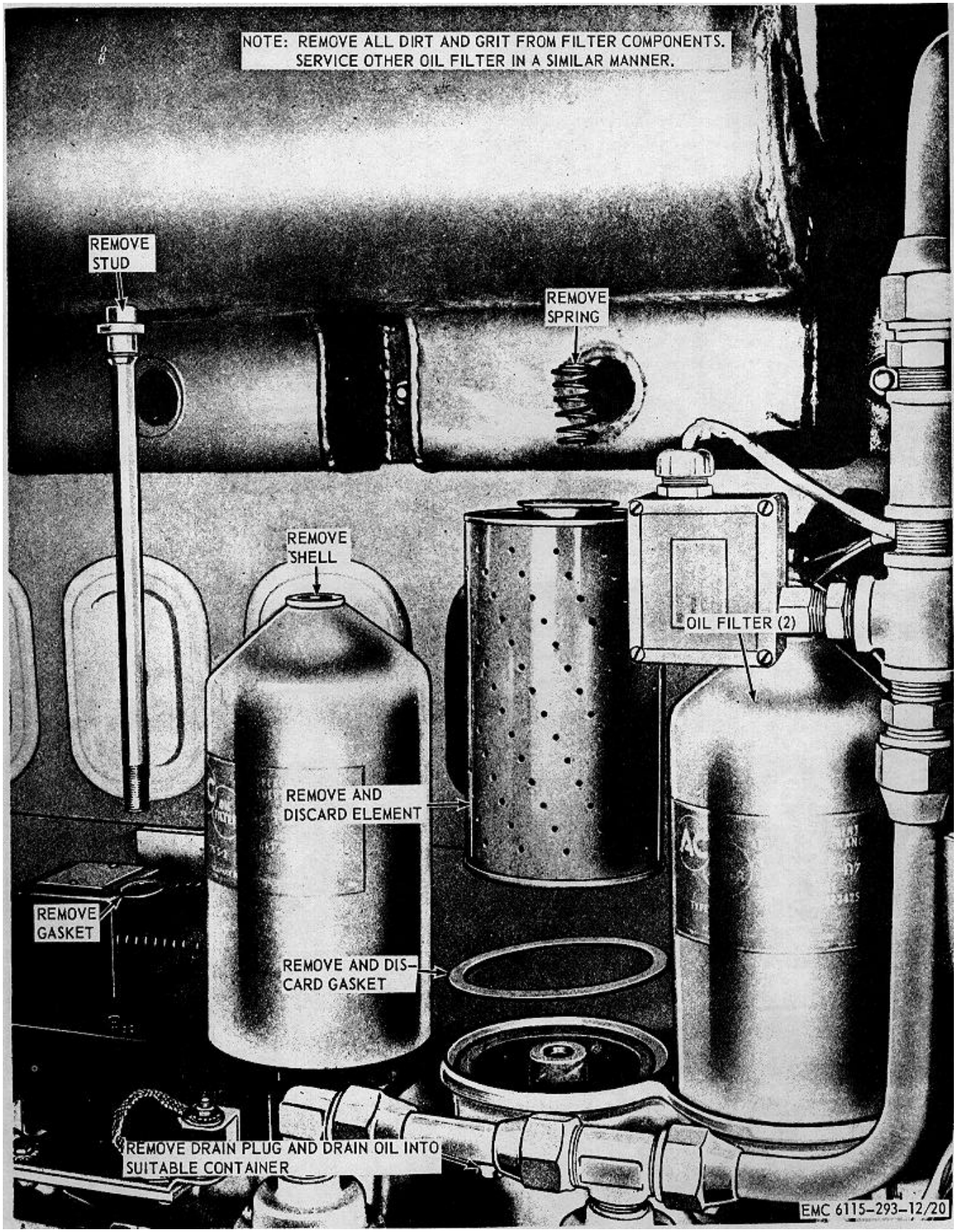


Figure 20. Oil filter service.

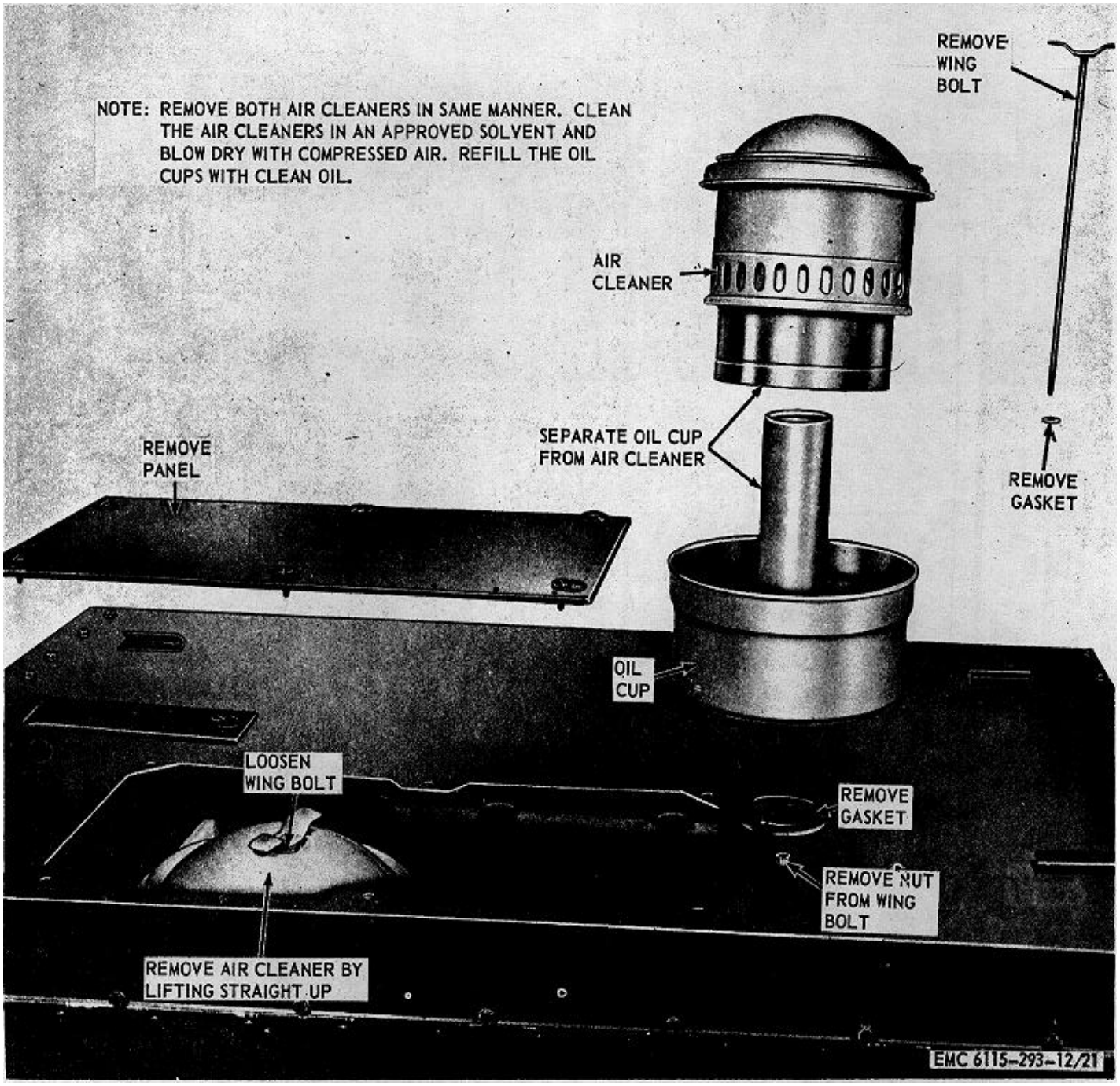


Figure 21. Air cleaner, removal, installation, and service.

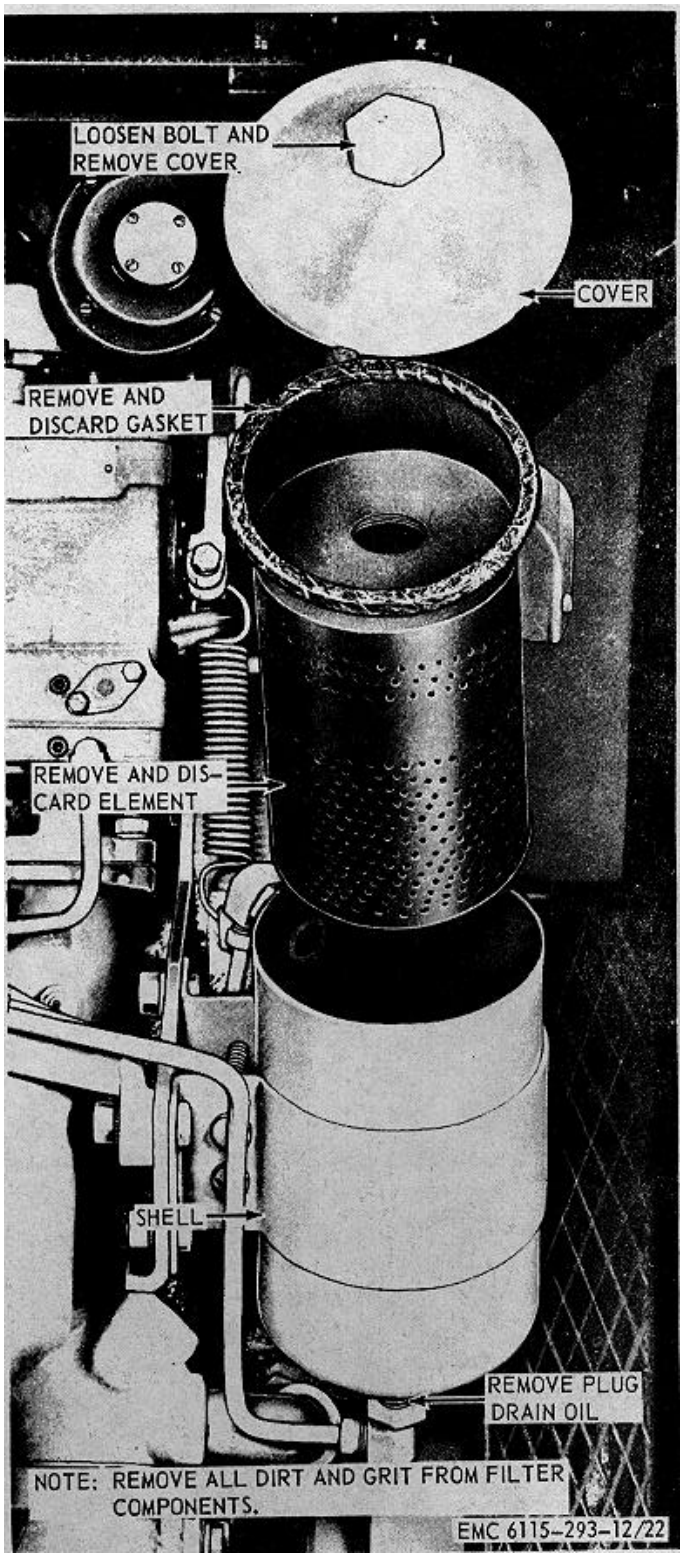


Figure 22. Governor oil filter service.

Section II. PREVENTIVE MAINTENANCE SERVICES

33. General

To insure that the equipment is ready for operation at all times, it must be inspected systematically before operation, during operation, and after operation, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services will be performed before operation. Defects

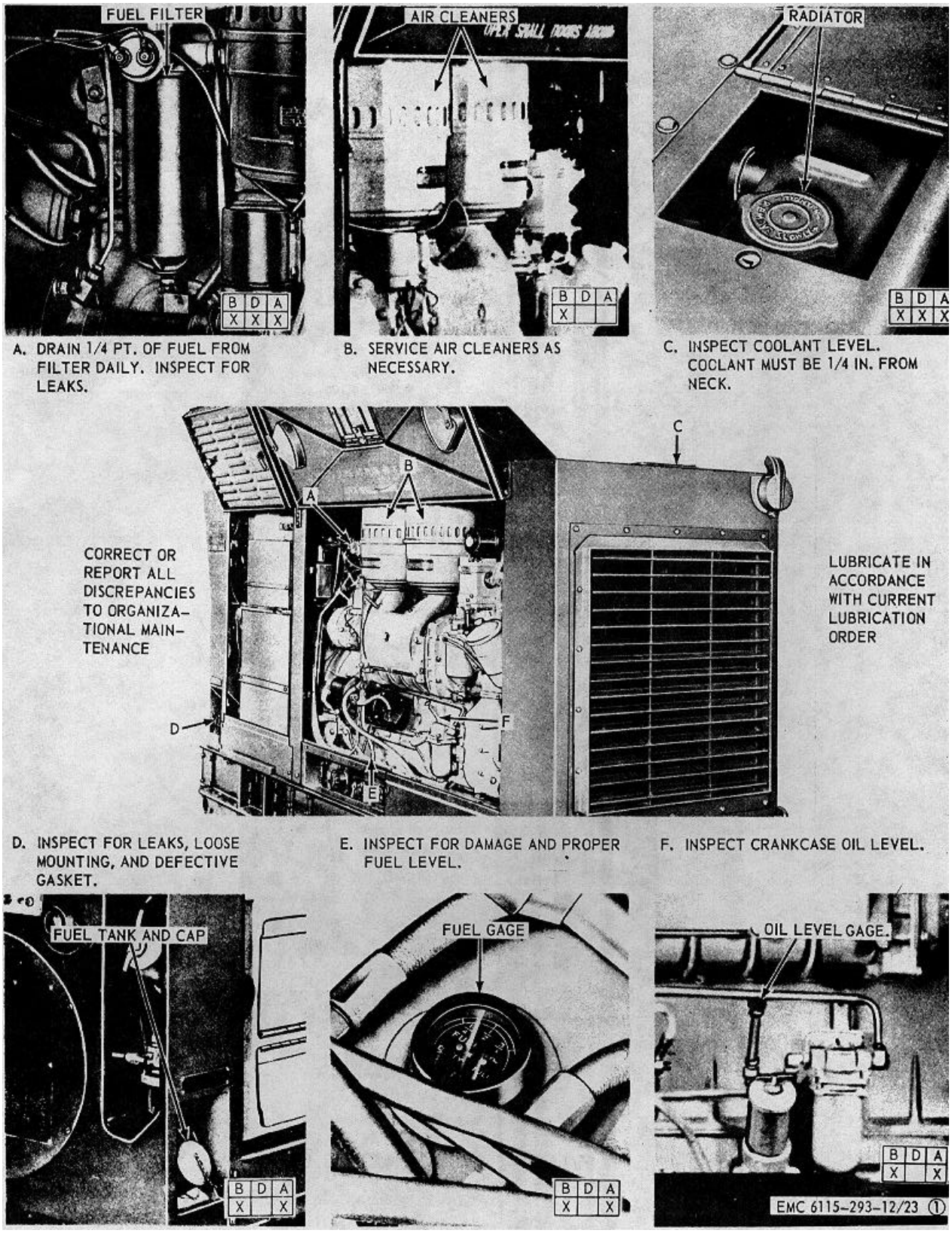
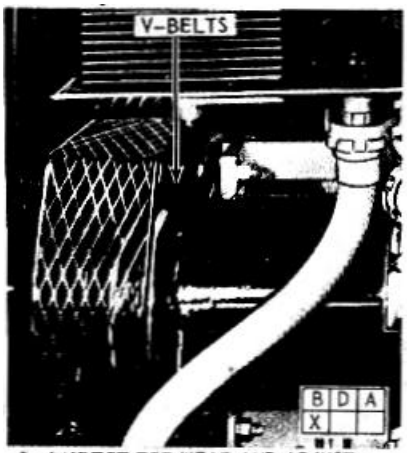
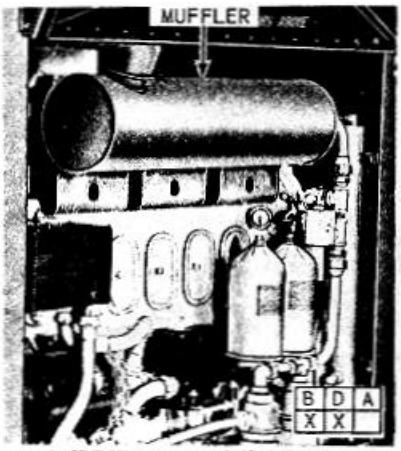


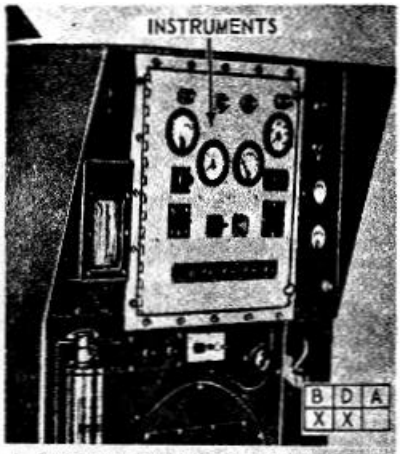
Figure 23. Operator's daily services.



G. INSPECT FOR WEAR AND ADJUSTMENT. V-BELTS SHOULD DEPRESS 3/4 IN.

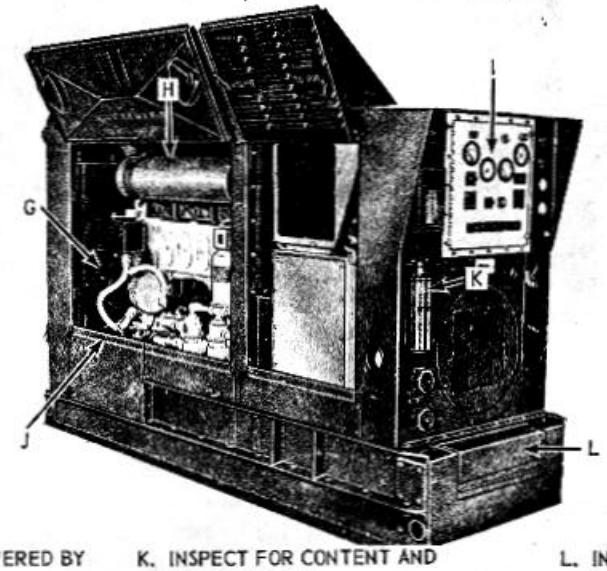


H. INSPECT FOR CRACKS, LEAKS, AND INSECURE MOUNTING.



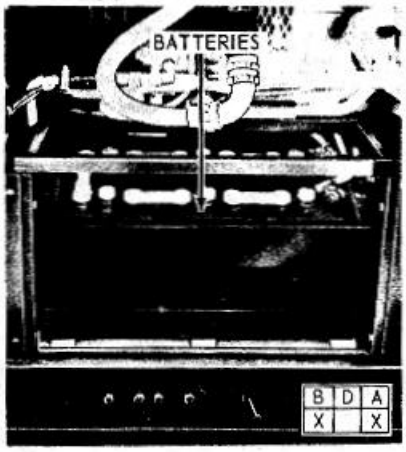
I. INSPECT FOR DAMAGE AND IMPROPER OPERATION.

CORRECT OR REPORT ALL DISCREPANCIES TO ORGANIZATIONAL MAINTENANCE



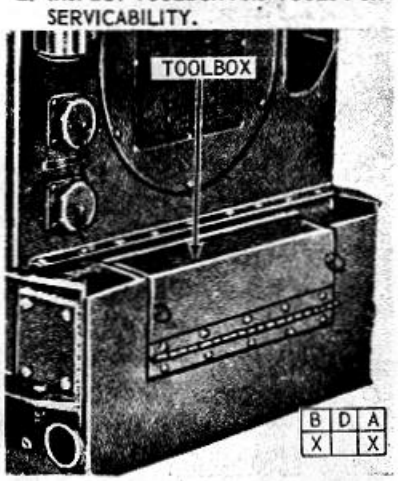
LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

J. SEE THAT PLATES ARE COVERED BY 3/8 IN. OF ELECTROLYTE.



K. INSPECT FOR CONTENT AND SERVICABILITY.

L. INSPECT TOOLBOX AND TOOLS FOR SERVICABILITY.



EMC 6115-293-12/23 ②

Figure 23-Continued.

discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. After-operation services will be performed by the operator after every operating period. After operation services will be performed at intervals based on the normal operations of the unit. Reduce intervals to compensate for abnormal conditions. Defects or unsatisfactory operating characteristics beyond the scope of the operator to correct must be reported at the earliest possible opportunity to organizational maintenance. Responsibility for performance of preventive maintenance services rests not only with the operator, but with the entire chain of command from section chief to commanding officer (AR 750-5).

34. Operator's Daily Services

a. General. The intervals at which the operator's daily services are to be performed are indicated by an X in the appropriate column, on the small tab, located at the bottom of each illustration in figure 23. The tab columns are B (before), D (during), and A (after) operation of the equipment. The intervals and services not illustrated are prescribed in b through d below.

b. Before-Operation Services.

(1) *Visual inspection*. Visually inspect the entire generator set for missing parts, insecure mounting, and other damage. Correct all discrepancies or report them to organizational maintenance.

(2) *Publications.* Make sure that a copy of this manual, the current lubrication order, and DA Form 285 are on, or with the unit, and in serviceable condition.

(3) *Lubrication.* Lubricate the generator set in accordance with the current lubrication order.

(4) *Leaks, general.* Inspect the entire generator set for evidence of fuel, oil, or coolant leaks. Correct all deficiencies or report them to organizational maintenance.

c. During-Operation Services.

(1) Visual inspection and observation. Visually inspect the generator set for loose mountings. Observe the unit while in operation for excessive vibration, unusual noises, overheating, and smoking. If any of the above mentioned deficiencies are noted, shut down the unit. Correct or report the deficiencies to organizational maintenance.

(2) Leaks, general. Inspect the generator set for fuel, oil, or coolant leaks. Correct or report all leaks to organizational maintenance.

d. After-Operation Services.

(1) *Lubrication*. Lubricate the generator set in accordance with the current lubrication order.

(2) *Cleaning.* Clean all dirt and grease from the generator set. Pay particular attention to the radiator core.

(3) *Protection.* See that all doors and covers are installed on the generator set. If outdoors, cover with a suitable waterproof cover. If low temperatures are expected, and antifreeze is not available, drain the cooling system. Idle the engine for 30 seconds to pump all water from the engine. Place a tag on the radiator, stating that the cooling system has been drained.

35. Organizational Maintenance

a. Preventive maintenance is performed by organizational maintenance at quarterly intervals. The quarterly interval is equivalent to 3 calendar months or 250 hours of operation, whichever occurs first.

b. The preventive maintenance services to be performed at quarterly intervals are listed and described in paragraph 36. The number opposite each service refers to a corresponding number on DA Form 464 and indicates the services to be performed. The number listed under "Inspection" indicates the minimum inspection requirements for the equipment.

36. Quarterly Preventive Maintenance Services

Inspection	Service quarterly	GENERAL
1	1	Before-operation services. Perform the before-operation services listed in paragraph 33.
2	2	Lubrication. Inspect the entire generator set for damaged oil lines, leaking oil seals and gaskets, and evidence of insufficient lubrication.
	2	Lubricate in accordance with the current lubrication order. Report all uncorrected deficiencies to field maintenance.

Inspection	Service quarterly	
3	3	*Tools and equipment.* Inspect the condition of all tools and equipment assigned to the unit.
	3	Make sure that all tools assigned to the unit are clean, serviceable, and properly stowed.
4	4	*Fire extinguisher.* Inspect a carbon tetrachloride fire extinguisher every 4 months for improper charge and damage. Weigh a monobromotrifiuoromethane-type extinguisher every 6 months and replace the cylinder if gross weight has decreased 4 ounces or more. Lubricate the cylinder neck threads with 1 drop of OE oil before reassembly. Refer to TM 5-687 and TM 9-1799.
	4	Replace a defective fire extinguisher.
5	5	*Publications.* See that a copy of this manual, the current lubrication order and DA Form 285 are on, or with the equipment, and in serviceable condition.
6	6	*Appearance*. Inspect the general appearance of the generator set, paying special attention to dirt, illegibility of identification markings, and cracked, blistered, or peeling paint.
	6	See that all deficiencies noted are corrected or reported to field maintenance.
7	7	*Modifications*. See that all available modification work orders, applying to this unit, have been completed and recorded on DA Form 478, DA Form 5-73, and DA Form 5-73a as applicable.
	7	Record all modification work orders applying to the generator set that have not been recorded.
		ENGINE
11	11	*Manifold, muffler, and exhaust pipe.* Inspect the manifold, muffler, and exhaust pipe for leaks, loose mounting hardware, defective gaskets, and rust or corrosion.
	11	Tighten all loose mounting hardware, and remove as much rust and corrosion as possible. Replace a defective manifold and muffler or exhaust pipe (par. 74). Correct or report all leaks to field maintenance.
12	12	*Valve mechanism*. Inspect the rocker arm cover and gasket for signs of damage. Refer to paragraph 110 and inspect the valve clearance. Inspect the valve mechanism for defective parts and evidence of insufficient lubrication.
	12	Replace a defective rocker arm cover and gasket (para. 109). Adjust the valve clearance as necessary (para. 110). Report defective valves or insufficient lubrication to field maintenance.
14	14	*Engine breather and crankcase*. Inspect the engine breather for damage and clogging. Inspect the crankcase for leaks, loose mounting hardware, and improper oil level.
	14	Remove all restrictions from the breather. Replace a defective breather (para. 111). Tighten all loose mounting hardware. Correct or report all leaks to field maintenance. Fill the crankcase to the proper oil level in accordance with the current lubrication order.
15	15	*Oil filters and oil cooler.* Inspect oil filters, coolers, and all external engine oil lines for loose mountings, unserviceability, and leakage.
	15	Service the oil filters as necessary (par. 32). Service the oil cooler as necessary (para. 88). Tighten all loose mounting hardware, correct all leaks, and remove all excessive grease and oil Replace a defective oil filter (para.89) or oil cooler (para. 88). Report all conditions not corrected to field maintenance.
16	16	*Radiator.* Inspect the radiator for leaks, obstructions in the core, air passages, and loose mounting hardware. Inspect the manual shutter control lever for proper operation. Inspect all cooling system hoses for leaks, deterioration, and loose connections. Inspect the cooling system thermostat for improper operation. If antifreeze is used, test the freezing point of the coolant.
	16	Clean the radiator core air passages and flush the cooling system as necessary (para. 93). Replace all defective cooling system hoses (para. 93). Tighten all loose mounting hardware and hose connections. Replace a defective cooling system thermostat (para. 95). Refer to table II and add antifreeze as necessary. Report all deficiencies not corrected to field maintenance.
17	17	*Water pump, fan, and fan guard.* Inspect the water pump for leaks, loose mounting, and unusual noises. Inspect for excessive play in the water pump shaft and fan shaft. Inspect the fan for bent or cracked blades. Inspect the water pump, fan, and fan guard for loose mounting hardware.

Inspection	Service quarterly	
	17	Tighten all loose mounting hardware. Replace a defective fan (para. 97) or fan guard (para. 96). Report a defective water pump to field maintenance.
18	18	V-*belts*. Inspect for worn, cracked, or frayed V-belts. Inspect the pulleys for cracks, scoring, and misalinement. Inspect the belts for improper tension. Depress the belt midway between the pulleys. The depression should not exceed three-quarters of an inch.
	18	Adjust or replace all defective belts (para. 97 and 102). Replace a defective fan pulley (para. 97). Report all defects not corrected to field maintenance.
19	19	*Oil pressure relief valve.* Remove the oil pressure bypass valve plunger and spring and inspect for evidence of wear, scoring, and dirt between the plunger and seat (fig. 41). Inspect the spring for distortion and weakened condition.
	19	Remove all dirt and grit from the relief valve plunger and seat. Replace defective bypass valve (para. 88).
20	20	*Governor, reservoir, and filter.* Inspect the governor, reservoir, and filter for loose mounting hardware, leaks, and other signs of damage. Inspect the filter for dirt. Inspect the governor under load for evidence of improper operation.
	20	Tighten all loose mounting hardware. Correct all leaks or report them to field maintenance. Service the filter (fig. 22) and reservoir (para. 90) as necessary. Report a defective governor to field maintenance.
21	21	*Overspeed governor*. Inspect the overspeed governor for loose mounting hardware, leaks, and loose electrical connections.
	21	Tighten all loose mounting hardware and electrical connections. Report all defects not corrected to field maintenance.
22	22	*Air box drains*. Inspect the air box drains for loose mounting, leaks, and other damage. Inspect the air box drain hoses for clogging and deterioration.
	22	Tighten all loose connections. Remove all restrictions from the air box drains. Replace defective drain hoses (par. 112).
38	38	*Fuel pumps.* Inspect the high-lift diesel fuel pump for cracks, breaks, and other damage. See that all electrical connections are tight and undamaged. Inspect the winterization fuel pump for cracks, breaks, leaks, and loose electrical connections. See that the pump screen is free of foreign matter.
	38	Tighten all loose connections and mounting hardware. Replace any damaged electrical wiring. Service the winterization fuel pump screen (para. 129). Replace a defective winterization fuel pump (para. 129). Report deficiencies not corrected to field maintenance.
40	40	*Fuel filter and strainer*. Inspect the filter and strainer for insecure mounting. Inspect for cracks, breaks, and leakage. Inspect the fuel lines for loose connections and other damage.
	40	Tighten all loose mounting hardware and fuel connections. Correct all leaks. Replace a defective strainer or filter (para. 78 and 79).
41	41	*Air cleaners.* Inspect the air cleaners for insecure mounting, defective gaskets, and other damage. Inspect the condition of the cleaning elements, baffles, and body. Inspect the air cleaners for proper oil level.
	41	Clean and service the air cleaners (par. 32). Tighten all insecure mountings, replace defective gaskets and defective air cleaners (para. 32).
42	42	*Injector pump and nozzles*. Inspect the diesel fuel injection pump housing for leaks and insecure mounting. Inspect all lines and connections for leaks. Inspect the engine shutdown solenoid for evidence of damage and restricted movement.
	42	Tighten all loose mounting bolts and fuel line connections. Replace a defective injection pump (para. 81). Test and replace a defective shutdown solenoid as necessary (para. 106).
43	43	*Fuel tanks, caps, and gaskets.* Inspect the diesel fuel tank and winterization tank for leaks, loose mountings, and other damage. Inspect the fuel caps for defective gaskets. See that the vent holes are open.
	43	Tighten all loose mounting hardware. Correct or report leaks to field maintenance. Replace a defective fuel cap and gasket (para. 76).
44	44	*Fuel lines.* Inspect all fuel lines for kinds, sharp bends, and evidence of leakage. Inspect all fuel hoses for cracks, breaks, and deterioration.
	44	Tighten all loose fuel connections. Repair or replace all defective fuel lines.
45	45	*Supercharger.* Inspect the supercharger for loose mounting hardware, cracks or breaks, and leakage.

Inspection	Service quarterly	
	45	Tighten all loose mounting hardware and fuel line connections. Report a defective supercharger to field maintenance.
		ELECTRICAL
47	47	*Batteries and cables.* Inspect the batteries for cracks and leaks. Inspect for loose retainers, loose or corroded terminals, and excessive dirt.
		the electrolyte level is three-eighths of an inch above the top of the plates. Test the specific gravity of the batteries and record it on)DA Form 464.
	47	Clean all dirt and corrosion from the batteries and terminals. Replace defective cables (para. 100). Apply a thin coating of grease over the terminals after they are clamped tight. Add distilled water as necessary. If freezing temperatures prevail, or are expected, the batteries should he charged long enough to allow the added water to mix thoroughly with the electrolyte. Make sure the filler cap vent holes are open. Replace a defective battery (para. 100).
48	48	*Battery-charging generator and starter*. Inspect the battery-charging generator and starter for insecure mounting, loose electrical connections, and excessive dirt and grease.
	48	Tighten all loose mountings and electrical connections. Replace a defective battery-charging generator (para. 102). Replace a defective starter (para. 101).
51	51	*Battery-charging generator regulator*. Inspect the battery-charging generator regulator for insecure mounting, loose electrical connections, and improper operation.
	51	Tighten all loose mounting hardware and electrical connections. Replace a defective battery-charging generator regulator (para. 103).
52	52	*Lights.* Inspect for loose mounting and improper operation of all lights. Inspect for defective electrical wiring and corroded receptacles.
	52	Tighten or replace loose or missing mounting hardware. Replace defective lamps and receptacles as necessary (para. 132). Repair or replace defective electrical wiring.
53	53	*Coolant heaters.* Inspect the heaters for cracks, breaks, loose mountings, and improper operation.
	53	Tighten all loose mounting hardware and electrical connections. Report a defective coolant heater to field maintenance.
57	57	*Gages.* Inspect all gages for cracked or broken glass and cases. Inspect the gages for improper operation.
	57	Tighten all loose mounting hardware. Replace a defective gage (para. 132).
58	58	*Meters.* Inspect all meters for cracked or broken glass, insecure mounting, and improper operation.
See that		
	58	Tighten loose mounting hardware. Replace a defective meter (para. 132). Report a defective wattmeter or frequency meter to field maintenance.
		Caution: Disconnect the batteries when servicing electrical instruments, except when current is necessary for testing.
62	62	*Levers, linkage, and cables.* Inspect all levers for loose or missing mounting hardware. Inspect levers, linkage, and cables for proper operation. See that all cable clamps are secure. Make sure that the shutter linkage works freely and correctly.
	62	Tighten all loose or replace all missing mounting hardware. Correct all improper lever and linkage operation or report the condition, to field maintenance. Replace all defective cables.
80	80	*Frame*. Inspect the frame for distortion and loose or missing mounting hardware. Note all breaks in structural members or welded joints. Inspect for missing or defective fasteners.
	80	Tighten all loose mounting hardware. Replace defective fasteners. Report a defective frame to field maintenance.
84	84	*Hood, panels, and doors.* Inspect for dents, cracks, breaks, and other damage. Inspect the hinges and latches for defective parts and freedom of movement. Inspect for loose or missing hardware.
	84	Tighten all loose, or replace all missing hardware. Repair or replace all parts as necessary (para. 72).
85	85	*Coolant circulating pumps.* Inspect the circulating pumps for loose mountings and electrical connections. Inspect the pumps for improper operation.
	85	Tighten all loose mountings and electrical connections. Report a defective circulating pump to field maintenance.
		MAIN GENERATOR
52	52	*Wiring.* Inspect all electrical switches and wiring for loose mountings and connections. Inspect all wiring for

Inspection	Service quarterly	
		defective insulation. Inspect all receptacle connectors for cracks and breaks.
	52	Tighten all loose mountings and electrical connections. Replace defective wiring and switches. Report a defective wiring harness to field maintenance.
59	59	Regulator assembly. Inspect the regulator assembly for loose mounting hardware, cracked housing, and defective wiring. Inspect for excessive dirt and grease.
	59	Tighten all loose mounting hardware and electrical connections. Report a damaged or defective regulator assembly to field maintenance.
84	84	Side panels. Inspect the generator compartment for bent, cracked, or loose side panels. Inspect the fasteners for insecure mounting and other damage.
	84	Correct or report defective side panels to field maintenance.
172	172	Sliprings and brushes. Inspect the slip-rings for dirty or worn surfaces. Inspect the brushes for excessive wear. See that all electrical connections are tight and that the insulation is in serviceable condition. Inspect the brush holders for insecure mounting.
	172	Replace worn generator brushes (par. 114). Tighten all loose electrical connections and brush holders. Repair or replace electrical wiring as necessary. Adjust brush holders as necessary (para. 114). Report a defective brush holder or slip ring to field maintenance.
173	173	Generator control panel and instruments Inspect all instruments for cracked or broken glass. Inspect for insecure mountings, loose connections, and improper operation. Inspect the control panel for cracks, breaks, and other damage.
	173	Tighten loose mountings and electrical connections. Replace defective instruments (para. 132). Report other defective instruments or an instrument panel to field maintenance.

Section III. TROUBLESHOOTING

37. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the generator set and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any operational trouble that is beyond the scope of organizational maintenance must be reported to field maintenance, 3d echelon.

38. Engine Hard To Start or Fails To Start

Probable cause	*Possible remedy*
Starter fails to crank engine ..	Refer to paragraph 46.
Fuel tank empty	Fill the fuel tank.
Fuel system clogged	Remove the restriction or report the condition to field mainte nance.
Valve clearance incorrect.....	Adjust the valve clearance (par. 140).
Injection pump out-of-ad ..... justment or defective.	Replace the injection pump (para. 81).

39. Engine Misses or Runs Erratically

Probable cause	*Possible remedy*
Fuel supply to engine in ..... sufficient.	Service the fuel strainer (par. 78). Service the fuel filter (para. 79).
Probable cause	*Possible remedy*
Air supply to engine inade .... quate.	Provide adequate supply of air for engine.
Air cleaners clogged	Service the air cleaners (para. 32)
Tube and lever assembly ..... out of adjustment.	Adjust the tube and lever assembly (para. 82).
Coolant temperature too low.	Inspect the shutter operation. Replace the cooling system thermostat if necessary (par.95).
Fuel system contains dirt ..... or water.	Drain and replenish the fuel supply. Drain the fuel filter (para. 79) and internal tank (para. 75).

40. Engine Stops Suddenly

Probable cause	*Possible remedy*
Fuel tank empty	Fill the fuel tank.
Fuel system contains dirt or water, or is clogged.	Remove the restriction, drain the fuel system, and replenish the fuel supply (para. 75 and 79).
Air cleaners clogged	Service the air cleaners (para. 32).
High coolant temperature ..... switch operates.	Inspect the cooling system for restrictions in airflow. Re place a defective high coolant temperature switch. (para 120).
Low oil pressure switch ..... operates.	Inspect the oil system for re strictions. Replace a defective oil pressure switch (para. 119).

41. Engine Overheats

Probable cause	*Possible remedy*
Fan belt loose or defective	Adjust the belt tension or replace the fan belt (para. 97).
Low coolant level	Fill the cooling system (para. 34).
Radiator core air passages blocked.	Inspect the shutter for proper operation. Remove restriction from core passages with compressed air.
Exhaust system clogged	Remove the restriction.
Cooling system thermostat defective.	Replace the thermostat (para. 95)

42. Engine Exhaust Smoke Excessive

Probable cause	*Possible remedy*
Fuel of improper grade	Fill the fuel tank with the proper grade of fuel (refer to table I).
Air cleaner clogged	Service the air cleaner (para. 32).
Fuel control tube and lever assembly out of adjustment.	Adjust the fuel control tube and lever assembly (para. 82).

43. Engine Oil Pressure Low

Probable cause	*Possible remedy*
Oil level low	Fill to proper oil level (para. 34).
Oil pressure gage defective.	Replace the oil pressure gage (para. 132).
Oil system restricted	Remove the restriction.

44. Engine Lacks Power

Probable cause	*Possible remedy*
Air cleaners clogged	Service the air cleaners (para. 32).
Restriction in fuel system	Remove the restriction.
Engine air supply inadequate	Provide proper ventilation for engine.
Fuel control tube and lever assembly out of adjustment.	Adjust the fuel control tube and lever assembly (para. 82).
Valves improperly adjusted	Adjust the valves (para. 110).

45. Engine Noisy

Probable cause	*Possible remedy*
Valves out of adjustment	Adjust the valves (para. 110).
Engine mounts loose	Tighten the engine mounts.

46. Starter Fails To Crank Engine

Probable cause	*Possible remedy*
Start switch defective	Replace the start switch (par. 132).
Starter solenoid relay defective.	Replace the starter solenoid relay (para. 101).
Start switch solenoid defective.	Replace the start switch solenoid(para. 107).
Starter defective	Replace the starter (para. 101).
Starter circuit wiring defective.	Repair or replace defective wiring.
Batteries low or discharged	Charge or replace the batteries (para. 100).

47. Battery-Charging Ammeter Fails To Show Charge When Batteries Are Low or Discharged

Probable cause	*Possible remedy*
Battery-charging regulator defective.	Replace the battery-charging regulator (para. 101).
Battery-charging generator defective.	Replace the battery-charging generator (para. 102).
Battery-charging circuit wiring defective.	Repair or replace defective wiring.
Battery-charging ammeter defective.	Replace the battery-charging ammeter (para. 112).

48. Battery-Charging Ammeter Shows Charge When Batteries Are Fully Charged

Probable cause	*Possible remedy*
Battery-charging ammeter defective.	Replace ammeter (para. 132).
Battery-charging regulator defective.	Replace the battery-charging regulator (para. 103).
Generator rotor grounded	Replace generator (para. 102).

49. Battery-Charging Generator Overheats

Probable cause	*Possible remedy*
Battery-charging generator defective.	Replace the battery-charging generator (para. 102).
Battery-charging regulator defective.	Replace the battery-charging regulator (para. 103).

50. Batteries Discharge When Engine is Stopped

Probable cause	*Possible remedy*
Battery-charging regulator defective.	Replace the battery-charging regulator (para. 103).
Fuel pressure switch defective.	Replace the fuel pressure switch(para. 79).

51. Main Generator Fails to Build Up Rated Voltage

Probable cause	*Possible remedy*
Generator brushes worn	Replace the brushes (para. 114).
Slip rings rough or dirty	Smooth and polish the slip rings (para. 114).
Generator brushholders out of adjustment.	Adjust the generator brush holders (para. 114).
Radio interference suppression capacitors defective.	Replace the radio interference capacitors (para. 69).

52. Main Generator Voltage Drops Under Increase of Load

Probable cause	*Possible remedy*
Governor speed switch defective.	Replace switch (para. 132).
Generator brushes worn	Replace the generator brushes (para. 114).
Slip rings rough or dirty	Smooth and polish the slip rings (para. 114).
Parallel operation switch on or defective during single unit operation.	Reposition or replace the parallel operation switch (para. 132).

Probable cause	*Possible remedy*
Generator brush holders out of adjustment.	Adjust the generator brush holders (para. 114).

53. Voltmeter or AC Ammeter Registers Incorrectly

Probable cause	*Possible remedy*
Meter defective	Replace the meter (para. 132).
Wiring defective	Repair or replace the wiring.

54. Main Generator Voltage Erratic

Probable cause	*Possible remedy*
Brushes worn or defective	Replace the brushes (para. 114).
Sliprings dirty	Clean and polish sliprings (para. 114).
Brush holders out of adjustment	Adjust the brush holders (par. 114).

55. Main Generator Frequency Fluctuates or Drifts

Probable cause	*Possible remedy*
Fuel injection pump defective.	Replace the fuel injection pump (para. 81).
Governor speed switch defective.	Replace the governor speed switch (para. 132).

56. Main Generator Frequency Drops Under Load

Probable cause	*Possible remedy*
Engine lacks power	Refer to paragraph 44.

57. Main Generator Fails To Supply Power To The Load

Probable cause	*Possible remedy*
Main circuit breaker off-	Place circuit breaker in ON position.
Load terminals dirty or loose.	Clean and tighten loose or dirty load terminals.

58. Main Circuit Breaker Trips or Fails To Close

Probable cause	*Possible remedy*
Short in load lines	Eliminate the short in load lines.
Generator overloaded	Reduce the load.
Main generator fails to build up rated voltage.	Refer to paragraph 51.

59. Excessive Sparking at Generator Brushes

Probable cause	*Possible remedy*
Brushes worn or defective	Replace the brushes (para. 114).
Sliprings dirty	Clean and polish the sliprings (para. 114).
Brush holders out of adjustment.	Adjust the brush holders (par. 114).

60. Main Generator Overheats

Probable cause	*Possible remedy*
Generator screens clogged	Remove and clean the generator screens (para. 114).
Generator clogged with dirt and dust.	Remove the generator screens and blow out dirt and dust from the generator (para. 114).

61. Main Generator Noisy

Probable cause	*Possible remedy*
Generator mounting bolts loose	Tighten the generator mounting bolts.
Generator brush loose or broken	Replace the generator brush (para. 114).

62. Main Generator Fails To Maintain Kilowatt Load Division During Parallel Operation

Probable cause	*Possible remedy*
Parallel operation switch defective.	Replace the parallel operation switch (para. 132).
Parallel operation receptacle defective.	Replace the parallel operating receptacle (para. 116).
Engine lacks power	Refer to paragraph 44.
Main generator frequency fluctuates or drifts.	Refer to paragraph 55.

63. Main Generator Fails To Maintain Reactive Load Division During Parallel Operation

Probable cause	*Possible remedy*
Main generator voltage drops upon increase of load.	Refer to paragraph 52.

64. Gasoline Heater Fails To Ignite

Probable cause	*Possible remedy*
Fuel tank empty	Fill the fuel tank.
24-v coolant thermostat defective.	Replace the 24-v coolant thermostat (para. 125).
Heater switch defective	Replace the heater switch (par. 124).
Heater reset circuit breaker defective.	Replace the heater reset circuit breaker (para. 124).
Gasoline pump defective	Replace the gasoline pump (par. 129).

65. Battery Box Heater Fails To Operate

Probable cause	*Possible remedy*
Battery box thermostat switch defective,	Replace the battery box thermostat switch (para. 125).
Heater switch defective	Replace the heater switch (par. 124).

66. Electric Coolant Heater Fails To Operate

Probable cause	*Possible remedy*
220-v coolant thermostat switch defective.	Replace the 220-v coolant thermostat switch (para. 125).
Heater switch defective	Replace the heater switch (par. 124).
Fuse defective	Replace the fuse (para. 123).

67. Field Expedient Repairs

Operational troubles may occur while the generator set is operating in the field, where supplies and repair parts are not available and normal remedial action cannot be performed. When this condition exists, the expedient remedies listed below may be used only upon the decision of the unit commander. Equipment so repaired must be removed from operation at the earliest possible moment and properly repaired before being placed in operation again.

Trouble	*Expedient remedy*
Air cleaner clogged	Remove the air cleaner (para. 80*c*).

Caution:

Operating the unit in sandy or dusty areas without the air cleaner can cause serious damage to the supercharger.

Fuel strainer clogged	Remove the element (para. 78*d*).
Fuel filter clogged	Remove the element (para. 79*d*).

Caution:

Operation of the engine without the fuel filter element can result in damage to the fuel injection pump.

Trouble	*Expedient remedy*
Cooling system thermostat switch defective.	Remove the thermostat (switch para. 95*f*).
Cooling system hose collapsed.	Remove the hose and install a section of coiled, heavy wire in the hose. Install the hose(para. 93*e*).
High coolant temperature switch. defective	Remove the switch and tape the two wires separately (para. 120*d*).

Caution:

In the event of an overheat condition, and the high coolant temperature switch is disconnected, serious damage may result to the engine.

Low oil pressure switch defective	Remove the switch and tape the ends of the two electrical leads (para. 119*d*).

Caution: Operation of the generator set without the low oil pressure switch may result in damage to the engine in the event of a loss of oil pressure.

Lubricating oil filter element clogged	Remove the oil filter element (para. 89*c*).

Caution:

Operation of the engine without the oil filter element may result in damage to the engine if operated for extended periods of time.

Section IV. RADIO INTERFERENCE SUPPRESSION

68. General Methods Used To Attain Proper Suppression

Essentially, suppression is attained by providing a low-resistance path to ground for-the stray currents. The methods used to attain suppression include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors where necessary. For general information on radio interference suppression, refer to TM 11-483.

69. Interference Suppression Components

a. Refer to figure 24 for the location, removal, and installation of interference suppression components.

b. To correct faulty interference suppression, remove the suppression components one at a time and substitute with new ones until the defective component is found.

c. Always replace suppression components with identical parts.

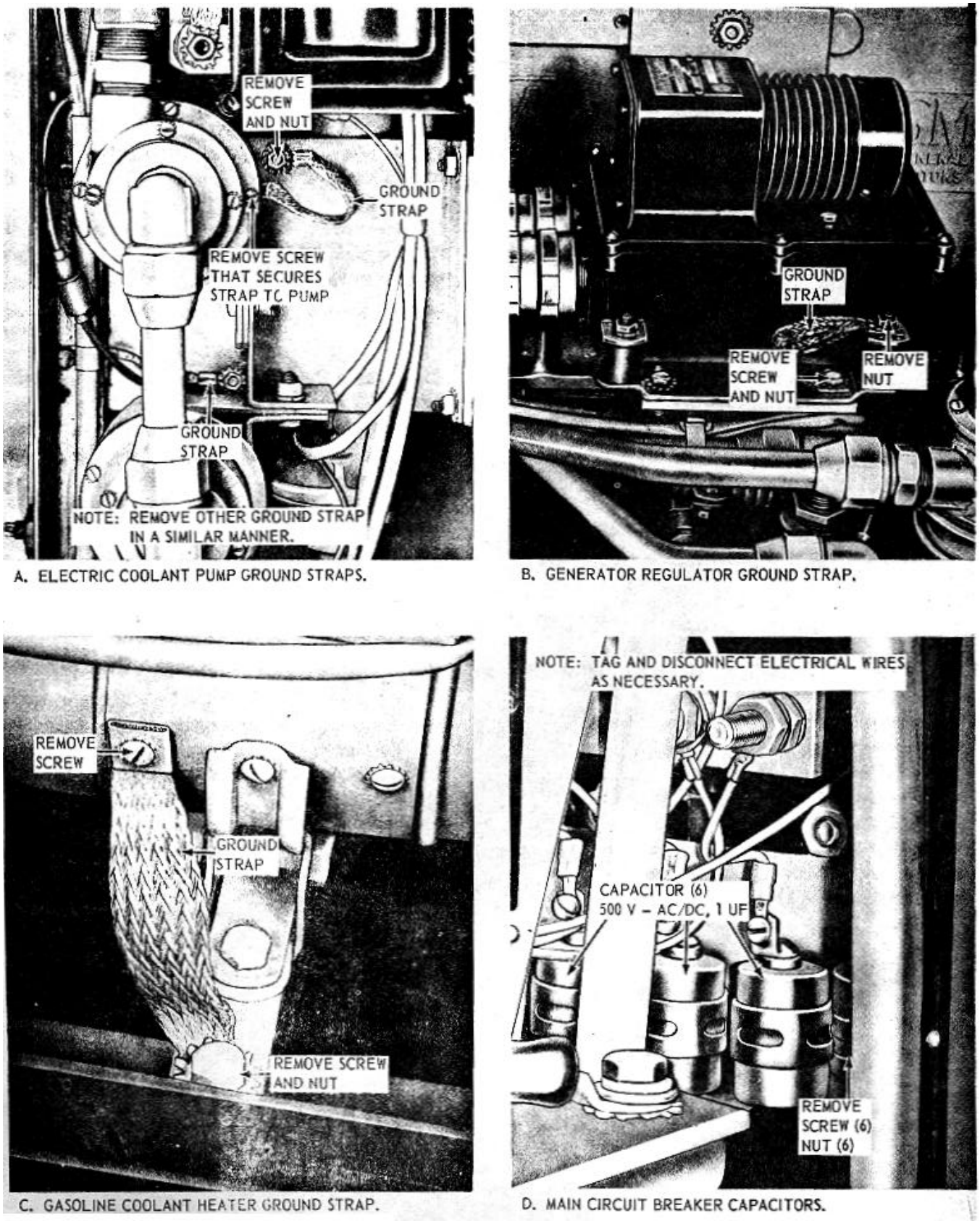


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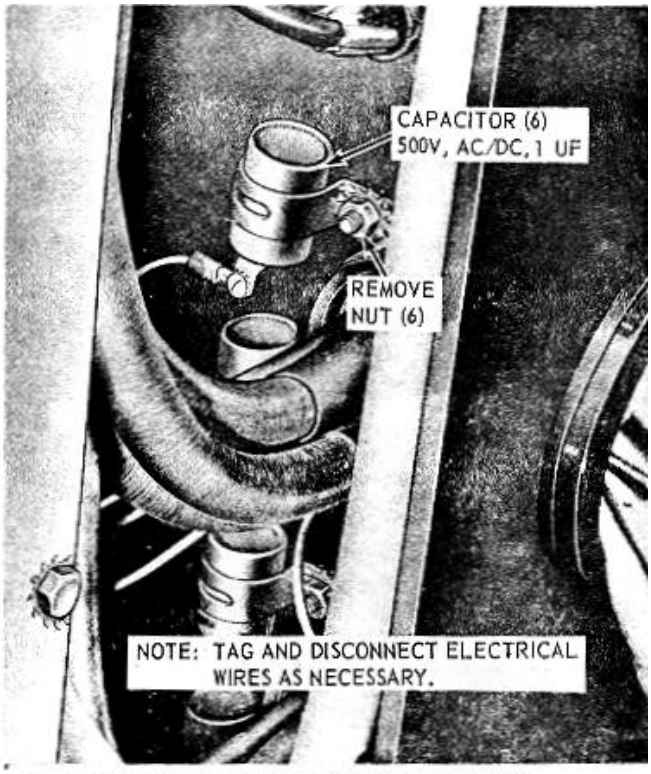
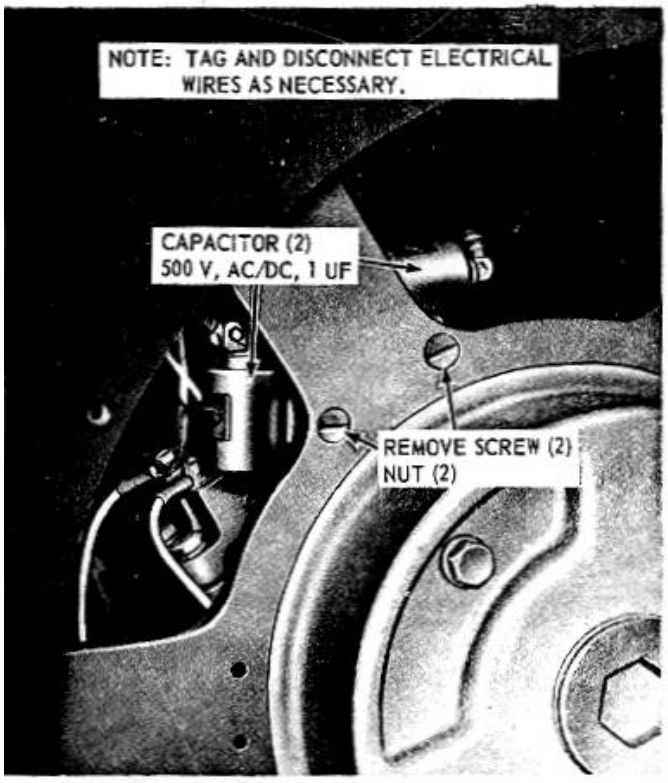
Figure 24. Interference suppression components, removal and installation.

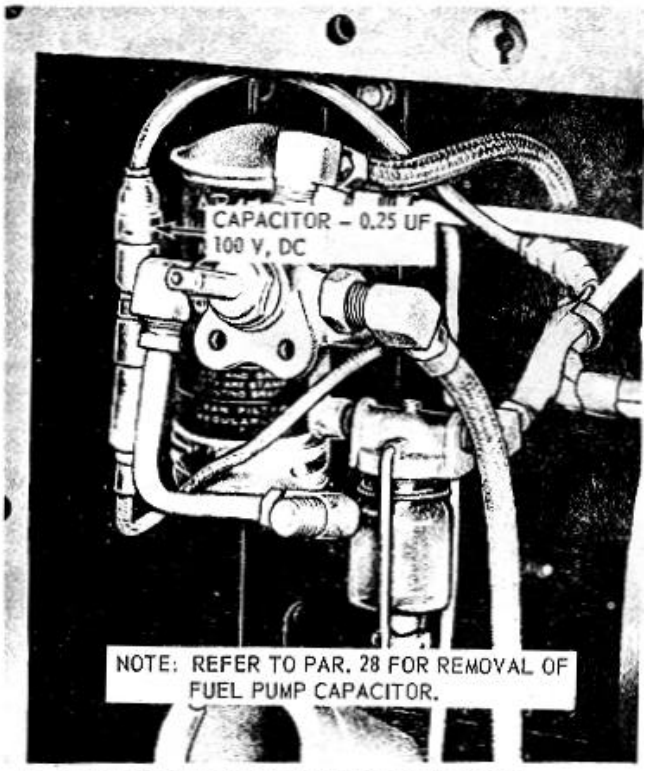
E. 115–V ELECTRICAL RECEPTACLE CAPACITOR



F. LOAD RECEPTACLE CONNECTOR CAPACITORS.



G. MAIN GENERATOR BRUSH CAPACITORS.



H. GASOLINE PUMP FEED–THROUGH CAPACITOR.

Figure 24--Continued.

Section V. FIRE EXTINGUISHER BRACKET, HOOD, DOORS, AND PANELS

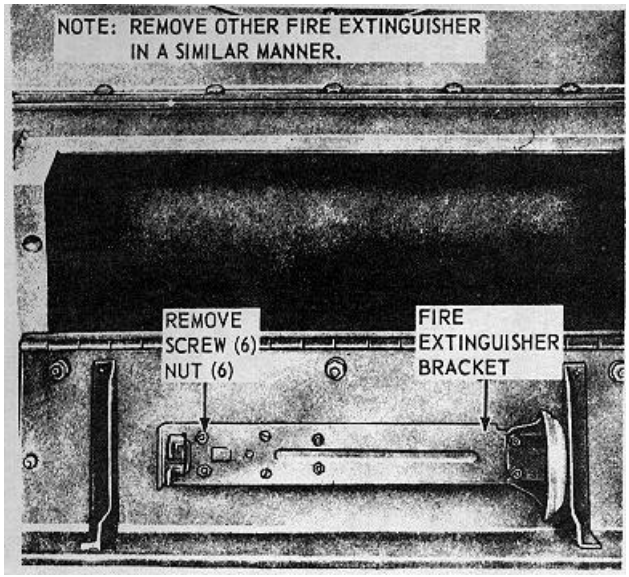


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Figure 25. Fire extinguisher bracket, removal and installation.

70. General

The engine and main generator of the generator set is inclosed in a sheet metal housing with doors and panels provided for easy access to all components. This section covers maintenance procedures on the fire extinguisher bracket, hood, doors, and panels.

71. Fire Extinguisher Bracket

a. Remove and install the fire extinguisher bracket as shown by figure 25.

b. Clean and inspect.

72. Hood, Doors, and Panels

a. Remove and install the hood, doors, and panels as shown by figure 26.

b. Clean, inspect, and repair.

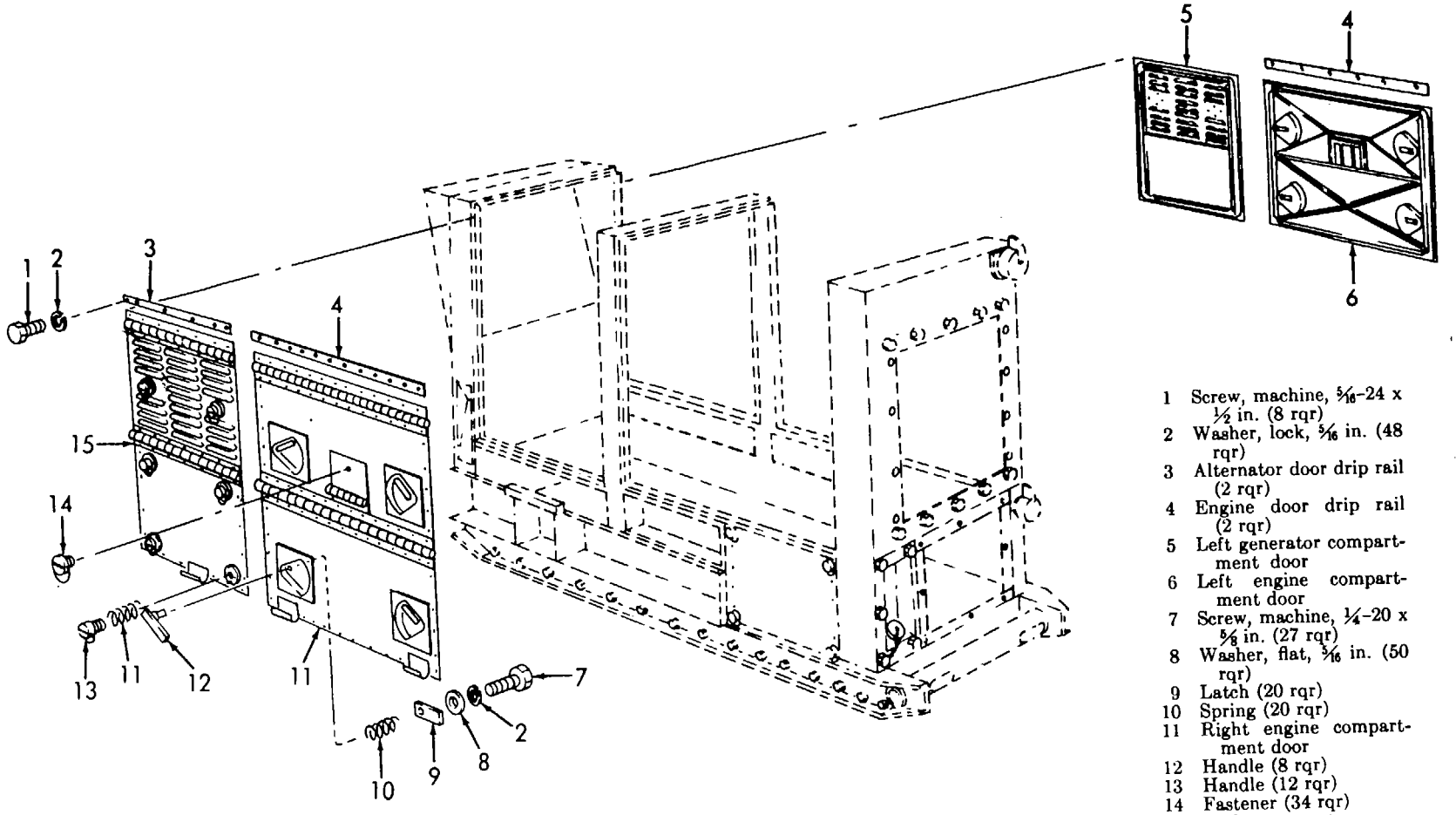


Figure 26. Hood, doors, and panels, removal, disassembly, reassembly, and installation.

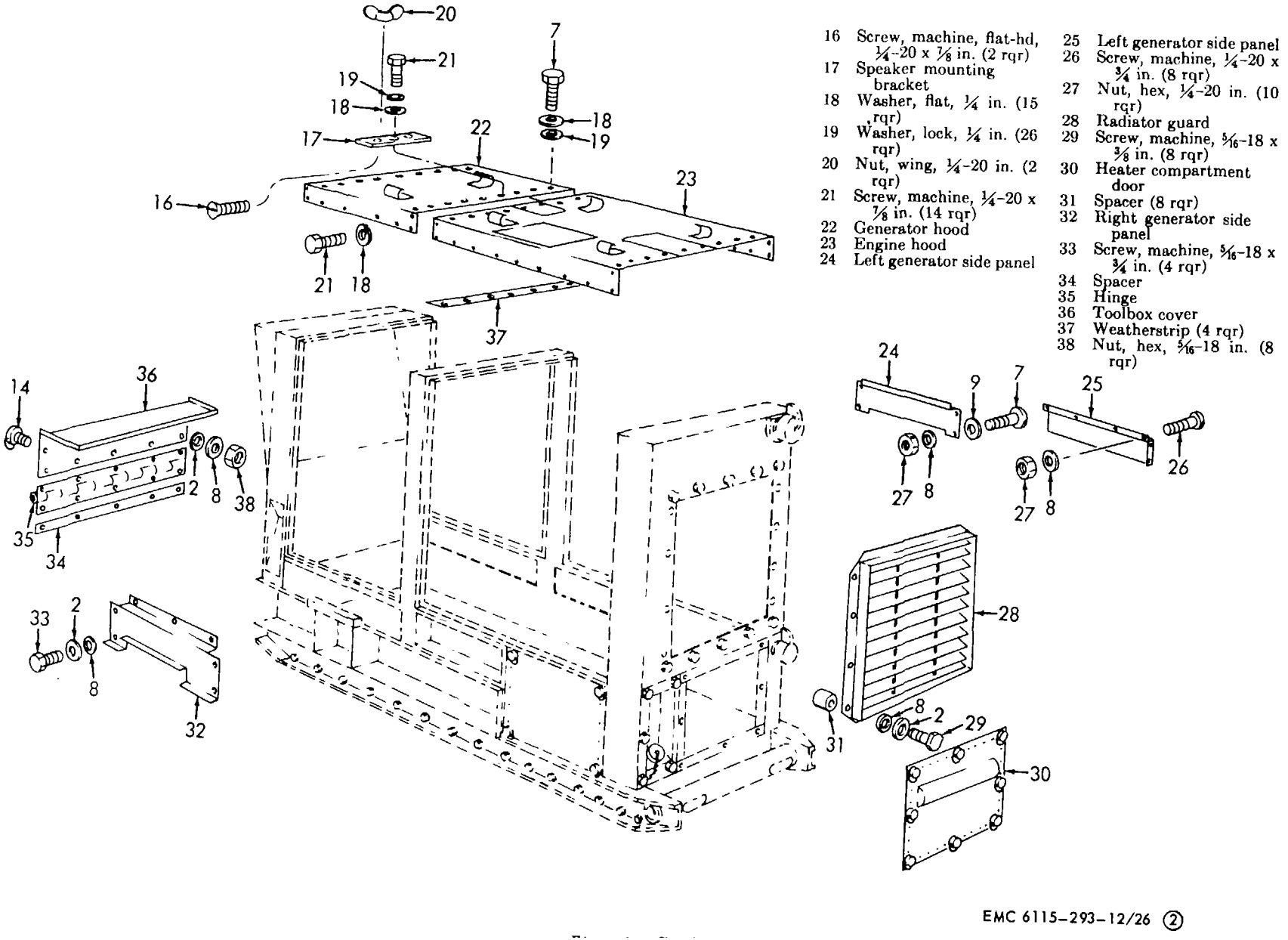


Figure 26--Continued.

Section VI. EXHAUST SYSTEM

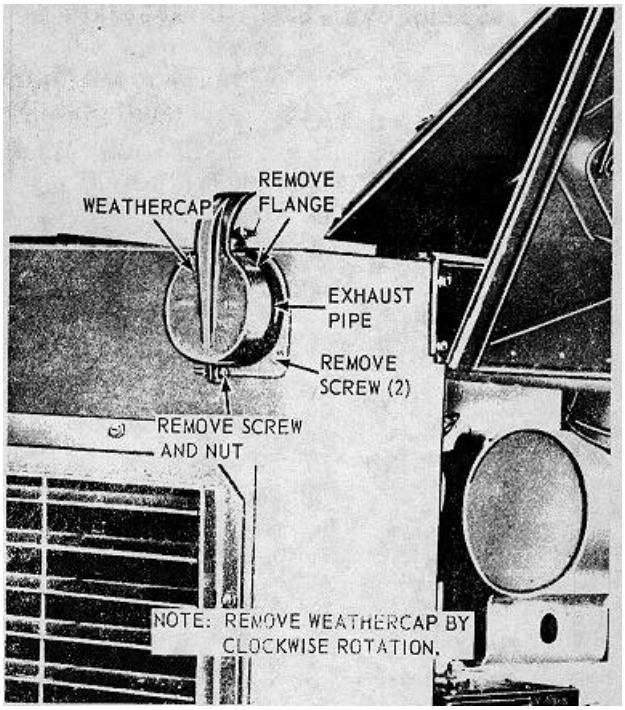
73. General

The generator set is equipped with an exhaust manifold constructed integrally with the exhaust muffler. A weathercap is also provided. This section covers maintenance procedures for the exhaust manifold and muffler, exhaust pipe, and weathercap.

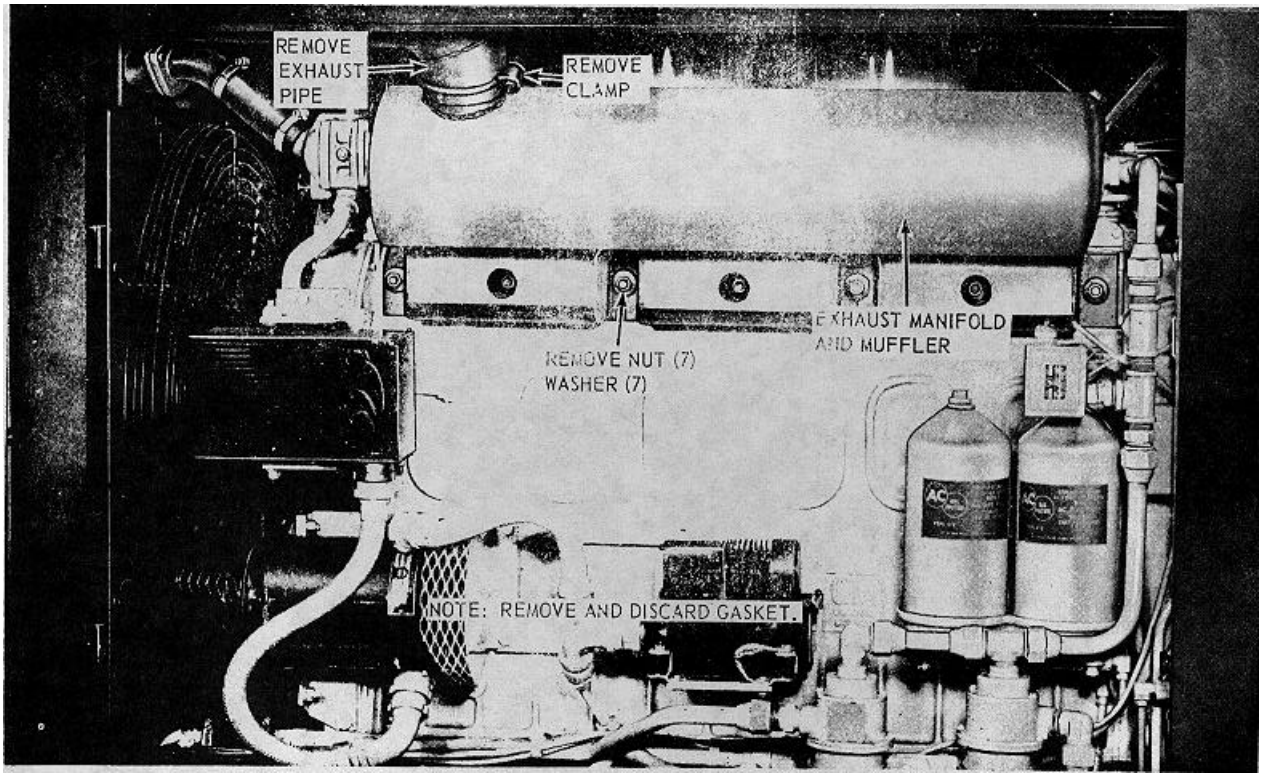
74. Exhaust Manifold and Muffler, Exhaust Pipe, and Weathercap

a. Remove and install the exhaust manifold and muffler, exhaust pipe, and weathercap as shown by figure 27.

b. Clean and inspect.



A. WEATHERCAP.



B. EXHAUST MANIFOLD AND MUFFLER AND EXHAUST PIPE.

EMC 6115-293-12/27

Figure 27. Exhaust manifold and muffler, exhaust pipe, and weathercap, removal and installation.

Section VII. FUEL SYSTEM

75. General

The generator set fuel system is designed to inject fuel into the combustion chambers under pressure at properly timed intervals. Fuel can be drawn from either the internal tank or from an auxiliary fuel source. The high-lift pump draws fuel through the fuel strainer and sends it through the fuel filter to the fuel injectors. The surplus fuel is then returned to the internal tank or auxiliary source.

76. Fuel Tank Cap, Filler Neck, and Screen

a. Remove and install the right rear side panel (para. 72).

b. Remove and install the generator brush access panel (para. 114).

c. Remove and install the fuel tank cap, filler neck, and screen as shown by figure 28.

d. Clean and inspect.

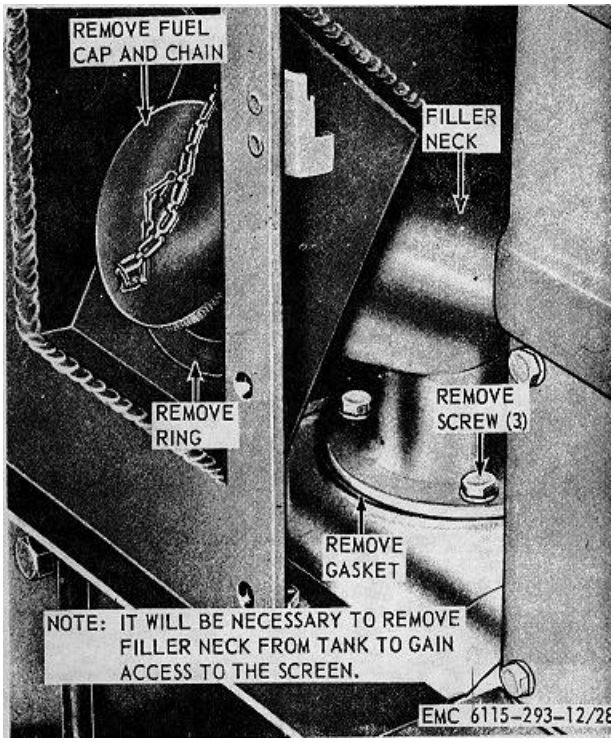
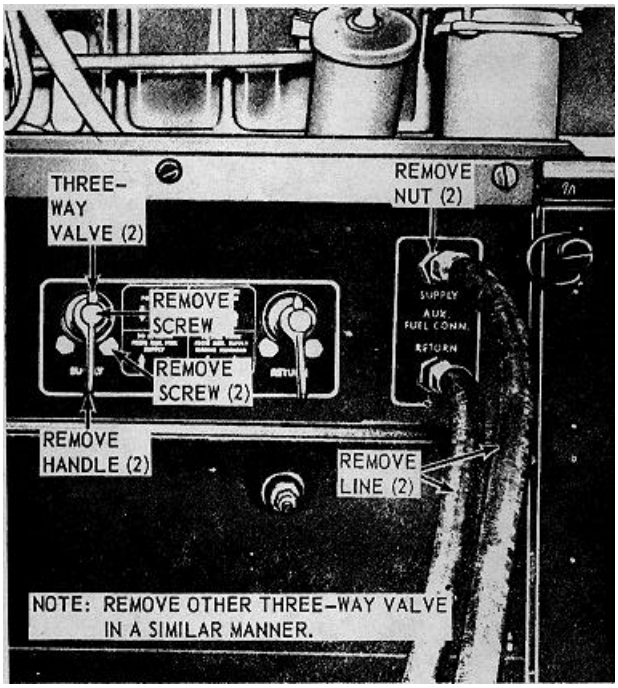


Figure 28. Fuel tank cap, filler neck, anti screen, removal and installation.

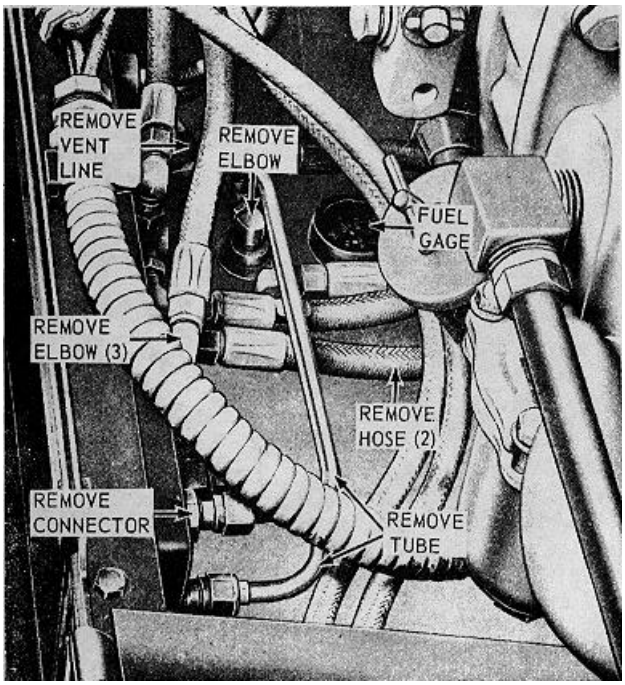
77. Diesel Fuel Control Valves and Auxiliary Fuel Connectors

a. Remove and install the diesel fuel control valves and auxiliary fuel connectors as shown by figure 29.

b. Clean and inspect.



A. FRONT VIEW.



B. REAR VIEW.

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Figure 29. Diesel fuel control valves, auxiliary fuel connectors, fuel quantity gage, and fuel tank vent, removal and installation.

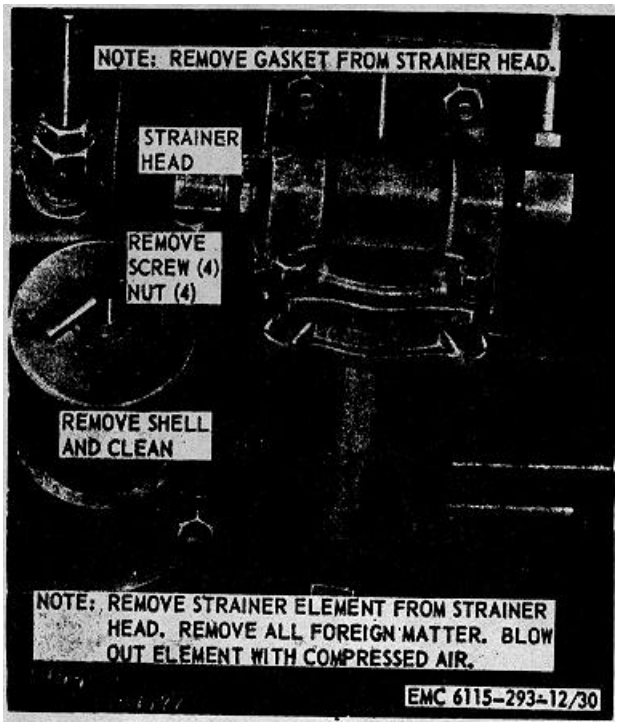


Figure 30. Fuel strainer service.

78. Fuel Strainer

a. Service the fuel strainer as shown by figure 30

b. Remove and install the fuel strainer as shown by figure 31.

c. Clean and inspect.

d. Should the engine stop or cease to operate due to a damaged or clogged fuel strainer, remove the strainer element as in b above and operate the engine without the fuel strainer element.

79. Fuel Filter

a. Service the fuel filter as shown by figure 32.

b. Remove and install the fuel filter as shown by figure 33.

c. Clean and inspect.

d. Should the engine fail to start or cease to operate due to a damaged or clogged fuel filter, remove the fuel filter element as in b above and operate the engine without the fuel filter element.

Caution:

Operation of the engine without the fuel filter element may cause serious damage to the engine. Do not operate the engine any longer than is necessary.

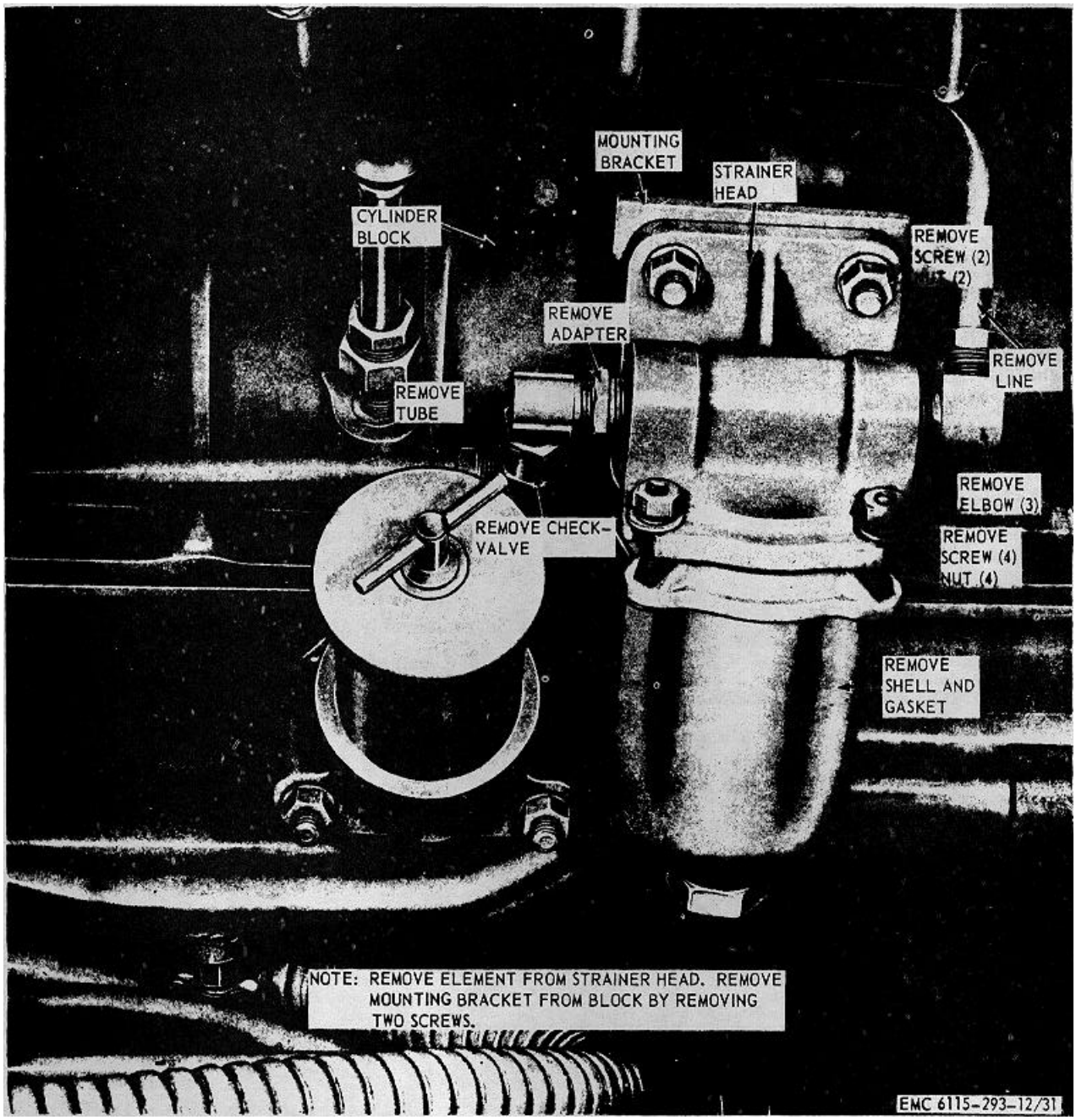


Figure 31. Fuel strainer, removal and installation.

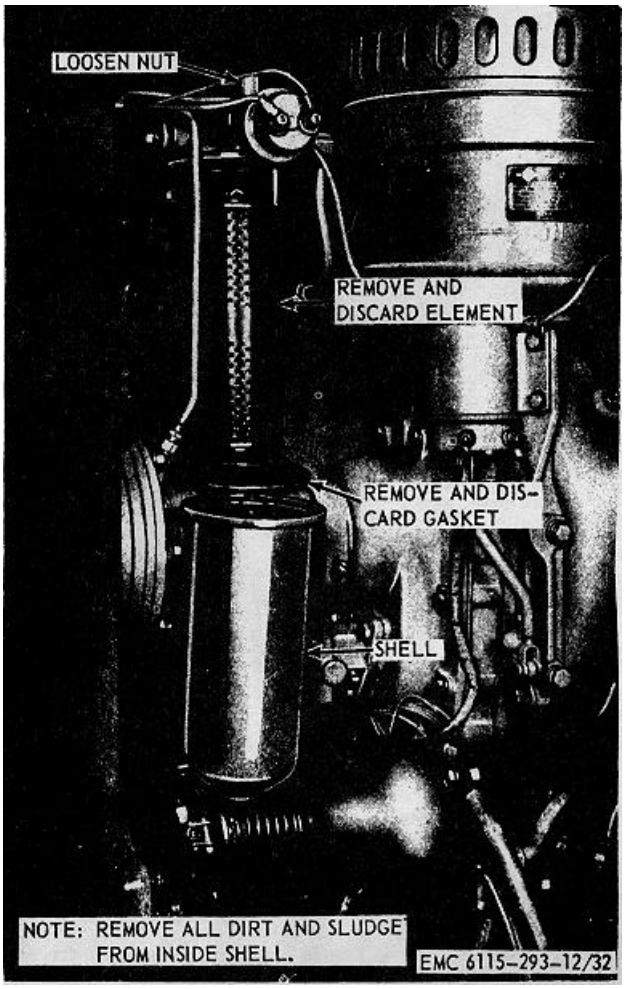


Figure 32. Fuel filter service.

80. Air Cleaners

a. Remove and install the air cleaners as shown by figure 22.

b. Clean and inspect.

c. Should the generator set fail to start or cease to operate due to a clogged or damaged air cleaner, remove the air cleaner as in a above. Secure a piece of fine mesh screen over the supercharger air intake flange and operate the engine without the air cleaner.

Caution:

Operation of the engine in sandy or dusty areas without the air cleaners may result in serious damage to the supercharger.

81. Diesel Fuel Injection Pump

a. Remove and install the diesel fuel injection pump as shown by figure 34.

b. Clean and inspect.

82. Fuel Control Tube and Lever Assembly

a. Remove and install the rocker arm cover (para. 109).

b. Adjust the fuel control tube and lever assembly as shown by figure 35.

c. Remove and install the fuel control tube and lever assembly as shown by figure 36.

d. Clean and inspect.

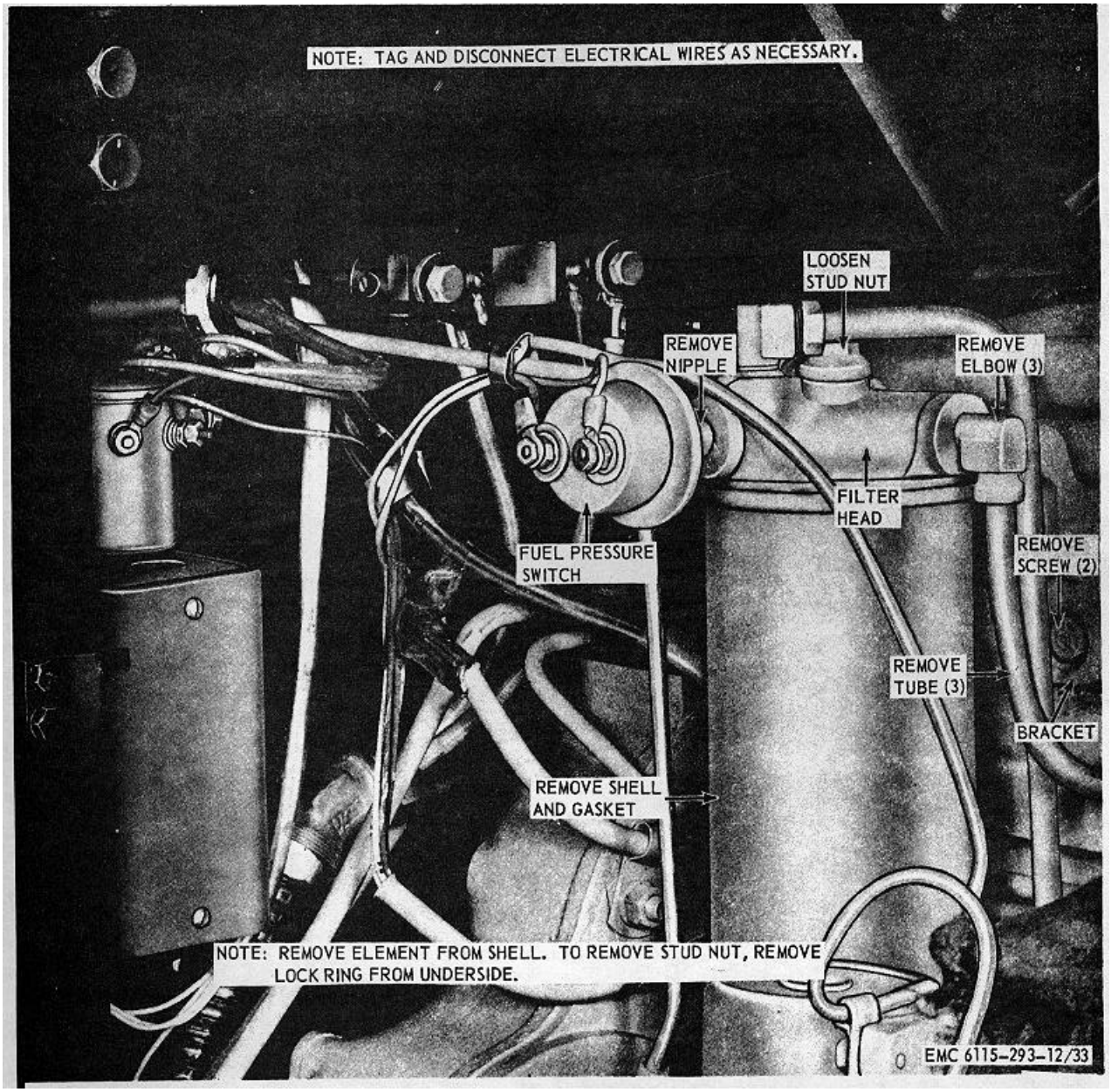


Figure 33. Fuel filter and fuel pressure switch, removal and installation.

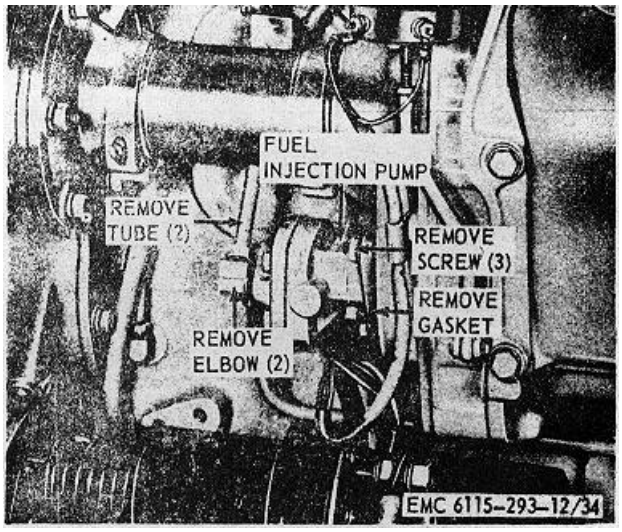


Figure 34. Diesel fuel injection pump, removal and installation

83. Fuel Tank Vent Line

a. Remove and install the fuel tank vent line as shown by figure 29.

b. Clean, inspect, and repair.

84. Fuel Quantity Gage

a. Remove and install the fuel quantity gage as shown by figure 29.

b. Clean and inspect.

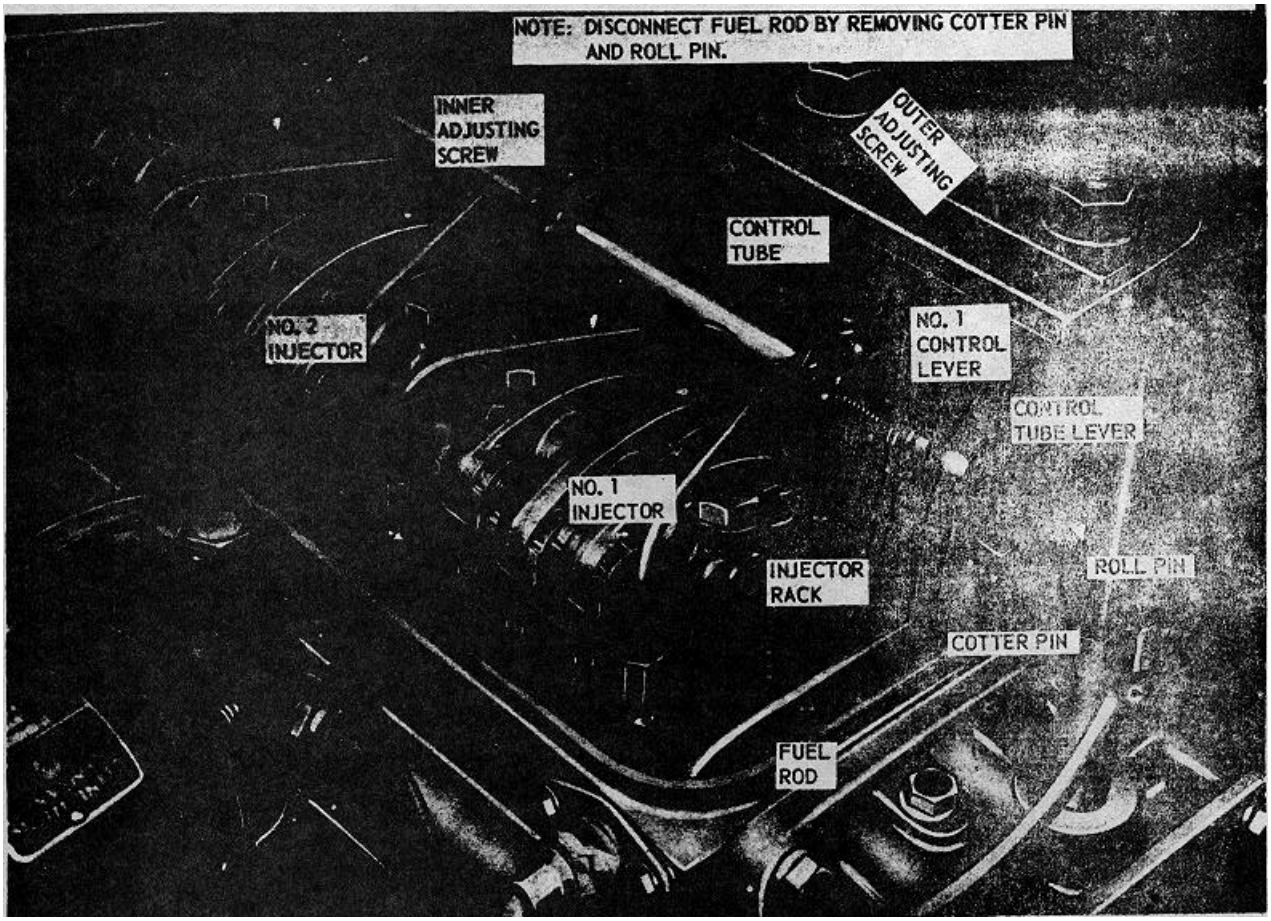
85. Ether Primer Assembly

a. Remove, disassemble, reassemble, and install the ether primer pump as shown by figure 37.

b. Remove and install the ether primer fluid-tank and metering reservoir as shown by figure 38.

c. Remove and install the ether primer air tank as shown by figure 39.

d. Clean, inspect, and repair.



STEP 1. DISCONNECT THE FUEL ROD FROM THE CONROL TUBE LEVER.

STEP 2. LOOSEN ALL INNER AND OUTER ADJUSTING SCREWS.

STEP 3. POSITION THE NO. 1 CONTROL LEVER UNTIL BOTH SCREWS ARE THE SAME HEIGHT WHEN TIGHTENED.

STEP 4. MANUALLY HOLD NO. 1 INJECTOR IN FULL FUEL POSITION AND THEN DOWN INNER ADJUSTING SCREW OF NO. 2 INJECTOR UNTIL INJECTOR RACK OF NO. 2 INJECTOR HAS MOVED TO FULL FUEL POSITION AND THE INNER ADJUSTING SCREW HAS BOTTOMED AGAINST THE CONTROL TUBE, ALTERNATELY TIGHTEN THE INNER AND OUTER ADJUSTING SCREWS UNTIL THEY ARE TIGHT.

STEP 5. RECHECK NO. 1 INJECTOR RACK TO BE SURE THAT IT HAS REMAINED SNUG ON THE ROUNDED END OF THE NO. 1 CONTROL LEVER WHILE ADJUSTING NO. 2 INJECTOR. IF NO. 1 INJECTOR HAS BECOME LOOSE, BACK OFF SLIGHTLY ON THE INNER ADJUSTING SCREW ON NO. 2 INJECTOR CONTROL LEVER. TIGHTEN THE OUTER ADJUSTING SCREW. WHEN SETTINGS ARE CORRECT, THE RACKS OF BOTH INJECTORS MUST BE SNUG ON THE ROUNDED ENDS OF THE CONTROL LEVERS.

STEP 6. POSTION THE REMAINING CONROL LEVERS AS IN 4 AND 5 ABOVE.

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Figure 35. Fuel control tube and lever assembly, adjustment.

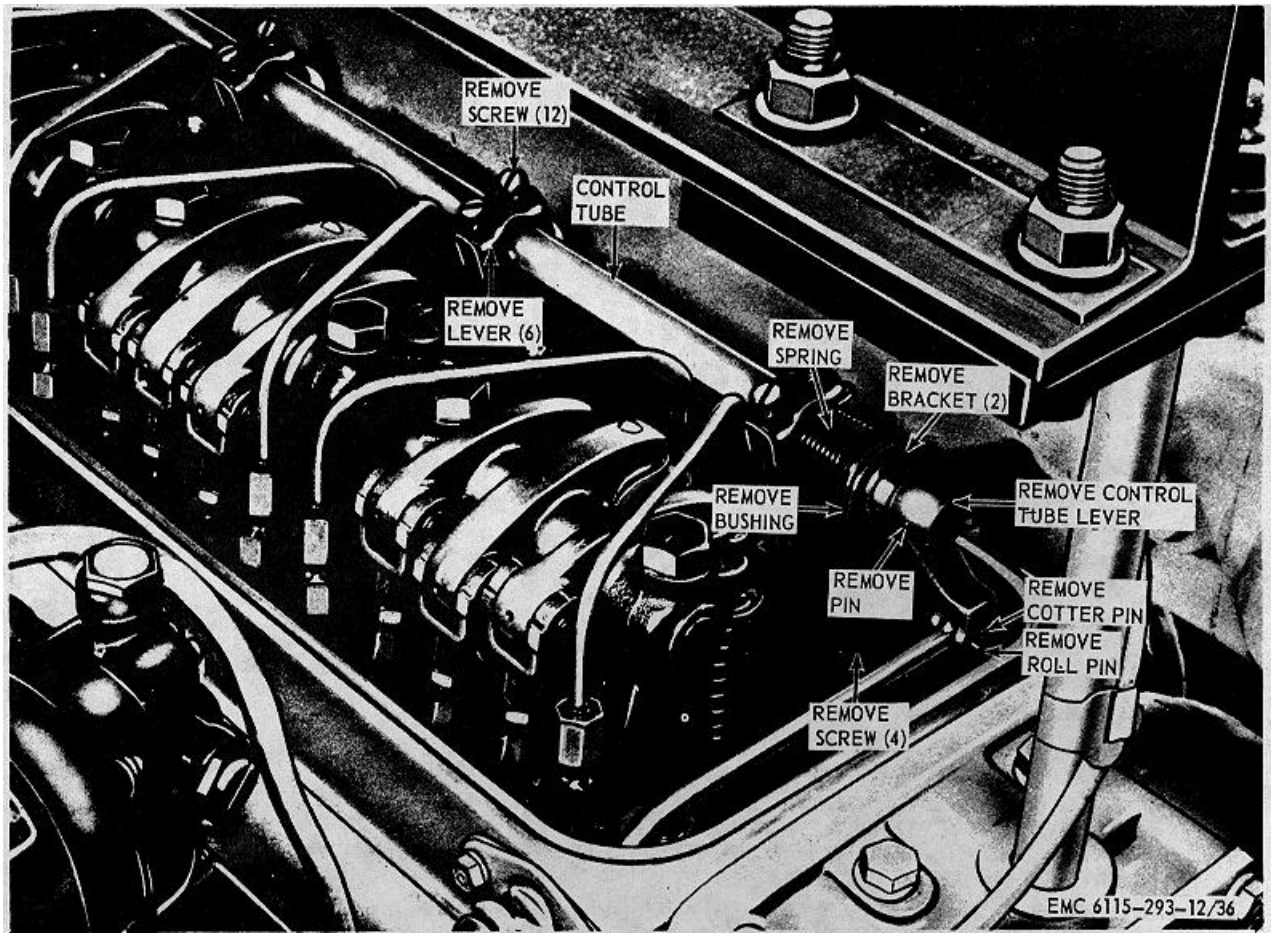


Figure 36. Fuel control tube and lever assembly, removal and installation.

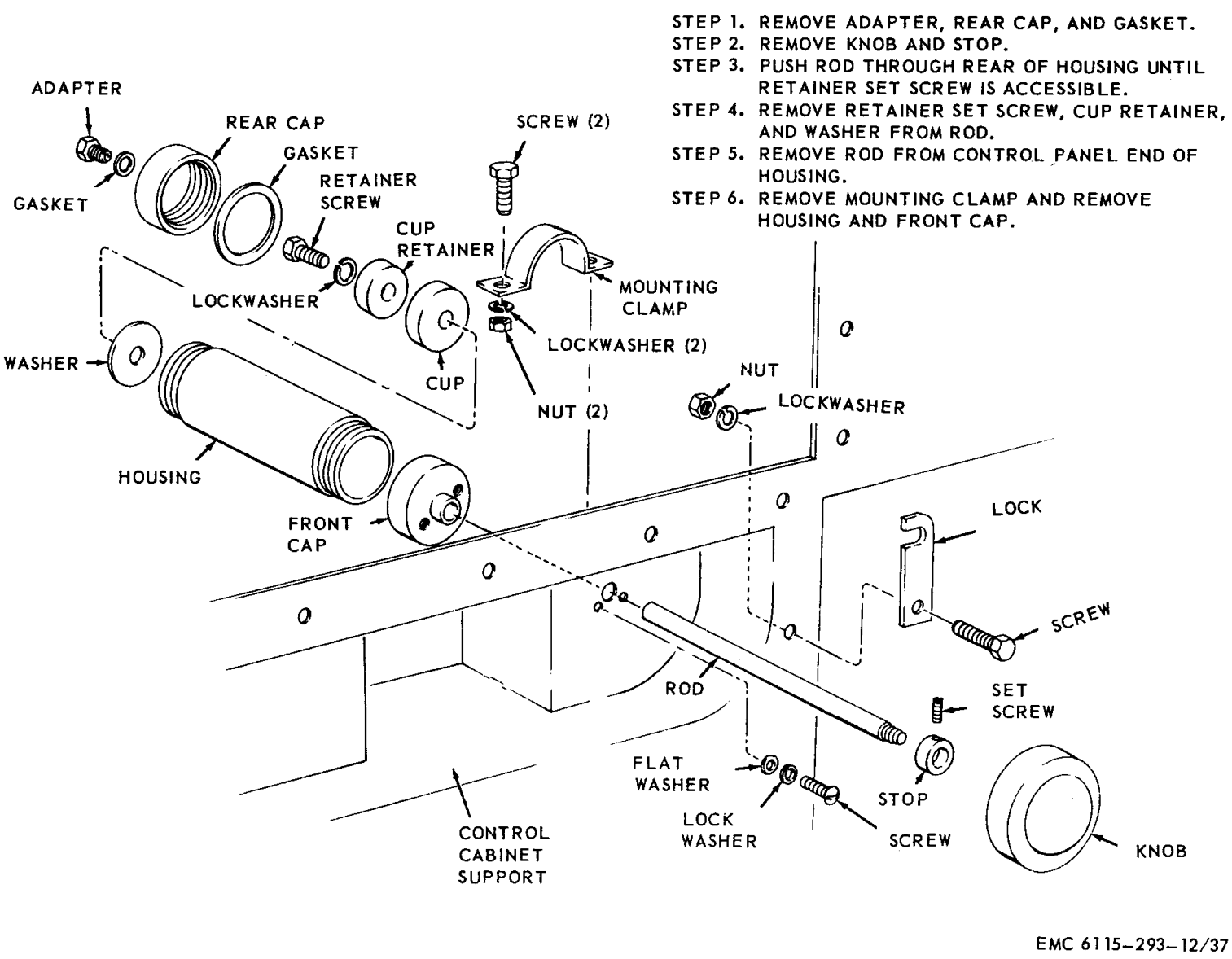


Figure 37. Ether primer pump, removal, disassembly, reassembly, and installation.

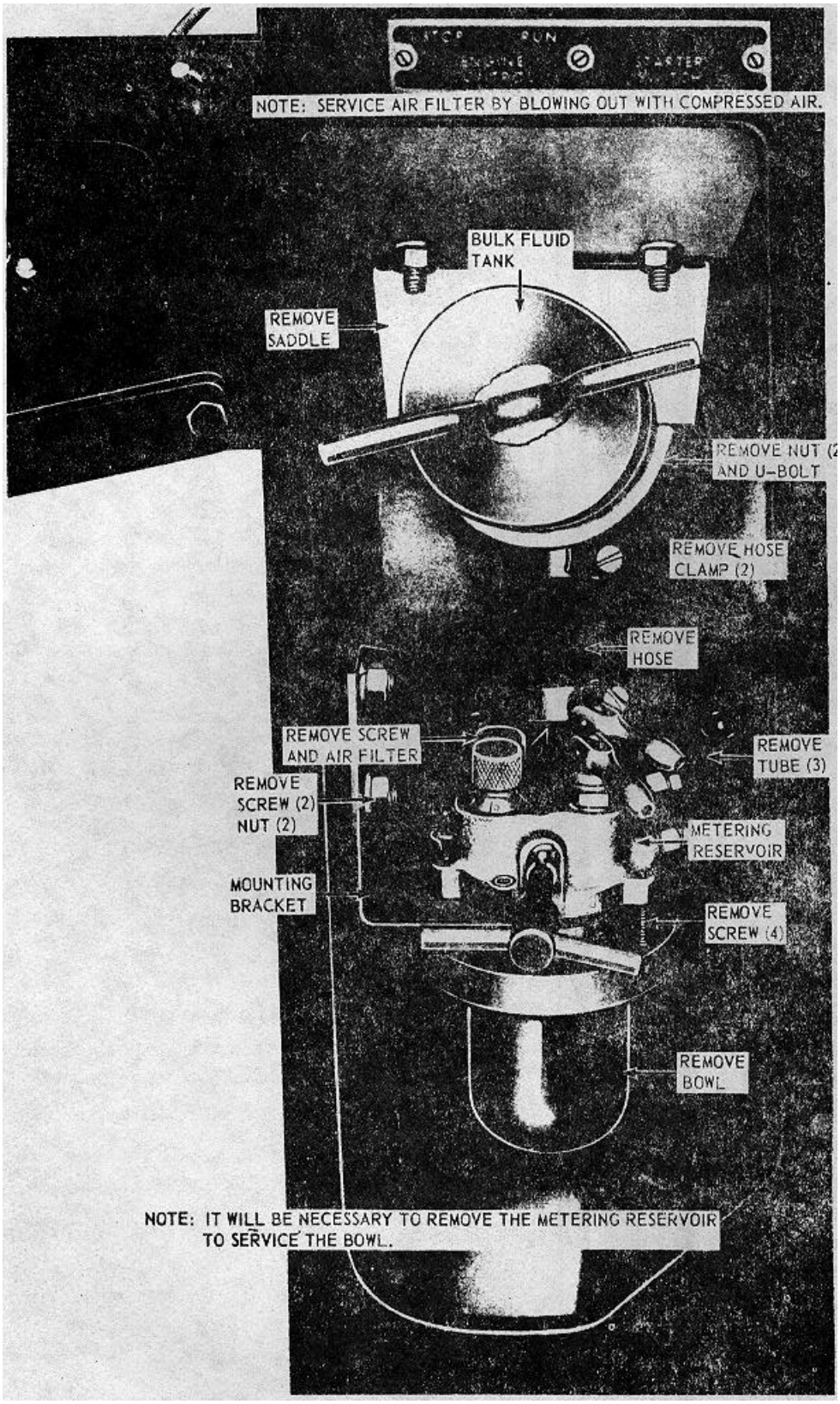


Figure 38. Ether primer fluid tank and metering reservoir, removal and installation.

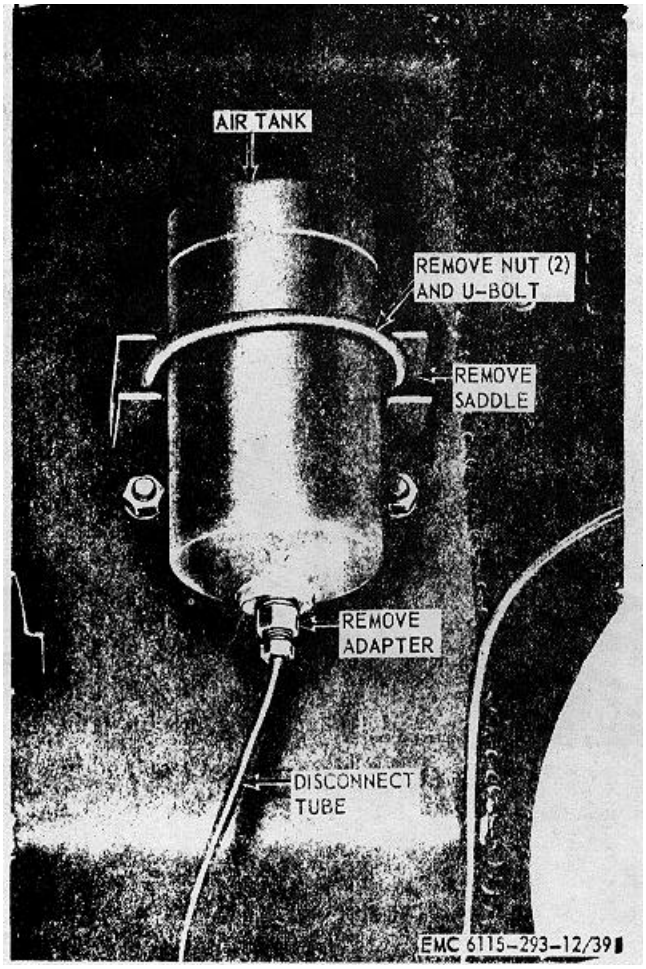


Figure 39. Ether primer air tank, removal, and installation.

Section VIII. LUBRICATION SYSTEM

86. General

The lubricating oil system provides a source of cooled, filtered oil under pressure to the various internal lubrication points of the engine. A separate reservoir and filter is provided for the electric hydraulic governor (fig. 2) but utilizes engine lubricating oil. The oil cooler (fig. 1) is equipped with a bypass valve which will allow oil to flow around the cooler in the event of a clogged cooler element.

87. Oil Filler Neck, Cap, and Gage

a. Drain the engine crankcase oil (par. 92).

b. Remove the oil filler neck, cap, and gage as shown by figure 40.

c. Clean and inspect.

88. Oil Cooler and Bypass Valve

a. To service the oil cooler, remove the cooling element (fig. 41) and remove all foreign ratter.

b. Remove and(install the oil cooler bypass valve as shorn b)y figure 41.

c. Clean and inspect.

89. Lubricating Oil Filters and Mounting Bracket

a. Remove and install the lubricating oil filters and mounting bracket as shown by figure 42.

b. Clean and inspect.

c. should the engine lubrication system cease to function properly due to clogged or damaged oil filter elements, remove the filter elements as in *a*

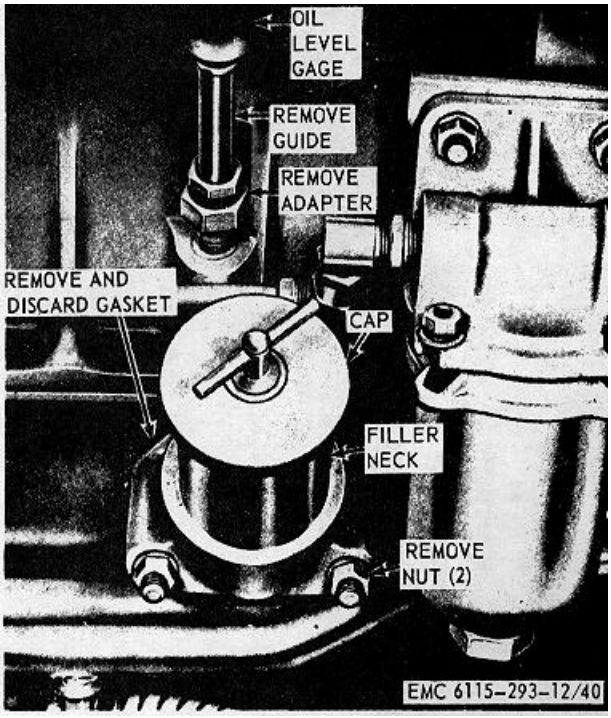


Figure 40. Oil filler neck, cap, and gage, removal and installation.

above and operate the engine without the filter elements.

Caution

Operation of the engine for extended periods of time without the oil filter elements may result in serious damage to the engine.

90. Governor Oil Reservoir and Input Solenoid Valve

a. Remove and install the governor oil reservoir and input solenoid valve as shown by figure 43.

b. Clean and inspect.

91. Governor Oil Filter and Output Solenoid Valve

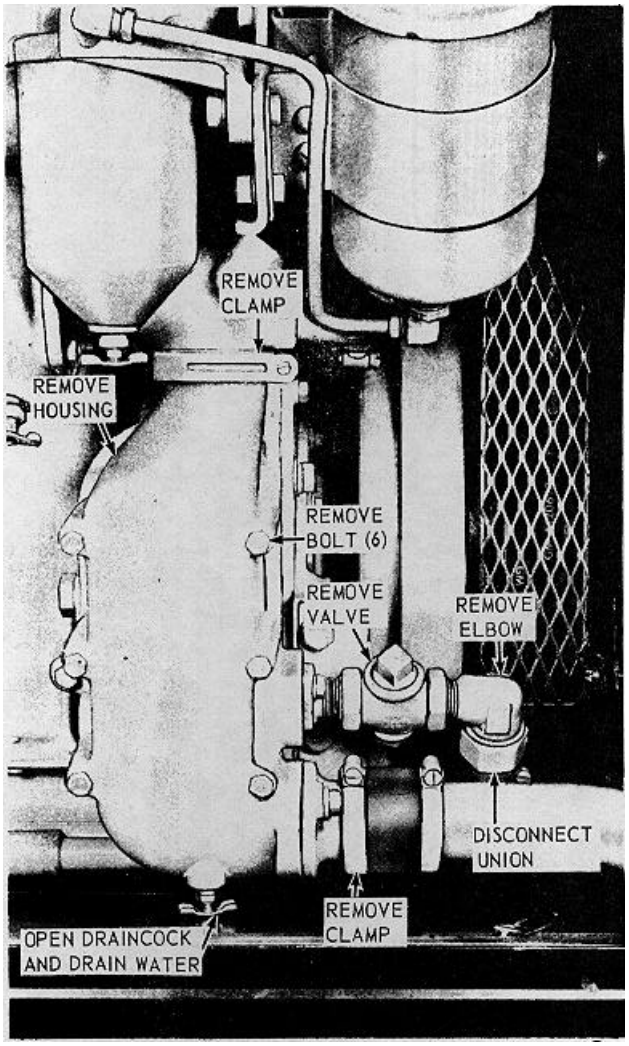
a. Remove and install the governor oil filter and output solenoid valve as shown by figure 44.

b. Clean and inspect.

92. Engine Oil Drain Hose

a. Remove and install the engine oil drain hose as shown by figure 45.

b. Clean and inspect.



INSTALLED VIEW EMC 6115-293-12/41 (1)

Figure 41. Oil cooler, bypass valve, and coolant shutoff valve, removal, disassembly, reassembly, and installation.

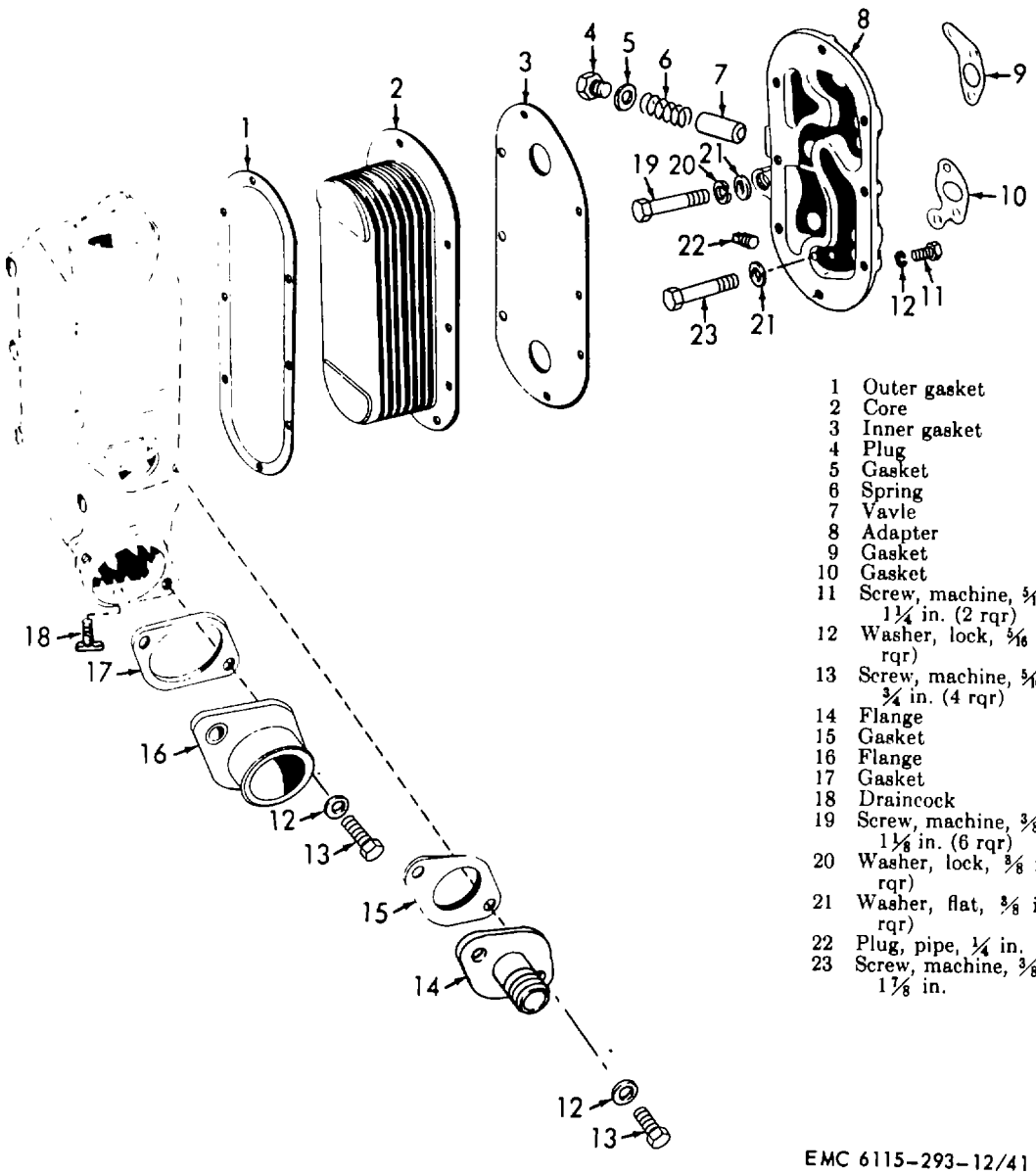


Figure 41-Continued.

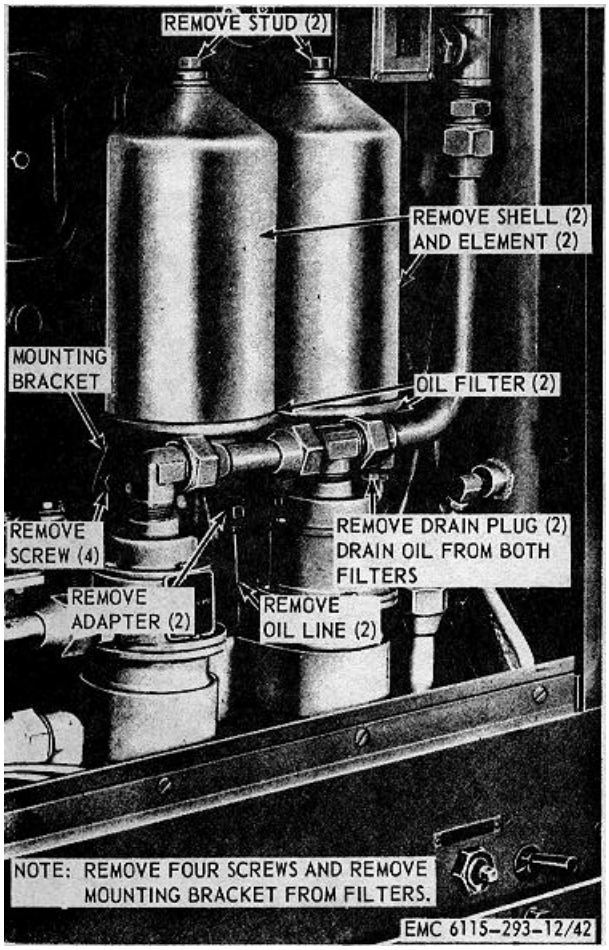


Figure 42. Lubricating oil filters and mounting bracket, removal and installation.

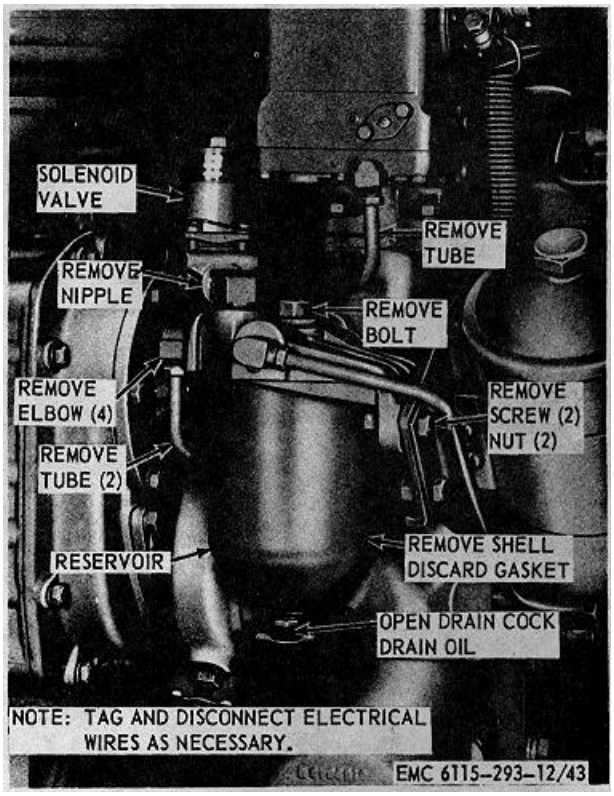


Figure 43. Governor oil reservoir and input solenoid valve, removal and installation.

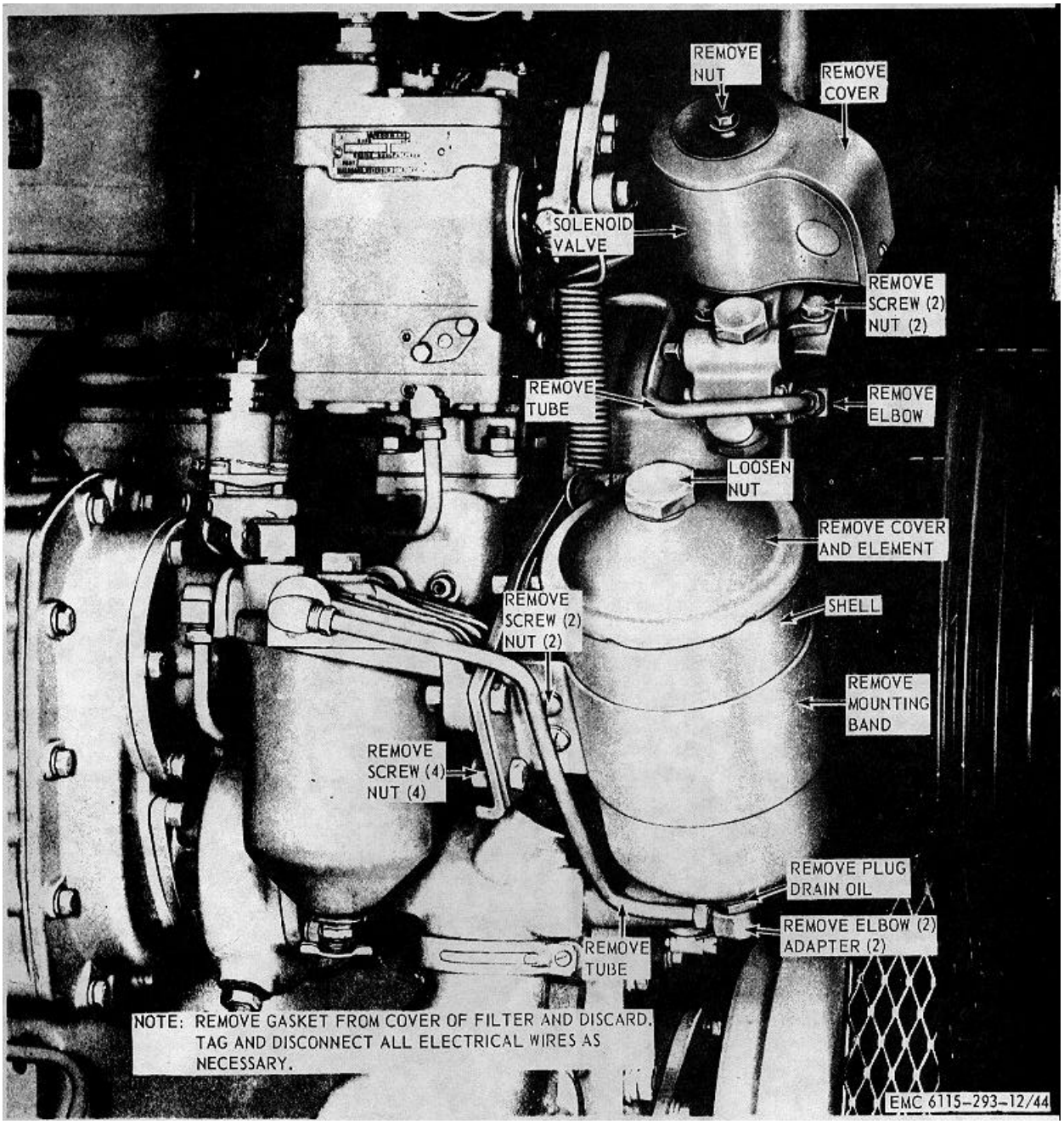


Figure 44. Governor oil filter and output solenoid valve, removal and installation.

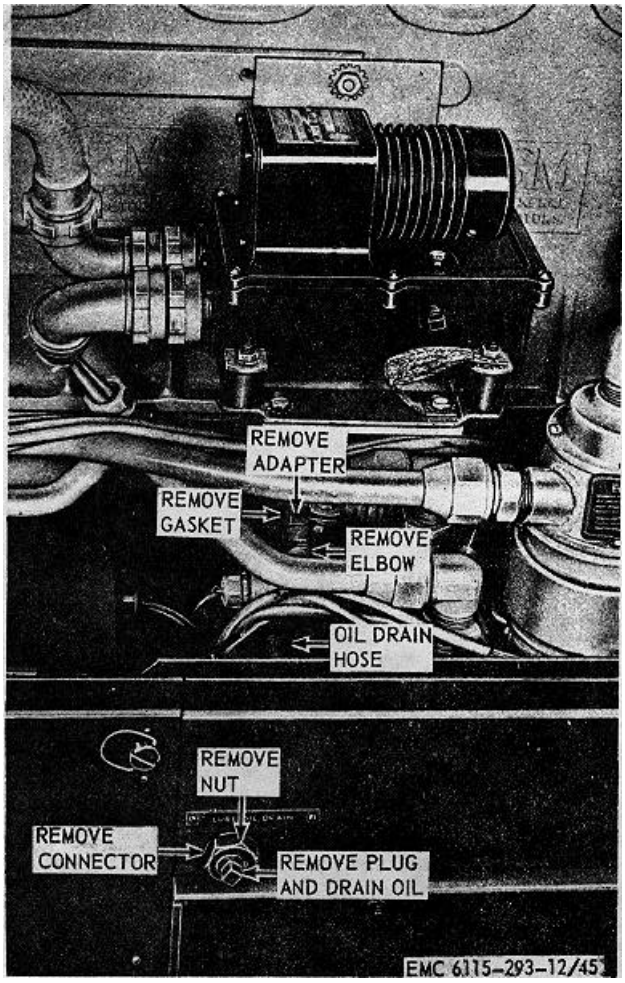


Figure 45. Engine oil drain hose, removal and installation.

Section IX. COOLING SYSTEM

93. Radiator, Cap, Overflow Valve, and Hoses

a. Flush the cooling system as follows:

(1) With the engine at operating temperature, drain the cooling system as shown by figure 46.

(2) Fill the cooling system with clean water and an approved amount of radiator cleaner.

Note

It is necessary to open the thermostat vent valve when filling the cooling system.

(3) Operate the engine long enough to remove all rust and scale from the cooling system. Drain the cooling system as in (1) above.

(4) Repeat (1) and (2) above with an approved neutralizer. Drain the cooling system as in (1) above.

(5) Continue flushing the cooling system with water only until the water runs clear when the system is drained.

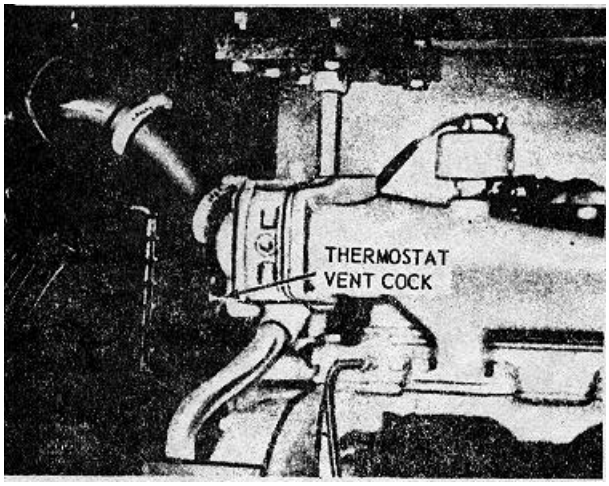
(6) Fill the cooling system with water and an approved rust inhibitor or antifreeze.

b. Remove and install the radiator cap, overflow valve, and hose as shown by figure 47.

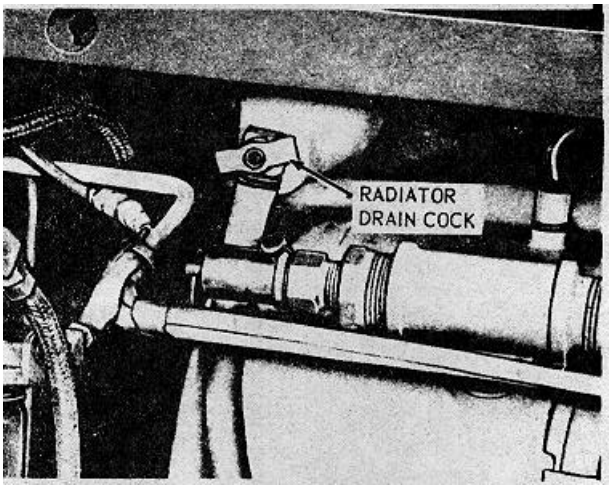
c. Remove and install the radiator draincock as shown by figure 48.

d. Clean and inspect.

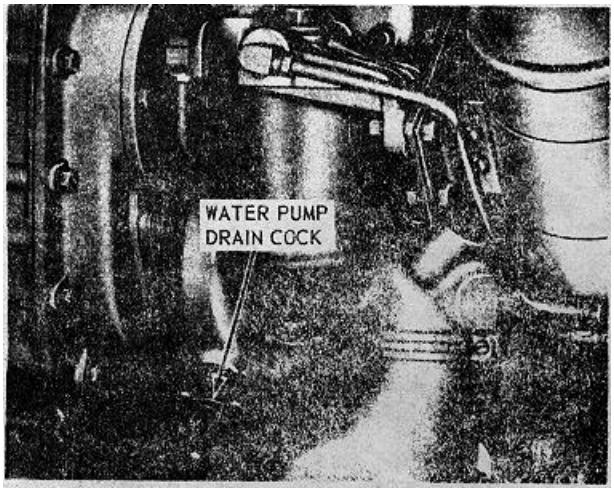
e. Should the engine cooling system cease to function properly due to a collapsed coolant hose, remove the hose as in b above and insert a coil of heavy wire into the hose. Install the hose and operate the engine.



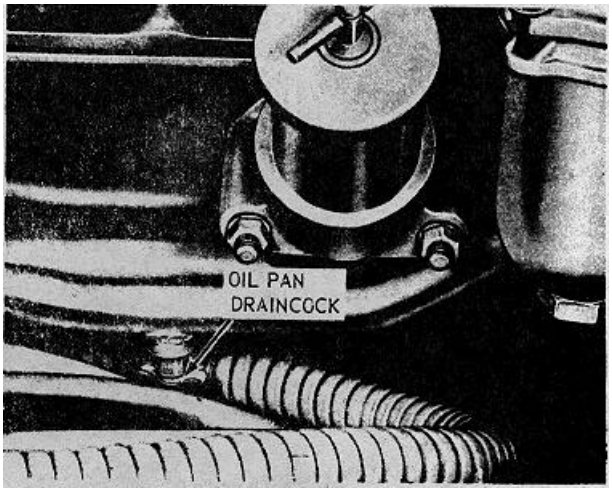
STEP 1. OPEN THERMOSTAT VENT COCK.



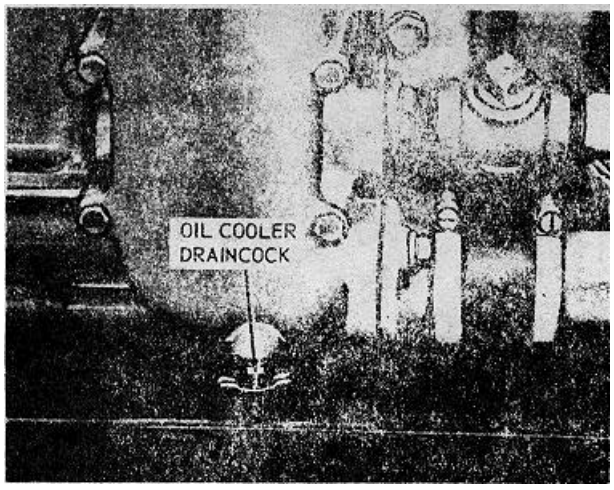
STEP 2. OPEN RADIATOR DRAIN COCK.



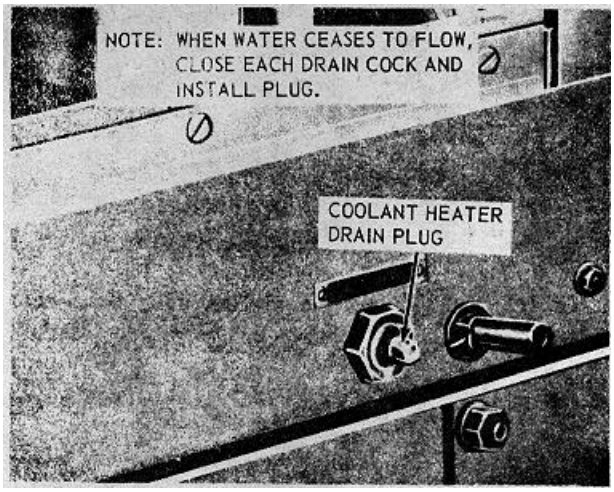
STEP 3. OPEN WATER PUMP DRAIN COCK.



STEP 4. OPEN OIL PAN DRAIN COCK.



STEP 5. OPEN OIL COOLER DRAIN COCK.



STEP 6. REMOVE COOLANT HEATER DRAIN PLUG.

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Figure 46. Cooling system draining instructions.

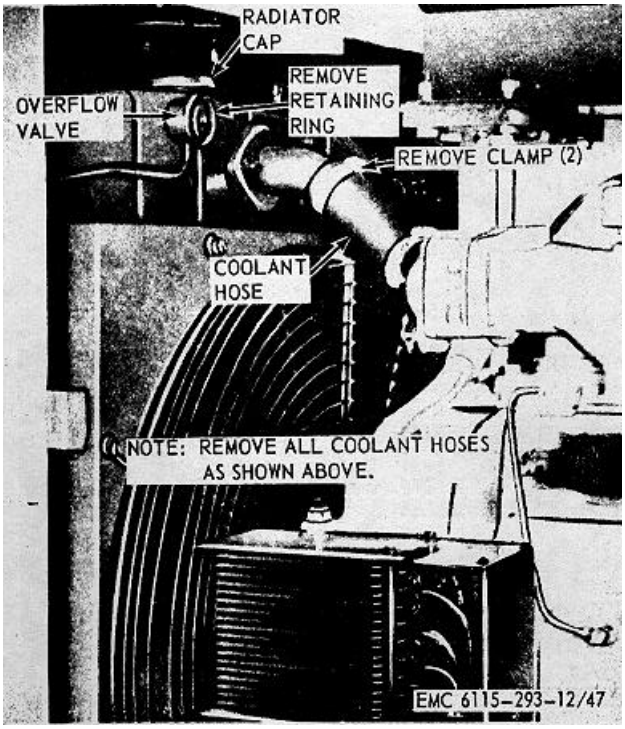


Figure 47. Radiator cap, overflow valve, and hose, removal and installation.

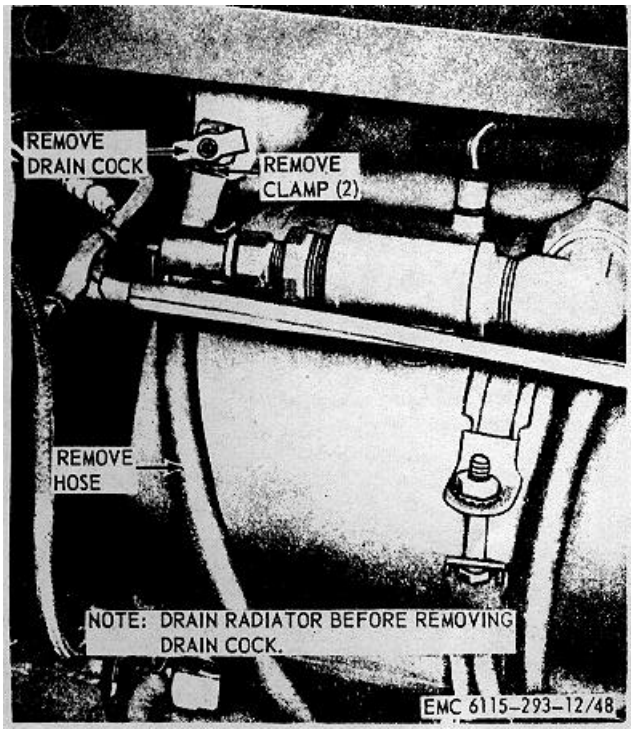


Figure 48. Radiator draincock, remove and installation.

94. Thermostat Bypass Check Valve

a. Remove and install the fall belt guard (par. 96).

b. Drain the cooling system (par. 93).

c. Remove and install the thermostat bypass check valve as shown by figure .19.

d. Clean and inspect.

95. Water Outlet Manifold, Thermostat and Housing, and Shutoff Valve

a. Remove and install the exhaust manifold and muffler (para. 74).

b. Disconnect the thermostat bypass tube from the thermostat bypass check valve (para. 94).

c. Remove and install the water outlet manifold, thermostat and housing, and shutoff valve as shown by figure 50.

d. Clean and inspect.

e. Test the thermostat for proper opening by submerging it in a container of water. Position a thermometer in the water and heat the container. When the thermometer indicates between 165°F. and 170° F., the thermostat should start to open and should be completely open when the temperature reaches 185° F. to 190° F. Remove the thermostat from the water. The cooler surrounding air should cause a pronounced closing action and the unit should be completely closed within a short time.

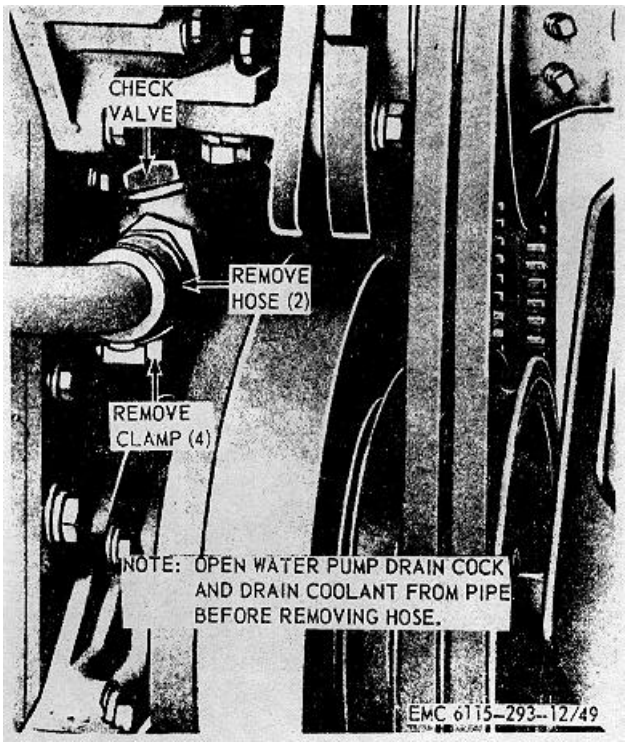


Figure 49. Thermostat bypass check valve, removal and installation.

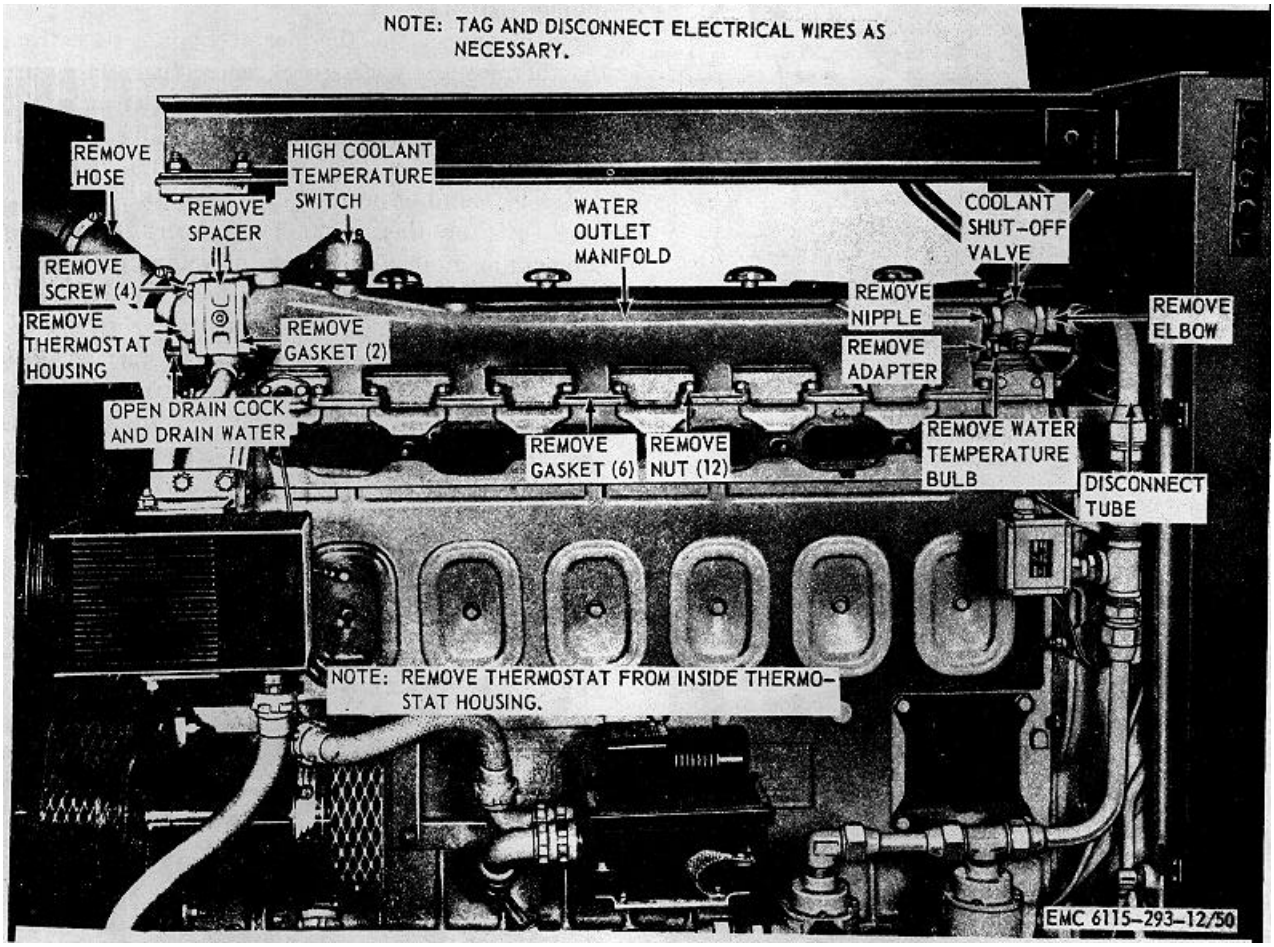
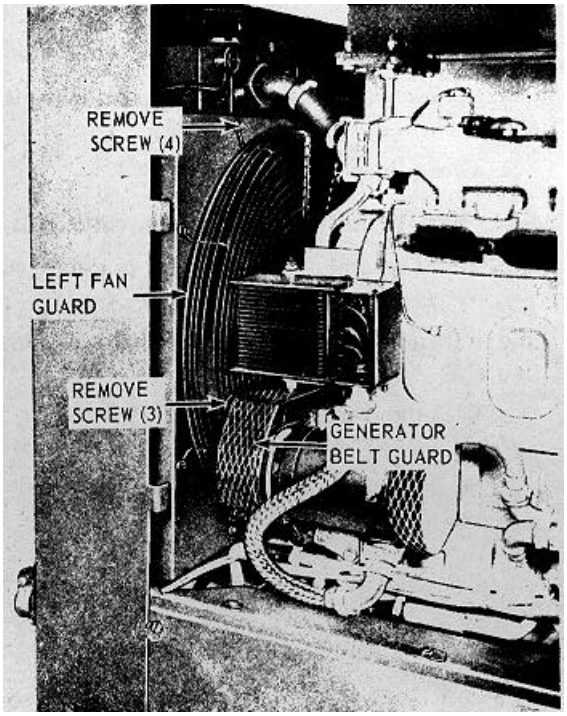
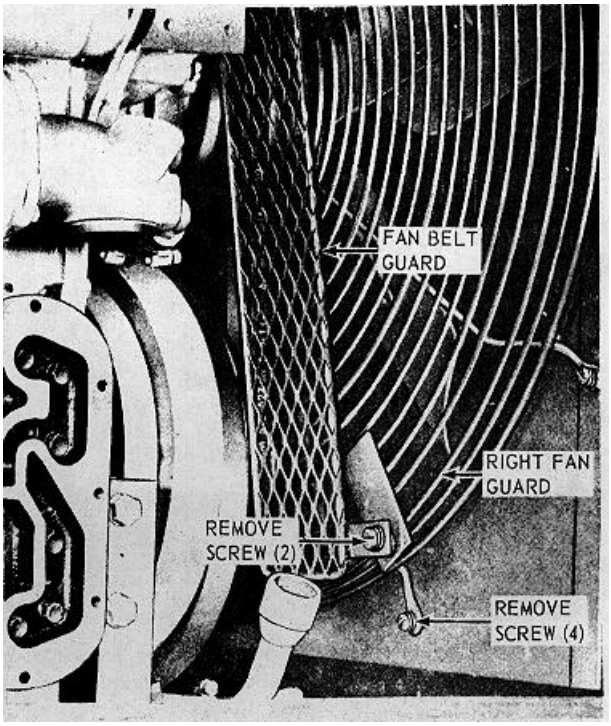


Figure 50. Water outlet manifold, thermostat and housing, high coolant temperature switch, shutoff valve, and water temperature bulb, removal and installation.



A. GENERATOR AND LEFT FAN GUARDS.



B. FAN AND FAN BELT GUARDS.

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Figure 51. Fan and belt, guards, removal and installation.

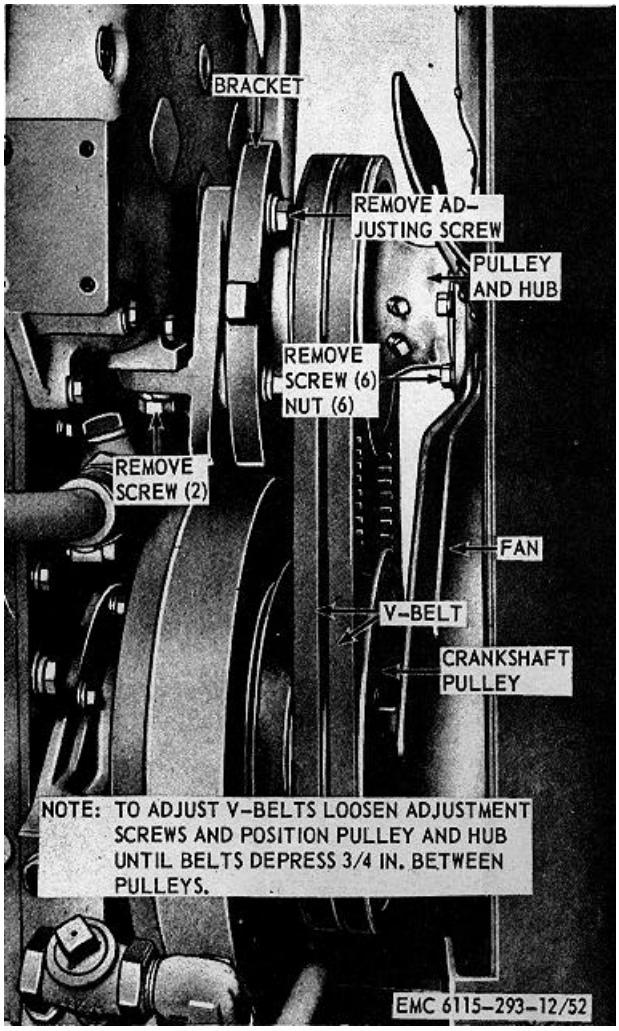


Figure 52. Fan V-belts, fan, pulley and hub, bracket, and support, removal, installation, and V-belt adjustment.

f. Should the generator set cease operation due to an overheat condition caused by a defective cooling system thermostat, remove the thermostat (*b* above) and operate the engine without the thermostat.

96. Fan and Belt Guards

a. Remove and install the fan and belt guards as shown by figure 51.

b. Clean, inspect, and repair.

97. Fan V-Belts, Fan, Pulley, and Hub

a. Remove and install the fan guards (par. 96).

b. Remove and install the fan V-belts, fan, pulley, and hub and adjust the fan V-belts as shown by figure 52.

c. Clean and inspect.

Section X. ENGINE ELECTRICAL SYSTEM

98. General

The engine electrical system consists of two 12-v, dc (direct current) batteries, a 28-v, dc battery charging generator of the alternator type, a 24-v, dc starter, a 28-v, dc rectifier, a starter solenoid relay, a 28-v, dc carbon pile generator regulator, and the necessary wiring and connections In addition, provisions are made to use 24-v, dc power from an external source or to provide 24-v ,dc power to an external source.

99. Battery-Charging Receptacle

a. Remove and install the battery-charging receptacle as shown by figure 53.

b. Clean and inspect.

100. Batteries, Cables, and Trays

a. Remove and install the batteries as shown by figure 54.

b. Remove and install the battery cables and trays as shown by figure 55.

c. Clean, inspect, and repair.

101. Starter and Solenoid Relay

a. Refer to figure 56 and perform the starter and solenoid relay on-engine testing.

b. Remove and install the starter and solenoid relay as shown by figure 57.

c. Clean and inspect.

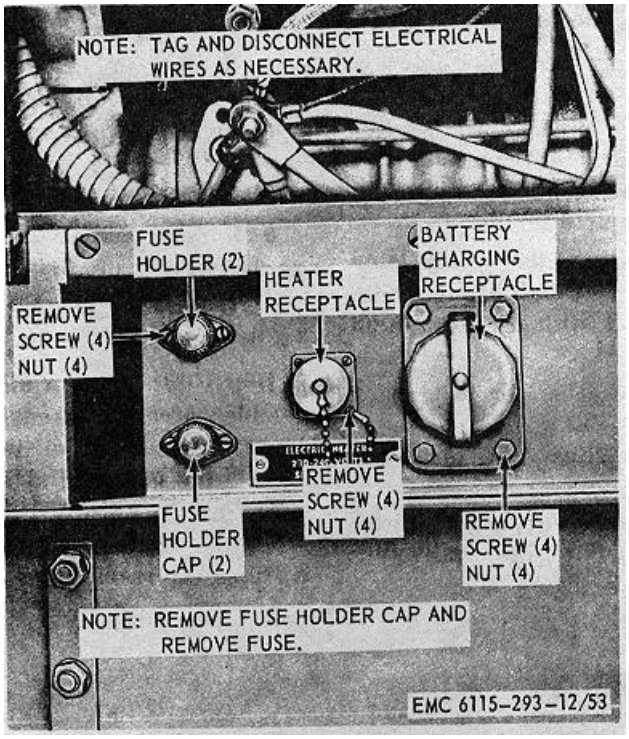
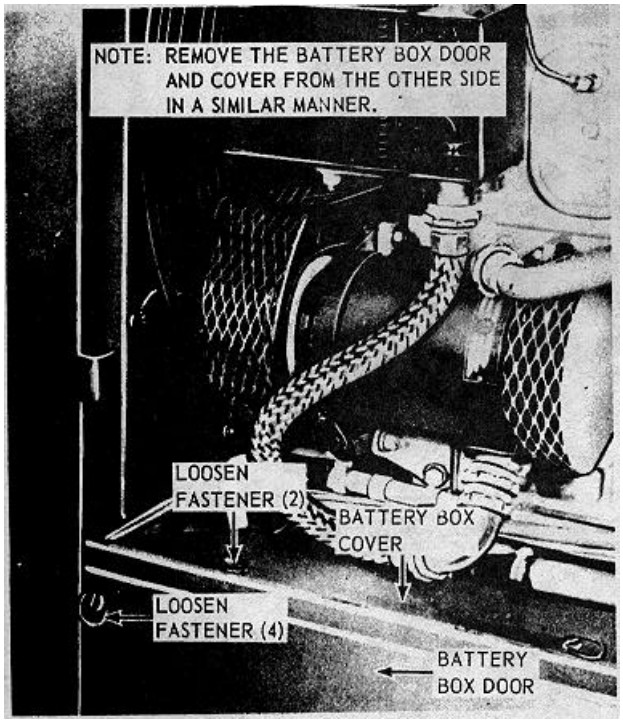
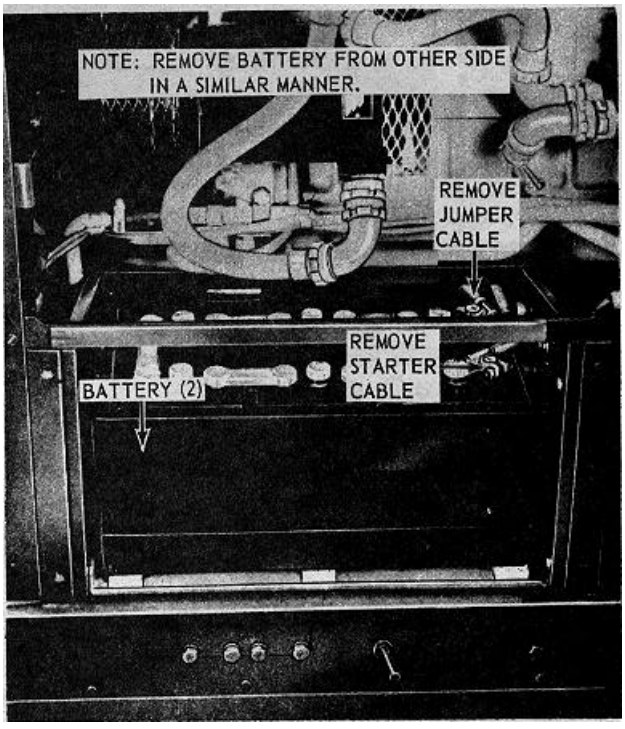


Figure 53. Battery-charging receptacle and paralleling receptacle connector fuses, and fuse holders, removal and installation.



A. BATTERY BOX COVER AND DOOR.



B. BATTERIES.

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Figure 54. Batteries, removal and installation.

102. Generator V-Belts, Generator, Adjusting Straps, and Bracket

a. To test stator winding continuity, without removing generator, position the prods of a 110-v test lamp across the A-B, B-C, and A-C connector pins of the battery-charging cable connector (fig. 58). Each test should show a complete circuit.

Warning

Exercise care in the use of test lamp circuits of 110 volts or higher. Death by electrocution can result from contact with the test lamp circuit or the circuit under test.

b. Remove and install the generator belt guard (para. 96).

c. Remove, install, and adjust the generator V-belt as shown by figure 58.

d. Remove, disassemble, reassemble, and install generator, pulley, generator fan guard, adjusting strap, and bracket as shown by figure 59.

e. Clean, inspect, and repair.

103. Generator Regulator and Bracket

a. Remove and install the generator regulator and bracket as shown by figure 60.

b. Clean and inspect.

104. Rectifier and Brackets

a. Remove and install the rectifier and brackets as shown by figure 61.

b. Test the rectifier for defective circuits as shown by figure 62.

Warning

When a malfunction of the selenium rectifier occurs, thoroughly ventilate the area to prevent inhalation or poisonous fumes. Do not handle the damaged selenium rectifier. Selenium oxide may be absorbed through the skin, especially when the rectifier is hot. Failure to observe this warning can result in severe illness or death.

c. Clean and inspect.

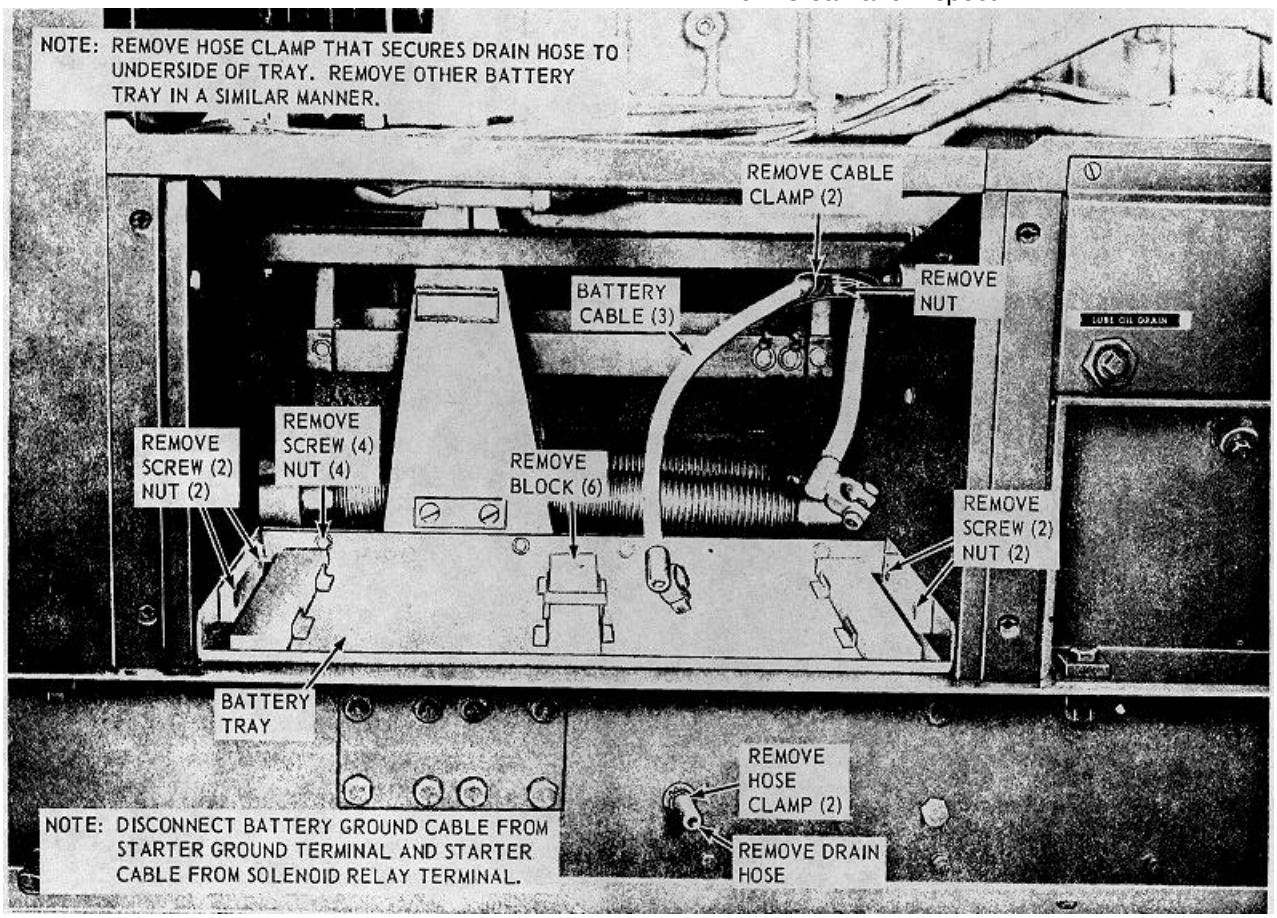

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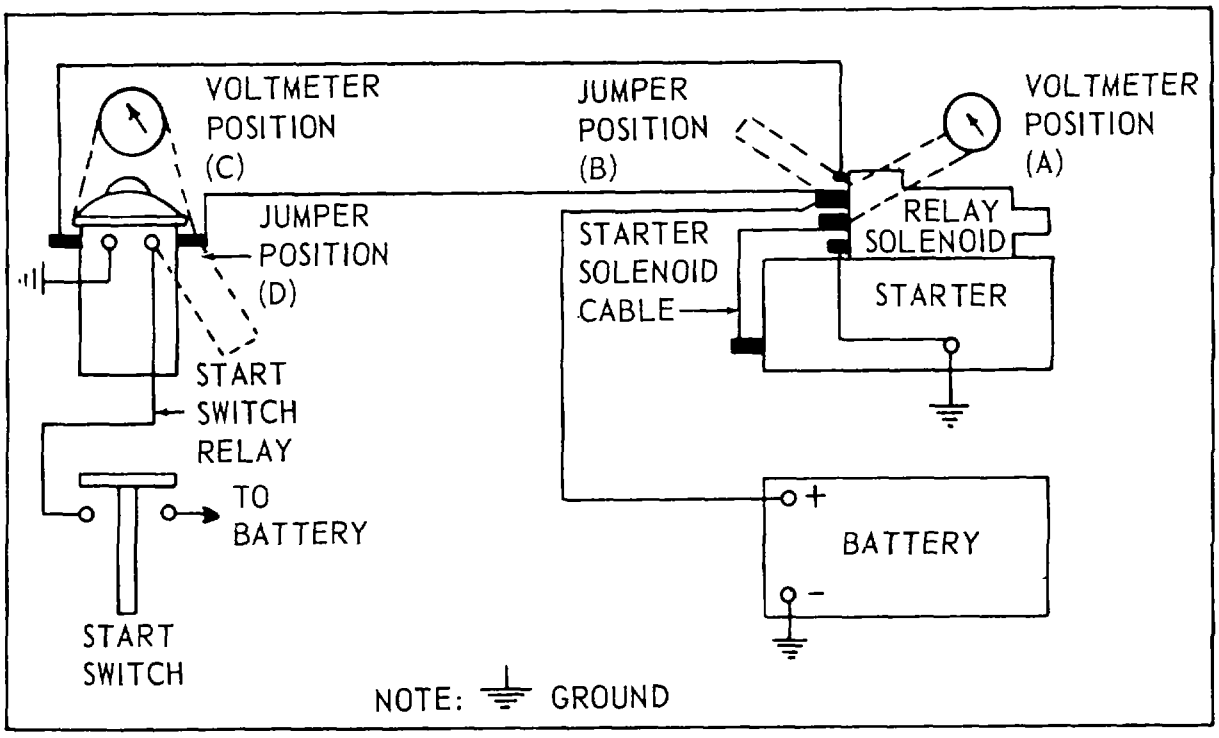
Figure 55. Battery cables and trays, removal and installation.



STEP 1. DETERMINE THAT BATTERY IS FULLY CHARGED AND THAT ALL BATTERY AND STARTER CABLES ARE SERVICABLE AND PROPERLY INSTALLED.

STEP 2. REMOVE STARTER SOLENOID CABLE. CONNECT A VOLTMETER AS SHOWN AT POSITION A ABOVE. IF VOLTAGE IS INDICATED, STARTER RELAY IS DEFECTIVE AND MUST BE REPLACED.

STEP 3. INSTALL THE STARTER SOLENOID CABLE. WITH THE VOLTMETER INSTALLED AS IN POSITION A ABOVE, BATTERY VOLTAGE (24-V) MUST BE INDICATED. IF NOT, THE STARTER IS DEFECTIVE AND MUST BE REPLACED.

STEP 4. WITH THE VOLTMETER CONNECTED AS IN POSITION A ABOVE, MOMENTARILY CONNECT A JUMPER WIRE AS IN POSITION D ABOVE. THE VOLTMETER SHOULD DROP TO ZERO AND THE STARTER SHOULD CRANK THE ENGINE. IF VOLTMETER DOES NOT DROP TO ZERO, STARTER SOLENOID IS DEFECTIVE AND MUST BE REPLACED. IF THE VOLTMETER DROPS TO ZERO BUT STARTER FAILS TO CRANK ENGINE, STARTER IS DEFECTIVE AND MUST BE REPLACED.

STEP 5. REMOVE THE JUMPER WIRE FROM POSITION D ABOVE AND INSTALL THE VOLTMETER AT POSITION C ABOVE. BATTERY VOLTAGE WILL BE INDICATED. MOMENTARILY CONNECT A JUMPER WIRE AS SHOWN AT POSITION D ABOVE. THE VOLTMETER SHOULD DROP TO ZERO. IF NOT, THE START SWITCH RELAY IS DEFECTIVE AND MUST BE REPLACED.

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Figure 56. Starter and solenoid relay, on-engine testing.

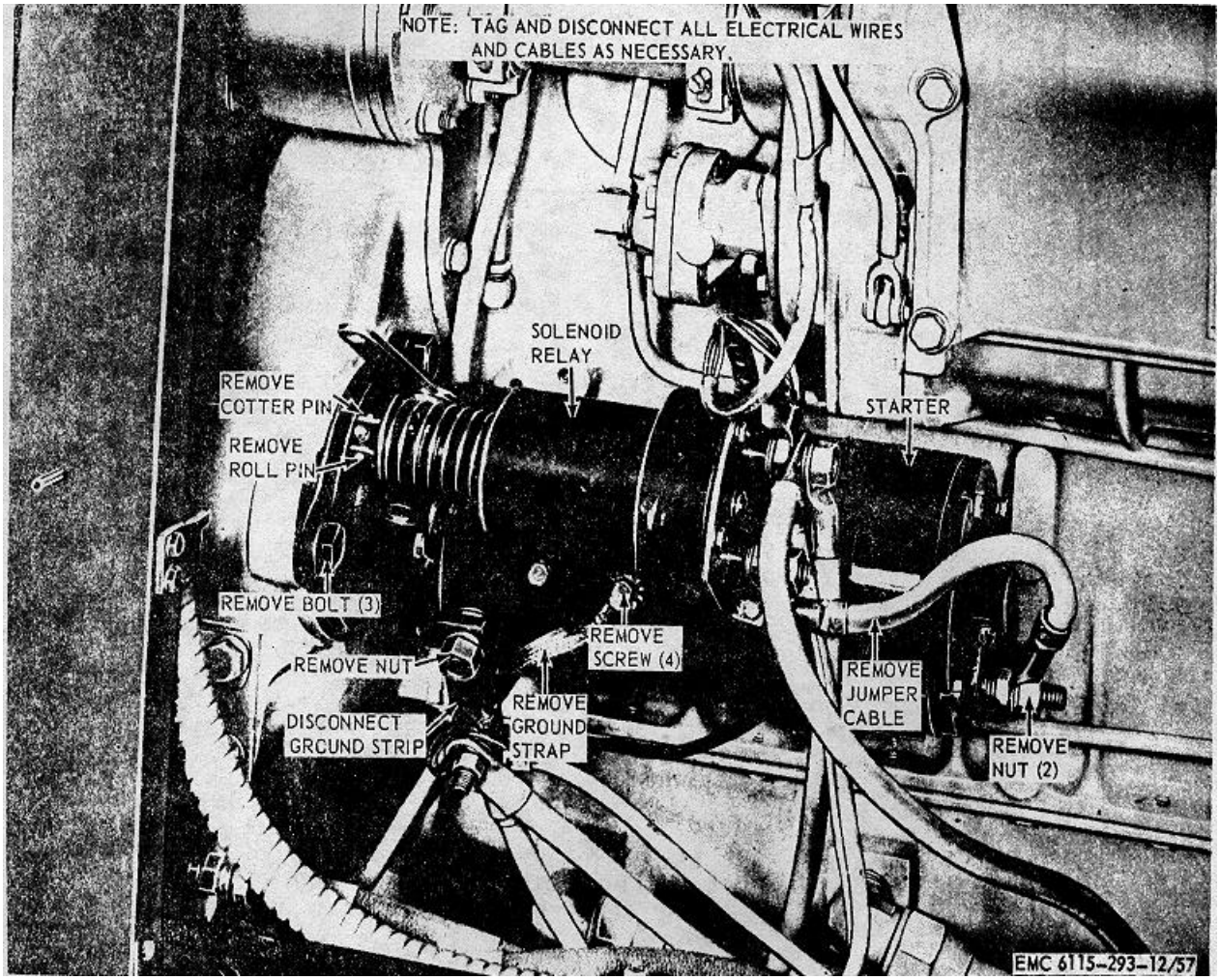


Figure 57. Starter and solenoid relay, removal and installation.

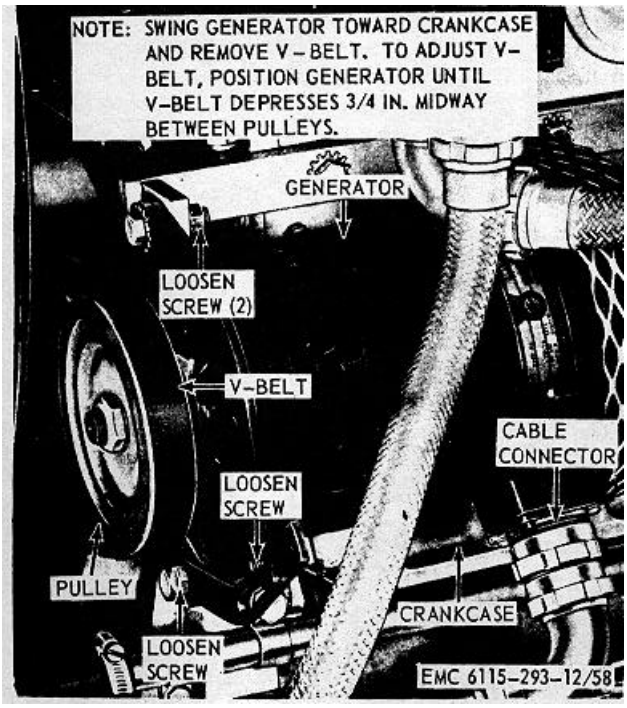


Figure 58. Generator V-belt, removal, installation, and adjustment.

105. Fuel Pressure Switch

a. Remove and install the fuel pressure switch as shown by figure 33.

b. Clean and inspect.

c. To test remove the fuel pressure switch as in a above. Connect a source of air pressure to the switch. Connect a multimeter across the switch terminals and slowly increase the air pressure. The switch, which is normally open, should close at 20 psi (pounds per square inch). Slowly decrease the air pressure. The switch should open at 20 psi. Should the switch fail to open or close, the switch is defective and must be replaced.

106. Engine Shutdown Solenoid

a. Remove and install the engine shutdown solenoid as shown by figure 63.

b. Clean and inspect.

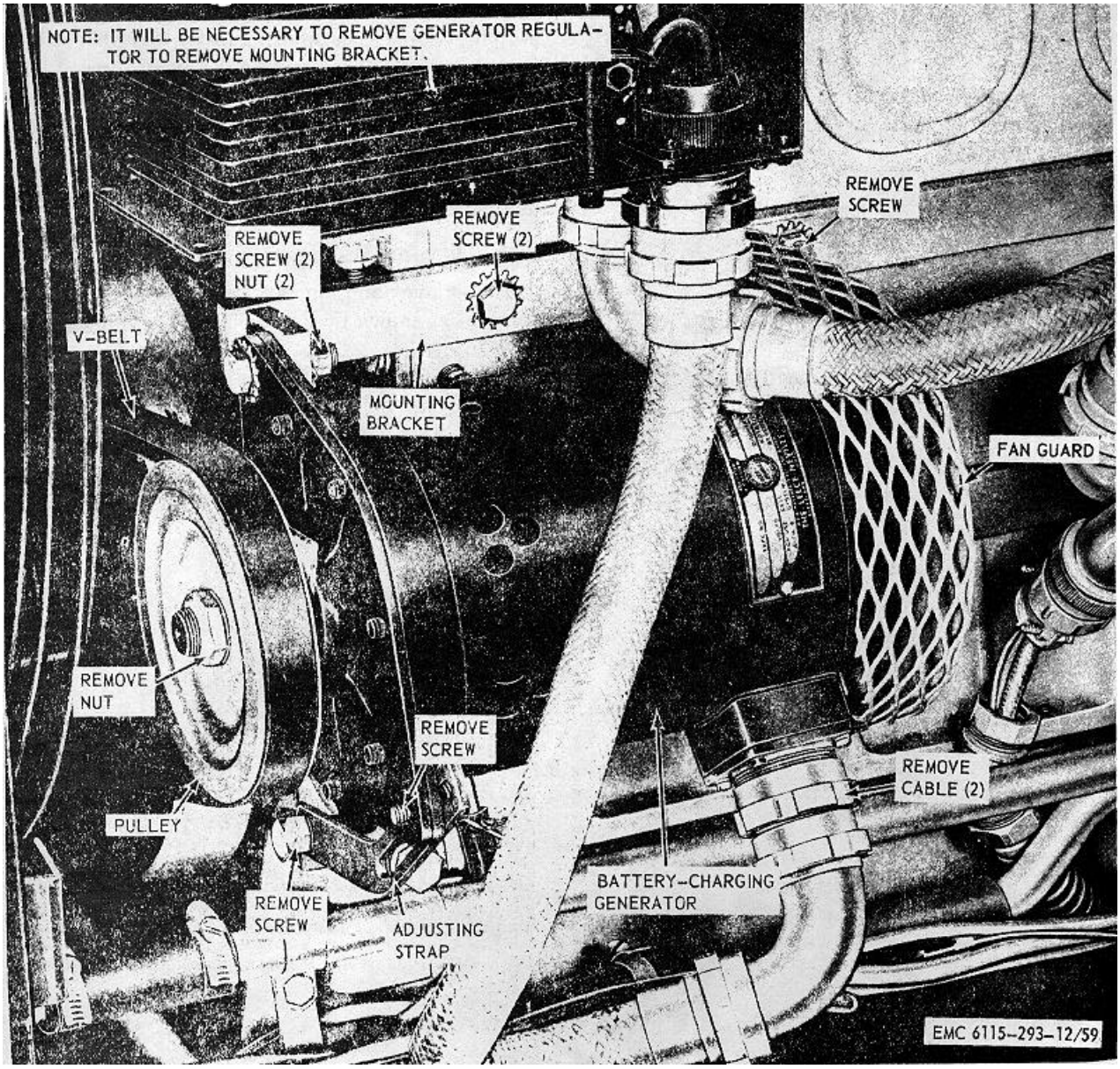


Figure 59. Generator, pulley, fan guard, adjusting strap, and bracket, removal, disassembly, reassembly, and installation.

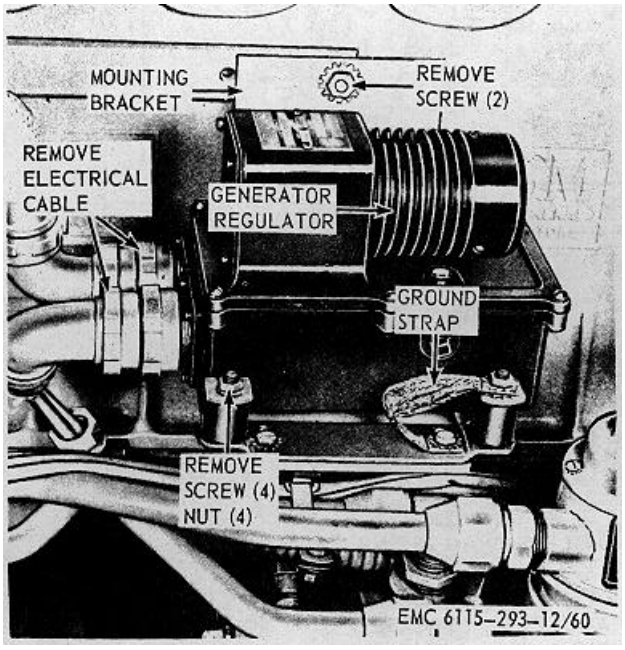


Figure 60. Generator regulator and bracket, removal and installation.

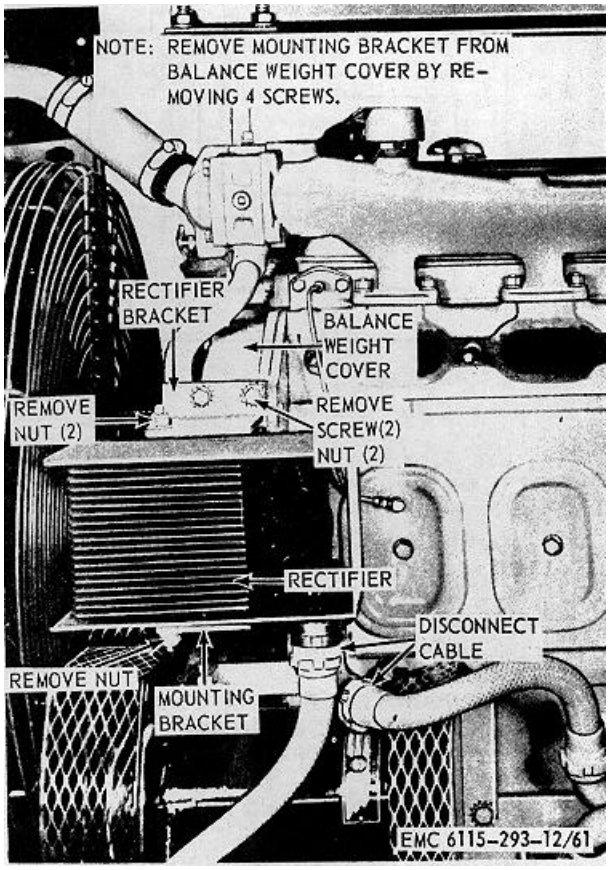
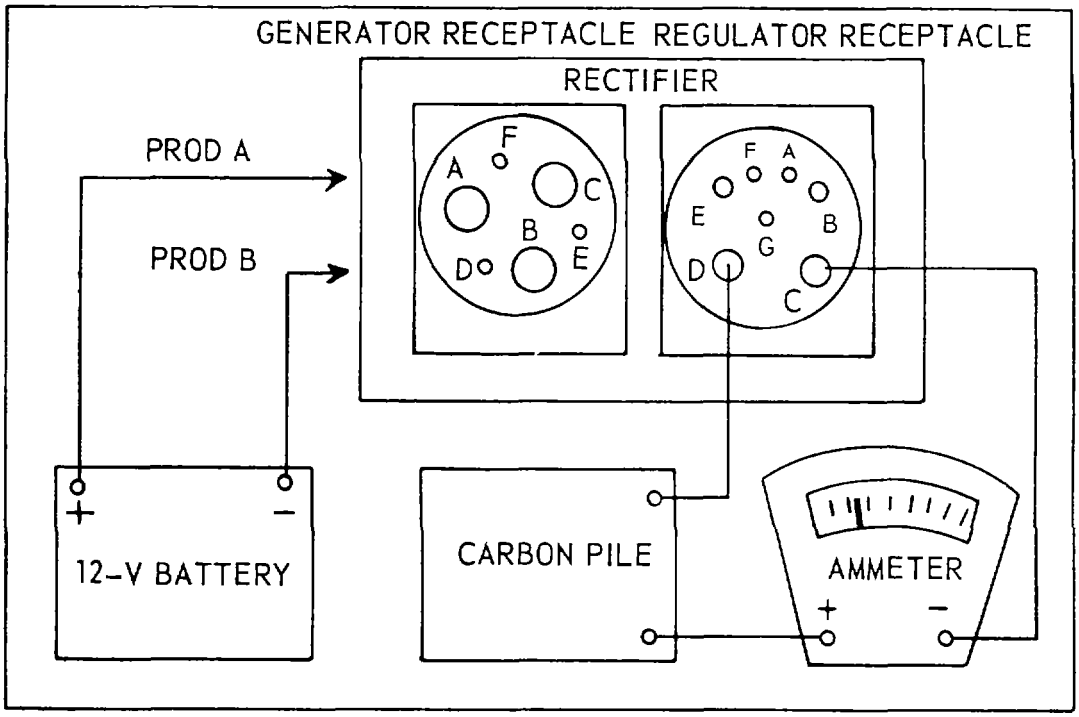


Figure 61. Rectifier and brackets, removal and installation.



STEP 1. DETERMINE THAT THE GENERATOR IS FUNCTIONING PROPERLY (PARA. 101).

STEP 2. REMOVE THE RECTIFIER FROM THE ENGINE (FIG. 61).

STEP 3. SET UP A TEST CIRCUIT AS SHOWN ABOVE.

NOTE

USE AN AMMETER WITH A SCALE OF NOT LESS THAN 25 AMPS.

STEP 4. TOUCH TEST PROD (A) TO GENERATOR CONNECTOR PIN A AND PROD(B)TO PIN B; ADJUST CARBON PILE UNTIL AMMETER INDICATES 25 AMPERES. REVERSE PRODS TOUCHING PROD(A) TO PIN B AND PROD(BITO PIN A; AMMETER SHOULD AGAIN INDICATE 25 AMPERES.

STEP 5. TEST PINS B-C AND PINS B-A AS IN 4 ABOVE.

STEP 6. AMMETER READINGS SHOULD NOT VARY MORE THAN 5 AMPERES IN ANY OF THE ABOVE TESTS. IF THE VARIATION IN READINGS EXCEEDS 5 AMPERES, THE RECTIFIER IS FAULTY AND MUST BE REPLACED.

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Figure 62. Rectifier testing instructions.

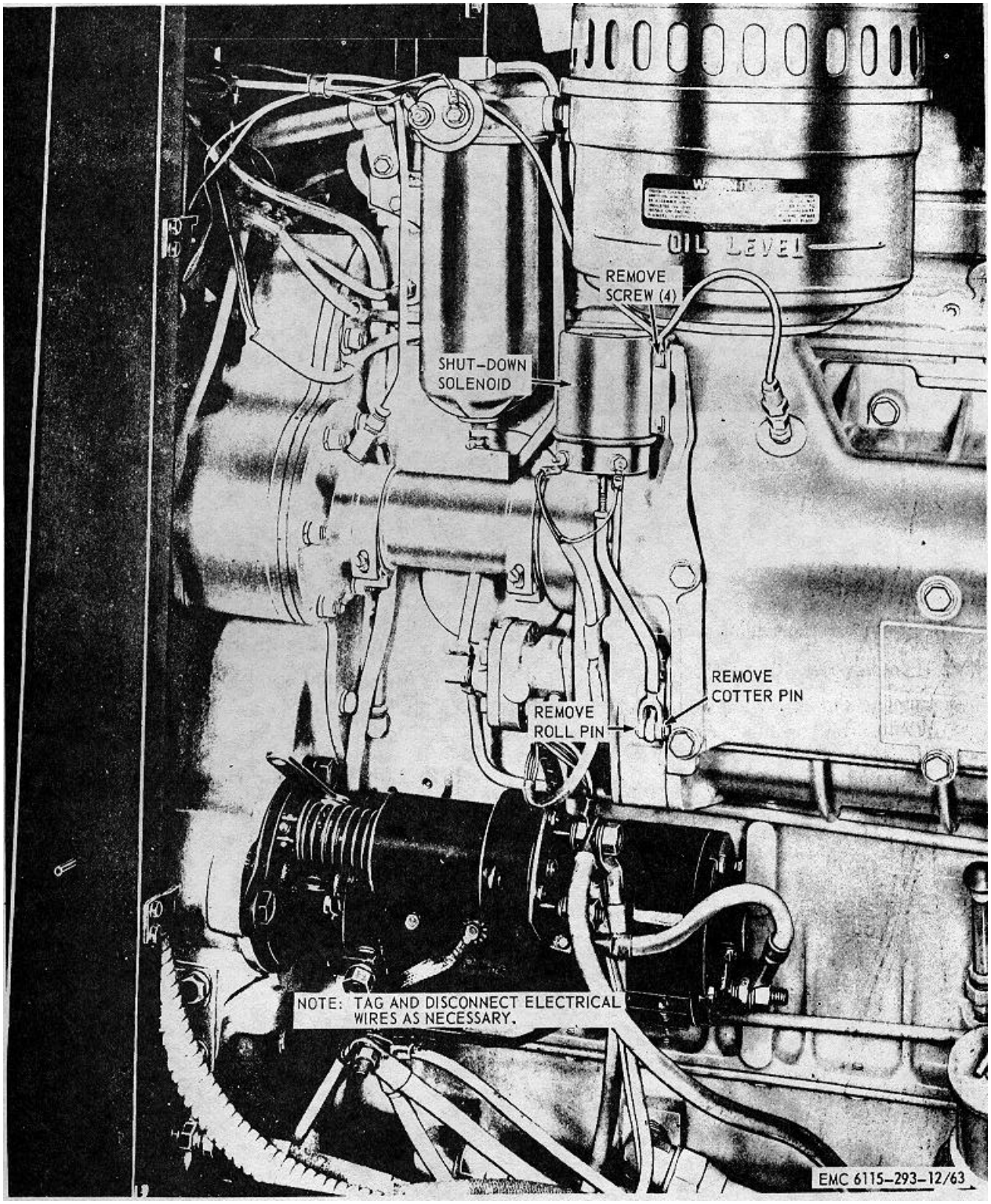


Figure 63. Engine shutdown solenoid, removal and installation.

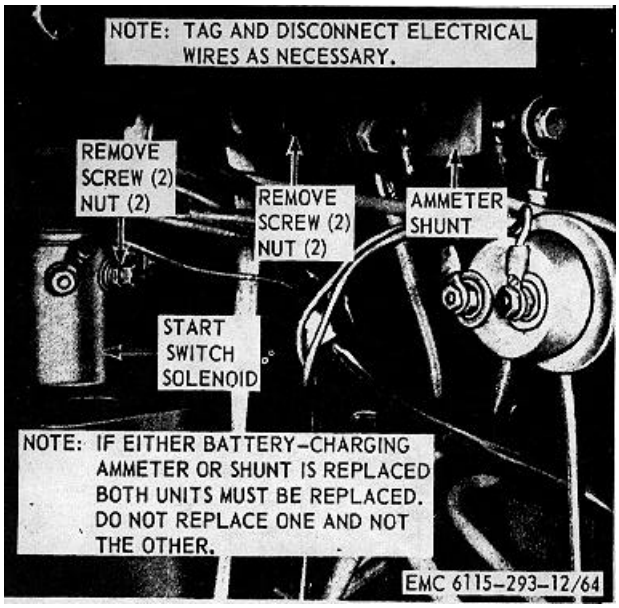


Figure 64. Engine start switch solenoid and battery-charging ammeter shunt, removal and installation.

c. To test the shutdown solenoid, operate the engine at idle speed. Place a jumper wire across the terminals of the high coolant temperature switch (fig. 50). The shutdown solenoid (fig. 63) should actuate to close the air box damper. If the solenoid fails to actuate. it is defective and must be replaced.

107. Engine Start Switch Solenoid and Battery-Charging Ammeter Shunt

a. Remove and install the engine start ,switch solenoid and battery-charging ammeter shunt as shown by figure 64.

b. Clean and inspect.

Section XI. ENGINE

108. General

This section will cover the various components and accessories of the engine not previously covered.

109. Rocker Arm Cover

a. Remove and install the air cleaner (para. 80).

b. Remove and install the rocker arm cover as shown by figure 65.

c. Clean and inspect.

110. Rocker Arms

a. Remove the rocker arm cover (para. 109).

b. Adjust the rocker arms as shown by figure 66.

c. Clean and inspect.

111. Engine Breather Pipe

a. Remove and install the engine breather pipe as shown by figure 65.

b. Clean and inspect.

112. Air Box Drain Hoses and Fittings

a. Remove and install the air box drain hoses and fittings as shown by figure 67.

b. Clean and inspect.

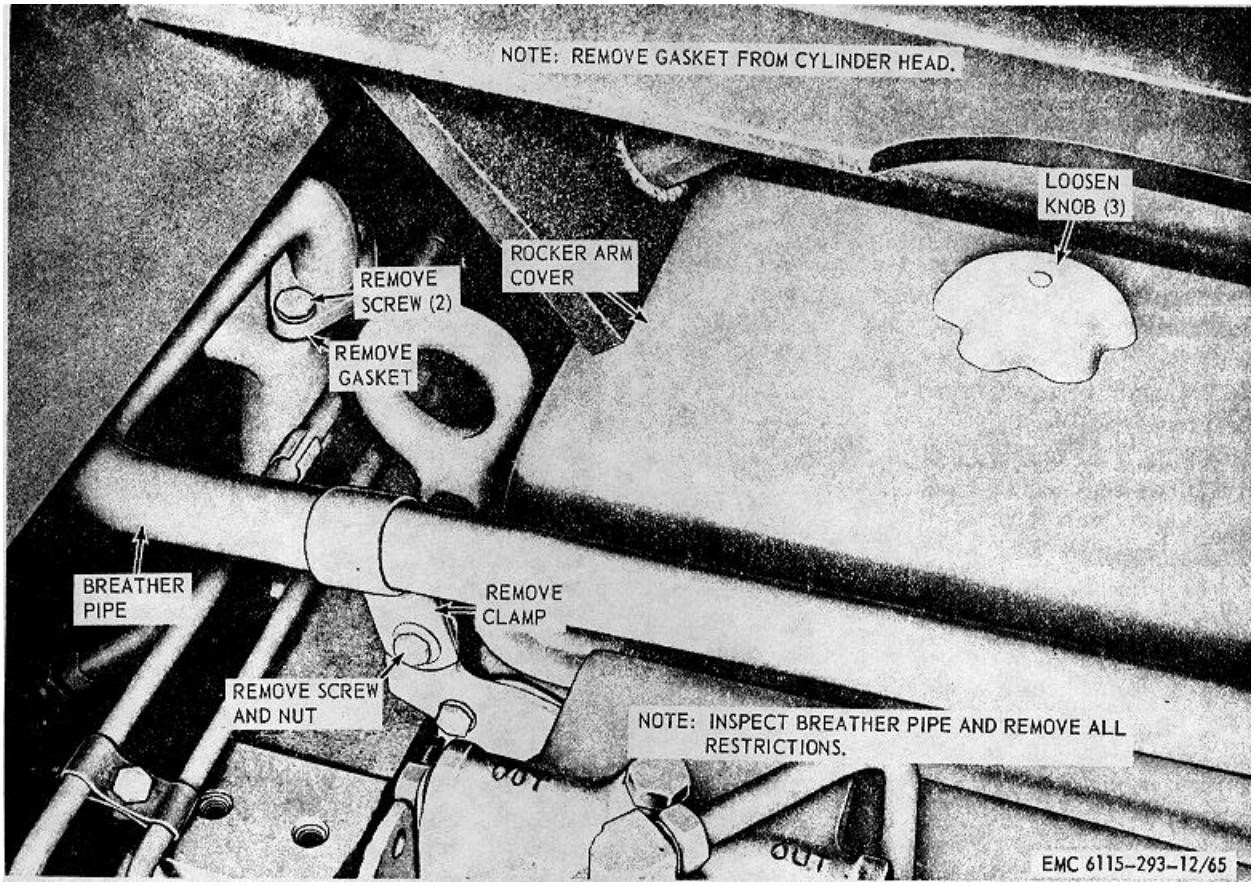
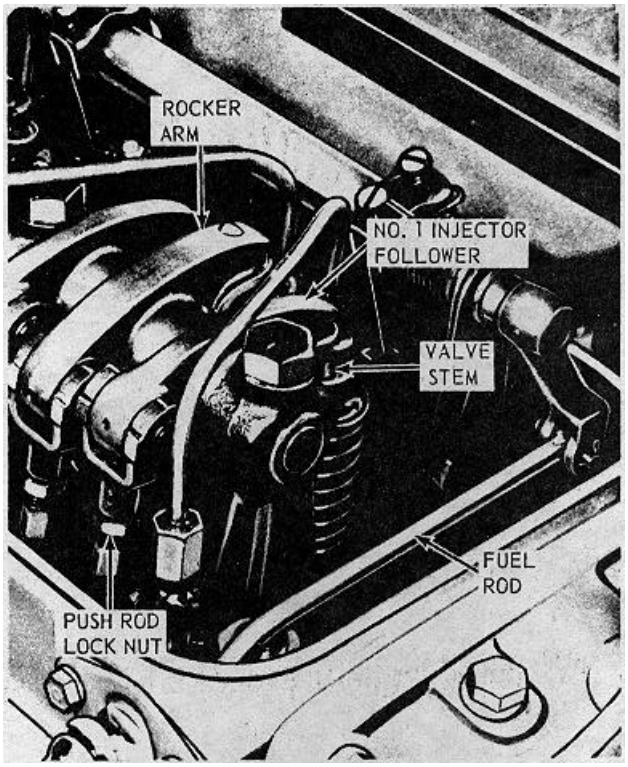


Figure 65. Rocker arm cover and engine breather pipe, removal and installation.



STEP 1. MOVE FUEL ROD TO NO FUEL POSITION.
STEP 2. TURN ENGINE CRANKSHAFT IN DIRECTION OF ENGINE ROTATION UNTIL INJECTOR FOLLOWER FOR NO. 1 CYLINDER IS FULLY DEPRESSED.
STEP 3. LOOSEN THE PUSH ROD LOCK NUT.
STEP 4. INSERT A FEELER GAGE BETWEEN VALVE STEM AND ROCKER ARM. THE CLEARANCE SHOULD BE 0.010 IN. ADJUST PUSH ROD UNTIL A SMOOTH PULL IS OBTAINED AS THE FEELER GAGE IS WITHDRAWN.
STEP 5. TIGHTEN PUSH ROD LOCK NUT AND RECHECK THE CLEARANCE.
STEP 6. ADJUST REMAINING VALVES AS IN 1 THROUGH 6 ABOVE.

Figure 66. Rocker arm adjustment.

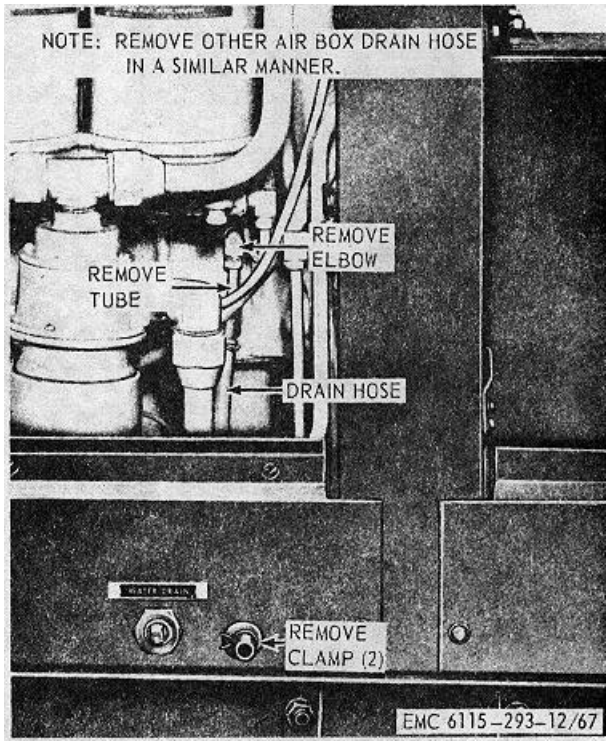


Figure 67. Air box drain hoses and fittings, removal and installation.

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Section XII. MAIN GENERATOR

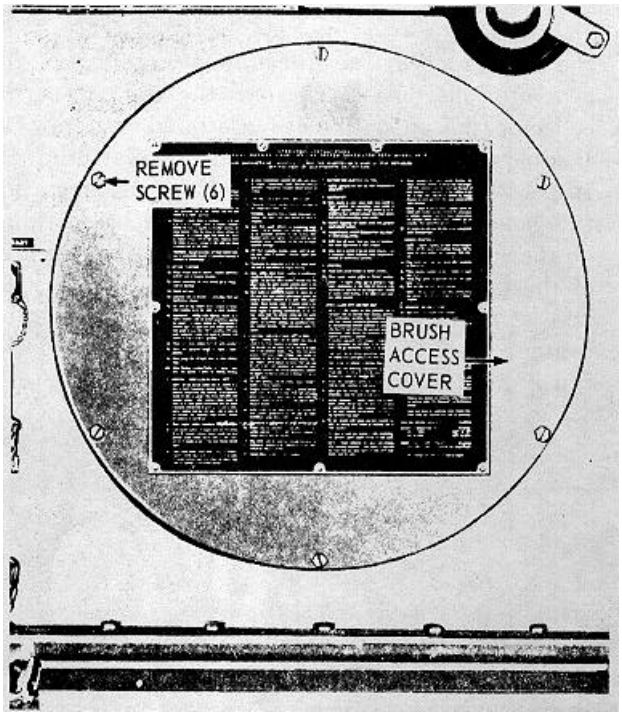
113. General

This unlit is equipped with 100 kw, 3-phase, 50/60 cycle, revolving-field, alternator-type generator. It is a self-ventilating unit utilizing surrounding air. The rotor of the main generator is attached through the fan and driving disk to the engine flywheel. The generator brushes are accessible through the brush access door at the rear of the unit.

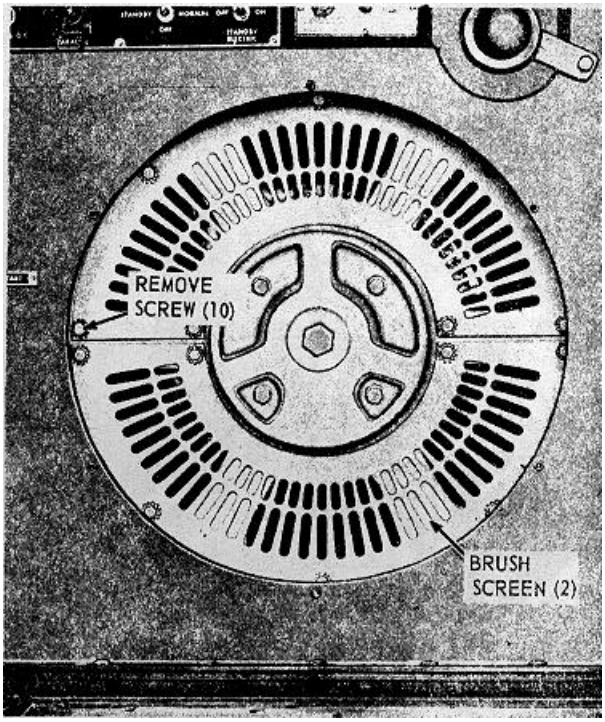
114. Generator Brushes, Brush Holders, Access Panel, and Screens

a. Removal and Installation. Remove and install the brushes, access panel, and screens as shown by figure 68.

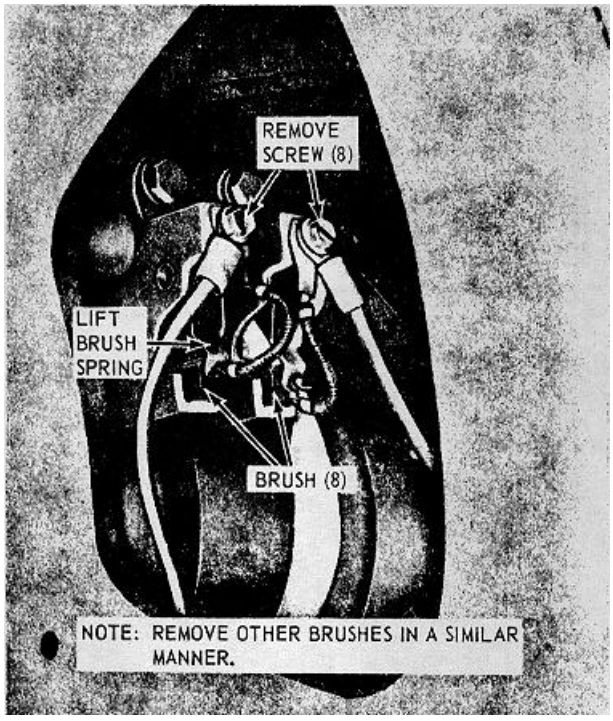
b. Seating New Brushes. Do not permit brushes to become worn shorter than three-quarters of an inch; damage to the sliprings may result. When brushes have been replaced, it is important that they be properly seated to the contour of the sliprings. To correctly seat a brush, insert a strip of No. OOO sandpaper, approximately 1 by 12 inches, between the brush and slipring, with the abrasive side toward the brush. Do not use emery cloth. With the brush in its holder, under pressure, withdraw



STEP 1. REMOVE BRUSH ACCESS COVER.



STEP 3. REMOVE GENERATOR BRUSHES.



STEP 2. REMOVE BRUSH SCREENS.

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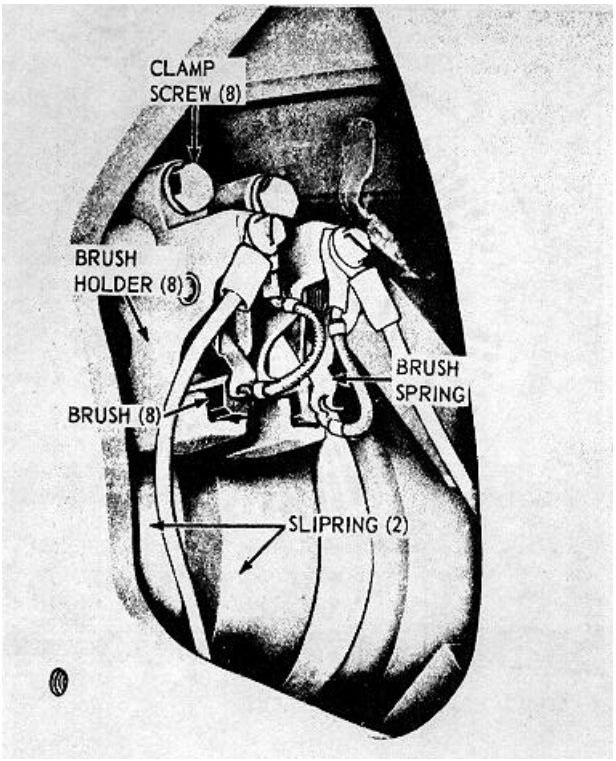
Figure 68. Generator brushes, access panel, and screens, removal and installation.



STEP 1. LOOSEN CLAMP SCREW.
STEP 2. CENTER BRUSH HOLDER SO THAT BRUSH WILL RIDE IN CENTER OF ITS SLIPRING.
STEP 3. USE A SPRING SCALE AND MEASURE AMOUNT OF PULL NEEDED 0TO LIFT BRUSH SPRING FROM ITS BRUSH. ADJUST BRUSH HOLDER UNTIL 8 TO 10 OUNCES OF PULL ARE NEEDED.
STEP 4. TIGHTEN CLAMP SCREW AND REMEASURE.
STEP 5. ADJUST OTHER BRUSH HOLDERS AS IN 1 THROUGH 4 ABOVE.

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Figure 69. Generator brush holder adjustment.

the sandpaper in the direction of rotation of the generator, keeping it close to the contour of the collector ring. Continue to insert and withdraw the sandpaper until the brush appears to seat properly. Inspect the brush for proper seating by operating the generator set at no-load with the brush riding on the slipring. Stop the unit and observe the area of the brush polished by the slipring. At least 80 percent of the brush area should appear polished by contact with the slipring. Continue to sand the brush until the brush is seating properly.

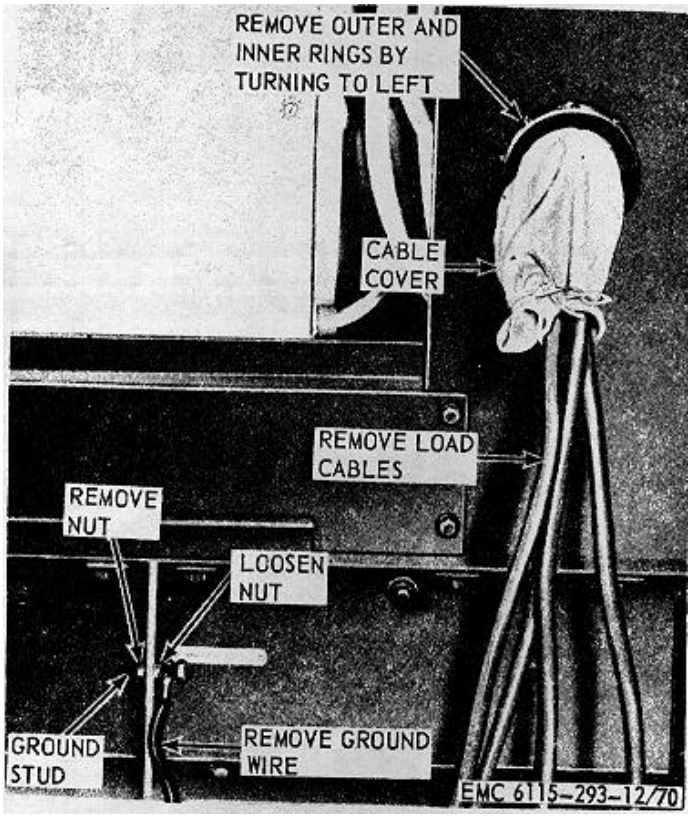

Figure 70. Ground stud and cable cover, removal and installation.

Note

If the sliprings appear to be rough or dirty, they may be polished with No. 000 sandpaper or a suitable polishing stone. Do not use emery cloth. If defects can not be removed in this manner, report the condition to field maintenance.

c. *Brush Holders*. Adjust the generator brush holders as shown by figure 69.

d. Clean. Clean and inspect.

115. Ground Stud and Cable Cover

a. Remove and install the ground stud and cable cover as shown by figure 70.

b. Clean and inspect.

116. Paralleling Receptacle Connector, 24-Volt Receptacle, and Remote Srart Receptacle

a. Remove and install the paralleling receptacle connector, 24-v receptacle, and remote start receptacle as shown by figure 71.

b. Clean and inspect.

117. 115-v Receptacle, Fuses, and Fuse Holders

a. Remove and install the 115-v receptacle, fuse, and fuse holder as shown by figure 72.

b. Clean and inspect.

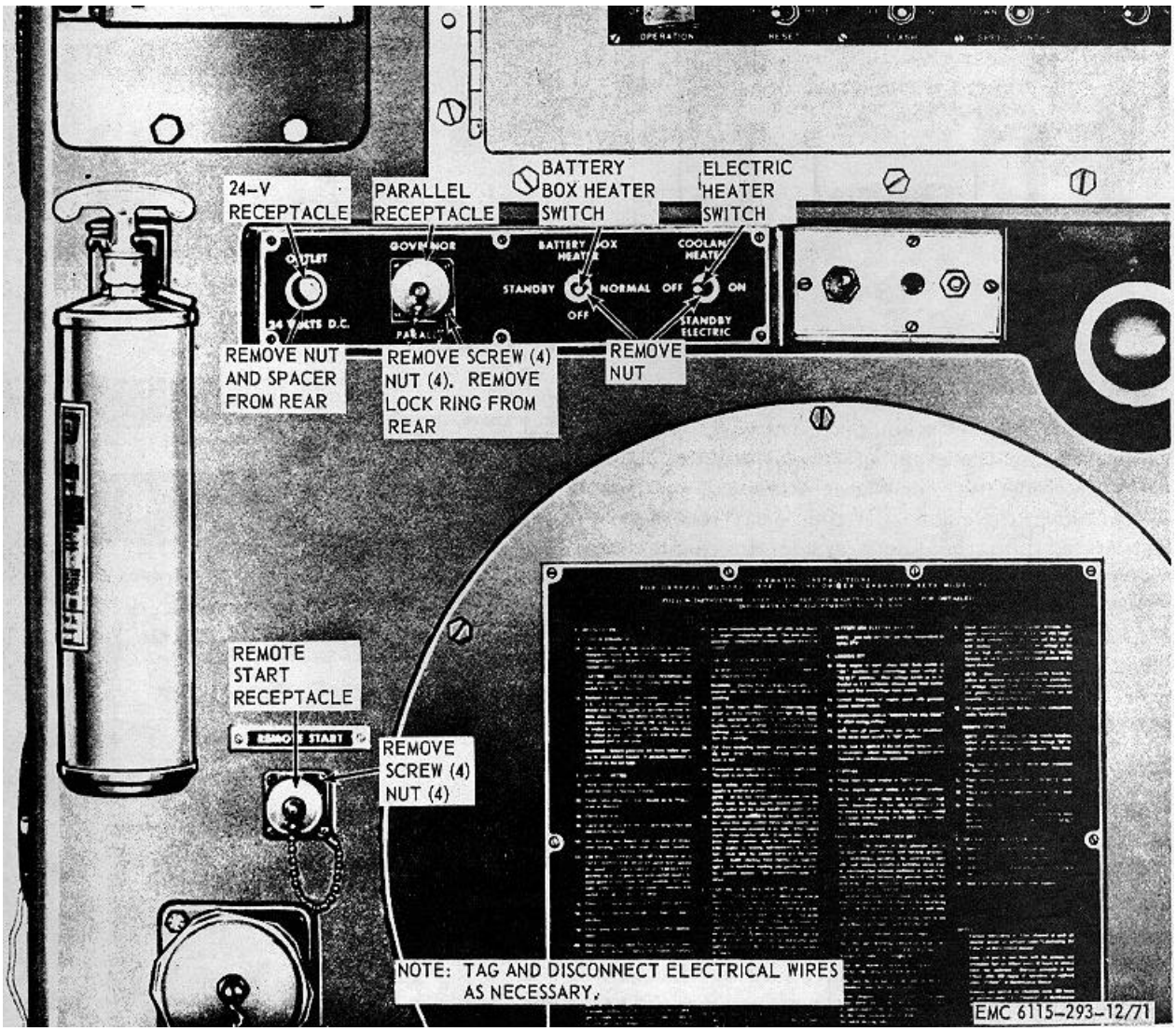

Figure 71. Paralleling receptacle connector, 204-v receptacle, remote start receptacle, and electric and battery box healer switches, removal and installation.

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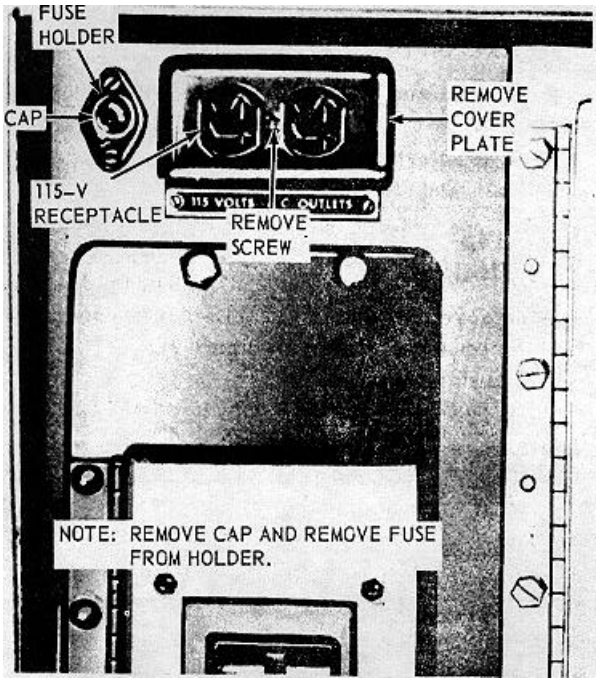
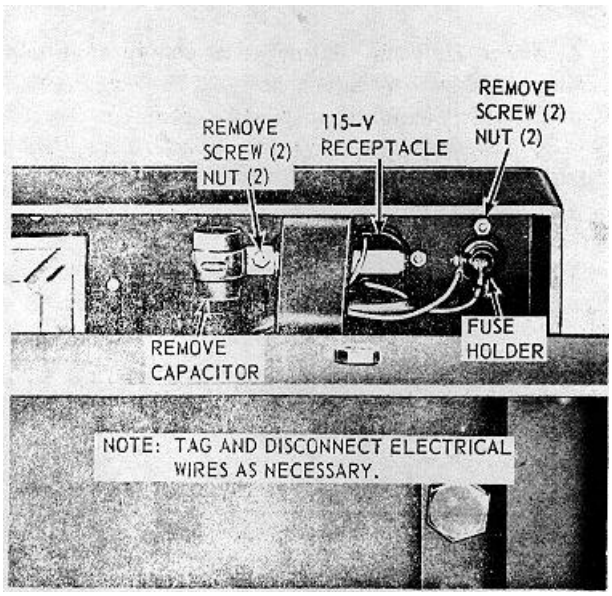


A. FRONT-VIEW.



B. REAR VIEW. EMC 6115-293-12/72

Figure 72. 115-v receptacle, fuse, and fuse holder, removal and installation.

Section XIII. SAFETY DEVICES

118. General

The generator set is equipped with safety devices which will, in the event of low oil pressure, high coolant temperature, or engine overspeed, function to shutdown the engine. A time delay relay is incorporated into the safety system to enable the engine to start by holding the safety shutdown components inoperative during the starting procedure. An emergency operation switch is also provided so that it is possible to override these safety devices, with the exception of the engine overspeed governor, and operate the generator set.

119. Low Oil Pressure Switch

a. Remove and install the low oil pressure switch as shown by figure 73.

b. Clean and inspect.

c. To test remove the low oil pressure switch as in a above. Connect a source of air pressure to the switch. Connect a multimeter across the two terminals and slowly increase the air pressure. The switch should open at 10 psi. Slowly decrease the air pressure. The switch should close at 10 psi. If the switch fails to open or close, the switch is defective and must be replaced.

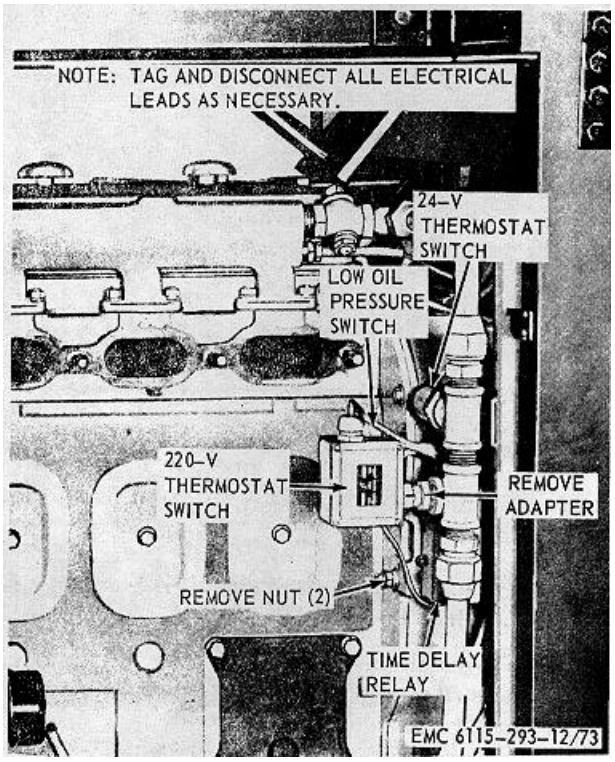


Figure 73. Low oil pressure switch, lime delay relay, and winterization system thermostat switches, removal and installation.

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d. Should the engine fail to start, or if it stops due to a defective low oil pressure switch, remove the switch as in a above and tape the two ends of the electrical leads. Operate the engine without the switch.

Caution

Should the engine be in operation and a low oil pressure condition develop, serious damage to the engine can result. Do not operate the engine without the low oil pressure switch unless absolutely necessary.

120. High Coolant Temperature Switch

a. Remove and install the high coolant temperature switch as shown by figure 50.

b. Clean and inspect.

c. To test remove the coolant temperature switch as in a above. Suspend the switch in water and connect a multimeter across the two terminals. Place a thermometer in the container of water and heat the water to 212° F. The switch, which is normally closed, should break the circuit at 212° F. Should the switch be open below 212° F. or should it fail to open when the temperature reaches 212° F., the switch is defective and must be replaced.

d. Should the engine fail to start or cease to operate due to a defective high coolant temperature switch, remove the switch as in a above. Tape the two electrical wires separately and operate the engine without the high coolant temperature switch.

Caution

In the event that the engine develops an overheat condition while the engine is operating without the high coolant temperature switch, serious damage to the engine may result.

121. Time Delay Relay

a. Remove and install the time delay relay as shown by figure 74.

b. Clean and inspect.

c. Test the time delay relay (fig. 73) with the engine at idle speed. Place a jumper wire across the terminals of the low oil pressure switch (fig. 73). In 3 to 5 seconds, the air box solenoid should actuate to close the air box damper.

Section XIV. WINTERIZATION SYSTEM

122. General

The generator set is equipped with both a gasoline and an electric winterization system. The gasoline winterization system consists of a gasoline heater, coolant pump, and the necessary controls. The electric winterization system consists of electric heaters, coolant pump, and the necessary controls. Electric heating elements are also provided for the battery compartment. Thermostat switches automatically control the two systems when used on standby. The electric winterization system will be used whenever a source of outside electrical power is available.

123. Heater Receptacle Connector, Fuses, and Fuse Holders

a. Remove and install the receptacle connector, fuses, and fuse holders as shown by figure 53.

b. Clean and inspect.

124. Winterization System Controls and Control Box

a. Remove and install the electric and battery box heater switches as shown by figure 71.

b. Remove and install the gasoline heater controls and control box as shown by figure 74.

c. Clean and inspect.

125. Winterization System Thermostat Switches

a. Remove and install the electric coolant heater and gasoline heater thermostat switches as shown by figure 73.

b. Remove and install the battery box and engine compartment thermostat switches as shown by figure 75.

c. Clean and inspect.

126. Battery Compartment Electric Heating Elements

a. Remove and install the batteries (para. 100).

b. Remove and install the battery compartment electric heating elements as shown by figure 75.

c. Clean and inspect.

127. Gasoline Heater Safety Relief Valve

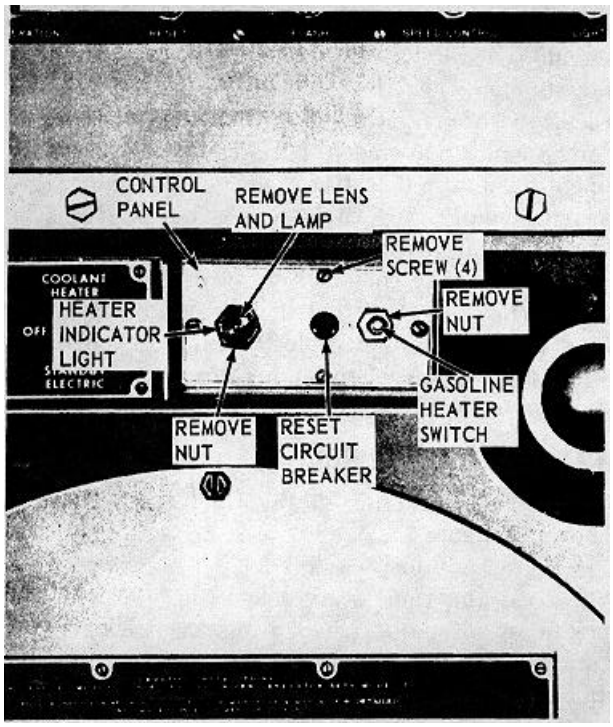
a. Remove and install the gasoline heater safety relief valve as shown by figure 76.

b. Clean and inspect.

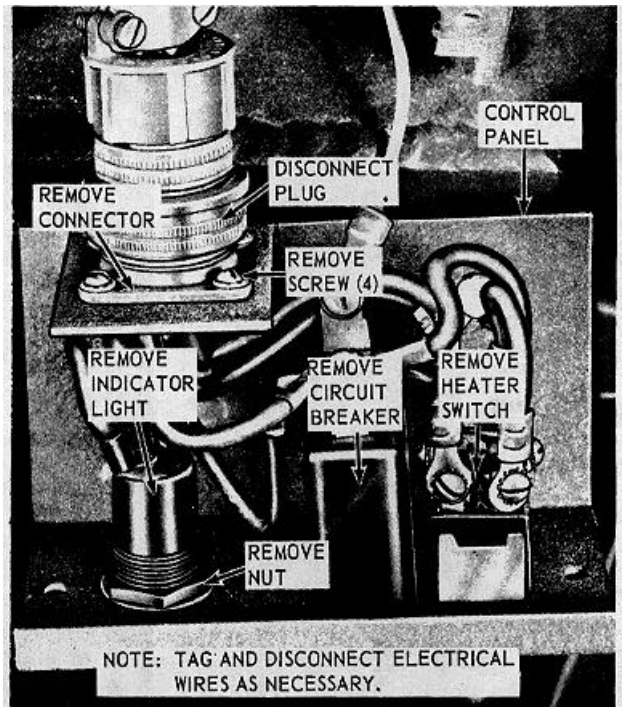
128. Coolant Shutoff Valve

a. Remove and install the coolant shutoff valve as shown by figure 41.

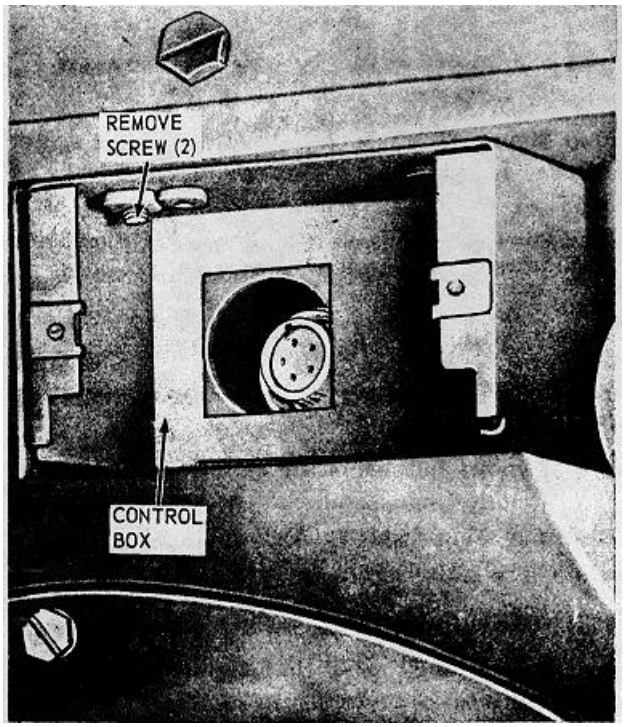
b. Clean and inspect.



A. CONTROL PANEL - FRONT VIEW.



B. CONTROL PANEL - REAR VIEW.



C. CONTROL BOX.

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Figure 74. Gasoline heater controls and control box, removal and installation.

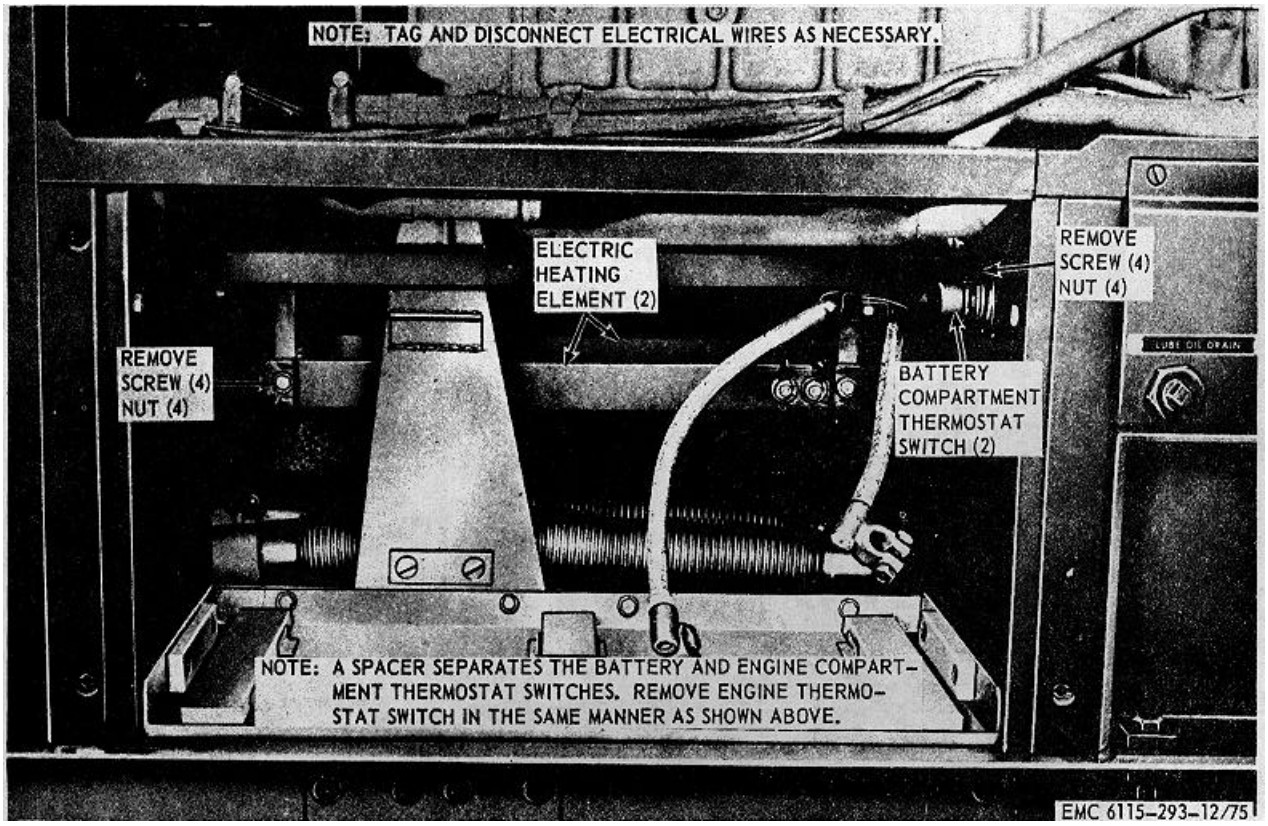
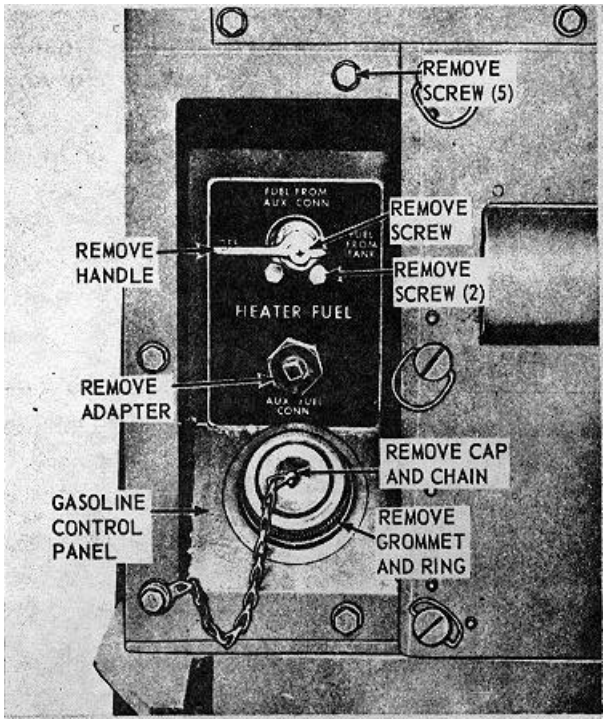
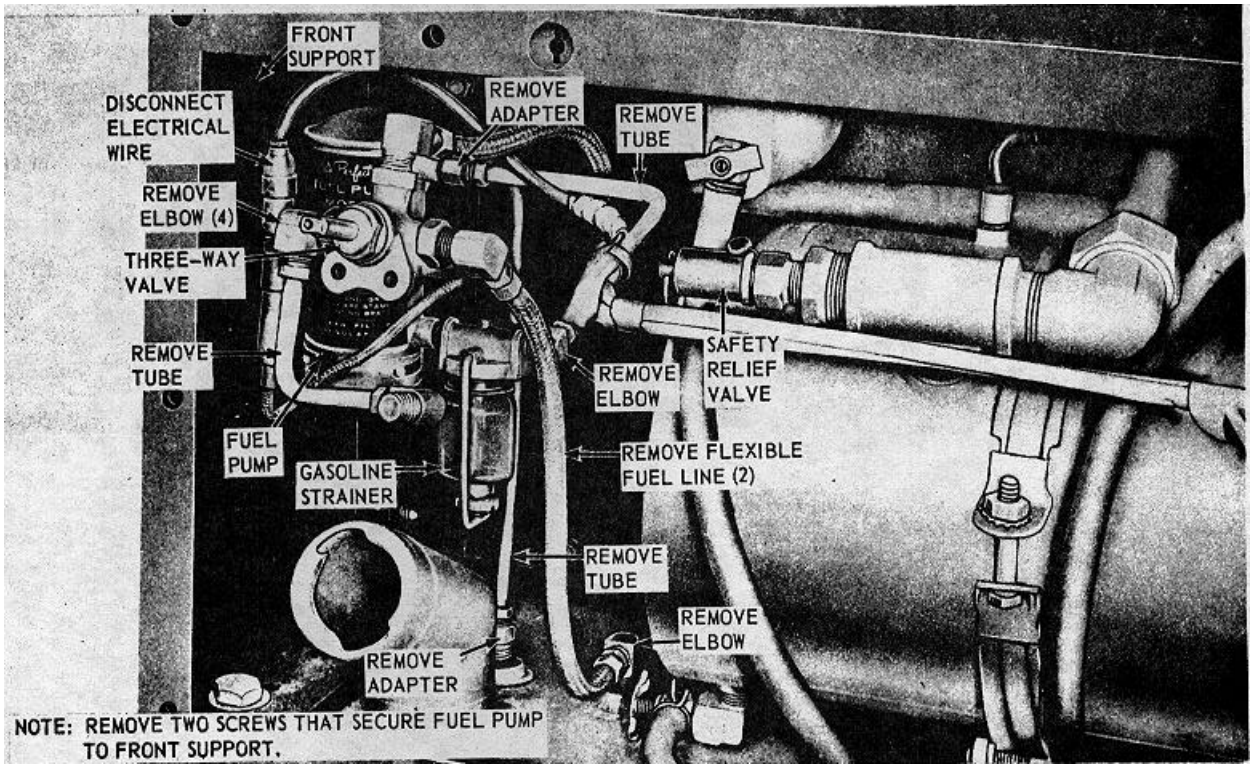


Figure 75. Battery compartment electric heating elements and battery box and engine compartment Thermostat switches, removal and installation.



A. GASOLINE CONTROL PANEL.



B. THREE-WAY VALVE, STRAINER, PUMP, AND RELIEF VALVE.

EMC 6115-293-12/76

Figure 76. Heater gasoline control panel, three-way valve, strainer gasoline pump, and safety relief valve, removal and installation.

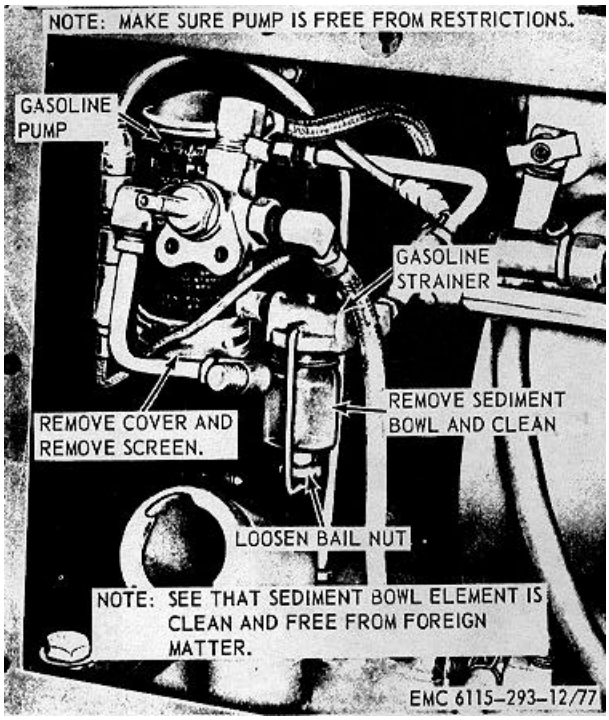


Figure 77. Gasoline pump and strainer servicing instructions.

129. Heater Gasoline Control Panel, Three-Way Valve, Strainer, and Gasoline Pump

a. Remove and install the heater gasoline control panel, threeway valve, strainer, and gasoline pump as shown by figure 76.

b. Service the gasoline pump and strainer as shown by figure 77.

c. Clean, inspect, and repair.

130. Heater Exhaust Weathercap

a. Remove and install the heater exhaust weathercap in a manner similar to that of the engine exhaust weathercap (fig. 29).

b. Clean and inspect.

Section XV. ENGINE AND GENERATOR CONTROLS AND INSTRUMENTS

131. General

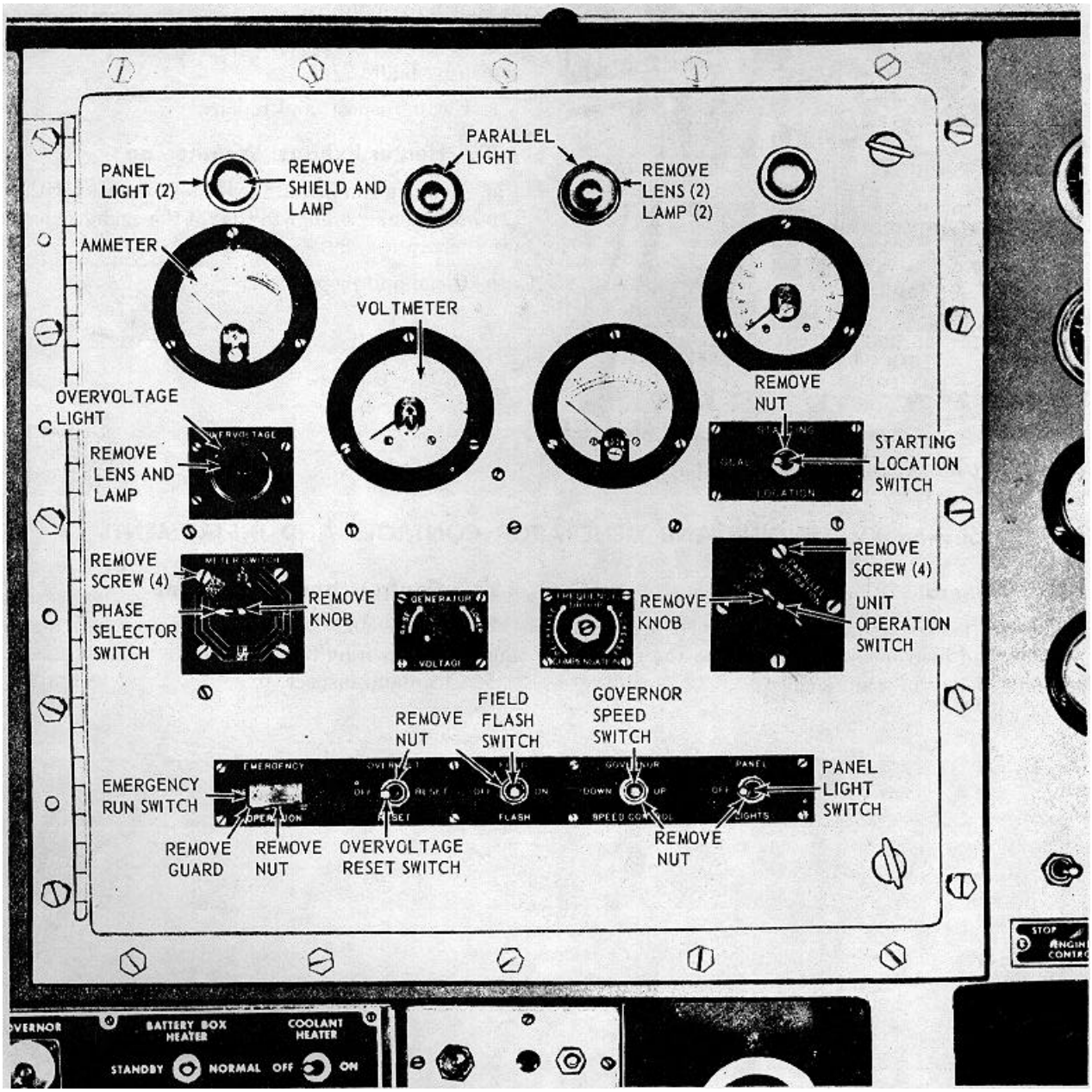
This section covers maintenance procedures on all controls and instruments applicable to the first and second echelons of maintenance.

132. Controls and Instruments

a. Remove and install the controls and instruments as shown by figure 78.

b. Clean and inspect.

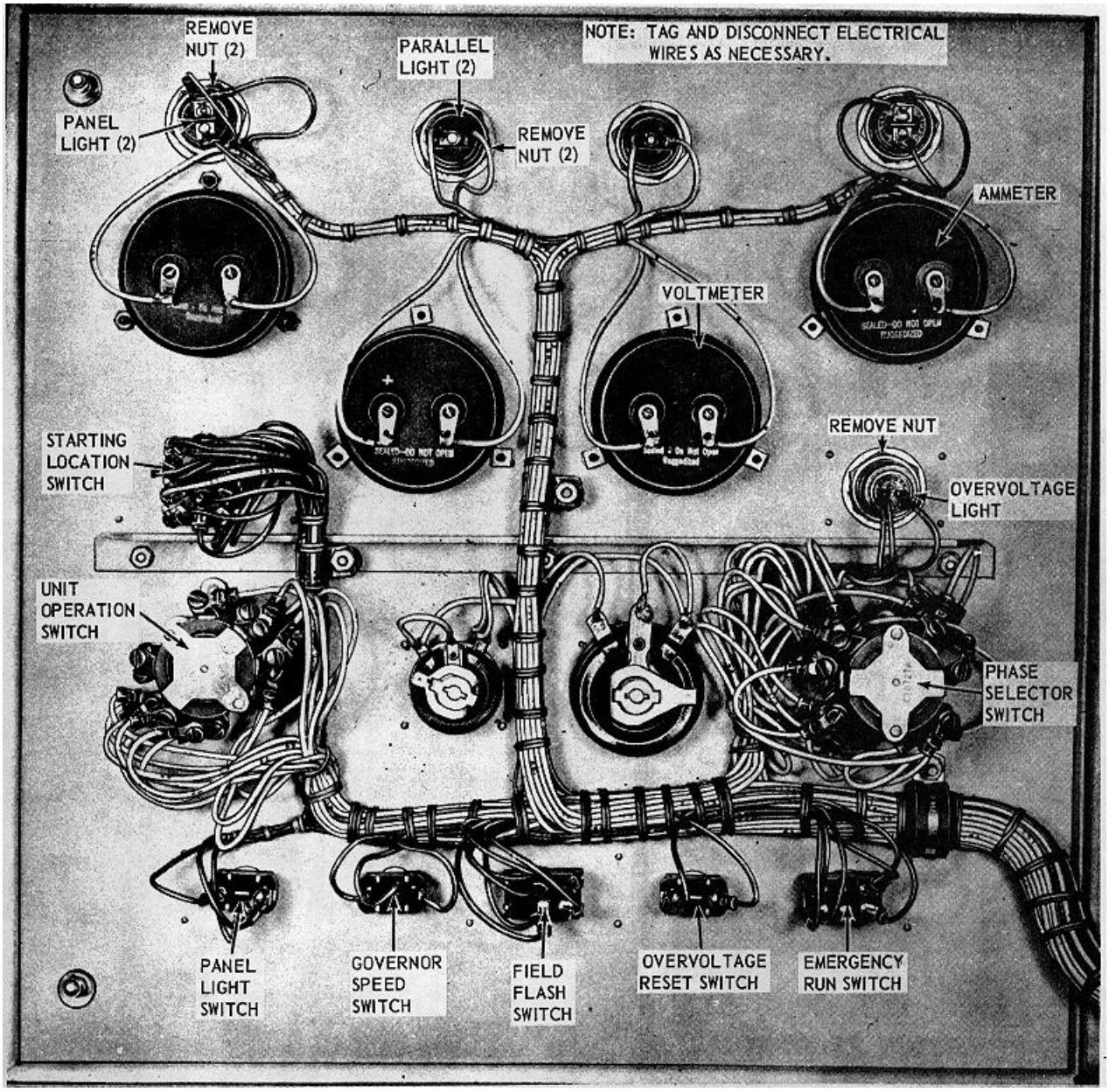
NOTE
TAG AND DISCONNECT ELECTRICAL WIRES AS NECESSARY.



A. INSTRUMENT PANEL, FRONT VIEW.

EMC 6115-293-12/78

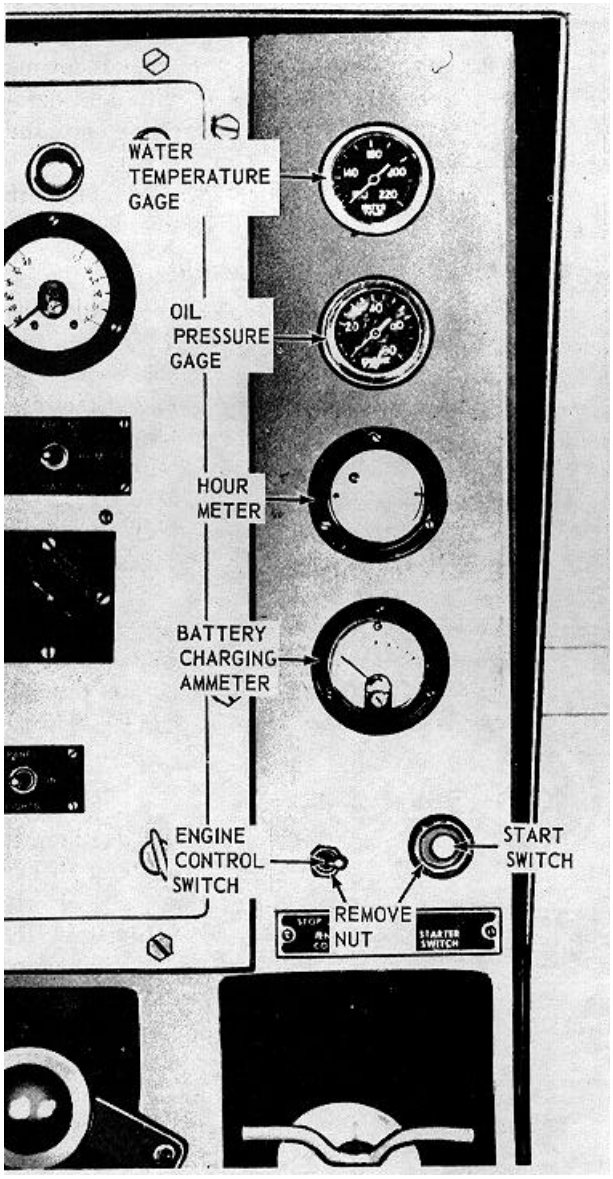
Figure 78. Engine and generator controls and instruments, removal and installation.



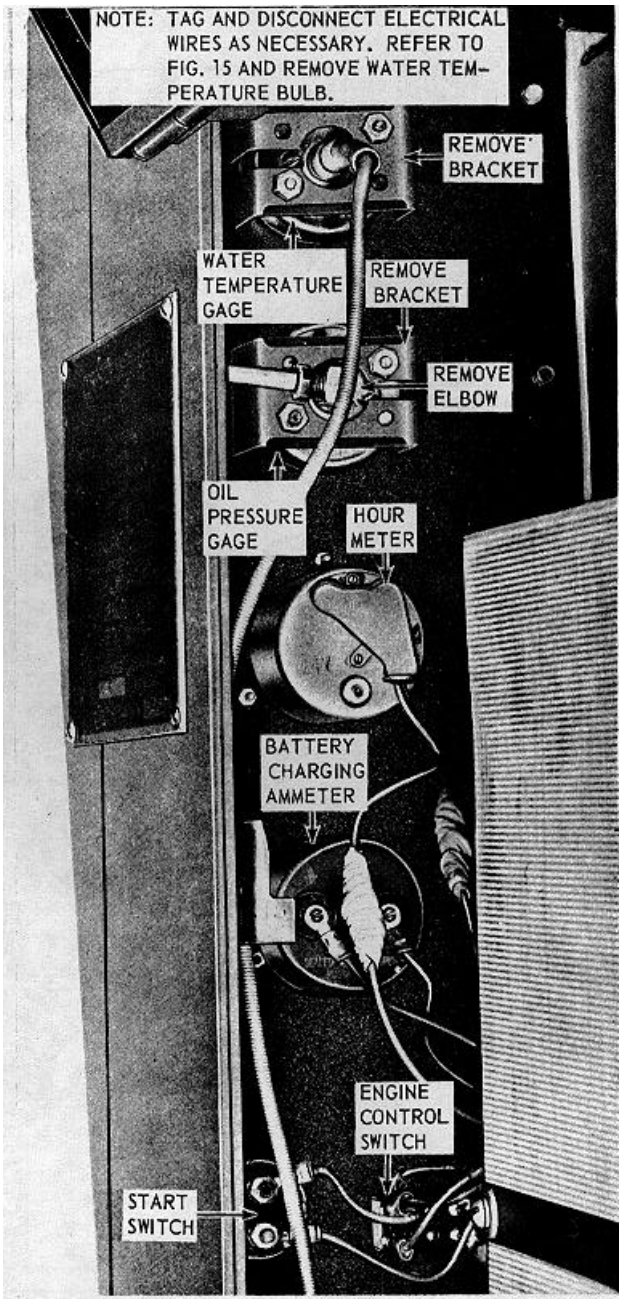
B. INSTRUMENT PANEL REAR VIEW.

EMC 6115-293-12/78

Figure 78-Continued.



C. ENGINE CONTROLS AND INSTRUMENTS-FRONT VIEW.



D. ENGINE CONTROLS AND INSTRUMENTS-REAR VIEW.

EMC 6115-293-12/78

Figure 78-Continued.

CHAPTER 4
DEMOLITION OF GENERATOR SET TO PREVENT ENEMY USE

133. General

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

134. Demolition To Render Generator Set Inoperative

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

(1) Fuel injector pump and engine crankcase.

(2) All fuel and oil lines.

(3) Starter and solenoid relay.

(4) Battery-charging generator, generator regulator, and rectifier.

Note

The above steps are minimum requirements for this method.

(5) Supercharger and water pump.

(6) Governor assembly.

(7) Main generator assembly.

(8) All controls and instruments.

b. Demolition by Misuse. Perform the following steps to render the generator set inoperative:

(1) Drain the radiator and engine crankcase. Pour sand, gravel, nuts, bolts, screws, or broken glass into the radiator, oil filler pipe, fuel tank, and other openings.

(2) Remove the belts and block the emergency operation switch in the run position. Operate the engine at operating speed until failure occurs.

135. Demolition by Explosives or Weapons' Fire

a. Explosives. Place as many of the following charges (fig. 79) as the situation permits and detonate them simultaneously with detonating cord and a suitable detonator.

b. Weapons' Fire. Fire on the generator set with the heaviest practical weapons available.

136. Other Demolition Methods

a. Scattering and Concealment. Remove all easily accessible parts such as the fuel injector pump, fuel and oil lines, starter and solenoid relay, battery-charging generator, generator regulator, rectifier, and load computer, and scatter them through dense foliage, bury them in dirt or sand, or throw them in a lake, stream, or other body of water.

b. Burning. Pack rags, clothing, or canvas under and around the unit. Saturate this packing with gasoline, oil, or diesel fuel and ignite.

c. Submersion. Totally submerge the unit in a body of water to provide water damage and concealment. A body of salt water will do greater damage to metal parts than submersion in a body of fresh water.

137. Training

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

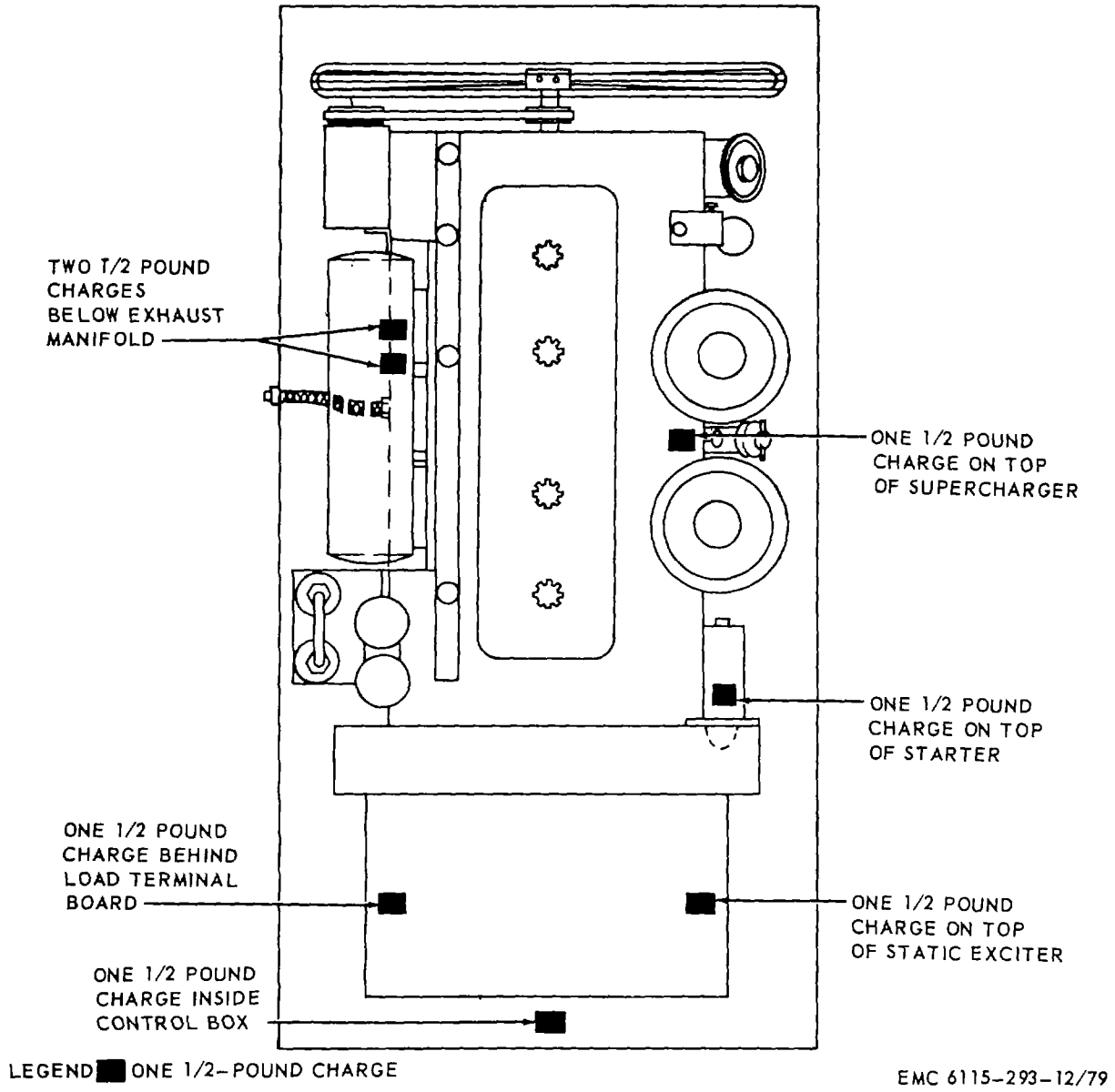


Figure 79. Placement of charges.

CHAPTER 5
SHIPMENT AND LIMITED STORAGE

Section I. SHIPMENT WITHIN ZONE OF INTERIOR

138. Preparation of Equipment For Shipment

a. Clean the generator set with an approved cleaning solvent.

b. Drain the fuel tank. Operate the engine until the fuel in the system is used up.

c. Drain the cooling system (par. 93).

d. Drain the lubricating oil system and air cleaners (pars. 92 and 80).

e. Disconnect the battery cables (par. 100). Tape the jumper cable to the inside of the battery compartment door.

f. Tag all items requiring special attention before the unit can be operated.

g. Refer to the basic issue items list (app. III) and make sure that all tools and publications therein listed are on, or with the generator set and in serviceable condition.

h. Close and fasten all doors and panels.

i. Refer to TMI 9-200 for preservation, packaging, packing, and shipping instructions.

139. Loading Equipment For Shipment

a. Hoist the generator set aboard the carrier with a sling or hook attached to the lifting U-bolt. For lifting instructions, refer to paragraph 7. When winching the generator set aboard a carrier, attach the sling or hook to the skid base.

b. Secure the generator set to the bed of the carrier by wedging blocks tightly against the skid base and securing them to the carrier.

c. Stretch cables from all four sides of the generator set and secure them to the sides of the carrier to prevent shifting during transportation.

Section II. LIMITED STORAGE

140. Preparation of Equipment for Storage

a. Inspection. Make a complete inspection of the generator set using the quarterly preventive maintenance services (par. 36) as a guide.

b. Cleaning and Painting. Clean the generator set and all components that are accessible without disassembly. Remove any accumulated water, oil or grease from inside the base of the Unit. Remove all rust and corrosion. Paint all parts on which the paint film has been damaged or removed. Refer to TM 9-2851.

c. Lubrication. Lubricate the generator set in accordance with the current lubrication order.

d. Protection.

(1) *Cooling system*. Drain and flush the cooling system (par. 93). Add antifreeze in accordance with table II. Make sure that the antifreeze will protect the unit to 15^{o} below the lowest expected temperature.

(2) *Batteries*. In extremely cold climates, disconnect and remove the batteries. Clean the battery terminals and cable connectors and apply a coating of grease or vaseline. Pack or store the batteries separately in a warm, dry place. If the batteries must remain in the unit, keep them filled and fully charged at all times.

141. Inspection and Maintenance of Equipment in Storage

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

b. Worksheet and Preventive Maintenance. DA Form 464 will be executed on each major item of equipment when equipment is initially placed in limited storage and every 30 days thereafter. Required maintenance will be performed promptly to insure that the equipment is mechanically sound and ready for immediate use

c. Operation. Equipment in limited storage must be operated long enough to bring it up to operating temperature and for complete lubrication of all bearings, gears, and so on, at least every 30 days. Equipment must be serviced and in satisfactory operating condition before it is operated.

APPENDIX I
REFERENCES

1. Dictionaries of Terms and Abbreviations

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

2. Fire Protection

TM 5-687	Repairs and Utilities: Fire Protection Equipment and Appliances; Inspections, Operations, and Preventive Maintenance.
TM 9-1799	Ordnance Maintenance: Fire Extinguishers.

3. Lubrication

LO 5-6115-293-12	Generator Set, Diesel Engine Precise Power; 100 Kw, Ac, 120/208V, 240/416V, 3 Phase, 60 Cycle, At 1800 Rpm, 83.3 Kw, 120/208V, 240/416V, 3 Phase 50 Cycle At 1,500 Rpm; Skid Mounted (Detroit Diesel Divn. General Motors Corp. Model 6910A) W/ General Motors Engine Model 6910A, Series 6-71.

4. Painting

TM 9-2851	Painting Instructions for Field Use.

5. Preventive Maintenance

AR 700-38	Unsatisfactory Equipment Report.
AR 750-5	Maintenance Responsibilities and Shop Operations.
TB ENG 347	Winterization Techniques for Engineer Equipment.
TM 5-505	Maintenance of Engineer Equipment.
TM 9-6140-200-15	Storage Batteries, Lead-Acid Type.

6. Publication Indexes

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

7. Radio Interference Suppression

TM 11-483	Radio Interference Suppression.

8. Shipment and Limited Storage

AR 743-505	Limited Storage of Engineer Mechanical Equipment.
TM 9-200	General Packaging Instructions for Ordnance General Supplies.

9. Supply Publications

SM 10-1-C4-1	Petroleum, Petroleum-Base Products, and Related Material.
TM 5-6115-293-20P	Organizational Maintenance Repair Parts and Special Tool Lists Generator Set, Diesel Engine: Precise Power; 100 Kw, Ac, 120/208V, 240/416V, 3 Phase, 60 Cycle, At 1,800 Rpm, 83.3 Kw, 120/208V, 240/416V, 3 Phase 50 Cycle At 1,500 Rpm; Skid Mounted (Detroit Diesel Divn. General Motors Corp. Model 6910A) FSN 6115-798-3444.

10. Training Aids

FM 5-25	Explosives and Demolition.
FM 21-5	Military Training.
FM 21-6	Techniques of Military Instruction.
FM 21-30	Military Symbols.

APPENDIX II
MAINTENANCE ALLOCATION

1. General

This appendix contains a maintenance allocation chart listing all maintenance and repair operations authorized for various echelons.

2. Maintenance

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

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

b. Adjust. To regulate periodically to prevent malfunction.

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

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

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

f. Repair. To restore to a serviceable condition by replacing unserviceable parts or by any other action required utilizing tools, equipment and skills available; to include welding, grinding, riveting, straightening, adjusting, and so on.

g. Overhaul. To restore an item to a completely serviceable condition by inspecting, disassembling its assemblies and subassemblies as necessary, replacing parts, and necessary boring, grinding or machining operations, followed by reassembly and final inspection.

3. Explanation of Columns

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

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

c. Echelon of Maintenance.

(1) *First echelon*. First echelon maintenance is that maintenance performed by the user or operator of the equipment, such as servicing, cleaning, lubricating, and limited adjustments. It also includes removal and replacement of items to accomplish servicing and lubrication.

(2) *Second echelon*. Second echelon maintenance is that maintenance performed by trained personnel provided for that purpose in the using organization, such as replacement of all items in column 2, limited parts fabrication from bulk material, adjustments, and repair of assemblies, components, and end items that can be accomplished without extensive disassembly.

(3) *Third echelon*. Third echelon maintenance is that maintenance performed by specially trained units in direct support of the using organization, such as replacement of all times in columns 2 and 3, repair assemblies, components, and end items, and fabricate parts from bulk material.

(4) *Fourth echelon*. Fourth echelon maintenance is that maintenance performed by units organized as semifixed or permanent shops to serve lower echelon maintenance within a geographical area, such as replacement of items in columns 2, 3, and 4, repair end items, overhaul assemblies, components, and fabricate general use common hardware and parts.

(5) *Fifth echelon*. Fifth echelon maintenance is that maintenance authorized to overhaul assemblies, components, end items, and replacement of all parts in columns 2, 3, 4, and 5.

d. Symbol X. The symbol X placed in the appropriate column indicates the lowest echelon responsible for performing that particular maintenance operation, but does not necessarily indicate repair parts will be stocked at that level.

e. Remarks. The remarks column is used to explain why maintenance that normally be done at a lower echelon, is moved to a higher echelon because of some particularly in the construction of the end item.

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
01	ENGINE						
0100	Engine Assembly						
	Engine, diesel:						
	Service	X					
	Inspect	X					
	Test			X			Compression
	Replace				X		
	Repair				X		
	Overhaul				X		
0101	Crankcase, Block, Cylinder Head						
	Tube, air box drain:						
	Replace		X				
	Head assembly:						
	Replace			X			
	Repair			X			
	Sleeve, cylinder:						
	Replace				X		
0102	Crankshaft						
	Bearings:						
	Replace				X		
	Crankshaft assembly:						
	Replace				X		
	Repair					X	Metalize, aline, resize, etc
	Seal, crankshaft:						
	Replace				X		
0103	Flywheel Assembly						
	Repair				X		Ring Gear
0104	Pistons, Connecting Rods						
	Piston assembly:						
	Replace				X		
	Repair				X		
	Rod assembly:						
	Replace				X		
	Repair				X		
0105.1	Valves						
	Guides and springs:						
	Replace			X			
	Insert valve:						
	Replace			X			
	Repair			X			Reface
	Valve, poppet:						
	Replace			X			
	Repair			X			Reface
0105.2	Rocker Arms, Tappets						
	Rocker arm assembly:						
	Adjust		X				
	Replace			X			
	Repair			X			
	Rod assembly, push:						
	Replace			X			
0105.3	Camshafts						
	Bearing, sleeve:						
	Replace				X		
	Camshaft:						
	Replace				X		
	Shaft, balance:						
	Replace				X		

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
0105.5	Timing Gears.						
	Gears, timing:						
	Replace				X		
0106.1	Oil Pump.						
	Pump, oil:						
	Replace				X		
	Repair				X		
	Gear, drive:				X		
	Replace				X		
0106.2	Oil Filters.						
	Filter assembly, oil:						
	Service	X					Element
0106.3	Oil Cooler.						
	Core assembly, oil:						
	Service		X				
	Valve, bypass:						
	Replace -		X				
0106.5	Crankcase Ventilation.						
	Separator, oil:						
	Service			X			
	Replace			X			
0106.6	Oil Pan, Lines, Level Gage.						
	Cap, filler:						
	Replace		X				Chained
	Pan, oil:						
	Service	X					
	Tube assembly, oil drain:						
	Replace		X				
	Lines:						
	Replace		X				Fabricate
0108	Manifolds.						
	Manifold w/muffler:						
	Replace		X				
	Gasket, manifold:						
	Replace		X				
0109.1	Accessory drive:						
	Coupling, blower drive						
	Repair			X			
03	FUEL SYSTEM						
0301	Fuel injector.						
	Injector assembly, fuel:						
	Replace						
	Repair			X			
0302.1	Fuel Transfer Pump.						
	Pump assembly, fuel transfer:						
	Replace			X			
	Repair			X			
0302.2	Diesel Injection Pump.						
	Pump assembly, fuel:						
	Replace		X				
	Repair			X			Install kit
0304	Air Cleaner.						
	Air cleaner:						
	Service	X					

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
0305	Supercharger, Blower, or Turbocharger						
	Blower assembly:						
	Replace			X			
	Repair				X		
	Overhaul				X		
	Coupling, half, shaft:						
	Replace			X			
0300	Tanks, Lines, Fittings.						
	Cap, fuel:						
	Replace		X				Chained
	Hose, flexible:						
	Replace		X				Fabricate
	Line assemblies:						
	Replace		X				Fabricate
	Valves, 3 way:						
	Replace	X					
	Tank assembly, fuel:						
	Service			X			
	Repair		X				
	Screen, fuel tank neck:						
	Service		X				
	Replace		X				
	Line assemblies, injector:						
	Replace		X				
0308	Engine Speed Governor.						
	Governor assembly:						
	Adjust			X			
	Replace			X			
	Repair				X		
	Overhaul				X		
	Valve, solenoid:						
	Replace		X				
	Filter assembly, governor:						
	Service	X					Element
0308.2	Governor Drive.						
	Drive assembly:						
	Replace			X			
	Repair			X			
0309	Fuel Filters.						
	Filter assembly, primary:						
	Service		X				Clean
	Filter assembly, secondary:						
	Service	X					Element
	Cock, drain:						
	Service	X					Drain ¼ pint daily
	Lines:						
	Replace		X				
0311	Priming System.						
	Tank, bulk fluid:						
	Service	X					
	Replace		X				
	Tank, air:						
	Replace		X				
	Reservoir, metering:						
	Service	X					Filter
	Adjust	X					
	Replace		X				

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
	Nozzle, spray:						
	Replace		X				
	Hose and lines:						
	Replace		X				Fabricate
	Pump, priming:						
	Replace		X				
	Repair		X				
0312	Accelerator, Throttle or Choke Controls.						
	Tube assembly injector control:						
	Adjust		X				
04	EXHAUST SYSTEM						
0401	Muffler and Pipes.						
	Pipe and rain cap:						
	Replace		X				
05	COOLING SYSTEM						
0501	Radiator.						
	Radiator assembly:						
	Service	X					
	Repair			X			
	Cap, radiator:						
	Replace	X					
	Valve, Overflow:						
	Replace		X				
	Shutter Assembly:						
	Repair			X			
0503	Lines and Fittings, Hoses, Pipes, Clamps.						
	Hoses and pipes:						
	Replace		X				
	Valve, check:						
	Replace		X				
	Cock, drain:						
	Replace		X				
	Clamps:						
	Replace		X				
0504	Water Pump.						
	Pump assembly, water:						
	Replace			X			
	Repair			X			Install kit
0505	Fan Assembly.						
	Belts, V, engine cooling:						
	Adjust		X				
	Replace		X				
	Pulley and hub assembly:						
	Repair			X			
0506	Water Manifolds, Headers, Thermostats and Housing, Gaskets.						
	Thermostat, flow control:						
	Test		X				
	Replace		X				
	Thermostat, shutter:						
	Test			X			
	Replace			X			
06	ELECTRICAL SYSTEM (ENGINE AND VEHICULAR)						
0601	Generator.						
	Generator assembly:						
	Test		X				
	Replace		X				
	Repair			X			Install kit

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
	Belt, V:						
	Adjust		X				
	Replace		X				
	Cables, electrical:						
	Replace		X				
0602	Generator Regulator.						
	Regulator, voltage:						
	Adjust				X		Carbon pile
	Replace		X				
	Repair				X		
	Rectifier:						
	Replace		X				
0603	Starter.						
	Starter, engine, electrical:						
	Service		X				
	Test		X				
	Replace		X				
	Repair			X			Install kit
	Relay, solenoid:						
	Replace		X				
	Strap, ground:						
	Replace		X				
	Lead, electrical:						
	Replace		X				Fabricate
0606	Engine Controls.						
	Governor, overspeed:						
	Replace			X			
	Repair			X			
	Switches, safety:						
	Replace		X				
	Solenoid, shutdown:						
	Replace		X				
	Relay, time delay:						
	Replace		X				
0607	Instrument or Engine Control Panel.						
	Meters:						
	Replace		X				
	Switches:						
	Replace		X				
0608	Miscellaneous Items.						
	Receptacle, battery charging:						
	Replace		X				
	Cables:						
	Replace		X				Fabricate
	Receptacle, 24v:						
	Replace		X				
	Harness, wiring:						
	Replace			X			
0612	Batteries.						
	Battery, storage:						
	Service	X					
	Test		X				
	Replace	X					
	Cable assembly:						
	Replace		X				Fabricate
	Host assembly, drain:						
	Replace		X				

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
0615	Radio Suppression.						
	Strap, bonding:						
	Replace		X				
15	FRAME						
1501	Frame Assembly.						
	Stud, ground:						
	Replace		X				
17	BODY; CAB; HOOD; HULL						
1708	Stowage Racks, Boxes, Straps.						
	Cover assembly, tool box:						
	Replace		X				
22	MISCELLANEOUS BODY, CHASSIS OR HULL, AND ACCESSORY ITEMS.						
2201	Canvas Items.						
	Cover, cable:						
	Replace		X				
2207	Winterization Equipment.						
	Heater assembly:						
	Test				X		Bench test
	Replace			X			
	Repair			X			
	Overhaul				X		
	Switches:						
	Replace		X				
	Receptacle, outside source:						
	Replace		X				
	Fuse:						
	Replace	X					
	Holder, fuse:						
	Replace		X				
	Valves, heater shutoff:						
	Replace		X				
	Tank, fuel:						
	Service	X					
	Pump, fuel:						
	Service		X				
	Replace		X				
	Strainer, fuel:						
	Service		X				
	Replace		X				
	Valves:						
	Replace		X				
	Hose:						
	Replace		X				
	Lines, pump to oil pan:						
	Replace			X			
	Tube, heater:						
	Replace			X			Fabricate
	Element, battery heater:						
	Replace		X				
	Switch, battery box:						
	Replace		X				
	Pump, circulating:						
	Replace			X			
	Repair			X			
	Element:						
	Replace			X			

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
	Thermostats, water:						
	Replace		X				
	Cock, steam:						
	Replace		X				
	Transformer:						
	Replace			X			
	Relay, heater 220 v:						
	Replace			X			
	Harness, wiring:						
	Replace			X			
	Burner assembly:						
	Replace				X		
	Igniter:						
	Replace			X			
	Blower assembly:						
	Replace			X			
	Lines, fuel:						
	Replace		X				Fabricate
2210	Data Plates and Instruction Holders.						
	Plates, instruction:						
	Replace		X				
	Plates, identification (C.O.E.):						
	Replace			X			
41	ELECTRIC GENERATORS						
4100	Generator Assembly						
	Generator assembly:						
	Service	X					
	Inspect	X					
	Test				X		
	Replace				X		
	Repair				X		
	Overhaul				X		
4100.1	Rotor Assemblies:						
	Rotor, generator:						
	Test				X		
	Replace				X		
	Repair				X		
	Overhaul					X	
4100.2	Stator Assemblies.						
	Stator, generator:						
	Test				X		
	Replace				X		
	Repair				X		
	Overhaul					X	
4100.3	Brush Holders.						
	Brush, electrical:						
	Replace		X				
	Holder, brush:						
	Adjust.		X				
	Replace			X			
4100.4	Ventilating System.						
	Cover, ventilation:						
	Replace			X			
	Cover, brush:						
	Replace		X				

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
4100.5	Frame Supports and Housings.						
	Bearing:						
	Replace				X		
4100.6	Drive Components.						
	Fan and driving fan:						
	Replace				X		
4100.7	Control Panels, Housings, Cubicles.						
	Lamp:						
	Replace	X					
	Meter, frequency and kilowatt:						
	Replace			X			
	Meter, current and volt:						
	Replace		X				
	Harness, wiring:						
	Replace			X			
4100.8	Master or Auxiliary Control Assembly.						
	Computer assembly, governor:						
	Test			X			
	Adjust			X			
	Replace			X			
	Repair				X		
4100.9	Circuit Breaker Assembly.						
	Circuit breaker assembly:						
	Replace			X			
4100.10	Switches.						
	Switches:						
	Replace		X				
4100.12	Resistors.						
	Resistors:						
	Replace			X			
	Rheostats:						
	Replace			X			
4100.14	Fuse and Fuse Holders.						
	Fuse:						
	Replace	X					
4100.16	Transformers; Rectifiers.						
	Transformers:						
	Replace			X			
4100.17	Terminal Blocks; Junction Boxes.						
	Receptacle, 125 v:						
	Replace		X				
	Receptacle, power:						
	Replace			X			
4100.18	Housing or Hull Panels and Attaching Parts.						
	Doors and hood:						
	Replace		X				
	Supports and panels:						
	Replace			X			
	Support, control cabinet:						
	Replace			X			
	Panels, side:						
	Replace		X				
	Doors, access:						
	Replace	X					
	Cover, access brush:						
	Replace		X				

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
4100.19	Radio Interference Suppression.						
	Capacitors:						
	Replace		X				
	Leads, electrical:						
	Replace		X				Fabricate
4107	Static Exciter.						
	Exciter, static:						
	Test			X			
	Replace				X		
	Repair				X		
	Overhaul				X		
4107.1	Exciter Components; Rectifiers, Diodes, Reactors, In oucitors, Transformers, Etc.						
	Resistors, rectifiers, transformers:						
	Replace				X		
	Regulator assembly:						
	Test			X			
	Replace				X		
	Repair				X		
	Overhaul				X		
47	GAGES (NONELECTRICAL) WEIGHING AND MEA-SURING DEVICES.						
4703.1	Oil Pressure Gages.						
	Gage, oil pressure:						
	Replace		X				
	Line, oil:						
	Replace		X				Fabricate
4705	Fuel Cages (Quantity).						
	Gage, fuel:						
	Replace		X				
4708	Temperature Cages.						
	Thermometer, temperature:						
	Replace		X				
76	FIREFIGHTING EQUIPMIENT						
7603	Fire Extinguishers.						
	Extinguisher, fire:						
	Replace	X					

APPENDIX III
BASIC ISSUE ITEMS

Section I. INTRODUCTION

1. General

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

2. Explanation of Columns

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

(1) *Technical services*. The basic number of the technical service assigned supply responsibility for the item is shown. Those spaces with no number shown are Corps of Engineers supply responsibility. Other Technical service basic numbers are-

9-- Ordnance Corps
10-- Quartermaster Corps
11-- Signal Corps
12-- Adjutant General's Corps

(2) *Source*. The selection status and method of supply are indicated by the following code symbols:

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

(*b*) P1-applied to repair parts which are low mortality parts; procured by technical Services, stocked only in and supplied from technical service key depots, and authorized for installation at indicated maintenance echelons.

(*c*) M-applied to repair parts which are not procured or stocked but are to be manufactured by using units at indicated echelons.

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

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

O-Organizational Maintenance (1st and 2nd Echelons)

b. Federal Stock Numbers. This column lists the 11-digit Federal stock number which is used for requisitioning purposes.

c. Description.

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

(2) A five-digit Federal supply code for manufacturers and/or other technical services is shown in parentheses followed by the manufacturer's part number. This number will be used for requisitioning purposes when no Federal stock number is indicated. Example: (08645) 86453.

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

d. Unit of Issue. Where no abbreviation is shown in this column, the unit of issue is "each." e. Expendability. Those items classified as nonexpendable are indicated by letters NX. Items not indicated by NX are expendable.

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

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

h. Illustrations.

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

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

3. Federal Supply Code For Manufacturers

72582-Detroit Diesel Engine Division of General Motors Corp.

4. Comments and Suggestions

Suggestions and recommendations for changes to the basic issue items list will be submitted on DA Form 2028 to the Commanding General, U.S. Army Engineer Maintenance Center, Corps of Engineers, ATTN: EMCDM, P.O. J3ox 119, Columbus 16, Ohio. Direct communication is authorized.

Section II. BASIC ISSUE ITEMS LIST

Source codes				Federal Stock No.	Description	Unit of issue	Ex-pend-ability	Quan-tity au-thorized	Quan-tity issued with	Illustration	
Tech-nical service	Source	Main-te-nance	Re cover-ability							Fig. No.	Item No.
				.....	GROUP 03-FUEL SYSTEM						
				.....	0306-TANKS, LINES,						
				.....	FITTINGS						
	P1	O		.....	HOSE ASSEMBLY, FUEL	.....	.....	 2	2		
				.....	(72582) 5120401.						
				.....	GROUP 086-ELECTRICAL						
				.....	SYSTEM (ENGINE AND						
				.....	VEHICULAR)						
				.....	0608-MISCELLANEOUS						
				.....	ITEMS						
	X2	O		.....	RECEPTACLE AND CABLE	.....	.....	 1	(*)		
				.....	ASSEMBLY, SLAVE (72582)						
				.....	5122215.						
				.....	0612-BATTERIES						
11	P	O		.....	BATTERY, STORAGE: 12 V	.....	...NX..	 2	2		
				.....	(72582) 1980345.						
9	P	O		6810-249-9354	SULPHURIC ACID: electrolyte	gal	.....	 6	6		
				.....	GROUP 26--ACCESSORIES,						
				.....	PUBLICATIONS, TEST						
				.....	EQUIPMENT AND TOOLS						
				.....	2602.1 ACCESSORIES						
10	P	O		7520-599-9618	CASE, MAINTENANCE AND	.....	.....	 1	1		
				.....	OPERATIONAL MANUALS:						
				.....	cotton duck, water repellent,						
				.....	mildew resistant.						
	X2	O		.....	HANDLE, STARTING (72582)	.....	.....	 1	(*)		
				.....	5121523.						
	P1	O		5975-642-8937	ROD, GROUND: 9 ft lg, 5/8 in.	.....	.....	 1	(*)		
				.....	dia, cone point, 3 sections (GE).						
	P1	O		5975-243-5861	CLAMP, ELECTRICAL: ground	.....	.....	 1	(*)		
				.....	rod, 1/2 to 1 in. id.						
	M	O		.....	WIRE, ELECTRICAL:						
				.....	Manufacture from:						
P	O	6		6145-189-695	WIRE, ELECTRICAL:	ft	.....	.....	(*)		
				.....	No. 6 AWG (10 ft required)						
				.....	(GE).						

Source codes				Federal Stock No.	Description	Unit of issue	Ex-pend-ability	Quan-tity au-thorized	Quan-tity issued with	Illustration	
Tech-nical service	Source	Main-te-nance	Re cover-ability							Fig. No.	Item No.
					2602.2-COMMON TOOLS						
10	P	O		5120-240-5328	WRENCH, OPEN END, AD-JUSTABLE: single head, 15/16. in. jaw opening, 8 in. lg.			1	(*)		
10	P	O		5120-423-6728	WRENCH, OPEN END, AD-JUSTABLE: single head, 0 to 1.698 in. jaw opening, 15 in. lg.			1	(*)		
					2602. 4-PUBLICATIONS						
12					DEPARTMENT OF THE ARMY OPERATOR AND ORGANIZATIONAL MAIN-TENANCE MANUAL TM 5-6115-293-12.			2	2		
12					DEPARTMENT OF THE ARMY LUBRICATION OR-DER LO 5-6115-293-12.			1	1		
					GROUP 42-ELECTRICAL EQUIPMENT, TRANSMIS-SION AND])ISTRIBUTION						
					4214-MISCELLANEOUS WIRING; FITTINGS						
	M	O			CABLE ASSEMBLY, PARAL-LEL (72582) 5120509 Manufacture from:						
	P1	O			PLUG, AMPHENOL (72582) 5120338.			2	(*)		
	P1	O			CLAMP, AMPHENOL (72582) 5120347.			2	(*)		
	P	O			WIRE, ELECTRICAL No. 16 AWG (25 ft required).	- ft					
					GROUP 76-FIREFIGHTING EQUIPMENT.						
					7603-FIRE EXTINGUISHERS						
	P1	O		4210-288-8269	EXTINGUISHER, FIRE VA-PORIZING LIQUID: ¼ gal capacity, w/wall bracket (GE).			(See note)			
	P1	O		4210-555-8837	EXTINGUISHER, FIRE MONOBROMOTRIFLUORO-METHANE: charged, hand-shatterable cylinder, penetrat-ing seal valve, stored pressure, w/bracket, 2.75 lbs (Halon 1301) Mlil-Spec E52031 (GE).			1	1		

Note: Requisition CTC/CO_2 extinguisher until depot stocks are exhausted.

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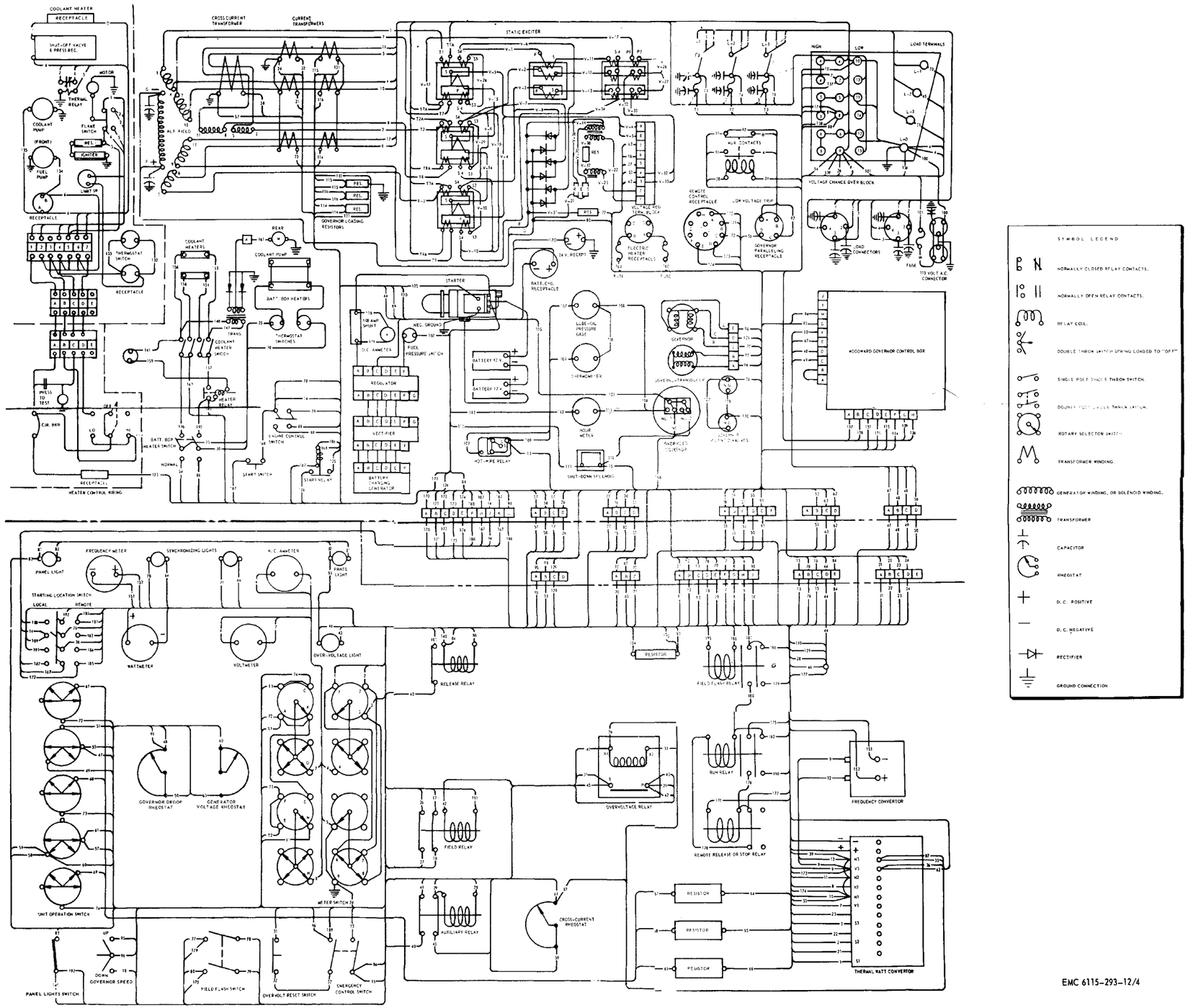

Figure 4. Practical wiring diagram.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

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P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

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 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 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 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 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. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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