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AIR FORCE            TO 35C2-3-471-1  
NAVY                AG-320B0-OMM-000

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OPERATOR'S AND UNIT  
MAINTENANCE MANUAL

**GAS TURBINE ENGINE DRIVEN  
AVIATION GENERATOR SET,  
NSN 6115-01-161-3992**

This manual supersedes TM 5-6115-612-12/TM 6115-12/7/T0 35C2-3-471-1/AG-320B0-OMM-000, 21 July 1986

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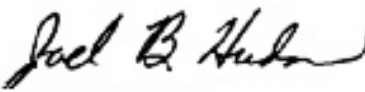
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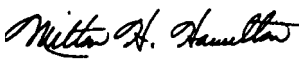
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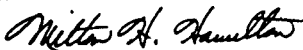
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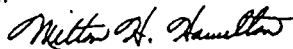
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**WARNING**

All specific cautions and warnings contained in this manual shall be strictly adhered to.  
Failure to do so may result in severe injury, death, and/or damage to the equipment.

HIGH VOLTAGE

testing may cause serious or fatal injury from electrical shock. Avoid bodily contact with test probes and perform testing on a wooden bench, or place an insulated mat under test items. The electrical charge stored in turbine engine ignition exciters may be lethal. Ground Igniter plug and lead and do not touch or put hand near base of plug while igniter unit is activated. Take precautions when discharging igniters. A special enclosed box with a viewing window should be used. Handle batteries with caution, verifying that all switches and controls on the control panel are off or neutralized prior to hookup of battery terminals. Disconnect battery cable plug connector prior to performing maintenance on electrical components.

DEATH

or severe burns may result if personnel fail to observe safety precautions. To avoid electrocution, the generator set must always be grounded. Do not operate the generator set until the ground terminal stud has been properly connected to a suitable ground. When performing maintenance on this equipment, personnel should remove all jewelry and secure loose-fitting clothing to prevent it from catching in moving parts. Do not attempt to inspect, service, adjust, repair, or replace parts until generator set has been completely shut down.

SEVERE INJURY

and equipment damage could result from foreign material entering the compressor inlet causing violent turbine or compressor failure. Do not operate generator set with engine access cover or foreign object deflection shield removed.  
Shut down unit and stow cable prior to towing.



### **EXPLOSION, FIRE OR ELECTROCUTION**

may be induced by frayed, cut or missing insulation on power supply cable. Exercise care in handling power supply cable. Do not route over airframe.

Fuels used in the generator set are flammable; cleaning solvents are flammable; and batteries, when shorted, can deliver high currents and a spark may cause cells to explode. To prevent explosion or fire, use and store fuels and solvents in a well-ventilated area, do not smoke, and keep area free of spark and open flame.

### **DANGEROUS MATERIALS**

Personnel must be adequately protected to prevent injury resulting from contact with heated or chilled parts; toxic primer and paint; solvents used in cleaning parts; corrosive chemicals contained in batteries; compressed air used for cleaning or drying; and radiation, sparks and airborne particles produced during welding activity. Personnel should use proper equipment and wear protective clothing such as goggles/face shields with tinted lenses, rubber gloves, boots, and aprons. MIL-L-7808 lubricant contains a poisonous additive readily absorbed by the skin. Use appropriate personnel protective equipment as designated by local occupational health authority. Dry cleaning solvent P-D-680 is flammable and toxic to the skin, eyes, and respiratory tract. All activities requiring exposure to these materials should be performed in well-ventilated areas with extinguishers and vat or tank covers on hand in case of fire.

### **WARNING**

Injury to personnel may result from improper lifting or movement of the generator set. Do not attempt to lift the front of the generator set with less than two persons. Set handbrake and chock both wheels to prevent accidental movement during inspection and maintenance. Exercise care when releasing handbrake to prevent inadvertent movement. When hoisting generator set, use hoisting device with lifting capacity of 2000 pounds (907.2 Kg).

### **WARNING**

The hot refueling of generators, while they are operating, poses a safety hazard and should not be attempted. Hot engine surfaces and sparks produced from the engine and the generator circuitry are possible sources of ignition. Death or personnel injury may result if personnel fail to follow this warning.

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MAINTENANCE MANUAL  
  
GAS TURBINE ENGINE DRIVEN  
AVIATION GENERATOR SET,  
NSN 6115-01-161-3992

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You can help Improve this manual If you find any mistakes, or if you know of a way to improve these procedures, please let us know Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATTN. AMSAT-I-MP, 4300 Goodfellow Blvd, St Louis, MO 63120-1798 You may also submit your recommended changes by E-mail directly to <mpmt/oavma28@st-louis-emh7.army.mil> A reply will be furnished directly to you Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

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## CHAPTER 1

### INTRODUCTION

#### SECTION I. GENERAL

**1-1. SCOPE.** This manual is for your use in with the 10kW, 28Vdc, Aviation Generator Set, MEP 362A The type I (tactical), class 1 (precise), mode IV (dc output) set is used where precise power is required. This manual covers operation, lubrication, and maintenance. The maintenance procedures may be performed by the operator/crew and organizational maintenance personnel as determined by the Maintenance Allocation Chart (MAC).

**1-2. LIMITED APPLICABILITY.** Some portions of this publication are not applicable to all services and are prefixed to indicate the services to which they pertain, (A) Army, and (N) Navy. Portions not prefixed are applicable to all services.

**1-3. MAINTENANCE FORMS AND RECORDS.**

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

b. (N) Navy users should refer to their service peculiar directives to determine applicable maintenance forms and records to be used.

**1-4. REPORTING OF ERRORS.** Reporting of errors, omissions, and recommendations for improvement of this publication by the individual user is encouraged. Reports should be submitted as follows:

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

b. (N) Navy--by letter, directly to Commanding Officer, Naval Construction Battalion Center, ATTN Code 15741, Port Hueneme, CA 93043-5000.

**1-5. (A) REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).** An EIR will be prepared using DA Form 2407, Maintenance Request Instructions for preparing EIRs are provided in DA PAM 738-750, The Army Maintenance Management System (TAMMS). EIRs should be mailed directly to US Army Aviation and Troop Command, ATTN AMSAT-I-MDO, 4300 Goodfellow Boulevard, St Louis, MO 63120-1798. A reply will be furnished directly to you.

**1-6. LEVELS OF MAINTENANCE ACCOMPLISHMENT.**

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

b. (N) Navy users shall determine their maintenance levels in accordance with their service directives.

**1-7. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.** (A) Destruction of materiel to prevent enemy use shall be in accordance with the requirements of TM 750-244-3, Procedures For Destruction of Equipment to Prevent Enemy Use.

**1-8. ADMINISTRATIVE STORAGE.** (A) for procedures to accomplish storage. Air Force personnel should refer to TO 35-1-4, Processing and Inspection of Aerospace Ground Equipment for Storage and Shipment. Army personnel should refer to TM 740-90-1, Administrative Storage.

**1-9. PREPARATION FOR SHIPMENT AND STORAGE.**

a. (A) Army. Refer to TB 740-97-2 and TM 740-90-1.

b. (N) Navy. Refer to service directives for requirements.

## SECTION II. DESCRIPTION AND DATA

**1-10. DESCRIPTION.** The MEP 362A Aviation Generator Set (figures 1-1 and 1-2) consists of a generator and gas turbine engine assembly enclosed in an all-weather frame and housing. The frame and housing are mounted on a running gear assembly to facilitate towing and positioning of the generator set. A fuel system consisting of a series of pumps and filters, fuel lines, and a fuel tank pro-

videos a clean, controlled flow of fuel to the turbine engine. A control panel mounted in the control fender contains the controls and indicators to operate the generator set and monitor its systems. A 40-foot power cable connects the generator set to an aircraft. A slave start receptacle is provided for use when normal starting procedures are not possible.

**1-2 Change 6**

1-10. DESCRIPTION. (cont)

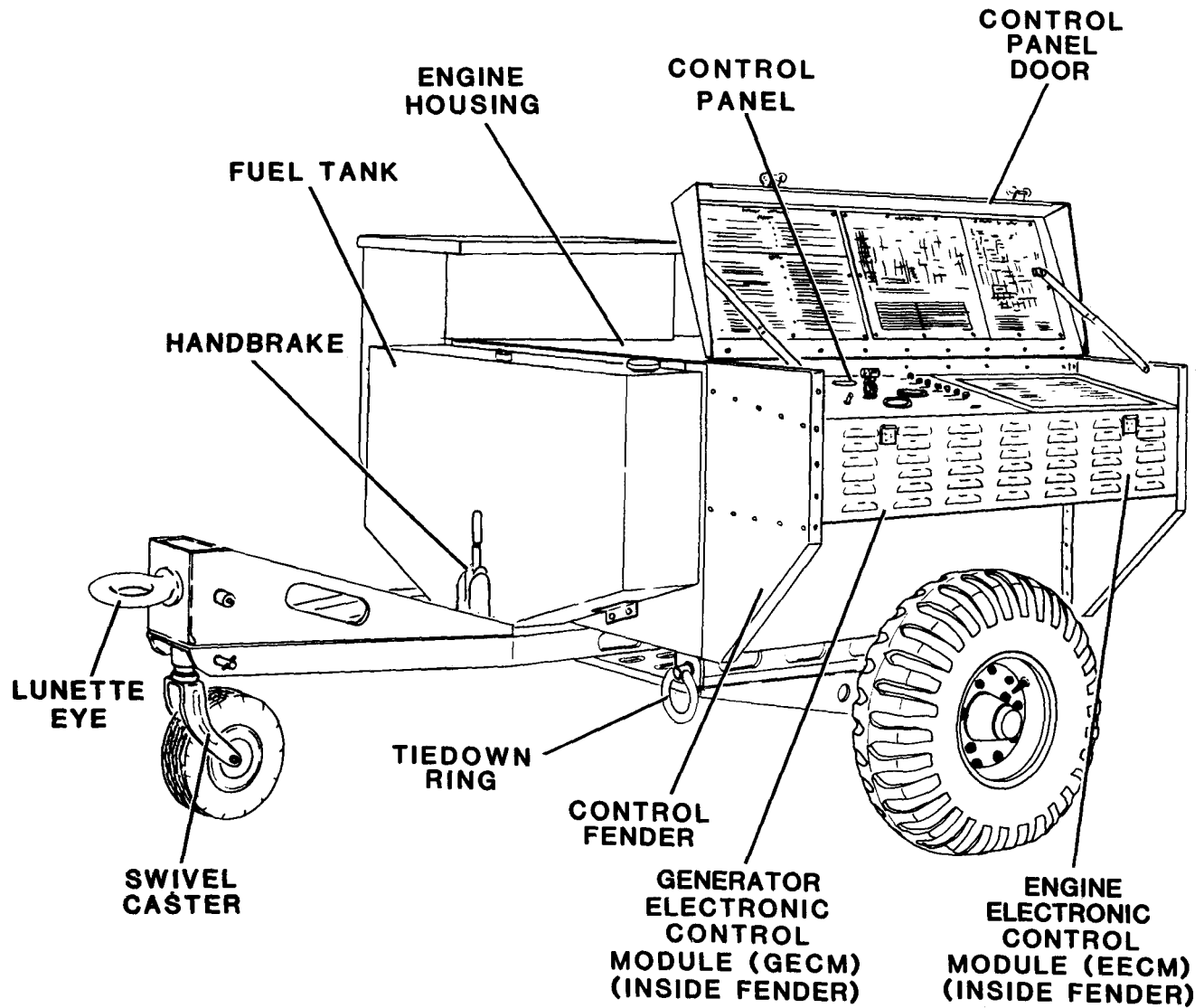


Figure 1-1. Aviation Generator Set, Front 3/4 View

1-10. DESCRIPTION. (cont)

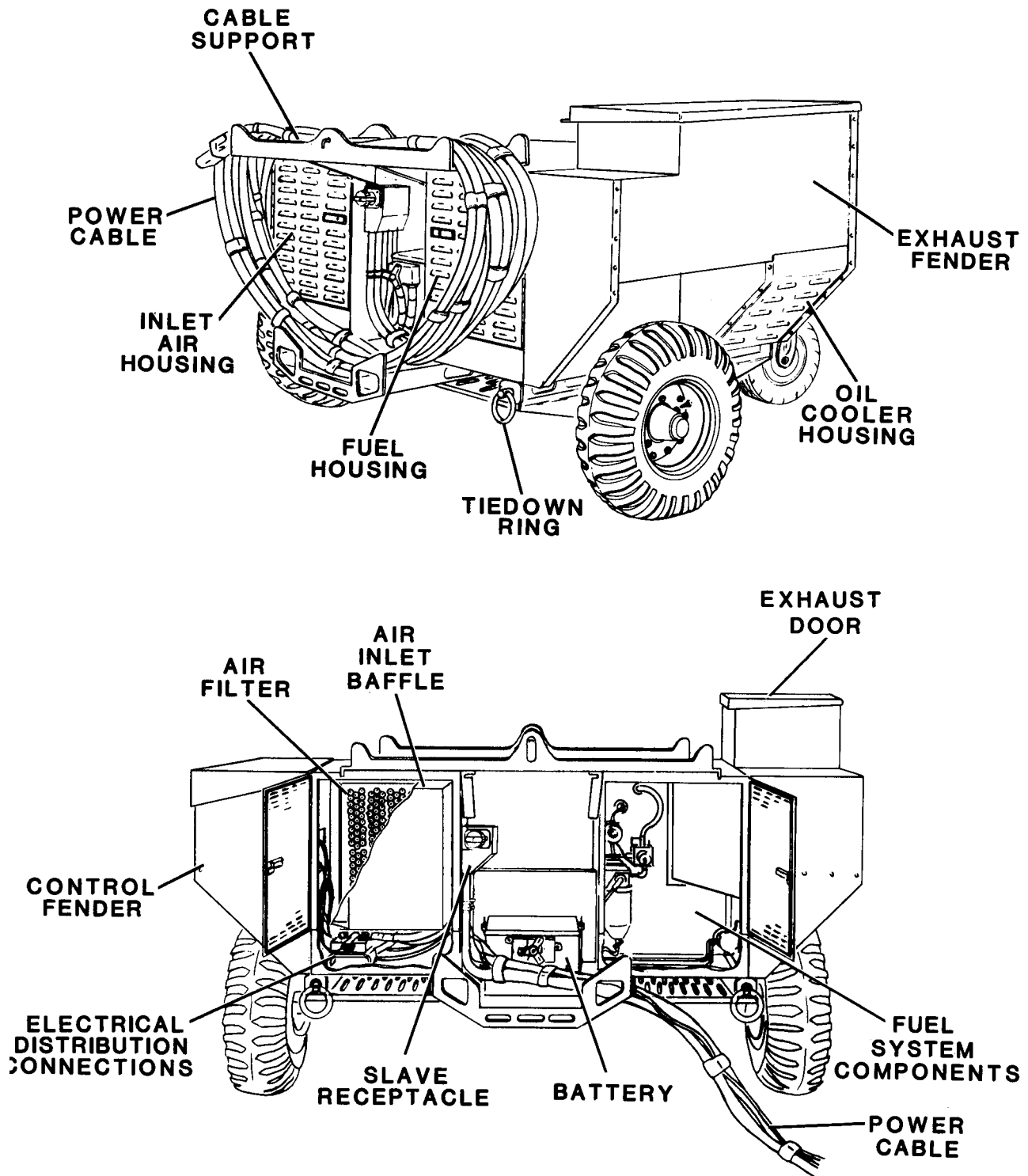


Figure 1-2. Aviation Generator Set, Rear Views

# 1-11. TABULATED DATA.

## Tabulated Data

1. GENERATOR SET	
DOD Drawing Number	83-362
Manufacturer	Tiernay Turbines Inc
Model	MEP 362A
Mode	28 Vdc (IV)
Class	1 (precise)
Fuel Consumption	52 PPH (23.6kg/h) (8 gal/30.3 l)
Operating Altitude Range	0 to 8000 ft (0 to 2438 m)
Operating Temperature Range	-65°F (53.9°C) to 125°F (51.7°C) with 107°F (41.7°C) max at 5000 ft (1524 m)
Capacities:	
Lube Oil System	4 qt (3.785 l)
Fuel System	32 gal (121.13 l) (208 lb/94.4kg)
Dimensions and Heights:	
Overall Length (max)	89 in. (226.06 cm)
Overall Width (max)	71 in. (180.34 cm)
Overall Height (max)	49 in. (124.46 cm)
Clearance (rein)	9 in. (22.86 cm)
Net Weight (wet)	1175 lbs (533 kg)
Net Height (dry)	960 lbs (435.45 kg)

## 2. FRAME AND HOUSING

### Air Filter

DOD Drawing Number	83-14441
Manufacturer	Pall Land Marine

## 3. DC ELECTRICAL AND CONTROL SYSTEM

### Battery (Lead-Acid)

Specification	M83769/6-1
Manufacturer	Concorde Battery



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1-11. TABULATED DATA. (cont)

3. DC ELECTRICAL AND CONTROL SYSTEM (cont)

Capacity

Nominal Voltage	24 Vdc
Rated Capacity	31 amp-hours
Discharge Rate	330 amps
Charging Rate	3.1 amps

Generator Electronic  
Control Module (GECM)

DOD Drawing Number	84-14134
--------------------	----------

4. ELECTRICAL POWER GENERATION AND CONTROL SYSTEM

Starter Assembly

Manufacturer	Tiernay Turbines Inc
Part Number	101679-1
System	24 Vdc

Generator

DOD Drawing Number	84-14135
Manufacturer	Teledyne Brown
Model	481-007
Load Provisioning Delay	60 sec
Operating Temperature	-65°F (-53.9°C) to 125°F (51.7°C)
Power Output	10kW at 10 to 35 Vdc
Current Limits	285 amps at 35 Vdc 357 amps at 28 Vdc 435 amps at 23 Vdc 1000 to 600 amps at 10 to 17 Vdc for 30 sec
Weight	56 lb (25.4 kg)

Circuit Breaker

Specification	MS25244-10
Operating Voltage	28 Vdc
Rating	10 amps
Interrupt Capacity	3500 amps at 28 Vdc
Dielectric Strength	1500V rm (min)

# 1-11. TABULATED DATA. (cont)

## 5. FUEL SYSTEM

### Electrical Fuel Pump (Transfer Pump)

DOD Drawing Number	83-14281
Manufacturer	Tiernay Turbines Inc
Capacity	25 gph (94.64 Lph)
output	7 psi (48.26 Pa)

### Fluid Filter (Primary)

DOD Drawing Number	83-14283
Manufacturer	Parker Hannifin
Part Number	PFF-1-XX-14383
Specification	MIL-F-20627, Type I, Class I
Filter Element	
Part Number	MIL-F-20627, Type II, Class 5
Filtration Rating	40 microns

### Fluid Filter (Secondary)

DOD Drawing Number	83-14279
Manufacturer	Parker Hannifin
Part Number	15P-1-XX-14256
Filter Element	
Part Number	927472
Filtration Rating	5 microns

### Engine Fuel Tank

DOD Drawing Number	83-14108
Manufacturer	Tiernay Turbines Inc
Capacity	32 gal (121.13 l)
Operating Time	4 hours

### Electrical Fuel Pump (High Pressure Pump)

DOD Drawing Number	83-14280
Manufacturer	Tiernay Turbines Inc
Part Number	101537-1
Rated Capacity	10.3 gph (38.99 Lph) at 200 psi (1379 kPa)

### Solenoid Valve

DOD Drawing Number	83-14251
Manufacturer	Tiernay Turbines Inc
Part Number	101541-1

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1-11. TABULATED DATA. (cont)

5. FUEL system (cont)

Atomizers

Part Number	101488-1
Manufacturer	Tiernay Turbines Inc

6. IGNITION SYSTEM

Ignition Coil

DOD Drawing Number	83-14249
Manufacturer	Tiernay Turbines Inc
Part Number	83-14249
Energy Level	0.3 Joules min spare energy 1.0-1.5 Joules stored energy
Input Voltage	10-30 Vdc
Output Voltage	5 Kv minimum
Input Current	1.5 amps maximum
Spark Rate	4 sparks/sec minimum at 14 Vdc
Duty Cycle	Intermittent - 1 minute on, 15 seconds off, for 3 cycles, then 5 min off

Spark Igniter

Manufacturer	Tiernay Turbines Inc
Part Number	101420-1

7. LUBRICATION ASSEMBLY

Oil Filter

Manufacturer	Tiernay Turbines Inc
Part Number	101483-1

Oil Pump

Manufacturer	Tiernay Turbines Inc
Part Number	101683-2
Rated Capacity	5.3 gpm at 70 psi (482.63 kPa)

Oil Cooler

DOD Drawing Number	83-14165
Manufacturer	Air Draulics
Part Number	010231, TU1041465

1-11. TABULATED DATA. (cont)

7. LUBRICATION ASSEMBLY (cont)

Safety Relief Valve

Manufacturer	Tiernay Turbines Inc
Part Number	101470-1
Type	Spring-loaded, ball type, relief discharge at 25 psi (172.37 kPa)
Rated Flow	3 gpm (11.35 lpm)

8. ENGINE

DOD Drawing Number	83-14254
Manufacturer	Tiernay Turbines Inc
Part Number	101800-1
Model	TT10-1
Type	Gas Turbine
Rated Speed	50,300 rpm (reduced to 12,000 rpm in gearbox)
Rotation	Counterclockwise (facing exhaust port)

Exhaust Gas Temperature

Nominal	620°F (326.6°C) normal day operation
Rated Load	780°F (415.5°C) normal day operation

Weight

Dry	100 lb (45.36 kg)
Wet	108 lb (48.99 kg)

Dimensions

Length (max)	31.00 in. (78.74 cm)
Width (max)	18.28 in. (46.43 cm)
Height (max)	16.05 in. (40.77 cm)

Gearbox Assembly

Manufacturer	Tiernay Turbines Inc
Part Number	101600-1

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1-11. TABULATED DATA. (cont)

9. ENGINE/GENERATOR CONTROLS AND INSTRUMENTS

Engine Electronic Control Module (EECM)

DOD Drawing Number	84-14133
Manufacturer	Tiernay Turbines Inc
Part Number	101700

Panel Lights Switch

Specification	MS24523-22
Type	One pole toggle
Lamp Load Circuit	5 amps
Resistive Circuit	20 amps
Inductive Circuit	15 amps
Operating Voltage	28 Vdc

Master Switch

Specification	MS27407-5
Type	Two pole toggle
Lamp Load Circuit	5 amps
Resistive Circuit	18 amps
Inductive Circuit	10 amps
Operating Voltage	28 Vdc

Contactor Switch

Specification	MS24523-27
Type	One pole toggle
Lamp Load Circuit	4 amps
Resistive Circuit	15 amps
Inductive Circuit	10 amps
Operating Voltage	28 Vdc

DC Circuit Breaker Switch

Specification	MS25244-10
Type	Trip free circuit breaker
Inductive Endurance	2500 cycles
Resistive Endurance	5000 cycles
Operating Force	Pull - 8 lb (9.6 Kg) max Reset - 12 lb (14.4 Kg) max

Incandescent Lamps

Specification	69-594
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ARMY	TM 5-6115-612-12
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# 1-11. TABULATED DATA. (cont)

## 10. RUNNING GEAR

### Running Gear Assembly

DOD Drawing Number  
Manufacturer

83-14102  
Tiernay Turbines Inc

### Tires/Tubes

Specification

Tube per ZZ-I-550E, Group 5 (6.90 x 9.00)  
w/valve per ZZ-V-25D, Type I, Class 4,  
Style Band Blk, Cap TR-VC8  
Tire per ZZ-T-410D, Size 6.90 x 9.00, 4-ply  
Rate D, Group 1 (Tube Type) Type B  
Traction Tread (Directional)

### Caster Wheel Assembly

DOD Drawing Number  
Manufacturer  
Part Number  
Tire Size

83-14440  
Prototype Development Inc  
5952-8  
4.10 X 3.50-6

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# 1-11. TABULATED DATA. (cont)

a. Torque Specifications. Table 1-1 lists the torque specifications applicable to the operator/crew and organizational levels of maintenance.

b. Location and Description of Identification and Instruction Plates. The locations and content of all identification and instruction plates are listed in table 1-2.

c. Diagrams and Schematics. Figure F0-1 shows a generator set wiring installation. Figure F0-2 is a generator set schematic. F0-3 is a generator set wiring diagram. F0-4 is a wiring diagram of the control panel. Foldouts are located at the back of this manual. Figure 1-3 is a schematic of the fuel system. Figure 1-4 is a simplified block diagram of the lubrication system.

TABLE 1-1.

## FINE THREAD SERIES NUTS , BOLTS, SCREWS

Size	Recommended tension		Maximum	
	Inch pounds	Newton meters	Inch pounds	Newton meters
8-36	12-15	1.4-1.7	20	2.3
10-32	20-25	2.3-2.8	40	4.5
1/4-28	50-70	5.7-7.9	100	11.3
5/16-24	100-140	11.3-15.8	225	25.4
3/8-24	160-190	18.1-21.5	390	44.1
7/16-20	450-500	50.9-56.5	840	94.9
1/2-20	480-690	54.2-78.0	1100	124.3
9/16-18	800-1000	90.4-113.0	1600	180.8
5/8-18	1100-1300	124.3-146.9	240	271.2
3/4-16	2300-2500	259.9-282.5	5000	565.0
7/8-14	2500-3000	282.5-339.0	7000	791.0
1-14	3700-5500	418.1-621.5	10000	1130.0

1-11. TABULATED DATA. (cont)

TABLE 1-1. Torque Specifications - Continued

COARSE THREAD SERIES NUTS, BOLTS, SCREWS				
Size	Recommended tension		Maximum	
	Inch pounds	Newton meters	Inch pounds	Newton meters
8-32	12-15	1.4-1.7	20	2.3
10-24	20-25	2.3-2.8	35	4.0
1/4-20	40-50	4.5-5.7	75	8.5
5/16-18	80-90	9.0-10.2	160	18.1
3/8-16	160-185	18.1-20.9	275	31.1
7/16-14	235-255	26.6-28.8	475	53.7
1/2-13	400-480	45.2-54.2	880	99.4
9/16-12	500-700	56.5-79.1	1100	124.3
5/8-11	700-900	79.1-101.7	1500	169.5
3/4-10	1150-1600	129.6-180.8	2500	282.5
7/8-9	2200-3000	248.6-339.0	4600	519.8
1-8	3700-5000	418.1-565.0	7600	858.3

FLARED TUBING AND HOSE FITTINGS					
Tube dash #	Fitting thread size	All aluminum parts		Steel tube, aluminum or steel nuts	
		Inch pounds	Newton meters	Inch pounds	Newton meters
2	5/16-24	None	None	35-40	4.0-4.5
3	3/8-24	20-50	2.3-5.7	90-100	10.2-11.3
4	7/16-24	40-60	4.5-6.8	135-150	15.3-17.0
5	1/2-20	60-80	6.8-9.0	180-200	20.3-22.6
6	9/16-18	75-125	8.5-14.1	270-300	30.5-33.9
8	3/4-1 8	150-250	17.0-28.2	450-550	50.8-62.2
10	7/8-14	200-350	22.6-39.6	650-770	73.5-87.0
12	1-1/16-12	300-492	33.9-55.6	900-1092	101 .7-123.4
18	1-5/16-12	492-696	55.6-78.6	1200-1536	135.6-173.6
20	1-5/8-12	600-900	67.8-101.7	1500-1800	169.5-203.4
24	1-7/8-12	600-900	67.8-101.7	1896-2196	214.2-248.1



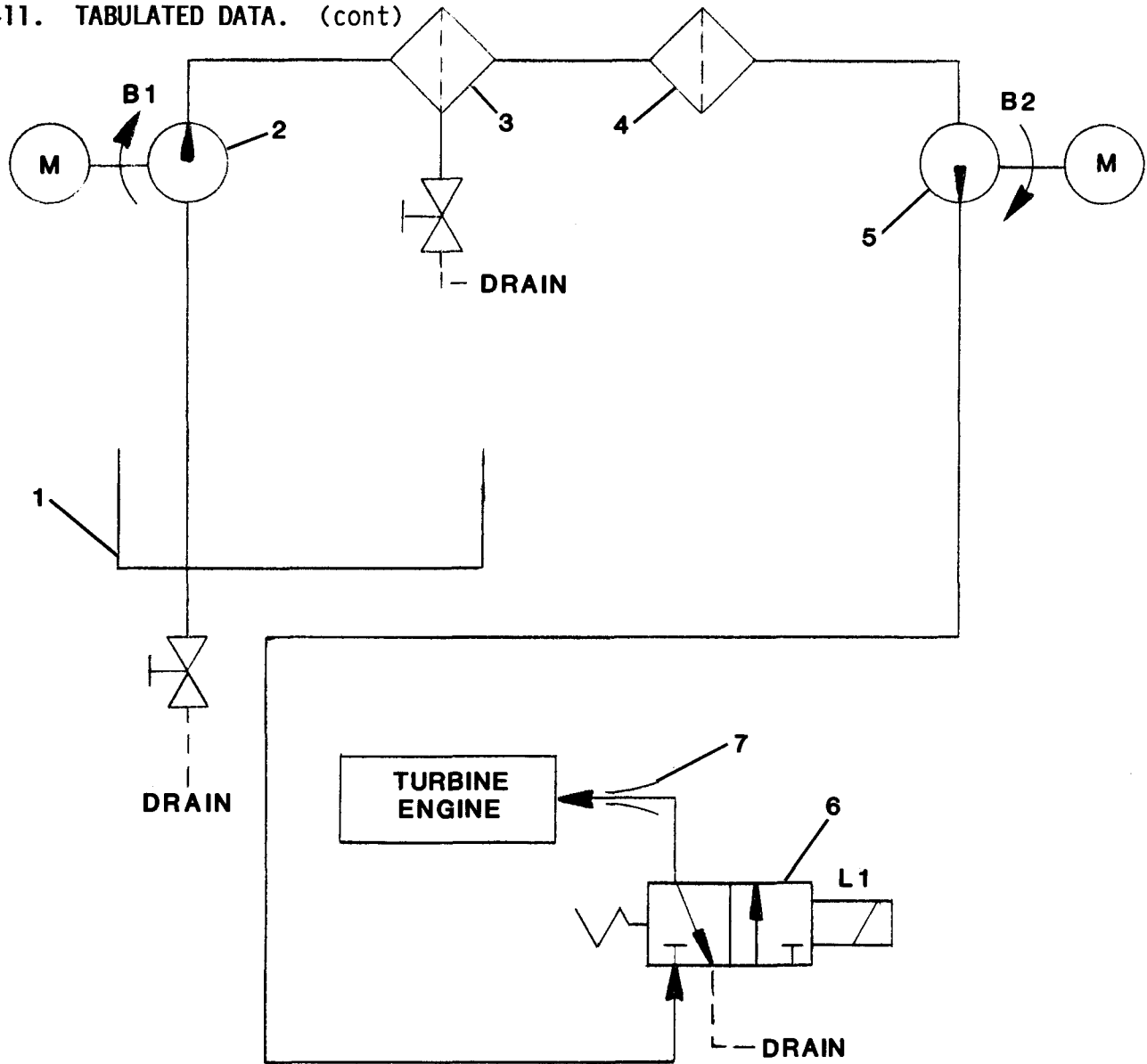
ARMY TM 5-6115-612-12  
MARINE CORPS TM 6115-12/7  
AIR FORCE TO 35C2-3-471-1  
NAVY AG-320B0-0MM-000

1-11. TABULATED DATA. (cont)

Table 1-2. Identification and Instruction Plates

Plate name	Plate location	Plate information
Towing Speed	Front of generator set	Shows maximum towing speed and plate ID/drawing number
Tire Inflation Pressure	Left side of generator set on control panel access door	Shows proper tire inflation pressures and plate ID/drawing number
Slave Receptacle	Back of generator set	Identifies location of slave receptacle with plate ID/drawing number
Ground Stud	Located on left side of tongue in front of fuel tank	Identifies location of ground with plate ID/drawing number
Generator Set Identification	Located center of control panel access door on left side of generator set	Shows identification number and certain operating characteristics of the generator set, and plate ID/drawing number.
Operating Instructions	Inside control panel access door	Shows preoperating and operating procedures, a caution note, and plate ID/drawing number.
Wiring and Schematic Diagrams	Inside control panel access door	Shows wiring diagrams of electrical components and plate ID/drawing number
Fuel and Lubricant Specifications	Inside control panel access door on front of EECM access cover	Provides fuel and lubricant specifications with temperature ranges and plate/ID drawing number
System Schematic	On back of EECM access cover	Shows system schematic and plate/ID drawing number.

1-11. TABULATED DATA. (cont)



LEGEND

- |                                    |   |
|------------------------------------|---|
| 1. FUEL TANK                       | 5. ELECTRICAL FUEL PUMP (HIGH PRESSURE) |
| 2. ELECTRICAL FUEL PUMP (TRANSFER) | 6. SOLENOID VALVE                       |
| 3. PRIMARY FLUID FILTER            | 7. FUEL NOZZLES                         |
| 4. SECONDARY FLUID FILTER          |   |

Figure 1-3. Fuel System Schematic

1-11. TABULATED DATA. (cont)

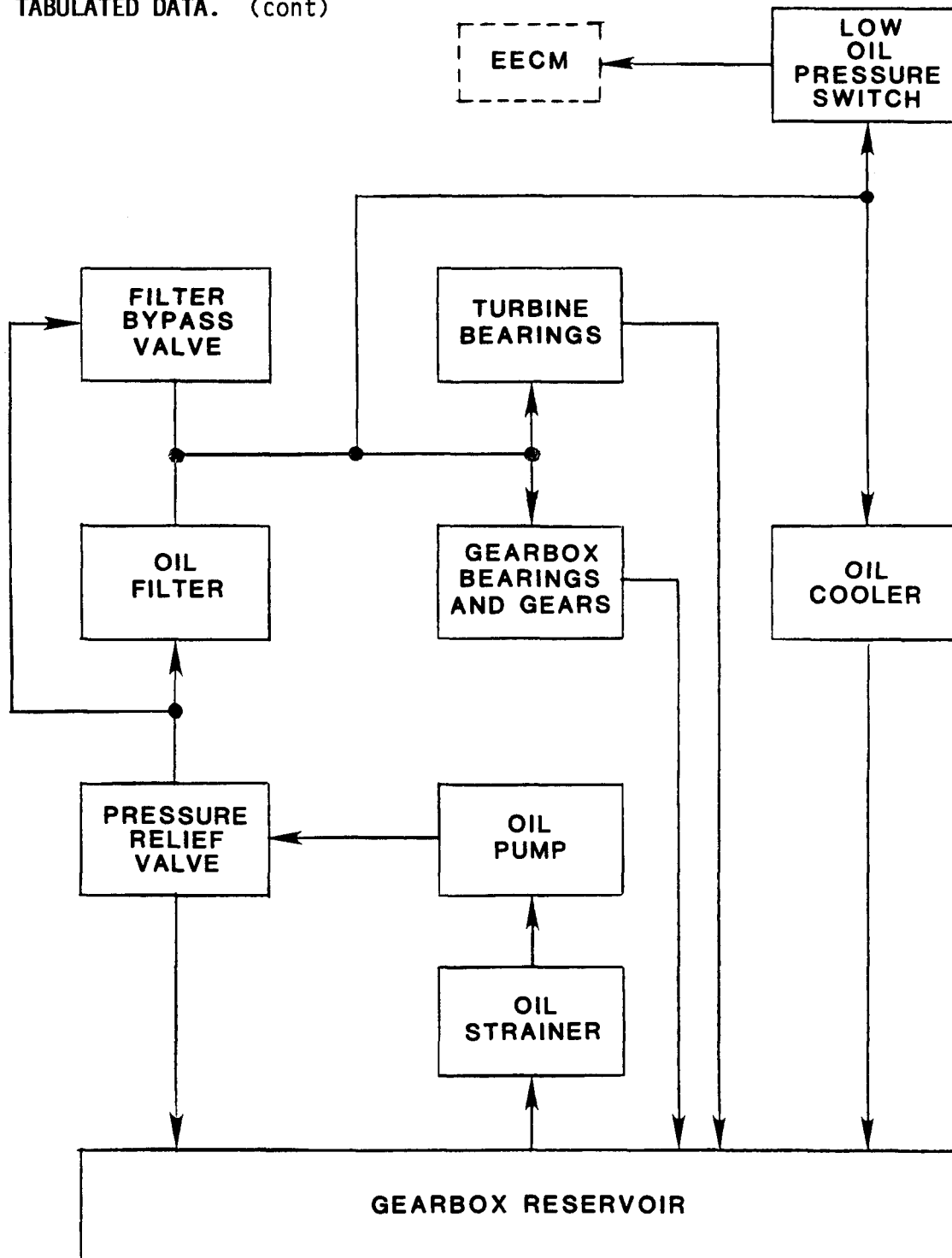


Figure 1-4. Lubrication System Simplified Block Diagram

## CHAPTER 2

### OPERATING INSTRUCTIONS

#### Section I. OPERATING PROCEDURES

2-1. **GENERAL.** This section contains procedures for operating the generator set under normal conditions. These procedures are intended to familiarize the operator with control and operation of the generator set.

2-2. **CONTROLS AND INDICATORS.** Information on description, function, and normal operating positions of controls and indicators is listed in table 2-1. Control panel controls and indicators are shown in figure 2-1.

Table 2-1. Controls and Indicators

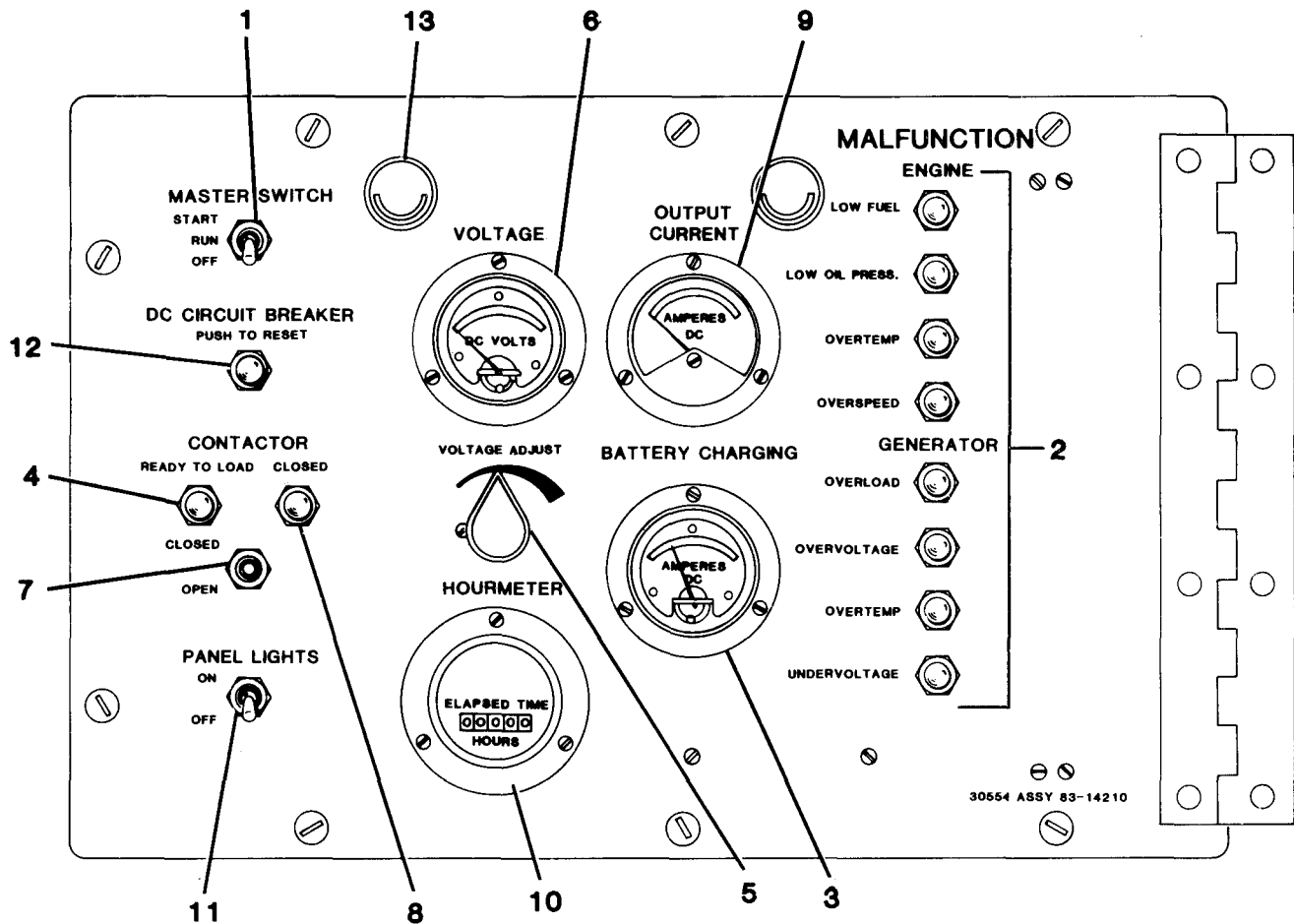
Control or indicator	Function	Normal operating position
MASTER SWITCH Toggle switch	Three-position toggle switch. RUN activates electrical and fuel systems. START position starts engine. OFF position shuts generator set OFF.	RUN
CONTACTOR Toggle switch	Opens and closes contactor.	CLOSED
READY TO LOAD Light indicator	Illuminates when set is running at 100% rpm (green).	off
CLOSED Light indicator	Illuminates when contactor is closed (yellow).	On
VOLTAGE DC voltmeter	Provides indication of dc volts.	28 Vdc
VOLTAGE ADJUST Potentiometer	Adjusted to maintain output voltage.	Midrange
OUTPUT CURRENT Output ammeter	Provides indication of output amperage.	Variable
BATTERY CHARGING Battery charging ammeter	Provides indication of battery charging rate.	To right of zero
DC CIRCUIT BREAKER (Pushbutton - press-to-reset)	Provides protection for dc electrical system.	Reset button pushed in

ARMY	TM 5-6115-612-12
MARINE CORPS	TM 6115-12/7
AIR FORCE	TO 35C2-3-471-1
NAVY	AG-320B0-0MM-000

## 2-2. CONTROLS AND INDICATORS. (cont)

Table 2-1. Controls and Indicators - Continued		
Control or indicator	Function	Normal operating position
HOURLMETER Time totalizing meter	Indicates total engine operating hours at 100% rated load.	- -
PANEL LIGHTS Toggle switch	Turns on control panel lights.	OFF
LOW FUEL Indicator light (press-to-test)	Installed - not functional.	- -
LOW OIL PRESS Indicator light (press-to-test)	Red light indicates low oil pressure in lubrication system.	off
OVERTEMP Indicator light (press-to-test)	Red light indicates high engine temperature.	off
OVERSPEED Indicator light (press-to-test)	Red light indicates engine overspeed. Will also come on to indicate underspeed.	off
OVERLOAD Indicator light (press-to-test)	Red light indicates excessive current demand.	off
OVERVOLTAGE Indicator light (press-to-test)	Red light indicates excessive output voltage.	off
OVERTEMP Indicator light (press-to-test)	Red light indicates excessive generator temperature.	off
UNDERVOLTAGE Indicator light (press-to-test)	Red light indicates undervoltage output .	off
Manual Control Lever handbrake	Sets or releases brake system.	Set

2-2. CONTROLS AND INDICATORS. (cont)



LEGEND

- |                                  |                           |
|----------------------------------|---------------------------|
| 1. MASTER SWITCH                 | 8. CONTACTOR CLOSED LIGHT |
| 2. MALFUNCTION INDICATOR LIGHTS  | 9. OUTPUT CURRENT AMMETER |
| 3. BATTERY CHARGING AMMETER      | 10. HOURMETER             |
| 4. CONTACTOR READY TO LOAD LIGHT | 11. PANEL LIGHTS SWITCH   |
| 5. VOLTAGE ADJUST KNOB           | 12. DC CIRCUIT BREAKER    |
| 6. VOLTAGE DC VOLTMETER          | 13. PANEL LIGHTS          |
| 7. CONTACTOR SWITCH              |                           |

Figure 2-1. Control Panel Controls and Indicators

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MARINE CORPS TM 6115-12/7  
AIR FORCE TO 35C2-3-471-1  
NAVY AG-320B0-0MM-000

2-3. **STARTING THE GENERATOR SET.**  
The detailed start procedures described in this manual are given in a quick reference form on the operating instructions plate (figure 2-2). See table 1-2 for plate location. Position generator set on a level surface. Generator set start is illustrated in figures 2-3 and 2-4.

**WARNING**

To prevent accidental movement, ensure that handbrake is set when generator set is parked.

Set the Handbrake. Place handbrake lever (figure 2-3, step 1) in ON position to set parking brakes.

**WARNING**

To prevent injury, ensure that generator set is grounded before operation.

b. Grounding the Generator Set.  
Ground the generator set in accordance with paragraph 4-2 and as shown in figure 2-3, step 2.

c. Perform PMCS. Refer to table 3-2 and perform before operation (B) Preventive Maintenance Checks and Services (PMCS). Ensure that fuel and oil levels are at full.

d. Raise Control Panel Access Door. Unlatch, raise, and secure control panel access door. Ensure that fuels and lubricant being used are in accordance with temperature ranges shown on Fuel and Lubricant Specifications plate located on top of engine electronic control module (EECM) access cover. (See figure 2-3, step 3.)

**WARNING**

Explosion, fire, or electrocution may result from frayed, cut, or missing insulation on power cable. Do not place power cable on airframe. Failure to observe this warning could result in injury to personnel or equipment damage.

e. Connect Power Cable. Insert power cable into aircraft receptacle as far as it will go. (See figure 2-4, step 4.)

f. Starting Procedures. See figure 2-4, step 5, and proceed as follows.

**WARNING**

To prevent injury, ensure that ear protection is worn when operating generator set.

**CAUTION**

To prevent damage, do not attempt to start generator set until engine and generator shafts have completely stopped rotating.

**CAUTION**

Do not operate generator set with engine housing access cover removed. Severe damage to engine compressor could result.

(1) Set VOLTAGE ADJUST knob (5, figure 2-1) to midrange.

## 2-3. STARTING THE GENERATOR SET. (cont)

OPERATING INSTRUCTIONS	
<u>PREOPERATION</u>	
1. INSPECT UNIT FOR PHYSICAL DAMAGE. 2. MAKE SURE: ● UNIT IS PROPERLY POSITIONED. ● HANDBRAKE IS APPLIED. ● UNIT IS PROPERLY GROUNDED (NEG GROUND). ● MASTER SWITCH IS IN 'OFF' POSITION. ● VOLTAGE ADJUST KNOB IS AT MIDRANGE.	3. MAKE SURE: ● ALL ACCESS COVERS ARE SECURELY FASTENED. ● TURBINE EXHAUST DOOR OPERATES FREELY. 4. CHECK: ● OPERATION OF PANEL LIGHTS. ● 'PRESS TO TEST' LIGHTS; ADJUST DIMMERS. ● FUEL LEVEL IN TANK.
<u>OPERATION</u>	
<p>CAUTION</p> <p>DO NOT TOW UNLESS UNIT IS OFF AND CABLE IS STOWED. DO NOT OPERATE UNIT WITH ENGINE HOUSING ACCESS COVER REMOVED. DAMAGE TO ENGINE COULD OCCUR.</p> <p>1. CONNECT CABLE TO AIRCRAFT.</p> <p>NOTE FOR MULTIPLE AIRCRAFT STARTS, THIS STEP MAY BE PERFORMED AFTER STEP 5.</p> <p>2. MOVE MASTER SWITCH TO 'RUN'.            3. MOVE CONTACTOR SWITCH TO 'OPEN'.            4. MOVE MASTER SWITCH TO 'START' AND RELEASE.            5. CHECK MALFUNCTION INDICATOR LIGHTS DURING START AND OPERATION. 'LOW VOLTAGE' AND 'LOW OIL PRESSURE' LIGHTS WILL GO OFF BY THE TIME THE GREEN 'READY TO LOAD' LIGHT COMES ON.</p>	<p>WARNING</p> <p>IF ANY MALFUNCTION LIGHT COMES ON AFTER THE GREEN 'READY TO LOAD' LAMP LIGHTS, NOTE MALFUNCTION AND MOVE MASTER SWITCH TO 'OFF'. (FOR TROUBLESHOOTING, SEE TMS-6115-612-12)</p> <p>6. BATTERY CHARGING METER SHOULD SHOW CHARGING.            7. WHEN 'READY TO LOAD' LIGHT COMES ON, ADJUST VOLTAGE TO 28 VOLTS DC.            8. MOVE CONTACTOR SWITCH TO 'CLOSED'.            9. READJUST TO 28 VOLTS DC, IF NECESSARY. SIGNAL PILOT TO START AIRCRAFT.            10. AFTER AIRCRAFT START, MOVE CONTACTOR SWITCH TO 'OPEN'.</p> <p>NOTE IT IS NOT NECESSARY TO SHUT DOWN ENGINE TO MOVE CABLE FROM AIRCRAFT TO AIRCRAFT, BUT CONTACTOR SWITCH MUST BE 'OPEN'.</p>
<u>SHUT DOWN</u>	
1. TO SHUT DOWN UNIT, MOVE MASTER SWITCH TO 'OFF'. 2. REMOVE CABLE FROM AIRCRAFT AND STOW ON CART.	

30554-83-14076

Figure 2-2. Generator Set Operating Instructions Plate



2-3. STARTING THE GENERATOR SET. (cont)

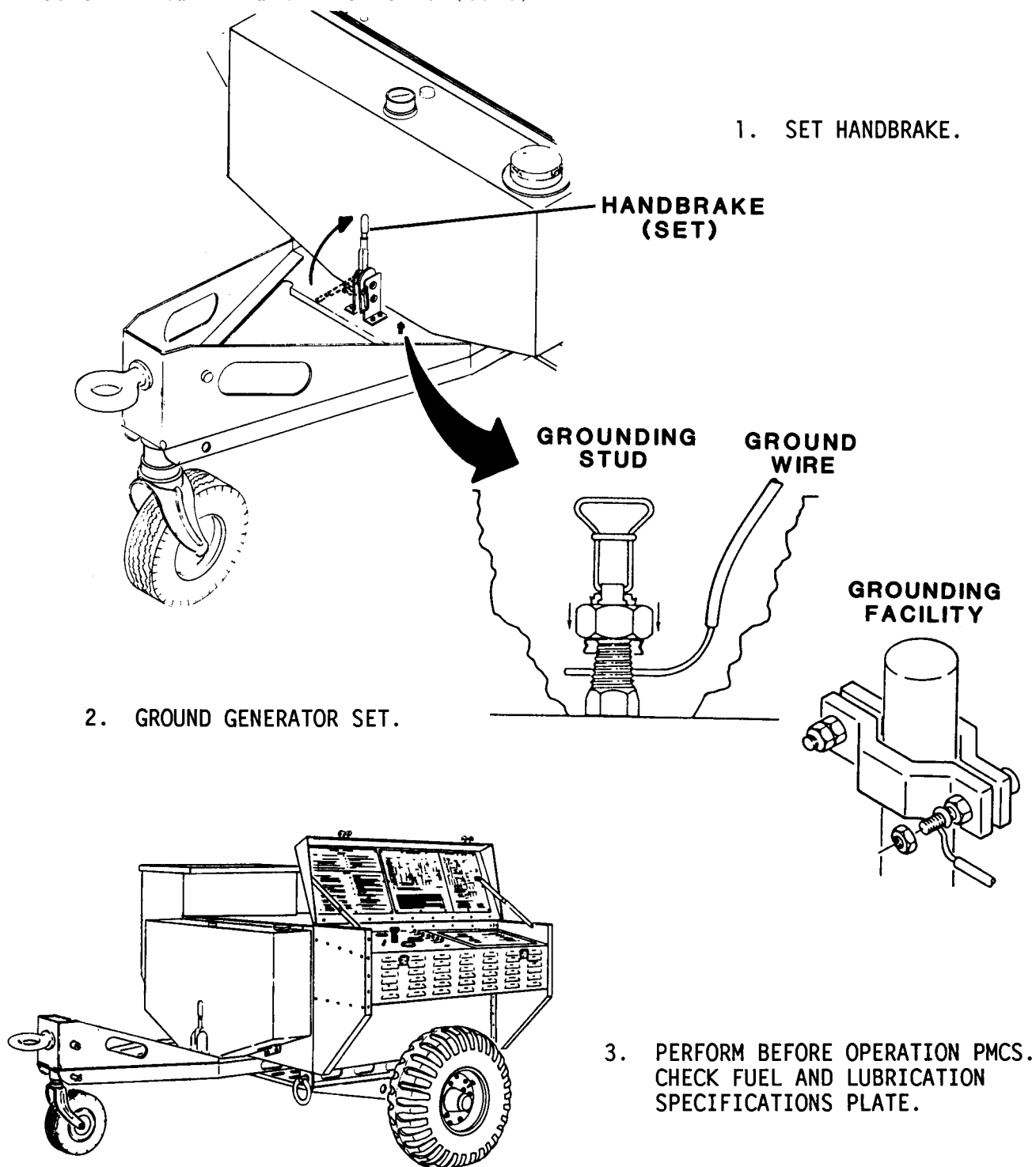
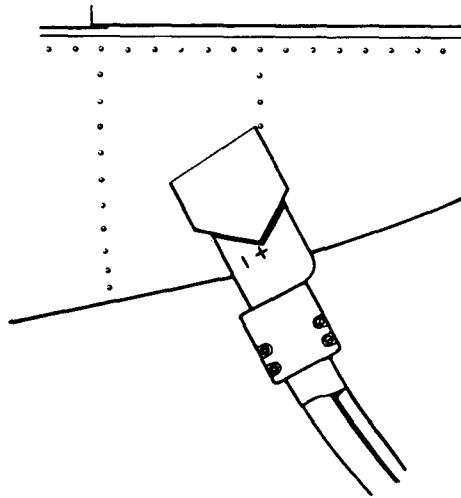


Figure 2-3. Sequence of Operation, Generator Set Start (Steps 1 thru 3)

2-3. STARTING THE GENERATOR SET. (cont)



4. CONNECT POWER CABLE.

5. PERFORM START OPERATIONS  
AT CONTROL PANEL.

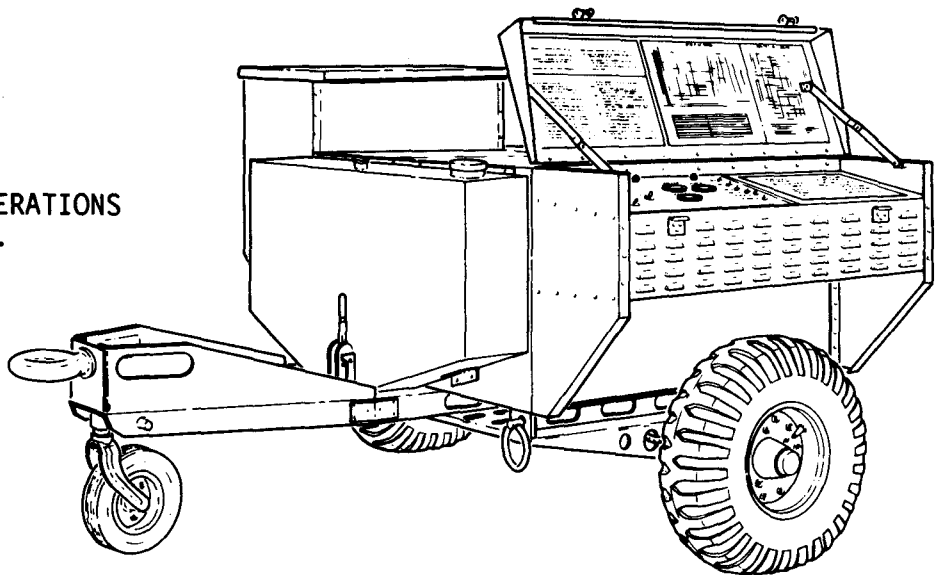


Figure 2-4. Sequence of Operation, Generator Set Start (Steps 4 and 5)

## 2-3. STARTING THE GENERATOR SET. (cont)

### f. Starting Procedures. (cont)

(2) Move MASTER SWITCH (1), to RUN position. LOW OIL PRESS indicator will come on and stay on until pressure in Lubrication system reaches approximately 4 psi (0.11 MPa). UNDERVOLTAGE indicator will come on and stay on until engine reaches 100% rpm and generator is enabled.

#### CAUTION

To prevent equipment damage, ensure that red MALFUNCTION indicator lights (2) are closely monitored during operation. Normally, when a red light comes on the engine will automatically shut down. If automatic shutdown does not occur, immediately move MASTER SWITCH (1) to OFF position. Do not attempt restart until reason for malfunction has been determined and corrected.

(3) Move MASTER SWITCH to START position and release. Engine should start and accelerate to rated speed within 1 minute.

#### CAUTION

If engine rotates but no ignition occurs, do not attempt restart. Check malfunction indicator lights and perform trouble-shooting as necessary.

#### NOTE

Engine life can be enhanced by allowing engine to run for a short time under no load before closing CONTACTOR.

(4) Allow engine to run a minimum of 5 minutes to allow generator set temperatures and electronics to stabilize. Observe READY TO LOAD light (4). Green light indicates engine is at rated speed.

(5) Use VOLTAGE ADJUST knob (5) to adjust VOLTAGE meter (6) reading to 28 Vdc. Clockwise adjustment will increase voltage.

(6) Move CONTACTOR switch (7) to CLOSED position and release. Yellow light will come on. Signal pilot to start aircraft.

#### CAUTION

Do not attempt to adjust VOLTAGE ADJUST knob in response to increases in load demand or decreases in voltage shown on VOLTAGE meter. These adjustments could cause stress on the equipment once the load is removed.

#### NOTE

The generator set provides constant dc voltage except during aircraft starting. The generator electronic control module (GECM) senses voltage at the output connector of the aircraft and automatically adjusts volt/ampere ratio to prevent exceeding 10 kW during aircraft starting.

#### NOTE

Engine life can be enhanced by allowing engine to run for a short time under no load before shutdown.

## 2-3. STARTING THE GENERATOR SET. (cont)

### f. starting Procedures. (cont)

(7) Once aircraft start is accomplished, move CONTACTOR switch to OPEN. Yellow CLOSED light will go off. Allow generator set to run for a minimum of one minute and move MASTER SWITCH to OFF.

#### NOTE

It is not necessary to shut set down when moving short distances to provide continued service. Common sense precautions follow. Include ensuring that contactor switch is open; power cable is disconnected from aircraft, ground cable is disconnected, and avoiding hot

exhaust gases. Do not exceed 5 mph while moving set with engine running.

## 2-4. SLAVE START OPERATION.

a. General. This procedure is used in the event normal starting operations for the generator set cannot be accomplished. A slave start can be accomplished using a jeep, a truck, another generator set, or other vehicle using a jumper connecting cable with proper connection for the slave receptacle.

### b. Slave Start Procedure.

(1) Remove dust cap (figure 2-5) from slave receptacle.

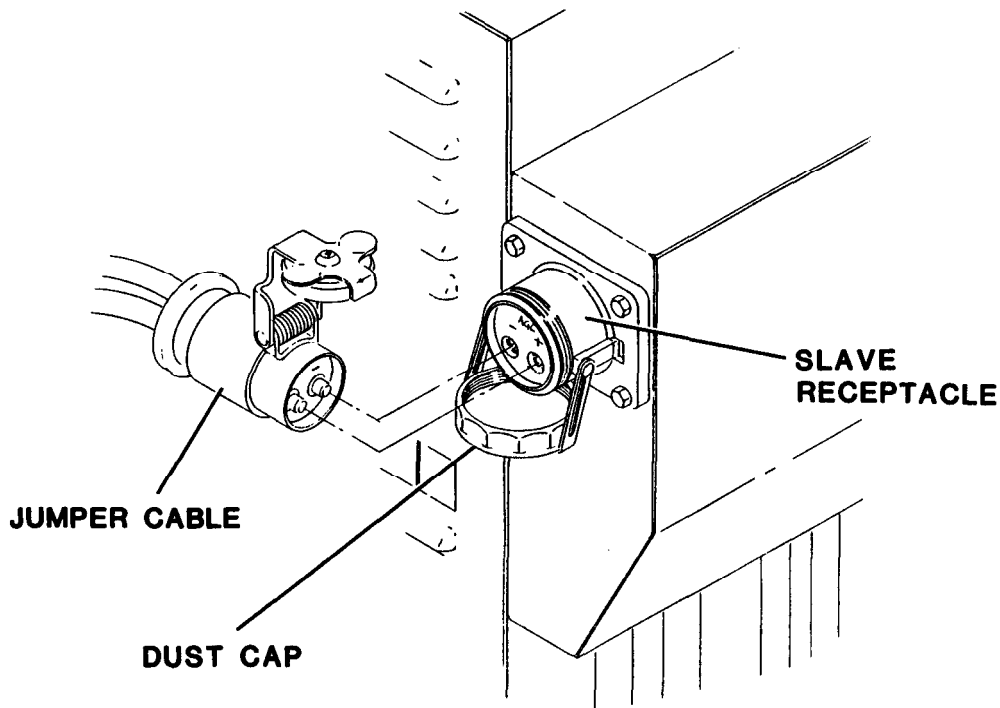


Figure 2-5. Slave Start Connection

## 2-4. SLAVE START OPERATION. (cont)

### b. Slave Start Procedure. (cont)

(2) Insert jumper cable from vehicle into slave receptacle of generator set.

(3) Start generator set in accordance with paragraph 2-3.

(4) When generator set is started, remove jumper cable. Install dust cap on slave receptacle.

## 2-5. REMOVING GENERATOR SET FROM OPERATION.

### Stop Generator Set Engine.

Place CONTACTOR switch in OPEN position. Allow engine to run a minimum of one minute, Move

MASTER SWITCH to OFF position. Close and secure control panel access door.

### NOTE

When generator set is shut down, the fuel shutoff solenoid valve will discharge a small amount of fuel out the bottom of the cart beneath the fuel housing.

### b. Disconnect Power Cable.

Disconnect power cable and stow on cable support at rear of generator set.

### Perform After Operation PMCS.

Refer to Table 3-2 and perform after operation (A) PMCS. Ensure that fuel and oil levels are at full.

## Section II. OPERATION UNDER UNUSUAL CONDITIONS

2-6. GENERAL. The generator set is designed to operate in ambient temperatures of -65°F (-53.9°C) to 125°F (51.70°C). This section provides information for operating the set in extreme environmental conditions.

### 2-7. OPERATION IN EXTREME HEAT.

Procedures for operation of the generator set in extreme heat (ambient temperatures up to 125°F (51.7°C) are identical to normal operating procedures. Allow engine to run a minimum of 10 minutes prior to moving the CONTACTOR switch to the CLOSED position.

### 2-8. OPERATION IN EXTREME COLD.

Procedures for operation of the generator set in extreme cold (defined as ambient temperatures below -25°F (-32°C)) are identical to normal operating procedures. During operation in extreme cold, keep fuel tank full to reduce condensation, The primary fuel filter should be drained of condensation before and after operation.

### a. Open Fuel Housing.

(1) Set handbrake.

(2) Open control panel access door. Ensure MASTER SWITCH is in OFF position. Close control panel access door.

(3) Remove power cable (1, figure 2-6) from cable support assembly (2).

(4) Unlatch and open fuel housing access door (3).

### b. Drain Primary Filter.

(1) Place clear container (4) under fuel drain valve (5) of primary fuel filter (6).

2-8. OPERATION IN EXTREME COLD. (cont)

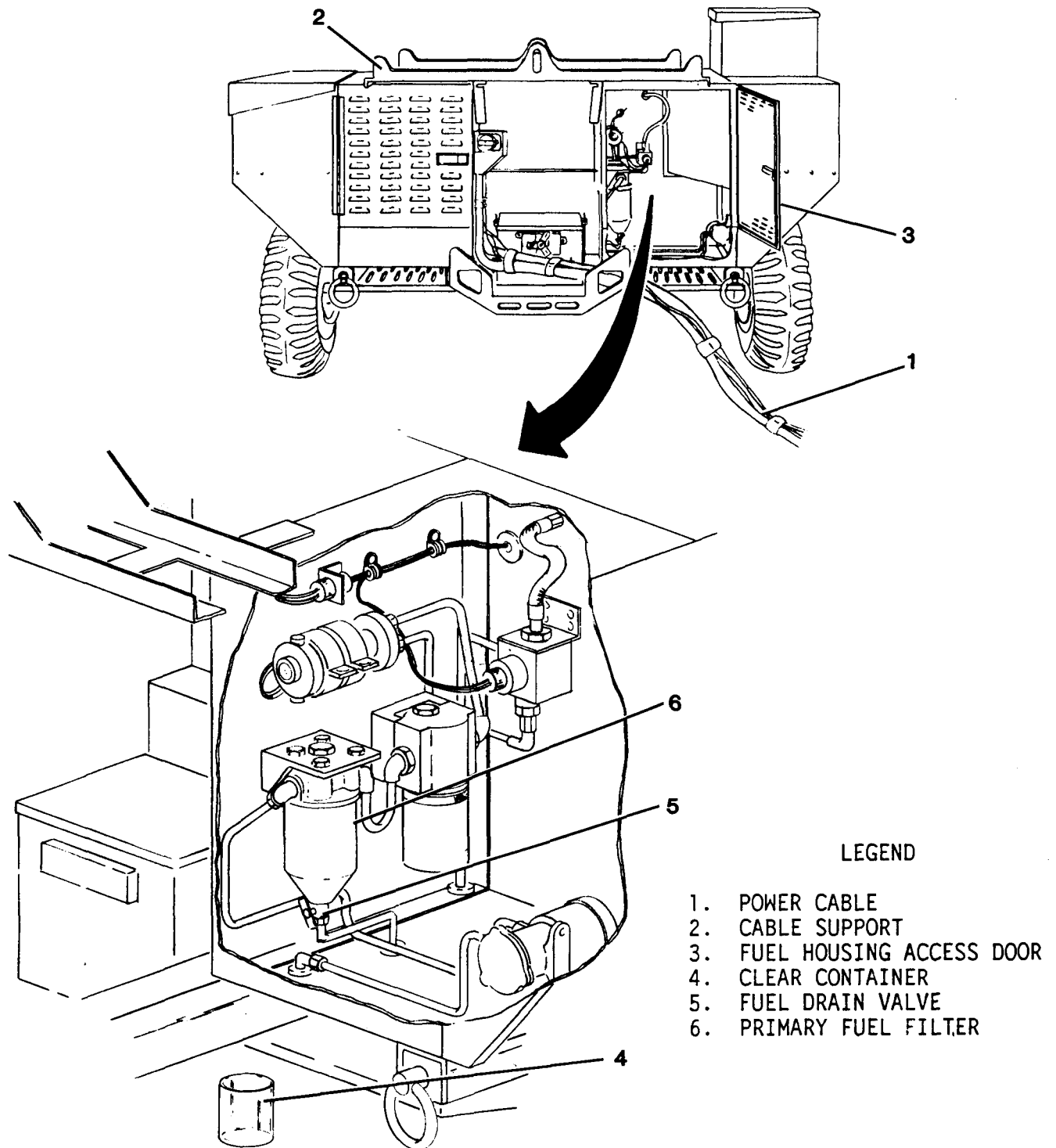


Figure 2-6. Draining Primary Fuel Filter

ARMY TM 5-6115-612-12  
MARINE CORPS TM 6115-12/7  
AIR FORCE TO 35C2-3-471-1  
NAVY AG-320B0-0MM-000

## 2-8. OPERATION IN EXTREME COLD. (cont)

(2) Open fuel drain valve and allow any water and sediment to drain off.

(3) When fuel is clear, close fuel drain valve.

### c. Secure Fuel Housing.

(1) Close and secure fuel housing access door.

(2) Stow power cable on cable support assembly.

**2-9. OPERATION IN HIGH HUMIDITY.** Procedures for operation of the generator set in high humidity or rain are identical to normal operating procedures.

**2-10. OPERATION IN DUSTY AND SANDY AREAS.** Procedures for operation of the generator set in dusty and sandy areas are identical to normal operating procedures.

### Protecting Internal Components.

Keep access doors and covers closed for maximum security of component parts and filters against dust, dirt, and sand.

b. Preventive Maintenance. More frequent cleaning of the generator set may be required when operating in dusty or sandy areas. Accumulated dust and sand shall be removed using a vacuum with a nonmetallic nozzle. Remove grease or fuel deposits and accumulated dust, dirt, and sand.

**2-11. OPERATION IN SALT WATER AREAS.** Procedures for operation of the generator set in salt water areas are identical to normal operating procedures, except that more frequent cleaning and inspection of the generator set may be required.

**2-12. OPERATION AT HIGH ALTITUDES.** Procedures for operation of the generator set at altitudes up to 8000 feet (2438 meters) above sea level are identical to normal operating procedures.

**2-13. OPERATION UNDER SNOWY CONDITIONS.** Procedures for operation of the generator set in snowy conditions are identical to normal operating procedures. Ensure that all air flow louvers are free of snow and ice. Keep snow from accumulating under generator set. Remove all snow and ice from generator set before opening access covers and doors.

## CHAPTER 3

### OPERATOR/CREW MAINTENANCE INSTRUCTIONS

#### Section I. CONSUMABLE OPERATING AND MAINTENANCE SUPPLIES

**3-1. GENERAL.** Consumable operating and maintenance supplies required to perform maintenance or operate the generator set are listed in

Table 3-1. Items listed are identified by assigned National Stock Numbers (NSN)

**Table 3-1. Consumable Operating and Maintenance Supplies**

Component Application	National Stock Number	Description	Qty. required for initial operation	Qty. Required 8 hours operation	Notes
Engine	9150-00-270-4057	Lubricant MIL-L-7808	4 quarts (3 785 liters)		For temperatures -65° F (-53.9° C) to 125° F (51 7° C)
	9150-00-985-7099	MIL-L-23699	4 quarts (3 785 liters)		For temperatures -40° F (-40° C) to 400° F (204.4° C)
Fuel System	9130-00-256-8613	FUEL MIL-T-5624 JP-4/JP-5	32 gallons (121.1 liters)	64 gallons (242 3 liters)	
	6810-00-782-2686	Ethyl Alcohol O-E-760			General Cleaning
	6850-00-331-3350	Solvent PD-680, Type III			General Cleaning
Banned From Use		Trichloroethylene O-T-634			General Cleaning
		Tnchloroethylene 1. 1. 1 MIL-T-81533			Vapor Degreasing
Battery	6810-00-249-9354	Electrolyte			Battery Fluid
	8040-00-826-3535	Distilled Water Adhesive, Locking MIL-A-46050			Battery Service General Repair
Power Cable		This Is no longer used.			
Spark Igniter	8030-00-059-2761	Anti-seize Compound MIL-A-907E FSC 8030 (MO11-2836)			



Table 3-1. Consumable Operating and Maintenance Supplies - Continued

Component Application	National Stock Number	Description	Qty. required for initial operation	Qty. required 8 hours operation	Notes
Turnlock Fasteners	8030-00-180-6150	Thread-locking Compound MIL-S46163A FSC 8030 (MO11-3301)			
Fasteners	8030-00-292-1102	Sealing Compound MIL-R-46082B FSC 8030 (X550-2193) MIL-S-22473E FSC ,8030 (X552-2455)			Reassembly Procedures
Swivel Caster	9150-00-721-8570	Grease, Automotive and Artillery MIL-G-10924-27 FSC 9150 (M117-2717)			See Lubrication Order (LO)
Fasteners	6850-00-880-7616	Silicone Compound MIL-S-8660			Reassembly Procedures
Hose Fittings		Petrolatum, Technical VV-P-236			Assembly and Repair
	5350-00-268-3116	Cloth, Abrasive, Crocus P-C-458			General Repair
Fuel Nozzles and Atomizers	6850-00-965-2332	Orthodichlorobenzene MIL-C-25107B FCS 6850 (M 101-2742) Calibrating Fluid MIL-C-7024, Type II			Carbon Removal  Testing
Insulation		Edge Sealer ADM6SE80-PB Wire, Lock MS20995-NC20 FSC 95-5 (D 401-1357)	1 gallon (3 78 liters)	Installation	Reassembly Procedures
	3439-00-184-8960	Solder SN60WRMAP3 (QQ-S-571)		Electrical Repair	
	6850-00-550-5565	Alkaline		Carbon Removal	

## Section II. LUBRICATION INSTRUCTIONS

**3-2. GENERAL.** This section contains a reproduction of the lubrication order and lubrication instructions that are supplemental to, and not specifically covered in, the lubrication order. The lubrication order is an exact reproduction of the approved lubrication order. Refer to Army LO 5-6115-612-12.

a. Lubricant and Equipment Storage. 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 to use.

b. Checking and Adding Lubrication oil.

(1) Unscrew and remove oil filler cap (figure 3-1).

(2) Wipe oil level gage clean.

(3) Reinsert oil level gage and tighten oil filler cap finger tight.

(4) Unscrew and remove oil filler cap.

(5) Check oil level on oil level gage. Add lubricating oil as necessary to obtain FULL reading on oil level gage. Refer to lubrication order (figure 3-2) for proper lubricating oil.

(6) Reinsert oil level gage and hand tighten oil filler cap.

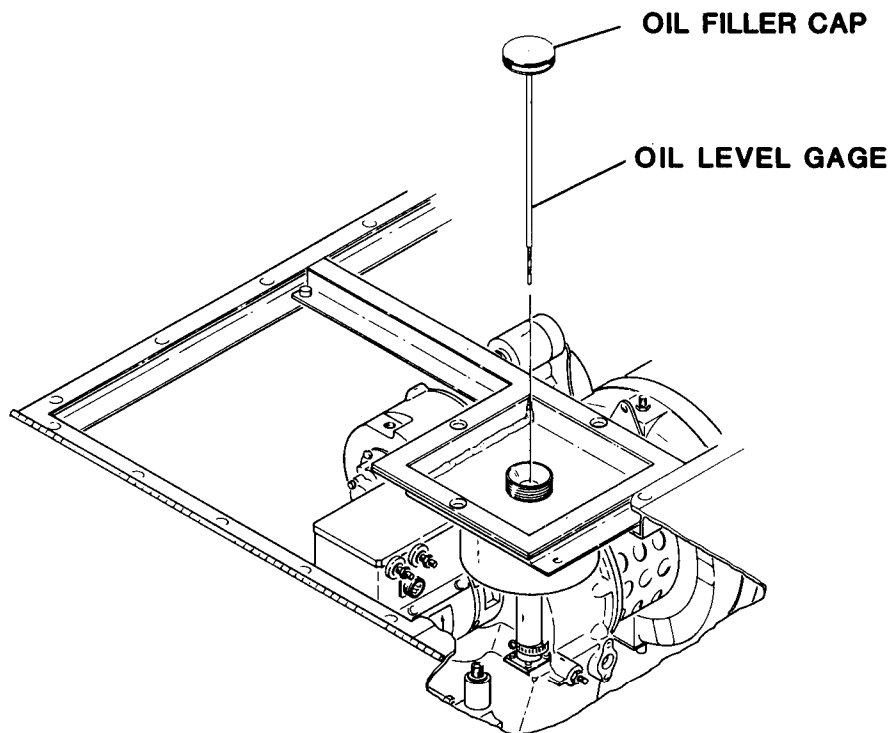


Figure 3-1. Checking Lubricating Oil

ARMY TM 5-6115-612-12  
MARINE CORPS TM 6115-12/7  
AIR FORCE TO 35C2-3-471-1  
NAVY AG-320B0-0MM-000

### 3-2. GENERAL. (cont)

## LUBRICATION ORDER

# L05-6115-612-12

## AVIATION GENERATOR SET, GAS TURBINE ENGINE DRIVEN INTEGRAL TRAILER MOUNTED, 10KW, 28 VOLTS DC

**DOD MODEL**  
**MEP 362A**

**CLASS**  
**PRECISE**

**NSN**  
**6115-01-161-3992**

Reference: TM5-6115-612-12

Intervals (on-condition or hard time) and the related manhour times are based on normal operation. The manhour time specified is the time you need to do all the services prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied unless changed by the Army Oil Analysis Program (AOAP) laboratory. Change the hard time interval if your lubricants are contaminated or if you are operating equipment under adverse operating conditions, including longer-than-usual operating hours. The hard time interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals will be applied in the event AOAP laboratory support is not available.

Clean fittings before lubricating. Clean parts with dry cleaning solvent (SD) type II or equivalent. Dry before lubricating.

The lowest level of maintenance authorized to lubricate a point is indicated by one of the following symbols as appropriate: Operator/crew (C); and Organizational Maintenance (O).

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 direct to Commander, U.S. Army Troop support Command, ATT: AMSTR-MCTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished to you.

### LUBRICANT ● INTERVAL

### INTERVAL ● LUBRICANT

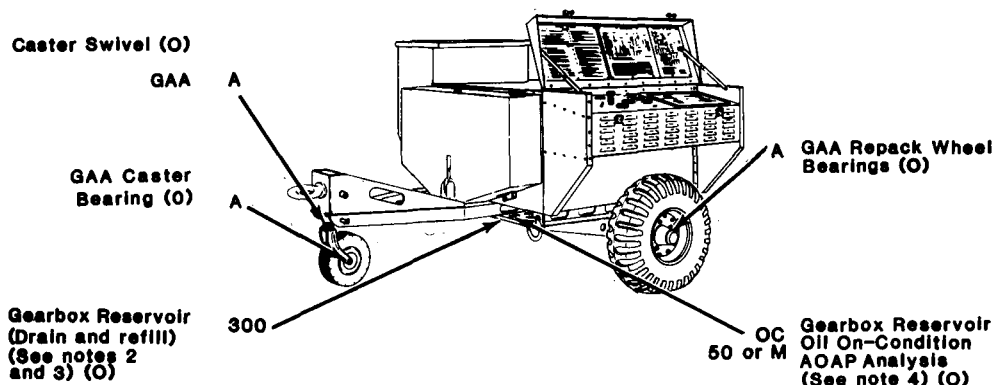


Figure 3-2. Lubrication Order (Sheet 1 of 2)

3-2. GENERAL. (cont)

**LUBRICANT ● INTERVAL**

**INTERVAL ● LUBRICANT**

The diagram shows a side view of a generator set. A dipstick labeled 'C' is shown with an arrow pointing to the 'Oil Level (C) ---' label. A circular component labeled '300' is shown with an arrow pointing to the 'Oil Filter (See note 3) (O)' label.

TOTAL MANHOURS		TOTAL MANHOURS	
INTERVAL	MANHOURS	INTERVAL	MANHOURS
A	1.5	M	0.1
D	0.1	300	0.5

LUBRICANTS		CAPACITIES	EXPECTED TEMPERATURES			INTERVALS
			ABOVE +32°F (ABOVE 0°C)	+40°F to -10°F (-6°C TO -23°C)	0°F to -66°F (-18°C TO -54°C)	
GAA	GREASE	As required.	ALL TEMPERATURES			For arctic operation, refer to FM 9-207.
(MIL-G-10924	Caster swivel and bearing. Wheel bearings.					
LGT	LUBRICATING OIL	ALL TEMPERATURES				
MIL-L-7808	Gearbox					
---	LUBRICATING OIL	ALL TEMPERATURES TO -40°F (-40°C)				
MIL-L-23699	Gearbox					

**NOTES:**

**CAUTION**  
**DO NOT OVERFILL**  
**DO NOT MIX LUBRICANTS**

- OIL LEVEL.** Check oil level before and after each operation. Fill to FULL mark on dipstick. Do not mix lubricants.
- GEARBOX RESERVOIR.** To drain, loosen turnlock fasteners and remove fuel/oil drain access cover from bottom of generator set. Pull oil drain tube through opening. Remove oil drain plug. Drain oil into suitable container. Refill and check level. Do not mix lubricants. If possible, attach label giving type of lubricant and date changed.
- OIL FILTER.** Install new oil filter when oil is changed (Note 2).
- GEARBOX RESERVOIR OIL.** A sample of the oil shall be sent to an AOAP laboratory for analysis at an interval of 50 hours or monthly. Refer to TB

43-0210 for sampling requirements. When AOAP laboratory support is not available, drain and refill reservoir every 300 hours (Note 2).

A copy of this Lubrication Order will remain with the equipment at all times. Instructions contained herein are mandatory.

By Order of the Secretaries of the Army and the Navy

JOHN A. WICKHAM, JR.  
General, United States Army  
Chief of Staff

Official:

R. L. DILWORTH  
Brigadier General, United States Army  
The Adjutant General

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Lieutenant General, USMC  
Deputy Chief of Staff for Installations and Logistics

Figure 3-2. Lubrication Order (Sheet 2 of 2)

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NAVY AG-320B0-0MM-000

### Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

**3-3. GENERAL.** To ensure 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 checks and services (PMCS) that are to be performed by Operator/Crew personnel are listed and described in table 3-2. Defects discovered during operation shall be noted for future correction. Stop operation immediately if a deficiency is noted that could damage the equipment. All deficiencies and shortcomings shall be recorded on the applicable form together with the corrective actions taken. Air Force users

shall refer to the applicable inspection manuals and work card sets in the TO 35C2-3 series for periodic requirements, and table 3-2 for detailed procedures. Marine Corps users shall refer to current issue of TM 11275-15-1.

**3-4. (A, N, MC) PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** Table 3-2 provides a listing of PMCS that shall be performed by the Operator/Crew personnel. The item numbers are listed consecutively and indicate the sequence of performance.

Table 3-2. Preventive Maintenance Checks and Services (PMCS)

	B - Before operation	0.5
	D - During operation	0.2
	A - After operation	<u>0.1</u>
	Total M/H:	0.8
Interval		
Operator		Work
Daily	Items to be inspected	Time
B D A	<u>Inspection procedures</u>	<u>M/H</u>
1	<u>GENERATOR SET</u> Set handbrake. Visually inspect unit for physical damage. Check ground cable and ensure that generator set is properly grounded. Ensure that set is free of tools and rags and that there is no spilled fuel or lubricating oil.	0.1
2	<u>CONTROL PANEL</u> Ensure MASTER SWITCH is in OFF position. Ensure that panel lights and press-to-test indicators operate properly. Inspect meters and indicators for broken glass and missing indicator lamps.	0.1

3-4. (A, N, Mc) (PREVENTIVE MAINTENANCE  
CHECKS AND SERVICES. (cont)

Table 3-2. Preventive Maintenance Checks and Services (PMCS) - Continued

			B – Before operation	0.5
			D – During operation	0.2
			A – After operation	<u>0.1</u>
			Total M/H:	0.8
Interval				
Operator			Work	
Daily			Time	
B	D	A	Items to be inspected Inspection procedures	M/H
3	6	8	<u>FUEL AND LUBRICATING OIL LEVELS</u> Ensure that fuel and oil levels are at full. Check levels every 4 hours during continuous operation. Ensure that oil cap is tightly secured and water drain hole in oil fill recess is clear.	0.3
4			<u>EXHAUST DISCHARGE AND INLET AIR</u> Ensure that exhaust door is free to operate. Ensure that louvers on inlet air housing access cover are free of obstructions.	0.1
5			<u>POWER CABLE AND BATTERY AND CABLES</u> Remove power cable from cable support assembly. Ensure that power cable is free of damage. Inspect battery for damaged case, corrosion on terminals, damaged cables, or loose connections. Check level of electrolyte. Add distilled water to fill battery to filler slots.	0.1
7			<u>FUEL SYSTEM COMPONENTS</u> Inspect fuel system components for leakage. Ensure that all electrical cable connectors are securely tightened.	0.1

## Section IV. TROUBLESHOOTING

### 3-5. GENERAL.

a. Table 3-3 provides troubleshooting information for locating and correcting problems that may develop in the generator set. Each malfunction for an individual component, unit, or system is followed by a list of tests or Inspections that will help determine probable causes and corrective actions to take. Perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur. If a malfunction is not listed or cannot be corrected by listed corrective actions, notify supervisor.

#### NOTE

Before using this table, ensure that all applicable operating checks have been performed.

Table 3-3. Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. STARTER ROTATES ENGINE, BUT COMBUSTION DOES NOT OCCUR.		
	Step 1. Check to ensure adequate fuel supply.	Fill fuel tank.
	Step 2. Unit still fails to operate.	Refer to next higher level of maintenance.
2. MASTER SWITCH IS PLACED IN THE START POSITION, BUT ENGINE DOES NOT ROTATE.		
	Step 1. Check that no malfunction indicator light is on.	Refer to higher level of maintenance if malfunction light is on.
	Step 2. Check that DC CIRCUIT BREAKER reset button is pressed in.	Press DC CIRCUIT BREAKER reset button to reset.
	Step 3. Check battery cable plug connector.	Tighten battery connector.
	Step 4. Unit still fails to operate.	Refer to next higher level of maintenance.

## Section V. OPERATOR/CREW MAINTENANCE INSTRUCTIONS

3-6. **GENERAL.** This section provides instructions to assist the operator in maintaining the generator set. If defective components are noted during inspections or operation, refer to the next higher level of maintenance for repair or replacement.

### 3-7. FRAME AND HOUSING.

a. Tiedown Rings. See figures 1-1 and 1-2 for locations and ensure that tiedown rings are in place, firmly attached, and rotate freely.

b. Cable Support Assembly. See figure 1-2.

(1) Ensure that cable support assembly is in place and firmly attached.

(2) Inspect all surfaces for corrosion and cracked or chipped paint.

3-3. Battery Holddown. See figure

### CAUTION

Battery holddown needs to be secure; however, excessive pressure may cause battery to buckle causing internal shorting.

(1) Ensure that battery holddown is firmly attached.

(2) Inspect battery holddown for rust or corrosion.

d. Access Doors and Covers. See figure 3-4.

(1) Ensure that access doors and covers are free of dents, sharp edges, and holes.

(2) Inspect all surfaces for corrosion and cracked or chipped paint.

(3) Inspect gaskets for damage.

e. Control Fender and Exhaust Fender Assemblies. See figures 1-1 and 1-2.

(1) Ensure that control fender and exhaust fender assemblies are free of dents, holes, and sharp edges.

(2) Inspect for corrosion and cracked or chipped paint.

(3) Ensure that louvers are free of obstructions.

(4) Ensure that hinges and latches are securely attached.

(5) Inspect identification plates for corrosion, legibility, and secure attachment. See table 1-2 for location of plates.

f. Fuel and Inlet Air Housings. See figure 1-2.

(1) Ensure that fuel and inlet air housings are free of dents, holes, and sharp edges.

(2) Inspect for corrosion, and cracked or chipped paint.

(3) Ensure all fasteners are securely attached.



3-7. FRAME AND HOUSING. (cont)

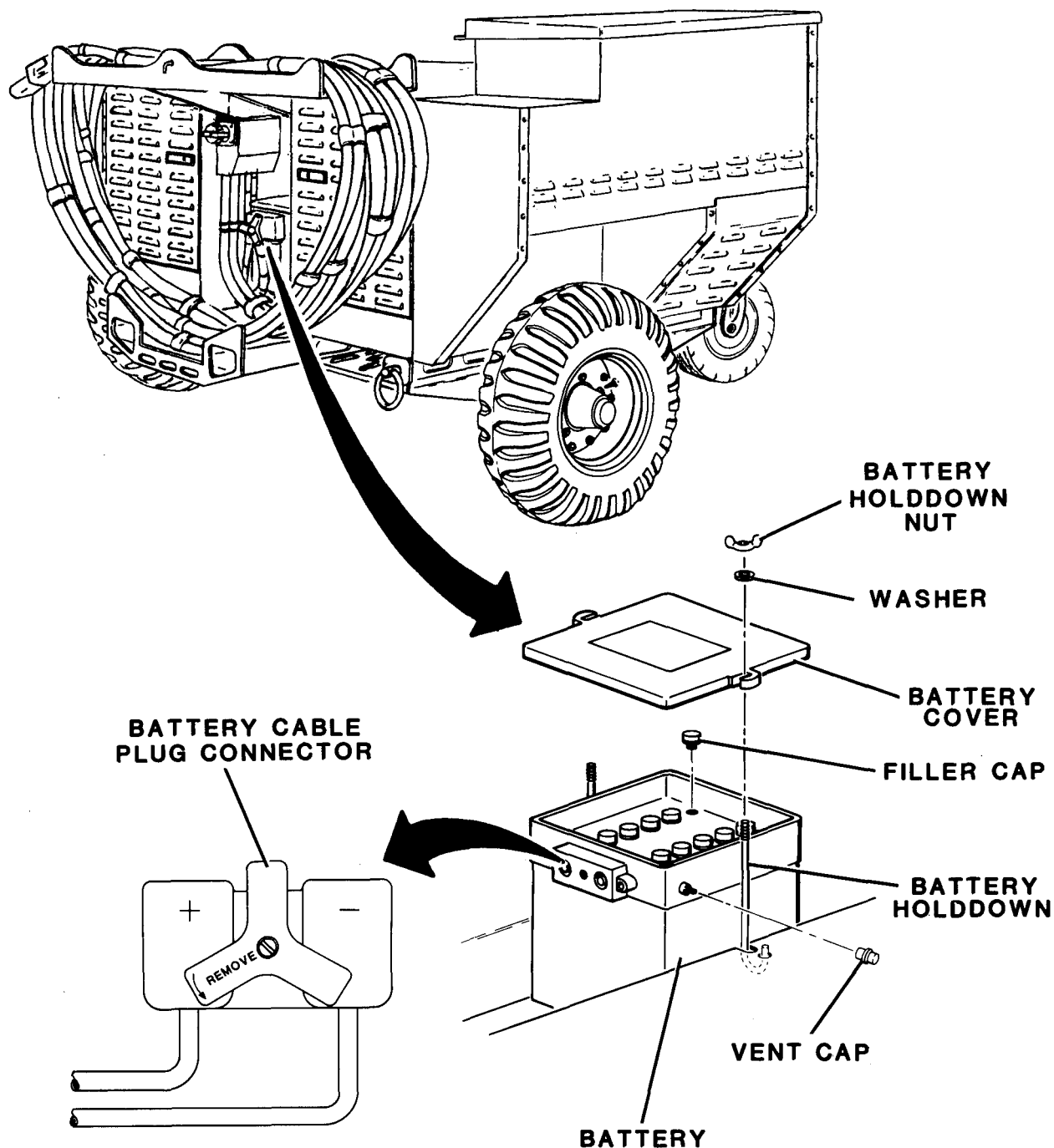


Figure 3-3. Battery Holddown Inspection

3-7. FRAME AND HOUSING. (cont)

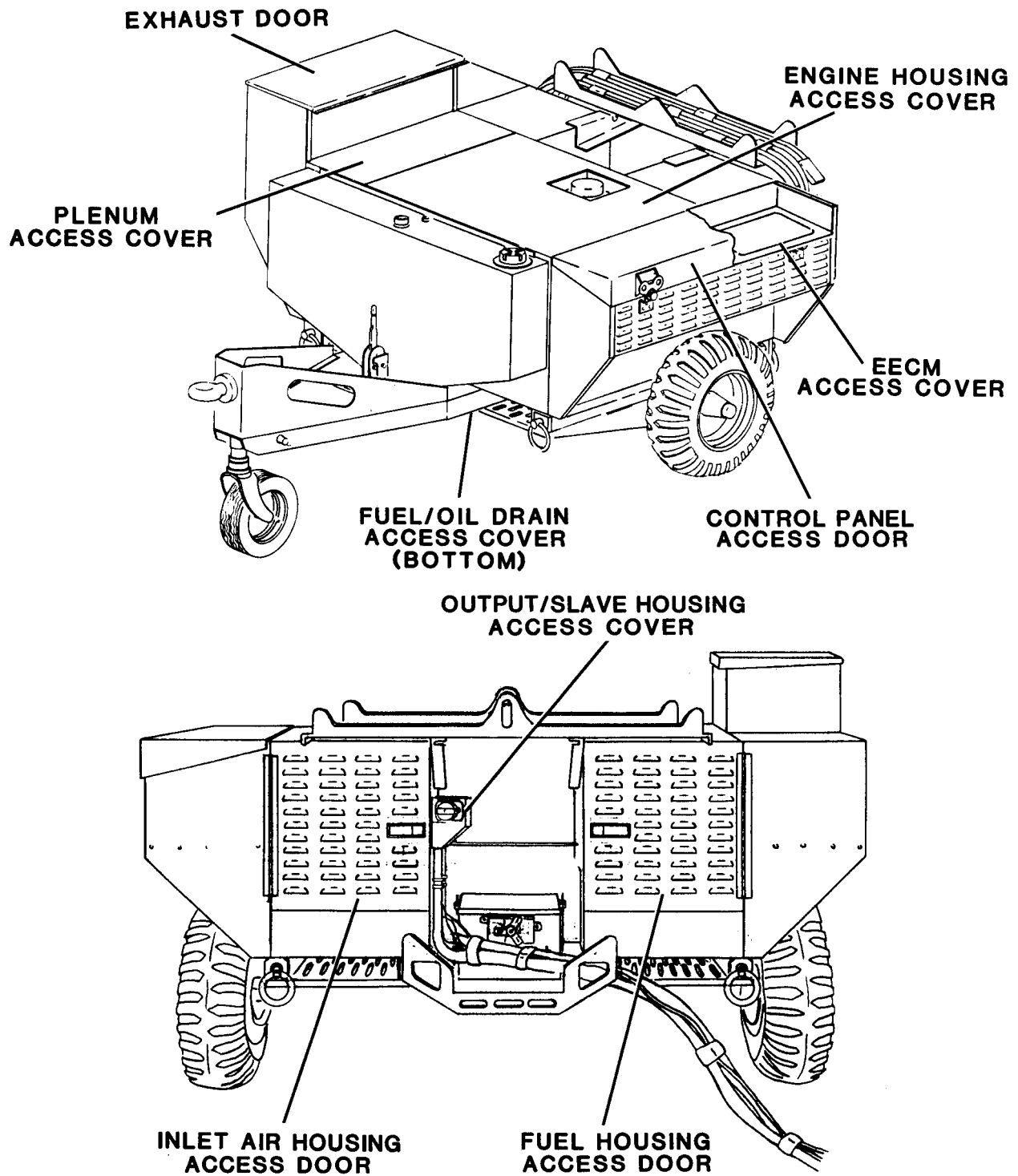


Figure 3-4. Access Covers and Doors Inspection

### 3-7. FRAME AND HOUSING. (cont)

Chassis Frame Assembly. See figure 3-5.

(1) Check for dents, holes, warpage, and cracks.

(2) Check battery holding area for corrosion from battery acid.

(3) Ensure that all bolts and fasteners are tight.

(4) Check forklift tubes for damage.

### 3-8. DC ELECTRICAL AND CONTROL SYSTEM.

a. Battery Cable Assembly. See figure 3-6.

(1) Visually inspect length of battery cable for cracks, abrasions and cuts.

(2) Check battery cable connector for damaged knob, cracks in case, damaged threads, and loose connections.

(3) Ensure that female contacts are securely in place and undamaged.

#### b. Battery.

(1) Inspect casing for cracks, broken caps, and corrosion.

(2) Check electrolyte level.

#### **WARNING**

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(a) Disconnect battery cable plug connector.

(b) Loosen nuts and washers and remove battery holddowns.

(c) Remove battery cover and filler caps.

(d) Add distilled water to fill battery up to vent filler slots.

(e) Install filler caps and battery cover.

(f) Install battery holddown and tighten washers and wingnuts. Ensure that battery is secure.

(g) Connect battery cable plug connector.

Slave Receptacle. See figure 2-5.

(1) Remove dust cap.

(2) Check for loose mounting.

(3) Check for damaged contact pins and foreign material.

(4) Inspect receptacle body for cracks, dents, and corrosion.

(5) Install dust cap.

3-7. FRAME AND HOUSING. (cont)

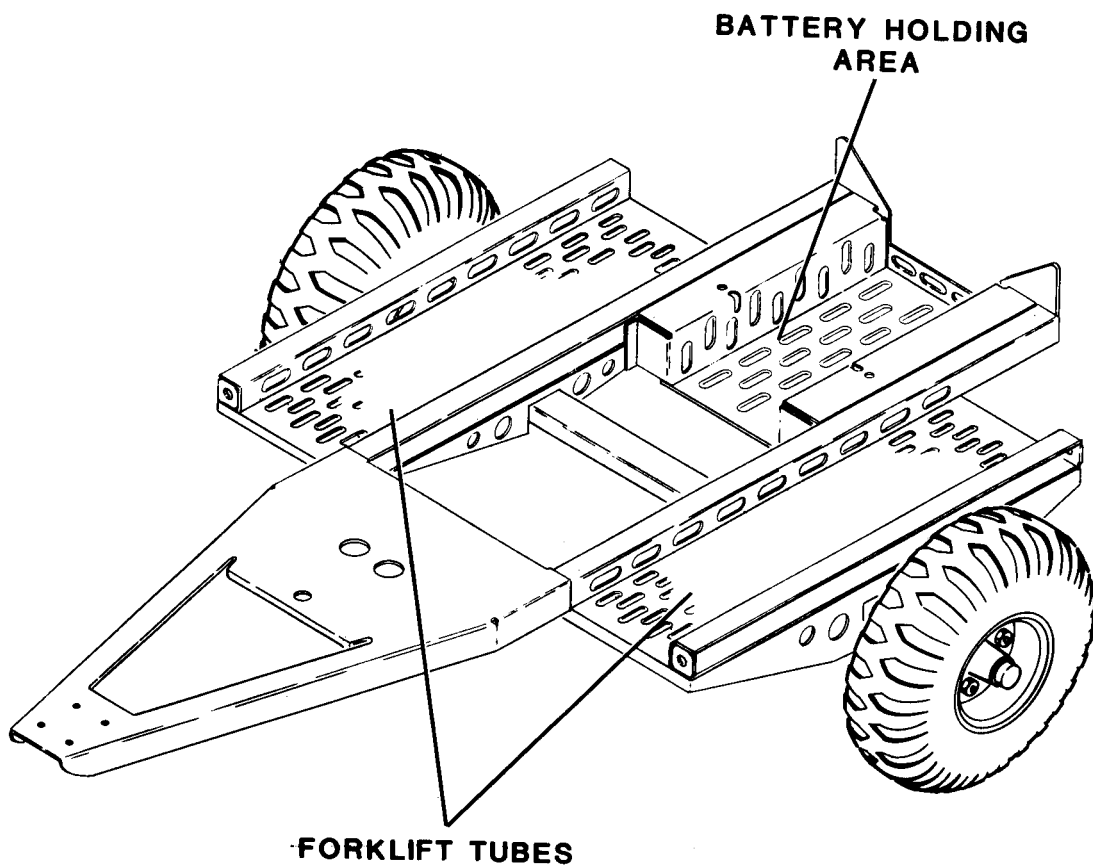


Figure 3-5. Chassis Frame Inspection

3-8. DC ELECTRICAL AND CONTROL SYSTEM. (cont)

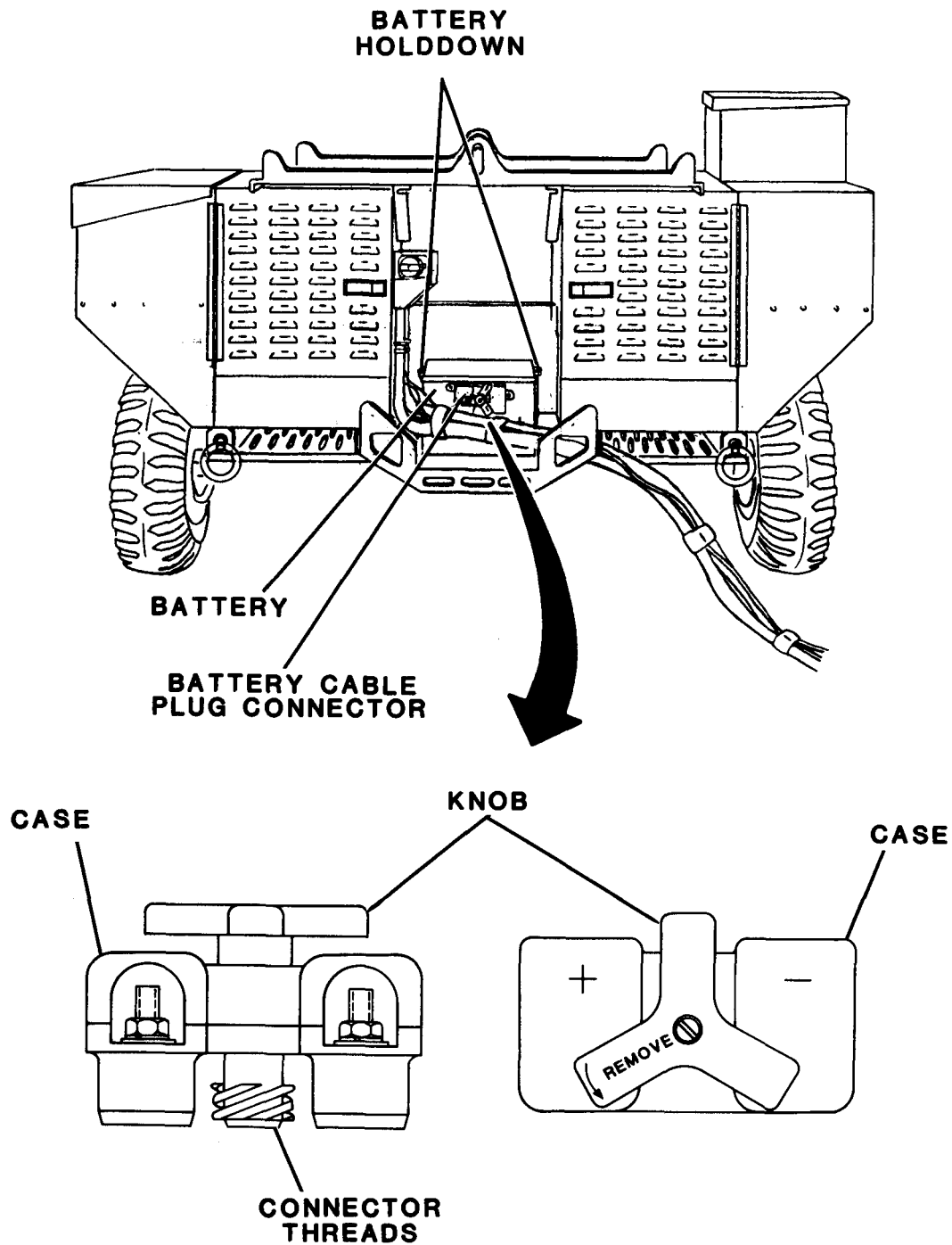


Figure 3-6. Battery and Battery Cable Inspection

### 3-9. FUEL SYSTEM.

Internal Fuel System Components. (See figure 3-7.)

(1) Remove power cable from cable support assembly.

(2) Unlatch and open fuel housing access door. Secure in open position.

(3) Inspect for loose fasteners and loose electrical connections on fuel transfer pump, high pressure fuel pump, and solenoid valve.

(4) Open control panel access door and place MASTER SWITCH in RUN position. This will actuate fuel transfer pump and pressurize fuel system up to high pressure fuel pump with 7 psi (48.26 kPa).

(5) Inspect for leaks at fuel line connections at ports of primary filter. Inspect for leaks at gasket where bowl fits into housing.

(6) Inspect for leaks at fuel line connections at ports of secondary fuel filter. Inspect for leaks at gasket where bowl fits into housing.

(7) Inspect for leaks at fuel line connections on fuel transfer pump, high pressure fuel pump, and solenoid valve.

(8) Ensure that fuel lines in fuel housing are securely fastened.

(9) Inspect fuel line from fuel tank to fuel housing for leaks and loose fasteners.

(10) Place MASTER SWITCH in OFF position.

(11) Close and securely latch control panel access door.

(12) Close and securely latch fuel housing access door.

(13) Stow power cable on cable support assembly.

#### b. Fuel Tank.

(1) Inspect fuel tank for leaks.

(2) Ensure that fuel tank is securely attached to generator set.

(3) Check filler cap and gasket for damage.

(4) Ensure that fuel gage is securely mounted.

3-10. LUBRICATION ASSEMBLY. See figure 3-1 and inspect oil level gage.

a. Ensure that MASTER SWITCH is OFF.

b. Unscrew and remove oil filler cap.

Inspect gasket and threads for damage.

d. Inspect oil level gage for damage.

Install oil filler cap. Turn until hand tight.

### 3-9. FUEL SYSTEM. (CONT)

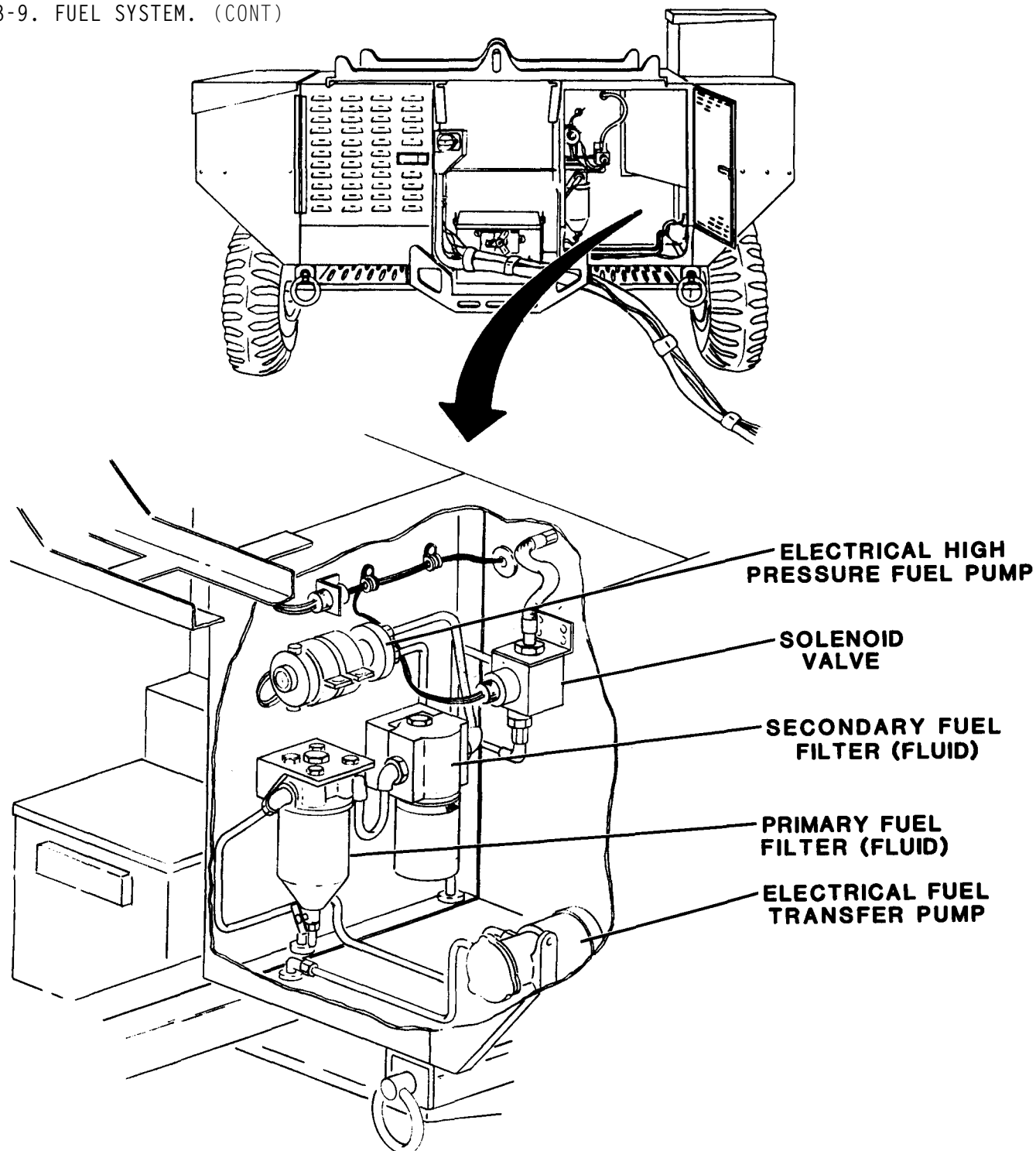


Figure 3-7. Inspection of Internal Fuel System Components

3-11. ENGINE AND GENERATOR CONTROLS AND INSTRUMENTS. Operator maintenance is limited to inspection of meters, indicators and lights. Component locations are shown in figure 3-8.

a. Meters.

door (1) Open control panel access

(2) Inspect meter faces for broken glass.

(3) Ensure that meters are securely attached to control panel and do not move when gently pressed.

b. Panel Lights. Indicator Lights. and Incandescent Lamps.

(1) Inspect panel light covers for damage.

(2) Inspect indicator lights for damage and missing or broken lenses.

(3) Ensure that DC CIRCUIT BREAKER reset button is pressed all the way in.

(4) Place PANEL LIGHTS toggle switch in ON position. Incandescent lamps will come on if good. Place switch in OFF position.

(5) Each indicator light has its own press-to-test feature. Press firmly each indicator light to be tested. Incandescent lamp will come on if good. Release. If damage or malfunction is observed, refer to next higher level of maintenance.

(6) Close control panel access door.

3-12. LOAD CONNECTION. Operator maintenance is limited to inspection of the power cable assembly (figure 3-9).

a. Open control panel access door.

b. Ensure that MASTER SWITCH is in OFF position.

c. Close control panel access door

WARNING

To prevent injury, ensure that battery cable plug connector is disconnected before performing maintenance.

d. Disconnect battery cable plug connector.

e. Remove power cable from cable support assembly.

f. Inspect length of cable for cuts, abrasions, and any other evidence of damage. If damage is observed, refer to next higher level of maintenance.

g. Check output connector for damage to pins and backshell. Ensure tightness of assembly. If connector is loose, refer to next higher level of maintenance for repair.

h. Ensure that output connector is free of foreign material.

i. Connect battery cable plug connector.

j. Stow power cable on cable support assembly.



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### 3-11. ENGINE AND GENERATOR CONTROLS AND INSTRUMENTS. (cont)

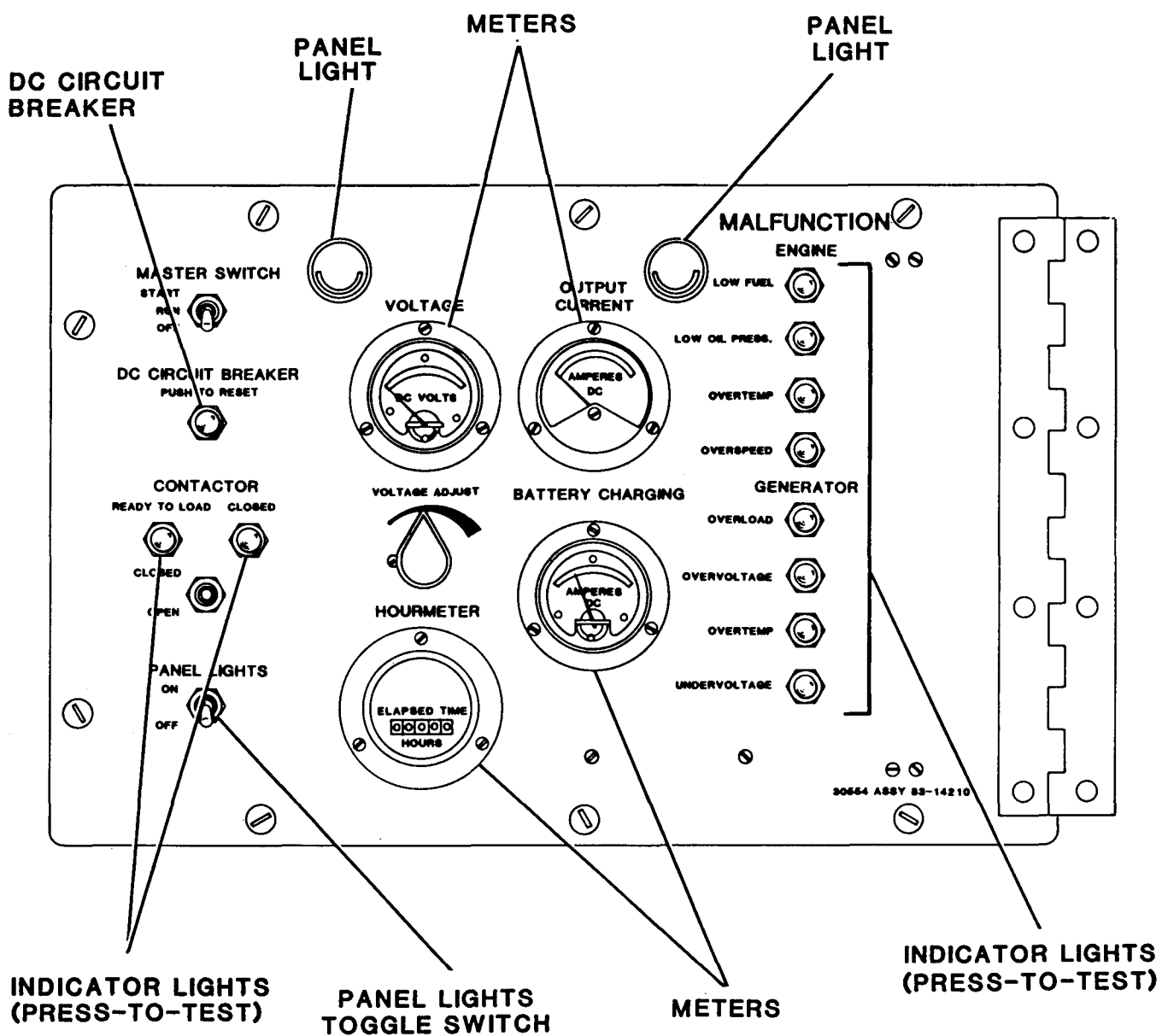


Figure 3-8. Inspection of Control Panel

3-12. LOAD CONNECTION. (cont)

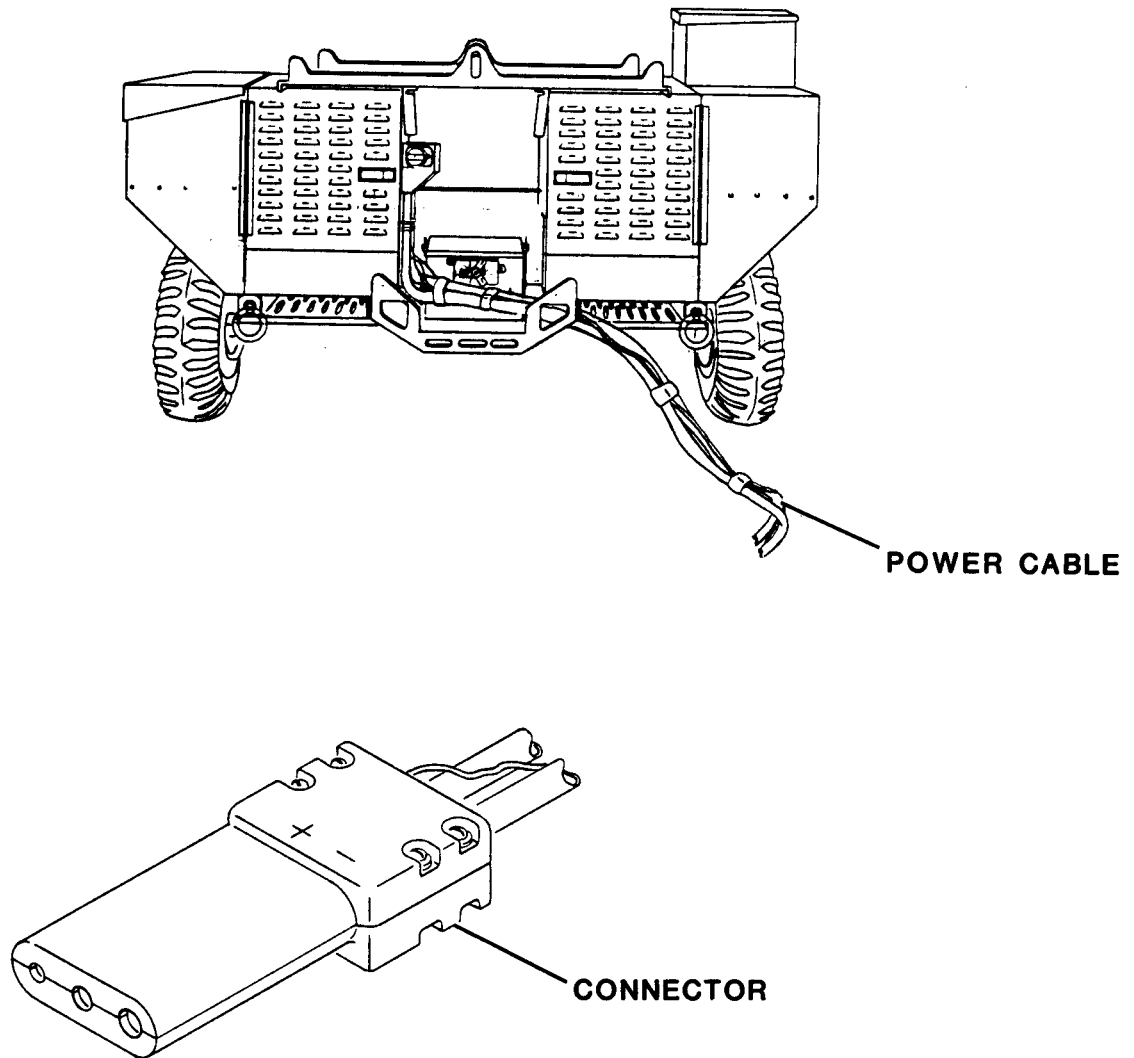


Figure 3-9. Inspection of Power Cable Assembly

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3-13. **RUNNING GEAR.** Maintenance of the running gear (figure 3-10) is limited to inspection.

a. Brake Control Installation.

Inspection of the brake control installation (handbrake and linkage) is as follows:

(1) Set handbrake.

(2) Attempt to move generator set. If generator set does not move, handbrake and linkage operate properly. If generator set moves, refer to next higher level of maintenance.

b. Wheel Assembly. Inspect wheel assembly as follows:

(1) Check for loose lug nuts.

(2) Inspect wheels for damage. If looseness or damage is observed, refer to next higher level of maintenance.

c. Tires/Tubes. Inspect and service tires and tubes as follows:

(1) Inspect tires for cuts, abrasions, excessive/uneven wear, tread separation, nails, or foreign material in tread.

(2) Inspect valve stem for damage or leaks in valve core. If any damage is observed on tires or valve stem, refer to next higher level of maintenance.

(3) Ensure that tires are inflated to 30 psi (206.8kPa).

d. Lunette Eye. Inspect lunette eye as follows.

(1) Inspect for damage, cracks, and distortion.

(2) Check for loose mounting bolt. If damage or looseness is observed, refer to next higher level of maintenance.

e. Swivel Caster Assembly. Inspect the swivel caster assembly as follows:

**WARNING**

To prevent injury, do not attempt to lift front of generator set with less than two persons.

(1) Raise and block front of generator set to provide ground clearance for swivel caster. Blocks should be placed under fuel tank or chassis. Do not place block under lunette eye.

(2) Rotate swivel caster 360 degrees. Swivel caster assembly should not bind or drag.

(3) Pull release pin and raise swivel caster. Release pin will engage hole and secure swivel caster in raised position.

(4) Check for loose wheel nut and bolt.

(5) Ensure that lubrication fittings are tight. If any damage or binding is observed, refer to next higher level of maintenance.

(6) Pull release pin and lower swivel caster.

(7) Inspect tire for cuts and abrasions. Ensure that tire is inflated to 30 psi.

(8) Remove block from generator set and lower front to ground.

3-13. RUNNING GEAR. (cont)

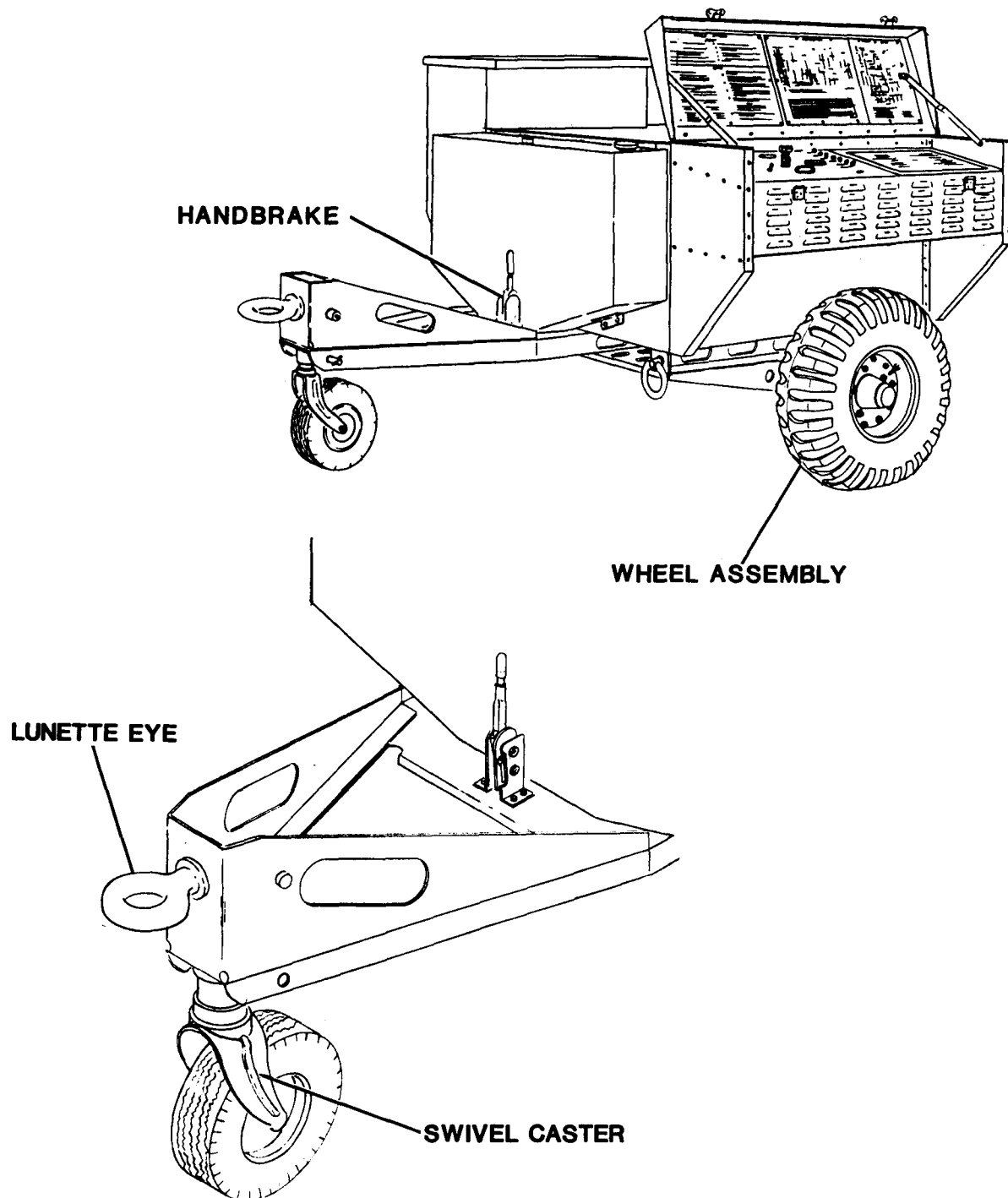


Figure 3-10. Inspection of Running Gear



## CHAPTER 4

### ORGANIZATIONAL MAINTENANCE

#### Section I. SERVICE UPON RECEIPT OF EQUIPMENT

##### 4-1. INSPECTING AND SERVICING THE EQUIPMENT.

a. General. The generator set shall be uncrated, inspected, and serviced in accordance with the following procedures.

##### b. Remove Generator Set from Packing Crate.

(1) Cut and remove steel banding. Carefully disassemble or lift top portion of crate from generator set.

(2) Remove all dunnage, cushioning, blocking, and bracing material away from generator set.

(3) Remove blocking and attaching hardware anchoring generator set to skid.

(4) Remove all sealing tape. Open all access doors and covers. Remove all desiccants, packings, and barriers from inside all compartments.

c. Inspect Generator Set for Damage. The generator set shall be inspected for damage, disconnections, and missing parts. See figures 1-1 and 1-2 for locations.

(1) Raise control panel access door. Inspect control panel for evidence of cracked and broken instruments and controls. All gage readings except hourmeter should be at zero. Hourmeter will show number of test hours on generator set.

(2) Loosen turnlock fasteners and open control panel. Ensure that all wiring is in place with connectors tight at terminals of controls, indicators, and terminal strip. Remove and discard all desiccant, packing, and barriers. Close and secure control panel.

(3) Remove power cable from cable support assembly and inspect cable for cracks, abrasions, and cuts. Check output connector for damage.

(4) Unlatch and open fuel housing access door. Secure door in open position. Inspect fuel system lines and components for damage. Ensure that fuel lines are tight. Close and securely latch fuel housing access door.

(5) Inspect battery for damage.

(6) Unlatch and open inlet air housing access door. Secure door in open position.

(7) Check air baffle, air filter and air inlet louvers for damage and foreign material. Ensure that all lines, fittings, wiring, and connectors are secure. Close and securely latch inlet air housing access door.

(8) Stow power cable on cable support assembly.

(9) Ensure that exhaust door is free of obstruction.

(10) Loosen turnlock fasteners and remove engine housing access cover.

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#### 4-1. INSPECTING AND SERVICING THE EQUIPMENT. (cont)

c. Inspect Generator Set for Damage. (cont)

##### CAUTION

To prevent damage, ensure that air intake to engine is free of obstruction.

(11) Inspect turbine engine and generator for damage. Ensure that all attaching parts and components are secure and undamaged. Check tightness of lines, fittings, wiring, and connectors. Ensure that air inlet is free of obstruction.

(12) Install engine housing access cover and secure with turnlock fasteners.

d. Servicing the Generator Set.  
Use the following procedure to provide initial service to the generator set.

(1) Lubricate generator set in accordance with lubrication order (figure 3-2).

(2) Service of the fuel system consists of inspection of system components, fuel lines, and fittings. Refer to paragraph 3-9. If damage is found, refer to Maintenance Allocation Chart (MAC) to determine level at which repairs are to be accomplished.

(3) Service the battery (figure 4-1) in accordance with the following procedure.

(a) Remove power cable from cable support.

(b) Disconnect battery cable plug connector.

(c) Loosen battery holddown nuts and remove battery holddown. Remove battery cover and filler caps.

##### WARNING

To prevent injury, do not smoke or use open flame near battery. Spark or flame may cause battery cells to explode.

##### WARNING

To prevent injury, use extreme caution when handling electrolyte. Electrolyte will cause severe burns on contact. Wear appropriate face and eye protection, rubber gloves, and a rubber apron.

(d) Fill battery with electrolyte up to vent filler slots. Use electrolyte with specific gravity of 1.285 at 80°F (27°C).

##### NOTE

Battery and electrolyte must be 60°F (16°C) or higher, but below 100°F (38°C), to ensure proper charging reaction.

(e) Let battery stand, with caps off, for 30 minutes.

(f) Test specific gravity in each cell using a hydrometer.

4-1. INSPECTING AND SERVICING THE EQUIPMENT. (cont)

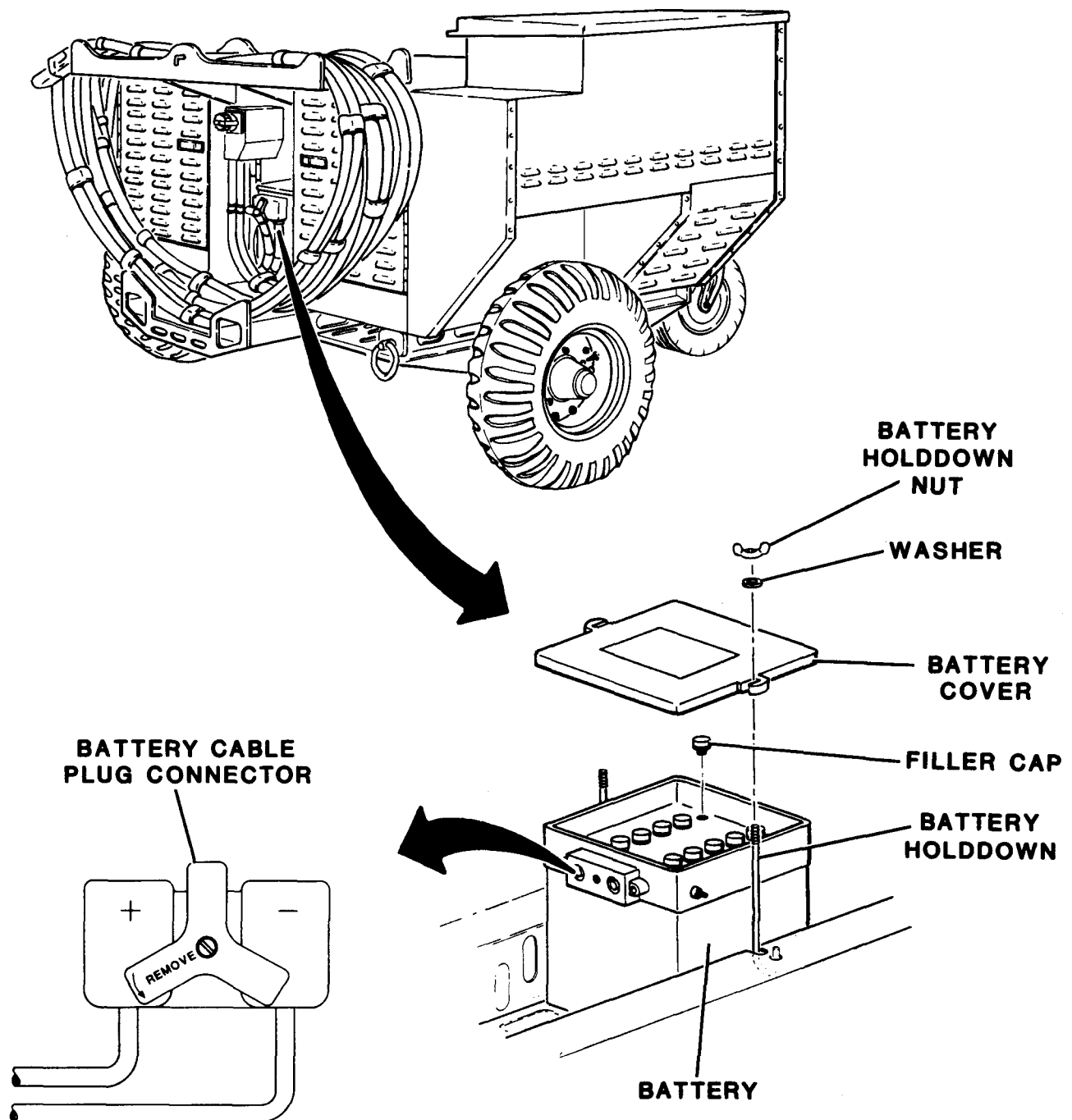


Figure 4-1. Battery Service



#### 4-1. INSPECTING AND SERVICING THE EQUIPMENT. (cont)

##### d. Servicing the Generator Set. (cont)

#### NOTE

Correct the hydrometer reading to 80°F (27°C) by adding 0.004 for each 10°F that ambient temperature exceeds 80°F (27°C), or by subtracting 0.004 for each 10°F that ambient temperature is below 80°F (27°C).

(g) if, after correction, the specific gravity of any cell measures below 1.270, the battery should be charged (Para 4.27.b (2)). If any cell cannot be charged to a specific gravity of at least 1.270, the battery is not acceptable and should be replaced.

(h) Install filler caps and battery cover. Install battery hold-down and tighten.

(i) Connect battery cable plug connector to battery.

(4) Open control panel access door and check all press-to-test fault indicators.

(5) Test operate generator set in accordance with the following procedure.

(a) Start engine (paragraph 2-3) and run for five minutes. Shut engine down (paragraph 2-5).

(b) Loosen turnlock fasteners and remove engine housing access cover. Inspect oil filter, oil lines and fittings, and fuel lines and fittings in the engine compartment for leaks. Tighten all lines and fittings as needed.

(c) Remove oil filler cap and check oil level on dipstick. If necessary, add oil in accordance with lubrication order (figure 3-2).

(d) Install oil filler cap hand tight.

(e) Unlatch and open fuel housing access door. Secure in open position.

(f) Inspect fuel lines, fittings, connections, and components for leaks. Tighten fittings and connections as needed.

(g) Close and securely latch fuel housing access door.

(h) Stow power cable on cable support assembly.

(i) Install engine housing access cover and secure with turnlock fasteners.

(j) Check tires for proper inflation (30 psi-206.84kPa).

#### 4-2. INSTALLATION.

a. General. Installation procedures include positioning the generator set on a level surface in a well-ventilated area and setting the handbrake. Select a site that allows for the clearances shown in figure 4-2, plus working room. Additionally, the generator set should be within easy access of an approved grounding facility. Approved grounding facilities can be attained using either of the procedures described in the following paragraph. See figure 4-3.

4-2. INSTALLATION. (cont)

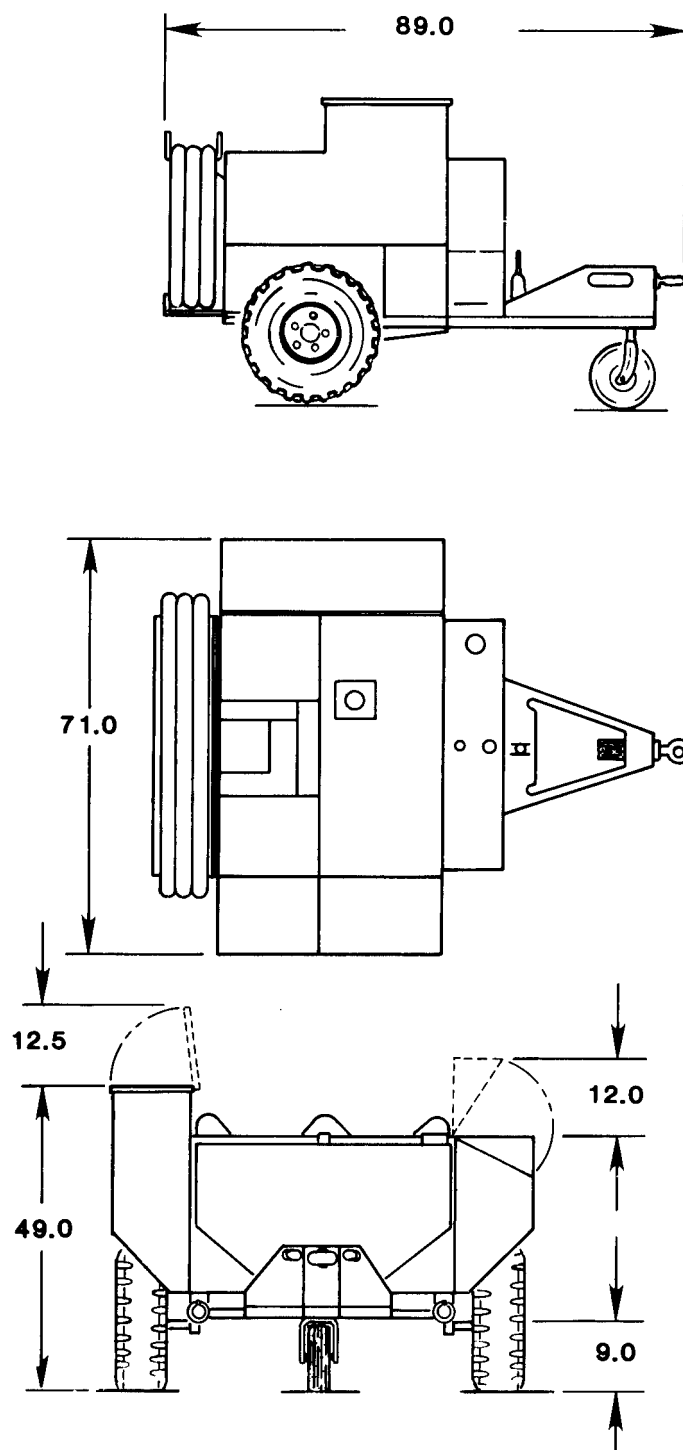


Figure 4-2. Installation Clearances

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#### 4-2. INSTALLATION. (cont)

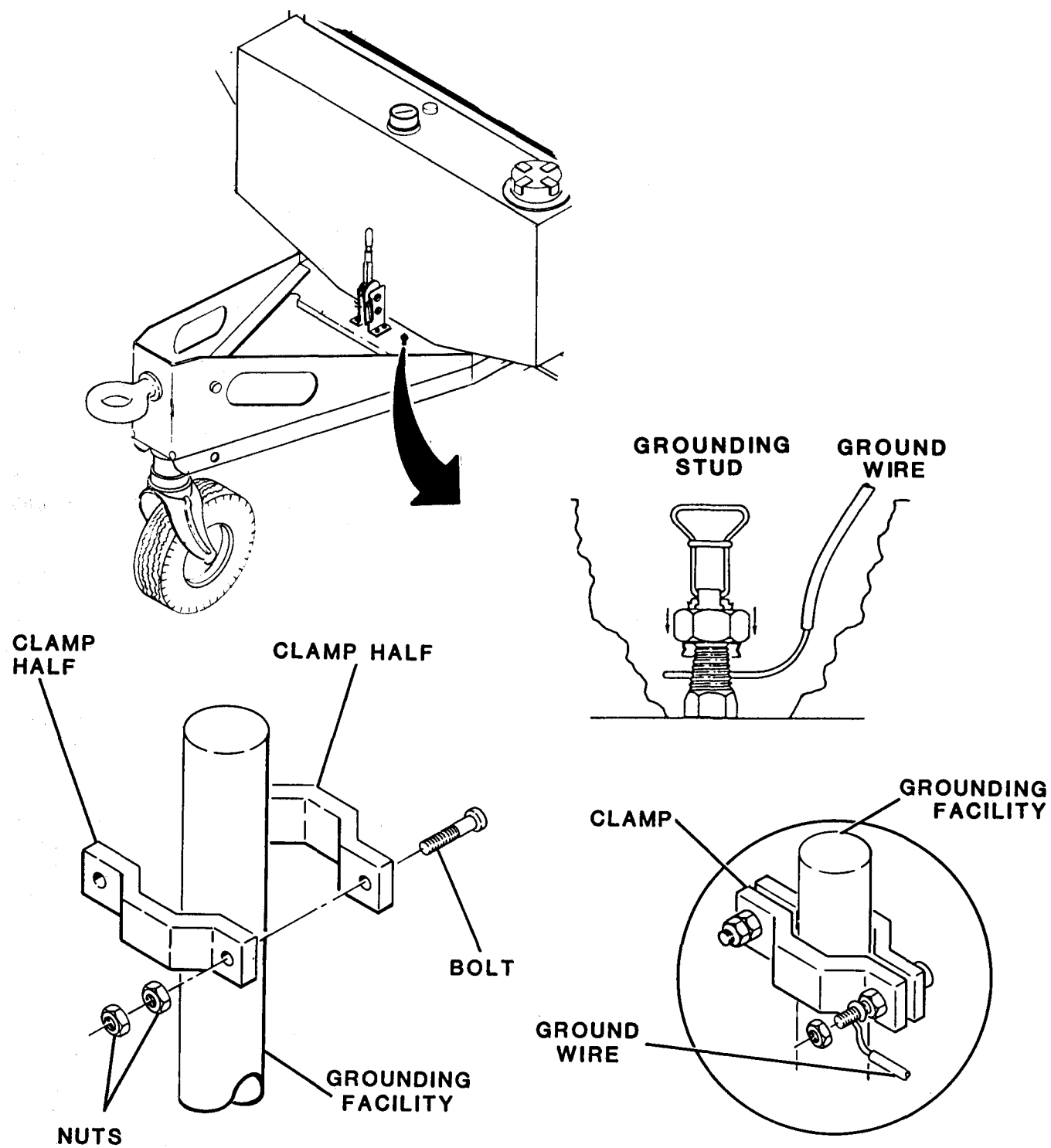


Figure 4-3. Grounding the Generator Set.

## 4-2. INSTALLATION. (cont)

### a. General. (cont)

#### NOTE

If the generator set cannot be grounded using the following methods, refer to FM20-31.

(2) Attach ground rod (figure 4-3) to ground cable by stripping 1 inch (25 mm) of insulation, if any, from ground cable. Insert stripped end of cable in clamp enough to insure a good electrical bond.

### b. Flightline Hardstand Ground Stud.

(1) Position generator set within easy access of hardstand ground stud and set handbrake.

(3) Place ground rod with attached ground cable along water pipe. Attach ground rod securely to water pipe to ensure a good electrical bond.

(2) Using at least No. 6 AWG (American Wire Gauge) copper wire, cut length of wire to fit between grounding stud on generator set and hardstand ground stud.

(4) Cover water pipe with dirt.

(5) Position generator set within easy access of grounding facility and set handbrake.

(3) Strip 1-1/2 inches (38 mm) insulation, if any, from one end of wire. Attach to grounding stud.

(6) Using at least No. 6 AWG (American Wire Gauge) copper wire, cut length of wire to fit between grounding stud on generator set and grounding facility.

(4) Strip insulation from other end of wire. Crimp wire on mounting lug. Attach mounting lug to hardstand ground stud. Tighten connections to ensure a good electrical bond.

(7) Strip 1-1/2 inches (38 mm) insulation, if any, from one end of wire. Attach to grounding stud.

### c. underground Metallic Water Pipe.

(1) Uncover metallic water pipe for at least 10 feet (3.05 m) to ensure that sufficient length is available between any insulated joints or sections.

(8) Strip insulation from other end of wire. Crimp wire on mounting lug. Attach mounting lug to hardstand ground stud. Tighten connection to ensure a good electrical bond.

### d. Driven Metal Rod.

#### NOTE

#### NOTE

If the distance between insulated joints or sections is less than 10 feet (3.05 m), this grounding method is unacceptable.

A driven metal ground rod must have a minimum diameter of 5/8 inch (16 mm) if solid, or 3/4 inch (19 mm) if pipe. Rod must be driven to a minimum of 8 feet (2.45 m).

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#### 4-2. INSTALLATION. (cont)

##### d. Driven Metal Rod. (cont)

(1) Drive rod into ground a minimum of 8 feet (2.45 m).

(2) Attach ground clamp securely to top of rod.

(3) Position generator set within easy access of grounding facility and set handbrake.

(4) Using at least No. 6 AWG (American Wire Gauge) copper wire, cut length of wire to fit between grounding stud on generator set and grounding facility.

(5) Strip 1-1/2 inches (38 mm) insulation, if any, from one end of wire. Attach to grounding stud.

(6) Strip insulation from other end of wire. Crimp wire or mounting lug. Attach mounting lug to hardstand ground stud. Tighten connection to ensure a good electrical bond.

##### e. Buried Metal Ground Plate.

#### NOTE

Metal ground plate must have a minimum area of 9 square feet (0.85 sq m), a minimum thickness of 1/4 inch (6.4 mm), and be buried to a minimum depth of 4 feet (1.22 m).

(1) Dig hole to size of plate. Ensure that bottom of hole is level so that plate will rest evenly.

(2) Attach a spare service post connector or ground stud to ground plate by drilling appropriate sized holes and securing stud to plate with washer, lockwasher, and nut. Attach ground wire to stud.

(3) Cover ground plate with dirt and pack ground firmly over plate.

(4) Position generator set within easy access of grounding facility and set handbrake.

(5) Using at least No. 6 AWG (American Wire Gauge) copper wire, cut length of wire to fit between grounding stud on generator set and grounding facility.

(6) Strip 1-1/2 inches (38 mm) insulation, if any, from end of wire. Attach to grounding stud.

(7) Strip insulation from other end of wire. Crimp wire on mounting lug. Attach mounting lug to hardstand ground stud. Tighten connection to ensure a good electrical bond.

## Section II. MOVEMENT TO A NEW WORKSITE

**4-3. MOVING THE GENERATOR SET.** The generator set can be moved by forklift, towed by vehicle, moved with a hoisting device or helicopter, or manually moved by two persons. Steps to prepare the generator set for movement are the same for each method.

a. Preparation for Movement.

(1) Ensure that MASTER SWITCH is OFF and control panel access door is secured.

(2) Ensure that all access covers and doors are secure.

(3) Ensure that power cable is properly stowed and that ground wire is disconnected.

b. Movement by Vehicle.

(1) Release handbrake (figure 4-4) and guide generator set toward pintle of tow vehicle.

(2) Open pintle.

**WARNING**

To prevent injury, do not attempt to lift the front of the generator set with less than two persons.

(3) Raise front of generator set and lock lunette eye into pintle.

(4) Pull release pin and swing swivel caster into stowed position until release pin engages hole.

c. Movement by Hoisting Device or Helicopter. Refer to FM 55-450-1 for additional information on performing helicopter external load missions.

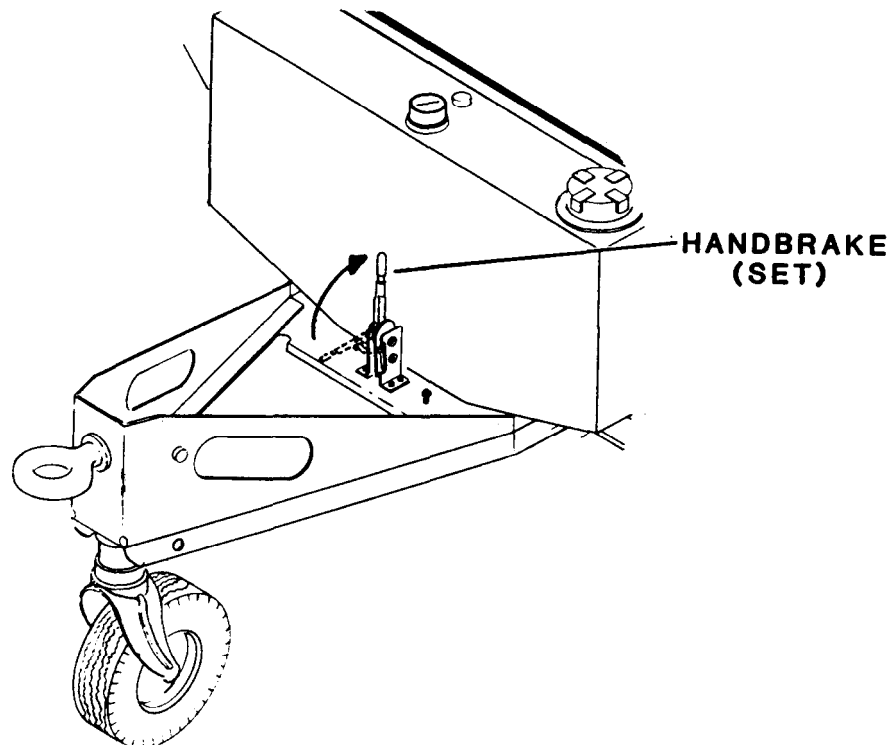


Figure 4-4. Setting the Handbrake

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#### 4-3. MOVING THE GENERATOR SET. (cont)

##### c. Movement by Hoisting Device or Helicopter. (cont)

##### WARNING

The generator set weighs approximately 1175 pounds (533 kg). To prevent injury, ensure that all cables, shackles, and the hoisting device are capable of lifting generator set.

##### CAUTION

To prevent damage, do not attempt to lift the generator set if tiedown rings are damaged.

(1) Inspect tiedown rings.

(2) Attach appropriate cables and shackles to tiedown rings (figure 4-5). Lift point shall be centered above the generator set.

(3) Attach cables and shackles to hoisting device. Using hoisting device, slowly take a strain on cables. If necessary, place padding between cables and generator set housing to prevent damage.

##### WARNING

To prevent injury, ensure that all personnel stand clear while generator set is suspended from hoisting device.

(4) Slowly lift generator set and move to new worksite.

d. Movement by Forklift. The generator set can be moved short distances with a forklift. The generator set must be lifted from the rear using the forklift tubes (figure 4-6).

e. Manual Movement. The generator set can be manually moved by two persons. One person is stationed at the rear of the generator set to push and the other person is stationed at the front to guide/steer the generator set.

#### 4-4. REINSTALLATION AFTER MOVEMENT.

After moving, install the generator set using the following procedures.

##### a. Movement by Vehicle.

(1) Pull release pin and lower swivel caster to down position. Ensure that release pin is securely engaged.

##### WARNING

To prevent injury, do not attempt to lift the front of the generator set with less than two persons.

(2) Open pintle and disengage from lunette eye. Lower front of generator set to ground.

##### WARNING

To prevent injury, ensure that handbrake is set whenever the generator set is parked.

(3) Set handbrake (figure 4-4).

4-3. MOVING THE GENERATOR SET. (cont)

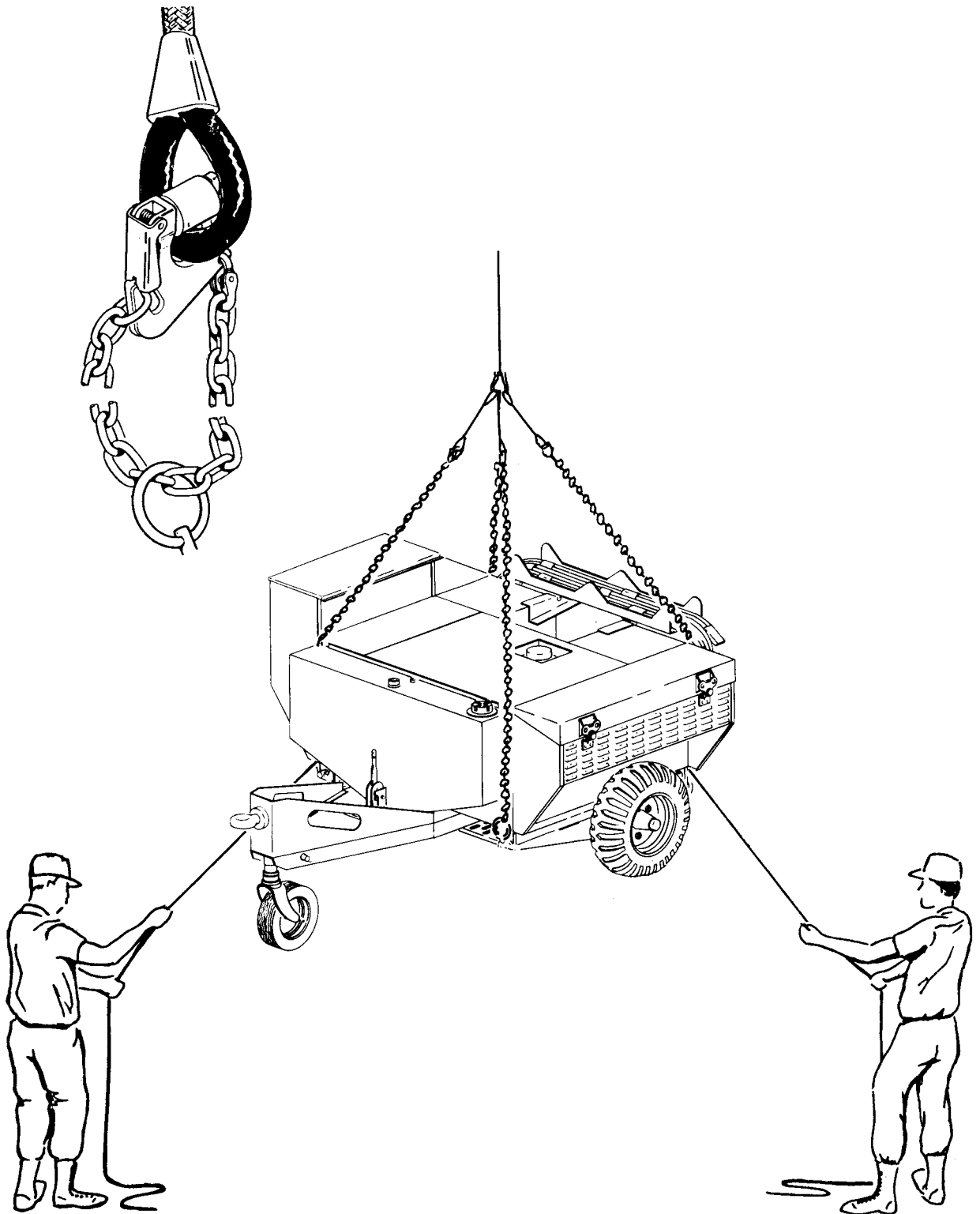


Figure 4-5. Cable/Sling Hookup for Moving Generator Set



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4-3. MOVING THE GENERATOR SET. (cont)

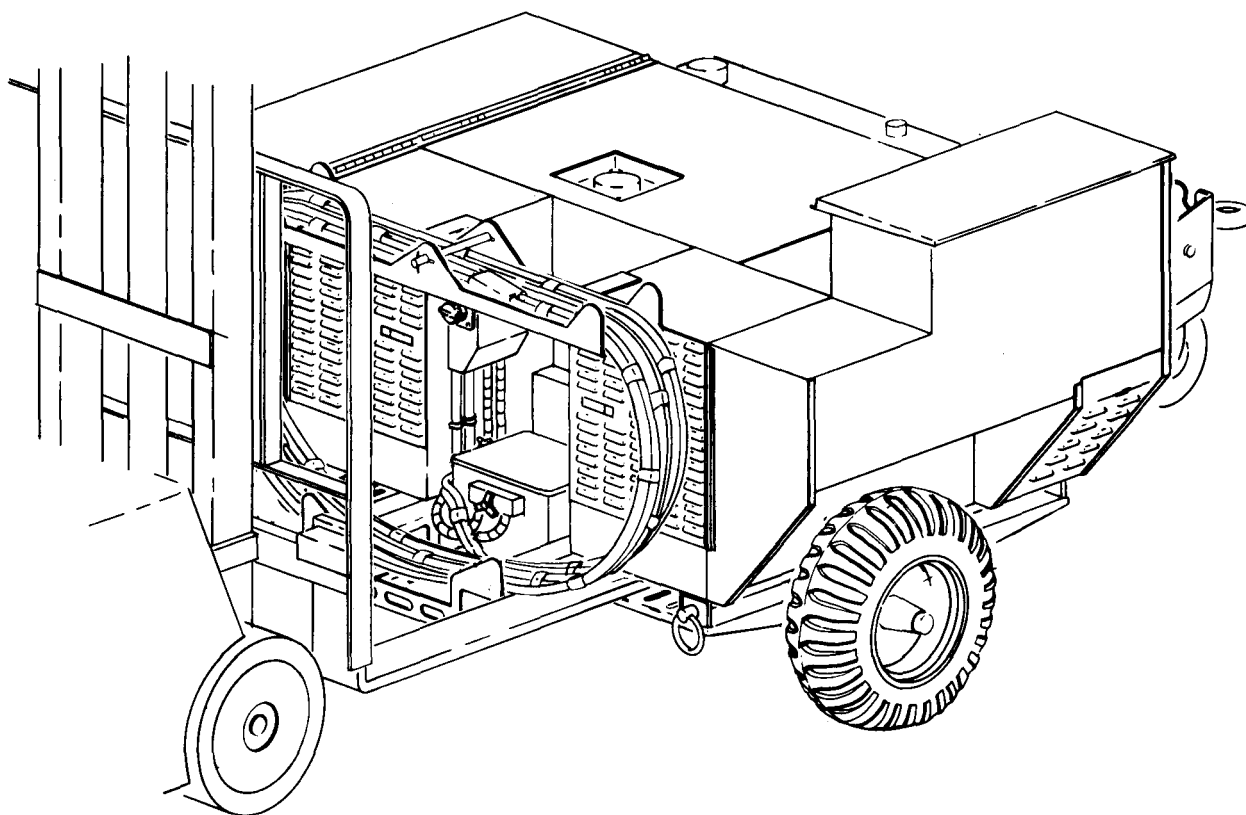


Figure 4-6. Movement by Forklift

#### 4-4. REINSTALLATION AFTER MOVEMENT. (cont)

##### a. Movement by Vehicle. (cont)

(4) Continue installation (paragraph 4-2).

##### b. Movement by Hoisting Device or Helicopter.

#### WARNING

To prevent injury, ensure that all personnel stand clear while generator set is suspended from hoisting device.

(1) Lower generator set to new worksite.

(2) Set handbrake (figure 4-4).

(3) Remove padding, if installed.

(4) Remove shackles and cables from hoisting device.

(5) Remove shackles and cables from tiedown rings.

(6) Continue installation (paragraph 4-2).

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

4-5. TOOLS AND EQUIPMENT. No special tools or equipment are required by organizational maintenance personnel for maintenance of the generator set.

4-6. MAINTENANCE REPAIR PARTS. Repair parts and equipment are listed and illustrated in the Organizational, Intermediate (Field), (Direct and General Support). and Depot Maintenance Repair Parts and Special Tools List manual, TM 5-6115-612-24P.

## Section IV. LUBRICATION INSTRUCTIONS

**4-7. GENERAL.** This section contains special organizational lubrication instructions not included in the lubrication order. Army personnel should refer to DA Pam 310-4 and Marine Corps personnel to SL-1-3 to ensure the latest edition of the lubrication order is used.

**4-8. LUBRICATION BY ORGANIZATIONAL MAINTENANCE.** Lubrication tasks not covered by the lubrication order (figure 3-2) consist of changing the oil and oil filter. Refer to figure 4-7.

### a. Draining Oil.

#### WARNING

To prevent injury, ensure that the handbrake is set whenever the generator set is parked.

(1) Set handbrake.

(2) Loosen turnlock fasteners and remove engine housing access cover.

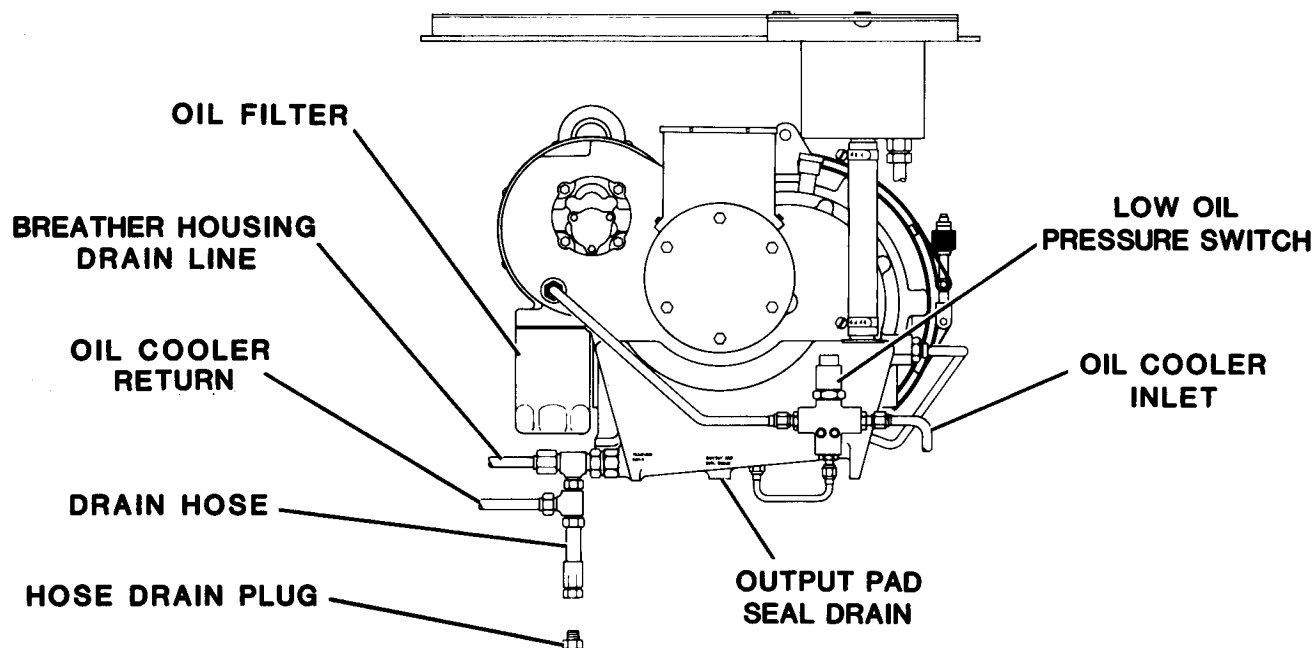


Figure 4-7. Lubrication by Organizational Maintenance

#### 4-8. LUBRICATION BY ORGANIZATIONAL MAINTENANCE. (cont)

##### a. Draining Oil. (cont)

(3) Unscrew and remove oil filter cap and oil level gage.

(4) On underside of generator set, loosen turnlock fasteners and remove fuel/oil drain access cover.

(5) Position container below drain area. Container must be capable of holding a minimum of 5 quarts.

(6) Pull drain hose to outside of generator set. Remove hose drain plug. Allow oil to drain completely.

(7) Using a filter wrench, unscrew and remove oil filter.

##### b. Filling the Reservoir

(1) Lightly coat sealing gasket of new filter with lubricating oil.

#### CAUTION

To prevent damage, ensure that oil filter is replaced only with oil filter P/N 101483 that includes special packing (O-ring) requirements.

(2) Install new oil filter. Tighten until just snug.

(3) Install hose drain plug in drain hose.

(4) Stow drain hose in generator set.

(5) Install fuel/oil drain access cover and secure with turnlock fasteners.

(6) Refer to lubrication plate on generator set for correct oil and fill reservoir with 4 quarts lubricating oil. Ensure that there is no leakage at drain.

(7) Install oil level gage and oil filler cap. Hand tighten only.

(8) Install engine housing access cover and secure with turnlock fasteners

(9) Perform operational check. Refer to paragraph 2-3. Ensure that there are no leaks.

##### c. Changing Types of Lubrication Oil

(1) Drain oil in accordance with paragraph 4-8a.

(2) Refer to lubrication plate or lubrication order and select alternate type of oil. Fill reservoir in accordance with paragraph 4-8b.

(3) Start generator set in accordance with paragraph 2-3g and run for 5 minutes. Secure generator set in accordance with paragraph 2-5.

(4) Drain oil in accordance with paragraph 4-8a.

(5) Fill reservoir with alternate type of oil in accordance with paragraph 4-8b.

## Section V. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

**4-9. GENERAL.** To ensure that the generator set is ready for operation at all times, It must be Inspected systematically so defects may be discovered and corrected before they result In serious damage or failure Defects discovered during operation of the unit, such as minor oil leaks or burned out lights, shall be noted for future correction Stop operation immediately If a deficiency is noted, such as abnormal noise, excessive vibration, fuel leaks, or smoke, that would Indicate equipment damage. All deficiencies shall be recorded on the applicable form together with the

corrective action taken Air Force users shall refer to the applicable Inspection manuals and work card sets in TO 35C2-3 Series for periodic requirements Marine Corps users shall refer to the current Issue of TM 11275 15 1 Table 4 1 provides a list of preventive maintenance checks ;and services (PMCS) that shall be performed by organizational maintenance personnel at weekly monthly and semi annual Intervals The Item numbers are listed consecutively and Indicate the sequence of performance

**Table 4-1 Preventive Maintenance Checks and Services**

Interval	W -	Weekly (40 hours)	Total M/H: 1 0	
	M -	Monthly (100 hours)	Total M/H: 7 1	
	S -	Semiannual (500 hours)	Total M/H: 4 3	
Organization				Work
W M S		Inspection procedures		M H
1		BATTERY AND CABLE		
		Service battery In accordance with paragraph 4 27		
		Clean cable connections In accordance with paragraph 4-26b		0 5
2		LUBRICATION LINES AND FITTINGS		
		Inspect lubrication lines and fittings In accordance with paragraph 4-53a		0 2
3		GEARBOX ASSEMBLY AND GEARBOX HOUSING		
		Inspect gearbox assembly and gearbox housing in accordance with paragraphs 4-60c and 4-62c		0 1
4		COMBUSTOR HOUSING AND COMPRESSOR INLET HIOUSING		
		Inspect combustor housing and compressor inlet housing in accordance with paragraphs 4 58c and 4 59c		0 1
5		INDICATOR LIGHTS AND SOCKETS		
		Test indicator lights and sockets in accordance with paragraph 4-73a		() 1

#### 4-9. GENERAL. (cont)

Table 4-1. Preventive Maintenance Checks and Services

Interval	W - Weekly (40 hours)		Total M/H: 1.0
	M - Monthly (100 hours)		Total M/H: 7.1
	S - Semiannual (500 hours)		Total M/H: 4.3
Organization			Work
W	M	S	M/H
Inspection procedures			
6	<u>BLEED AIR CONNECTOR AND BLEED AIR LINE</u> Inspect bleed air line connector and bleed air line in accordance with paragraphs 4-18a and 4-19a.		0.1
7	<u>GECM WIRING HARNESSSES</u> Inspect GECM wiring harnesses in accordance with paragraph 4-28a		0.1
8	<u>SLAVE RECEPTACLE</u> Inspect slave receptacle for damage.		0.1
9	<u>GENERATOR ELECTRONIC CONTROL MODULE (GECM)</u> Inspect GECM for damage and loose connections.		0.1
10	<u>CIRCUIT BREAKER</u> Inspect circuit breaker for damage and proper operation.		0.1
11	<u>ELECTRICAL FUEL TRANSFER PUMP</u> Inspect and service electrical fuel transfer pump in accordance with paragraphs 4-37a, 4-37b and 4-37c.		0.4
29	Test semiannually in accordance with paragraph 4-37a.		0.5
30	<u>PRIMARY FUEL (FLUID) FILTER</u> Change filter element in accordance with paragraph 4-38a.		0.2
12	<u>ENGINE FUEL TANK</u> Inspect engine fuel tank in accordance with paragraph 3-9b.		0.2
31	<u>SECONDARY FUEL (FLUID) FILTER</u> Change filter element (paragraph 4-40).		0.1
13	<u>SOLENOID VALVE</u> Inspect valve in accordance with paragraph 3-9.		0.2
14	<u>FUEL INJECTION NOZZLES</u> Inspect atomizers in accordance with paragraph 4-43.		2.5

4-9. GENERAL. (cont)

Table 4-1. Preventive Maintenance Checks and Services

Interval	W - Weekly (40 hours)			Total M/H: 1.0
	M - Monthly (100 hours)			Total M/H: 7.1
	S - Semiannual (500 hours)			Total M/H: 4.3
Organization				
W	M	S	Inspection procedures	Work M/H
		32	Service semiannually in accordance with paragraph 4-43c.	0.5
	15		<u>IGNITION SYSTEM HIGH TENSION LEAD</u> Inspect spark igniter in accordance with paragraph 4-46b.	0.2
		33	Test semiannually in accordance with paragraph 4-45.	0.4
	16		<u>SPARK IGNITER</u> Inspect spark igniter in accordance with paragraph 4-47c.	0.2
		34	Test semiannually in accordance with paragraph 4-45.	0.4
	17		<u>OIL DRAIN</u> Inspect oil drain for leaks in accordance with paragraph 4-52.	0.1
	18		<u>OIL COOLER</u> Inspect oil cooler in accordance with paragraph 4-54a.	0.6
		35	Service oil cooler semiannually in accordance with paragraph 4-54b.	0.4
	19		<u>ENGINE RIM CLENCHING CLAMP</u> Inspect rim clenching clamp (V-clamp) in accordance with paragraph 4-57.	0.1
	20		<u>STARTER MOUNTING PLATE</u> Inspect and service starter mounting plate in accordance with paragraph 4-61.	0.2
	21		<u>ENGINE ELECTRONIC CONTROL MODULE (EECM)</u> Inspect EECM for damage and loose connections.	0.1
	22		<u>LOW OIL PRESSURE SHUTDOWN SWITCH</u> Inspect low oil pressure shutdown switch in accordance with paragraph 4-67a.	0.2
	23		<u>CONTROL PANEL</u> Inspect control panel in accordance with paragraph 4-68a.	0.2

4-9. GENERAL. (cont)

Table 4-1. Preventive Maintenance Checks and Services

Interval	W-Weekly (40 hours)		Total M/H: 1.0
	M - Monthly (100 hours)		Total M/H: 7.1
	S - Semiannual (500 hours)		Total M/H: 4.3
<hr/>			
Organization			Work
W	M	S	M/H
<hr/>			
24	<u>MASTER SWITCH</u>		
	Test MASTER SWITCH in accordance with paragraph 4-70a.		0.2
25	<u>POTENTIOMETER (VOLTAGE ADJUST)</u>		
	Test potentiometer in accordance with paragraph 4-77a.		0.3
26	<u>SWITCHES</u>		
	Test switches in accordance with paragraph 4-78a.		0.5
27	<u>MAGNETIC (OUTPUT) CONTACTOR</u>		
	Inspect magnetic contactor in accordance with paragraph 4-83a.		0.3
36	Test semiannually in accordance with paragraph 4-83b.		0.6
28	<u>BRAKE CONTROL</u>		
	Service the brake control in accordance with paragraph 4-90a.		0.5
37	<u>IGNITION COIL</u>		
	Test ignition coil in accordance with paragraph 4-45.		0.4
38	<u>MONOPOLE SPEED SENSOR</u>		
	Test monopole speed sensor in accordance with paragraph 4-65a.		0.4
39	<u>THERMOCOUPLE</u>		
	Test thermocouple in accordance with paragraph 4-66a.		0.4



Section VI. TROUBLESHOOTING

4-10. GENERAL.

a. Troubleshooting Procedures. This section consists of a troubleshooting index and organizational troubleshooting procedures. Table 4-2 provides an index to assist in locating a specific malfunction. The first column lists the operational mode or condition of the generator set. The second column gives a very brief description of the malfunction indication (usually a red malfunction indicator light on the control panel). The third column provides the malfunction number that refers maintenance personnel to the troubleshooting procedures in table 4-3. Table 4-3 lists the malfunctions by number and provides troubleshooting procedures. Each malfunction followed by tests and inspections that will help determine the probable cause and the corrective action to take. Refer also to the foldout schematics FO-3 and FO-4 in the back of this manual.

b. Tests/Inspections and Corrective Actions. Perform the tests/inspections and corrective actions in the order listed. After repair, always repeat the step or corrective action in table 4-3 to make sure the fault has been corrected or traced properly, or that other faults do not exist. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or cannot be corrected by listed corrective actions, notify supervisor.

NOTE

Before using this table, ensure that all applicable operating checks have been performed and it is verified that a malfunction exists.

Table 4-2. Troubleshooting Index

Mode/condition	Malfunction indication	Malfunction
Prestart	PANEL LIGHTS DO NOT COME ON.	1
	DC CIRCUIT BREAKER TRIPS WHEN BATTERY IS CONNECTED.	2
	DC CIRCUIT BREAKER TRIPS WHEN MASTER SWITCH IS SET TO RUN.	3
	NO ELECTRICAL POWER TO CONTROL PANEL AND DC CIRCUIT BREAKER HAS BEEN RESET.	4
No starter engagement	PLACING MASTER SWITCH IN START POSITION DOES NOT CRANK ENGINE.	5

4-10. GENERAL. (cont)

Table 4-2. Troubleshooting Index

Mode/condition	Malfunction indication	Malfunction
	ENGINE OVERTEMP INDICATOR COMES ON BEFORE ENGINE START.	6
	STARTER ATTEMPTS TO OPERATE BUT CHATTERS, ENGAGES BUT DOES NOT TURN, OR TURNS BUT NO INDICATION OF IGNITION.	7
Before READY TO LOAD - starter engages	STARTER ENGAGES BUT UNIT SHUTS DOWN WITH ENGINE OVERTEMP LIGHT.	8
	ENGINE STARTS TO ACCELERATE BUT SHUTS DOWN WITH OVERSPEED LIGHT.	9
	UNIT ATTAINS IGNITION AND RUNS BUT READY TO LOAD LIGHT DOES NOT COME ON. NO MALFUNCTION LIGHTS.	10
After READY TO LOAD - no load condition	GENERATOR SET SHUTS DOWN WITH LOW OIL PRESS MALFUNCTION LIGHT AFTER READY TO LOAD BUT STILL IN NO LOAD.	11
	GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH ENGINE OVERTEMP MALFUNCTION LIGHT WHILE STILL IN NO LOAD.	12
	GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH ENGINE OVERSPEED MALFUNCTION LIGHT WHILE STILL IN NO LOAD.	13
	GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH OVERLOAD MALFUNCTION LIGHT WHILE STILL IN NO LOAD.	14
	GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH OVERVOLTAGE MALFUNCTION LIGHT.	15
	GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH GENERATOR OVERTEMP MALFUNCTION LIGHT.	16
	GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH UNDERVOLTAGE MALFUNCTION LIGHT.	17

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4-10. GENERAL. (cont)

Table 4-2. Troubleshooting Index

Mode/condition	Malfunction indication	Malfunction
	INTERMITTENT OR NO INDICATION OF BATTERY CHARGE CURRENT ON BATTERY CHARGING METER.	18
	PLACING CONTACTOR SWITCH IN CLOSED POSITION DOES NOT CAUSE CLOSED INDICATOR LIGHT TO COME ON.	19
	HOURLY METER DOES NOT OPERATE.	20
	NO VOLTAGE INDICATED ON VOLTAGE METER.	21
	AN ATTEMPT TO LOAD DOES NOT SHOW ANY INDICATION ON OUTPUT CURRENT METER.	22
	VOLTAGE METER INDICATES VOLTAGE BUT UNABLE TO ADJUST WITH VOLTAGE ADJUST KNOB.	23
During full load condition	GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH ENGINE OVERTEMP MALFUNCTION LIGHT.	24
	GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH OVERSPEED MALFUNCTION LIGHT.	25
	GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH OVERLOAD MALFUNCTION LIGHT.	26
	GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH OVERVOLTAGE MALFUNCTION LIGHT.	27
	GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH GENERATOR OVERTEMP MALFUNCTION LIGHT.	28
	GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH UNDERVOLTAGE MALFUNCTION LIGHT.	29
Any mode/condition - no malfunction lights or automatic shutdown	OIL SMOKE COMING FROM EXHAUST DURING OPERATION.	30
	SCRAPING/RUBBING NOISES DURING SHUTDOWN.	31

4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting

MALFUNCTION	TEST OR INSPECTION	
	CORRECTIVE ACTION	
1. PANEL LIGHTS DO NOT COME ON.		
	Step 1.	Ensure that battery cable plug connector is securely connected.  Tighten battery cable plug connector.
	Step 2.	Ensure that DC CIRCUIT BREAKER is pressed in.  If pressed in, go to Step 3.  If DC CIRCUIT BREAKER does not stay pressed in, test/replace DC CIRCUIT BREAKER (paragraph 4-31).
	Step 3.	Check light bulbs by replacing with new ones.  If still no lights, go to Step 4.
	Step 4.	Place PANEL LIGHTS switch in ON position. Check for 24 Vdc between terminal 1 (+) and terminal 2(-) of affected light (DS11 or DS12).  If no voltage, go to Step 5.  If voltage is good, replace lamp socket (paragraph 4-31).
	Step 5.	Check for 24 Vdc at PANEL LIGHTS switch S3-3(+) and TB3(-).  If no voltage, go to Step 6.
<b><u>WARNING</u></b>		
	To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.  If voltage is present, disconnect battery. Visually inspect and perform continuity check on wires U128A18 and V102U18N. Replace wires if damaged or no continuity.	
	Step 6.	Check for 24 Vdc at PANEL LIGHTS switch S3-2 and TB3-2.  If no voltage, go to Step 7.

4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		If voltage present, replace PANEL LIGHTS switch (paragraph 4-78b).
	Step 7. Check for 24 Vdc at DC CIRCUIT BREAKER CB1-2(+) and TB3-2(-).	If no voltage, perform steps under Malfunction 4.
2. DC CIRCUIT BREAKER TRIPS WHEN BATTERY IS CONNECTED.		
		<b><u>WARNING</u></b>
		To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.
	Step 1. Visually inspect the underside of control panel for shorts and damaged wires.	Remove shorts and repair damaged wires.
	Step 2. Disconnect battery cable plug connector. Disconnect P105A14 from TB3-5. Reset DC CIRCUIT BREAKER by pressing in reset button.	If reset button remains in, go to Step 3.
		If breaker trips, visually check wire P105B14 for shorts to control panel. Replace as necessary.
	Step 3. Connect battery plug connector to battery. Reconnect wire P105A14. Disconnect wire P105C18 from TB3-5. Reset DC CIRCUIT BREAKER.	If breaker trips, go to Step 4.
		If reset button remains in, visually check wire P105C18 and malfunction indicator light sockets (DS3-DS10) for shorts to control panel. Replace as necessary.
	Step 4. Reconnect wire P105C18. Disconnect wire P105D18 from TB3-6. Reset DC CIRCUIT BREAKER.	

4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	
	CORRECTIVE ACTION	
	<p>If reset button remains in, check wire P105D18 and malfunction indicator light sockets (DS3-DS10) for damage and shorts to control panel. Repair or replace as necessary.</p> <p>If breaker trips, check wire P105F18 to MASTER SWITCH (S1) for shorts to control panel. Replace as necessary.</p>	
3.	DC CIRCUIT BREAKER TRIPS WHEN MASTER SWITCH IS SET TO RUN.	
	Step 1.	<p>Reset circuit breaker. With MASTER SWITCH in OFF position, disconnect P2 from GECM. Move MASTER SWITCH to RUN.</p> <p>If breaker trips, reconnect P2 and go to Step 2.</p> <p>If reset button remains in, replace GECM (paragraph 4-30).</p>
	Step 2.	<p>Reset circuit breaker. With MASTER SWITCH in OFF position, disconnect P6 from EECM. Move MASTER SWITCH to RUN.</p> <p>If breaker trips, reconnect P6 and go to Step 3.</p> <p>If reset button stays in, replace EECM (paragraph 4-64).</p>
	Step 3.	<p>Reset circuit breaker. With MASTER SWITCH in OFF position, disconnect P17 from transfer pump. Move MASTER SWITCH to RUN.</p> <p>If breaker trips, reconnect PI 7 and go to Step 4.</p> <p>If reset button stays in, check pump (paragraph 4-37).</p>
	Step 4.	<p>Disconnect wire U117B1 8 from TB3-19. Measure resistance from disconnect wire to TB3-1.</p>

**WARNING**

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

If resistance is less than 2 ohms, check wires U117B18 and U117C18, MASTER SWITCH, and connector P6 for shorts. Replace as necessary.

4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		If resistance more than 2 ohms, check wire U117A16 from P17-A to TB3-19. Repair or replace as necessary.
4. NO ELECTRICAL POWER TO CONTROL PANEL AND DC CIRCUIT BREAKER HAS BEEN RESET.		
	Step 1. Check for loose battery cable plug connector at battery.	Tighten loose connector.
	Step 2. Remove air baffle (paragraph 4-22a). Check for 24 Vdc at terminal board TB1-2(-) and terminal TB1-3(+).	If 24 Vdc present, go to Step 3.
		<div><div>WARNING</div><p>To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.</p><p>If no voltage present, visually inspect for damage and perform continuity checks on following:</p><ul style="list-style-type: none"><li>P103C00 (TB1-4 to bulkhead connector)</li><li>V102H00 (TB1-2 to bulkhead connector)</li><li>P103A00 (bulkhead connector to P20(+))</li><li>V102AJ00 (bulkhead connector to P20(-))</li></ul><p>Replace wires if damaged or no continuity.</p></div>
	Step 3. Ensure that DC CIRCUIT BREAKER is reset. Check for 24 Vdc between DC CIRCUIT BREAKER pin 2(+) and terminal board TB3-2(-).	If 24 Vdc present, go to Step 4.
		If no voltage, check for 24 Vdc between DC CIRCUIT BREAKER pin 1(+) and terminal board TB3-2(-). If voltage present, replace DC CIRCUIT BREAKER (paragraph 4-78b). If no voltage, visually inspect for damage and perform continuity check on wires P103E14 (20 amp shunt R1-A to TB3-4), P103B14 (20 amp shunt R1-B to TB1-3), and V012J18 (TB3-2 to TB1-2). Replace wires if damaged or no continuity.

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 4. Check for 24 Vdc between MASTER SWITCH S1 pin 2(+) and TB3-2(-).	<p>If 24 Vdc present, go to Step 5.</p> <p>If no voltage, disconnect battery cable plug connector. Perform continuity checks on wire P105F18 (S1-5 to TB3-6) and jumper (TB3-5 to TB3-6). Replace if damaged or no continuity.</p>
	Step 5. Move MASTER SWITCH to RUN position and check for 24 Vdc on S1-1.	<p>If 24 Vdc present, go to Step 6.</p> <p>If no voltage, replace MASTER SWITCH (paragraph 4-70b).</p>
	Step 6. Remove connector P6 from EECM. Check for 24 Vdc between P6-M(+) and P6-N(-).	<p>If 24 Vdc present, replace EECM (paragraph 4-64).</p> <p>If no voltage, disconnect battery cable plug connector from battery. Visually inspect for damage and perform continuity check on wires U117C18 (S1-1 to P6-M) and V102N18N (TB3-1 to P6-N).</p> <p>Replace if damaged or no continuity.</p>

#### 5. PLACING MASTER SWITCH IN START POSITION DOES NOT CRANK ENGINE.

- Step 1. Perform Malfunction 1, Steps 6 and 7.
- If voltage present, go to Step 2.
- If no voltage, go to Malfunction 4.
- Step 2. Disconnect connector P6 from EECM. With MASTER SWITCH in START position, check for 24 Vdc between P6-J(+) and P6-N(-).
- If voltage present, go to Step 3.
- If no voltage, go to Step 4.



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#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

#### MALFUNCTION

#### TEST OR INSPECTION

#### CORRECTIVE ACTION

Step 3. Move MASTER SWITCH to START position and release to RUN position. Check for 24 Vdc at small stud on starter where wire K154A18(+) connects, and at ground stud(-) on starter.

If no voltage, go to Step 5.

If voltage present, perform maintenance on starter (paragraph 4-32).

Step 4. Check for 24 Vdc at MASTER SWITCH S1-4(+) and TB3-2(-) with MASTER SWITCH in START position.

If no voltage, perform maintenance on MASTER SWITCH (paragraph 4-70).

#### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

If voltage present, disconnect battery cable plug connector. Visually check and perform continuity check on wire U120A18 (S1-4 to P6-J). Replace wire if damaged or no continuity.

Step 5. Check for 24 Vdc between positive (+) and negative (-) starter terminals.

If voltage present, go to Step 6.

If no voltage, replace EECM (paragraph 4-64).

Step 6. Disconnect P5 from EECM and check for 24 Vdc between J5-K(+) and J5-P(-).

If no voltage replace EECM (paragraph 4-64).

If voltage present, disconnect battery cable plug connector. Visually check and perform continuity checks on wire K154A18 (P5-K to starter solenoid). Replace wire if damaged or no continuity.

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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#### 6. ENGINE OVERTEMP INDICATOR COMES ON BEFORE ENGINE START.

##### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

- Step 1. Disconnect connector P5 from EECM. Disconnect battery cable plug connector. Check continuity between P5-R and P5-S. Reading should be less than 100 ohms.

If open, go to Step 2.

If continuity indicated, measure P5-R and P5-S to good case ground. Reading should show infinity. If reading shows Infinity, replace EECM (paragraph 4-64). If resistance is measured, go to Step 2.

- Step 2. Disconnect one connector from thermocouple. Perform continuity check between thermocouple terminals. Reading should show less than 100 ohms.

If no continuity is indicated, replace thermocouple (paragraph 4-66b).

If continuity is indicated, visually inspect for damage and perform continuity checks on wires U145A (to P5-R) and U146A (to P5-S). Repair or replace wires if damaged or no continuity.

#### 7. STARTER ATTEMPTS TO OPERATE BUT CHATTERS, ENGAGES BUT DOES NOT TURN, OR TURNS BUT NO INDICATION OF IGNITION.

- Step 1. Move MASTER SWITCH to START position and check voltage at large studs on starter.

If voltage is below 14 Vdc, test battery (paragraph 4-27). Replace or recharge as necessary.

If voltage is above 14 Vdc, perform maintenance on starter (paragraph 4-32).

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#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION
	CORRECTIVE ACTION

If voltage is above 14 Vdc and starter chatters, remove starter (paragraph 4-32b) and send to Direct Support.

#### 8. STARTER ENGAGES BUT UNIT SHUTS DOWN WITH ENGINE OVERTEMP LIGHT.

Step 1. Check air filter and compressor inlet housing for obstructions.

Clear obstructions.

Step 2. Check exhaust door for obstructions and proper operation.

Clear obstructions. Refer to Direct Support for maintenance of inoperable exhaust door.

Step 3. Unscrew cover from slave receptacle. Move MASTER SWITCH to START while measuring voltage at slave receptacle contacts.

If voltage remains above 14 Vdc, go to Step 4.

If voltage below 14Vdc, check battery (paragraph 4-27).

Step 4. Connect thermometer (for K-type thermocouple) to EGT thermocouple. Start engine and monitor temperature.

If temperature remains below 1360°F, perform tests and inspections under Malfunction 6.

If temperature is above 1360°F, refer engine to next higher level of maintenance.

#### 9. ENGINE STARTS TO ACCELERATE BUT SHUTS DOWN WITH OVERSPEED LIGHT.

Step 1. Ensure that EECM connector P5 and speed sensor connector P13 are securely connected.

Tighten loose connectors.

Step 2. Disconnect P5 from EECM. Measure resistance from P5-F to P5-G.

If resistance is less than 1.8k ohms or greater than 2.2k ohms, go to Step 3.

If resistance is OK, go to Step4.

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

##### MALFUNCTION

##### TEST OR INSPECTION

##### CORRECTIVE ACTION

- Step 3. Reconnect P5. Disconnect P13 from speed sensor and measure resistance between pins of speed sensor and between each pin and case of speed sensor.

If resistance is less than 1.8k ohms or greater than 2.0k ohms or if resistance between either pin and case is less than 200k ohms, replace speed sensor (paragraph 4-65).

##### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

If resistance is OK. disconnect battery cable plug connector. Visually inspect and perform continuity checks on wires U150A18 and U151A18. Replace if necessary.

- Step 4. Open exhaust door and check for heat, an indication that engine has had ignition.

If no heat, go to Step 5.

If heat present, replace EECM (paragraph 4-64) with known good unit and attempt restart. If problem still exists, refer engine to next higher level of maintenance.

- Step 5. Check for odor of fuel and fuel sprayed in exhaust duct.

If no strong fuel odor or sign of fuel, go to Step 6.

If fuel or fuel odor is present, perform complete test of ignition system (paragraph 4-45).

- Step 6. Place MASTER SWITCH in RUN position and verify that transfer pump is running. There is a very distinct clicking noise when the pump is running.

If pump is not running, go to Step 7.

If pump is running, service and test pump (paragraph 4-37). If pump tests OK, go to Step 9.

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4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 7. Disconnect connector P17 from transfer pump and check for 16-24 Vdc between pins A and B.	<p>If no voltage, go to Step 8.</p> <p>If voltage present, service and test transfer pump in accordance with paragraph 4-37. If transfer pump tests OK, go to Step 9.</p>
	Step 8. Disconnect battery cable plug connector from battery. Check for continuity between TB3-19 and P17-A, and between TB3-1 and P17-B.	<p>If there is continuity, replace EECM (paragraph 4-64).</p> <p>If no continuity, repair or replace wires as necessary.</p>
	Step 9. Service primary fuel filter (paragraph 4-38a) and secondary fuel filter (paragraph 4-40a).	
	Step 10. Disconnect connector P14 from high pressure fuel pump. Carefully connect voltmeter across connector pins P14-A and P14-B. Check for voltage that varies between 6 and 22 Vdc.	<p>If voltage incorrect, go to Step 11.</p> <p>If voltage correct, replace high pressure fuel pump in accordance with paragraph 4-41. If problem continues, go to Step 12.</p>
	Step 11. Disconnect P5 from EECM and check continuity between P5-L and P14-A and between P5-M and P14-B.	<p>Replace wires if damaged or no continuity.</p> <p>If there is continuity, replace EECM (paragraph 4-64).</p>
	Step 12. Disconnect P12 from solenoid valve. Attempt restart while checking for 16-24 Vdc between pins P12-A and P12-B.	<p>If no voltage, go to Step 13.</p> <p>If voltage present, replace solenoid valve (paragraph 4-42).</p>

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

##### MALFUNCTION

##### TEST OR INSPECTION

##### CORRECTIVE ACTION

Step 13. Disconnect P5 from EECM and check continuity between P5-D and P12-A, and between P5-E and P12-B.

Replace wires if damaged or no continuity.

If there is continuity, replace EECM (paragraph 4-64).

10. UNIT ATTAINS IGNITION AND RUNS BUT READY TO LOAD LIGHT DOES NOT COME ON.  
NO MALFUNCTION LIGHTS.

##### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

Step 1. Check VOLTAGE meter on control panel for voltage indication of 20-35 Vdc.

If VOLTAGE meter reads zero or very low voltage, go to Step 2.

If voltage is correct, shut down generator set. Press to test READY TO LOAD light. If light does not come on, replace lamp (paragraph 4-74). If lamp is good, open control panel and check for 24 Vdc between pins of READY TO LOAD light (DS1). If voltage is correct, replace socket (paragraph 4-73b). If no voltage, disconnect battery cable plug connector. Inspect and check continuity on wires U122A18 and V102S18N. Replace if damaged or no continuity.

Step 2. With unit running, monitor BATTERY CHARGING meter.

If BATTERY CHARGING meter reads less than -5 amps, shut down generator set and go to Step 3.

If BATTERY CHARGING meter reads more than -5 amps and more than 20 seconds have passed since attempted start, shut down generator set. It may be necessary to disconnect battery to stop unit. Inspect starter and solenoid for damage and to see if starter is engaged. Replace starter if necessary (paragraph 4-32b).

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#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 3.	<p>While starting generator set, check voltage on high pressure fuel pump connector J14-A(+) and J14-B(-).</p> <p>If voltage is 16-24 Vdc, go to Step 4.</p> <p>If voltage less than 16 Vdc, check battery voltage. Replace or recharge battery (paragraph 4-27). If battery good, replace EECM (paragraph 4-64).</p>
	Step 4.	<p>Check for 24 Vdc on transfer pump connector P17-A(+) and P17-B(-).</p> <p>If 16-24Vdc present, go to Step 6.</p> <p>If no voltage, disconnect battery cable plug connector. Visually inspect for damage and check continuity on wires U117A16 (TB3-19 to P17-A) and V102AF16 (TB3-1 to P17-B). Replace if damaged, shorted, or no continuity.</p>
	Step 5.	<p>Check fuel flow of transfer pump (paragraph 4-37).</p> <p>If fuel flow is correct, go to Step 6.</p> <p>If fuel flow is low, service transfer pump (paragraph 4-37) and connecting fuel lines. Replace pump if necessary.</p>
	Step 6.	<p>Disconnect outlet fuel line from solenoid valve. Direct fuel outlet line into a suitable container. Start generator set and check fuel flow.</p> <p>If fuel flow good, refer to next higher maintenance level.</p> <p>If fuel flow appears low, ensure that solenoid valve fuel lines are not restricted. If no restrictions, replace solenoid valve (paragraph 4-42).</p>
11.	GENERATOR SET SHUTS DOWN WITH LOW OIL PRESS MALFUNCTION LIGHT AFTER READY TO LOAD BUT STILL IN NO LOAD.	
	Step 1.	<p>Inspect generator set lubrication system for leaks and damaged hoses (Section XII).</p> <p>Tighten loose fittings and replace damaged hoses.</p>

4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. Check oil level	Add oil as required.
		<div><b>WARNING</b></div> To prevent Injury, ensure that battery is disconnected before repairing or replacing damaged wires.
	Step 3. Disconnect connector P10 from low oil pressure switch. Install jumper wire between pins A and B of connector. Place MASTER SWITCH in RUN position.	<p>If LOW OIL PRESS light goes off, go to Step 4.</p> <p>If LOW OIL PRESS light stays on, visually inspect and check continuity on wires Q147A18 (P10-A to P5-A) and U148A18 (P10-B to P5-B). Replace if damaged or no continuity. If wires good, replace EECM (paragraph 4-64).</p>
	Step 4. Install pressure gage between oil pump and low oil pressure switch. Disconnect connector P10 from switch and install jumper wire between pins A and B of connector. Start generator set and check for correct oil pressure (25-40psi).	<p>If oil pressure is normal, perform maintenance on low oil pressure switch (paragraph 4-67).</p> <p>If oil pressure is low, refer to next higher level of maintenance.</p> <p>If oil pressure is high, refer to Section XII and inspect for clogged oil cooler, hoses, oil filter, or gearbox vent. Unclog and clean as necessary.</p>
12. GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH ENGINE OVERTEMP MALFUNCTION LIGHT WHILE STILL IN NO LOAD		<p>Step 1. Perform Step 1 of Malfunction 6.</p> <p>Step 2. Perform Step 4 of Malfunction 8.</p>



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#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

13. GENERATOR REACHES READY TO LOAD BUT SHUTS DOWN WITH OVERSPEED MALFUNCTION LIGHT WHILE STILL IN NO LOAD.

Step 1. Ensure that generator set has not run out of fuel.

Fill fuel tank.

Step 2. Determine if there was a noticeable change in engine RPM prior to shutdown. This condition can be identified by a change in pitch while engine is running.

If RPM increased, perform maintenance on monopole speed sensor (paragraph 4-65). If speed sensor OK, replace EECM (paragraph 4-64).

If RPM decreased, inspect all fuel fittings for leaks (paragraphs 4-35, 4-36). Tighten as necessary. If problem still exists, replace high pressure pump (paragraph 4-41).

14. GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH OVERLOAD MALFUNCTION LIGHT WHILE STILL IN NO LOAD.

#### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

Step 1. Monitor VOLTAGE and OUTPUT CURRENT meters with generator set running at READY TO LOAD and CONTACTOR switch set at OPEN.

If VOLTAGE meter reads 20-35 Vdc and OUTPUT CURRENT meter reads 0, go to Step 2.

If VOLTAGE reads other than 20-35 Vdc or if OUTPUT CURRENT meter reads other than 0, check current shunt R2 and the following wires for damage, shorts, and continuity.

U109A18 (R2-D to TB3-14)	P107B18 (S4-A1 to S4-23)
U110A18 (R2-C to TB3-13)	P106A18 (S4-B1 to S4-13)
U109C18 (TB3-14 to P2-J)	U113A18 (TB3-7 to S4-22)
U110C18 (TB3-13 to P2-K)	U114A18 (TB3-8 to S4-12)

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

##### MALFUNCTION

##### TEST OR INSPECTION

##### CORRECTIVE ACTION

Replace damaged or shorted wires. If problem still exists, replace GECM (paragraph 4-30).

Step 2. Disconnect connector P4 from EECM. Restart generator set. Do not apply load.

If unit shuts down, replace EECM (paragraph 4-64).

If unit does not shut down, place MASTER SWITCH in OFF position. Check for shorts and continuity between P4-C and P4-E. Repair or replace as required. If wires OK, replace GECM (paragraph 4-30).

15. GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH OVERVOLTAGE MALFUNCTION LIGHT.

##### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

Step. 1 When READY TO LOAD light comes on, place CONTACTOR switch in OPEN position and monitor VOLTAGE meter. Ensure that VOLTAGE ADJUST knob is adjusted to mid-range.

If voltage indicated is greater than 35 Vdc, replace GECM (paragraph 4-30) and repeat Step 1. If generator set still shuts down, refer generator set to next higher level of maintenance for testing of generator.

If voltage indicated is less than 35 Vdc, shut down generator set and allow generator set to cool. Disconnect connector P4 from EECM. Place MASTER SWITCH in RUN position. If OVERVOLTAGE malfunction indicator light comes on, replace EECM. If OVERVOLTAGE malfunction indicator light stays off, disconnect battery cable plug connector and check wire U138A18 (P4-B to P2-B) for continuity and shorts. Repair or replace as necessary. If problem still exists, replace GECM (paragraph 4-30). If generator set still shuts down, refer generator set to next higher level of maintenance for testing of generator.

4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

16. GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH GENERATOR OVERTEMP MALFUNCTION LIGHT.

WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

- Step 1. Place MASTER SWITCH in OFF position. Disconnect connector P1 from GECM. Check resistance across J1-D and J1-F.

If resistance is more than 10k ohms or less than 100 ohms, refer generator set to next higher level of maintenance.

If resistance is correct, check for shorts between GECM interconnect points J1-D, J1-F, P1-B, P1-C and ground. Remove or repair shorts. If no shorts found, go to Step 2.

- Step 2. Disconnect connector P4 from EECM. Restart unit with no load.

If generator set shuts down, replace EECM (paragraph 4-64).

If unit does not shut down, place MASTER SWITCH in OFF position. Disconnect battery and check for continuity between P4-B and P4-E. If good, refer generator set to next higher level of maintenance for testing of generator. If generator tests good, replace GECM (paragraph 4-30).

17. GENERATOR SET REACHES READY TO LOAD BUT SHUTS DOWN WITH UNDERVOLTAGE MALFUNCTION LIGHT.

- Step 1. Ensure that VOLTAGE ADJUST knob is set at mid-range. Check VOLTAGE meter for correct range (20-35 Vdc).

If voltage is correct, go to Step 2.

If voltage is below 20 Vdc, check generator output cables P107A00 (G1(+) to S4-A1) and P108A00 (G1(-) to R2-B) for shorts. If no shorts, replace GECM (paragraph 4-30). If problem still exists, refer generator set to next higher level of maintenance for testing of generator.

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2.	Disconnect connector P4 from EECM. Restart generator set. Do not apply load.  If generator set shuts down, replace EECM (paragraph 4-64).  If generator set does not shut down, place MASTER SWITCH in OFF position. Check for continuity and shorts between P4-B and P4-E. Repair or replace wires as necessary. If no shorts and continuity is good, replace GECM (paragraph 4-30).
18.	INTERMITTENT OR NO INDICATION OF BATTERY CHARGE CURRENT ON BATTERY CHARGING METER.	

#### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

- Step 1. Test battery (paragraph 4-27a).
- Recharge or replace battery as necessary. If battery is good, go to Step 2.
- Step 2. With generator set running at READY TO LOAD, disconnect battery cable plug connector. Measure voltage at connector. Voltage should be 25-28 Vdc.
- If voltage is not present, is low, or is unstable, go to Step 3.
- If voltage is correct and stable, check continuity of following wires.
- U111A18 (R1-C to TB3-16) U112A18 (R1-D to TB3-15)  
U111B18 (TB3-16 to M3(+)) U112B18 (TB3-15 to M3(-))
- Repair or replace wires as necessary. If wires and continuity are good, inspect 20 amp current shunt (R1) (paragraph 4-33a) and BATTERY CHARGING ammeter (M3) (paragraph 4-69). Replace as necessary.

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#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 3.	Shut down generator set. Disconnect connector P3 from GECM and connector P20 from battery. Connect ohmmeter between TB3-17 and TB3-18. Tap on resistor R3 and check resistance. Reading should be constant and between 90 and 110 ohms.
		If R3 reads open or out of tolerance, replace R3.
		If R3 is good, disconnect battery cable plug connector. Visually inspect and check continuity of following wires.
		P103D14 (P3-A to TB3-4) P103C00 (TB1-4 to bulkhead connector)
		P103E14 (TB3-4 to R1-A) P103A00 (bulkhead connector to P20(+))
		P103B14 (R1-B to TB1-3)
		Repair or replace wires as necessary. If checks good, visually inspect and check continuity of following wires.
		V102M14 (P3-C to TB3-1) V102H00 (TB1-2 to bulkhead connector)
		V102J18 (TB3-2 to TB1-2) V102AJ00 bulkhead connector to P20(-))
		Repair or replace wires as necessary. If checks good, replace GECM (paragraph 4-30).
19. PLACING CONTACTOR SWITCH IN CLOSED POSITION DOES NOT CAUSE CLOSED INDICATOR LIGHT TO COME ON.		

#### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

Step 1. Check press-to-test feature of CLOSED indicator light.

If light does not come on, replace lamp (paragraph 4-74).

If light still does not come on, test/replace indicator light socket (paragraph 4-73).

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2.	Check for 24 Vdc at end of power cable using voltmeter or by checking aircraft indicator.  If no voltage present, go to Step 3.  If voltage is present, place CONTACTOR switch in CLOSED position and check for 28 Vdc across magnetic output contactor terminals S4-31 and S4-32. If voltage is present, replace magnetic output contactor (paragraph 4-83c). If no voltage, check for shorts and continuity in wires U116A18 (S4-31 to TB3-9) and P105T18 (S4-32 to TB3-6). Repair or replace as necessary.
	Step 3.	With MASTER SWITCH in OFF position, disconnect connector P6 from EECM. Connect voltmeter between P6-T and ground. Place MASTER SWITCH in RUN position and CONTACTOR switch in CLOSED position.  If 28 Vdc present, go to Step 4.  If no voltage, check continuity in wires U126A18 (P6-T to S2-3) and P105B14 (CB1-2 to S3-2). Repair or replace as necessary. Test/replace CONTACTOR switch (paragraph 4-78).
	Step 4.	With generator set running and CONTACTOR switch in CLOSED position, measure voltage across magnetic output contactor S4-X1 and S4-X2.  If voltage reads 28 Vdc, replace magnetic output contactor (paragraph 4-83c).  If no voltage, check for shorts and continuity in wires U115A18 (S4-X1 to TB3-11) and V102AD18N (S4-X2 to TB3-12). Repair or replace as necessary. If good, replace EECM (paragraph 4-64).

#### 20. HOURMETER DOES NOT OPERATE.

- Step 1. Ensure that VOLTAGE meter indicates 20-35 Vdc.
- If no voltage indicated, go to Malfunction 21.
- If voltage present, go to Step 2.

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4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued		
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

Step 2. Measure voltage on terminals of HOURMETER. Voltage should be same as indicated on VOLTAGE meter.

If voltage is same, replace HOURMETER (paragraph 4-71).

If no voltage, disconnect battery cable plug connector. Visually inspect for damage and shorts and perform continuity check on following wires.

P106D18 (M4(-) to TB3-20) P107E18 (M4(+) to TB3-10)  
P107D18 (TB3-10 to S4-23) P106C18 (TB3-20 to S4-13)

Repair or replace wires as necessary.

21. NO VOLTAGE INDICATED ON VOLTAGE METER.

WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

Step 1. Check for 20-35 Vdc on output contactor S4-A1 and S4-B1.

If no voltage, inspect power leads from generator to output contactor. Replace if damaged. If good, go to Step 3.

If voltage present, check for 20-35 Vdc at output contactor S4-12 and S4-22. If voltage present, go to Step 2. If no voltage, disconnect battery cable plug connector. Check continuity of jumper wire between S4-B1 and S4-13 and between S4-A1 and S4-23. Repair or replace wires as necessary. Reconnect battery cable plug connector.

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

##### MALFUNCTION

##### TEST OR INSPECTION

Step 2. Ensure that CONTACTOR switch is in CLOSED position. Measure voltage between S4-11 and S4-21.

If no voltage, replace contactor (paragraph 4-83c).

If voltage present, check voltage on back of VOLTAGE meter. If voltage present, replace VOLTAGE meter (paragraph 4-75b). If no voltage, disconnect battery cable plug connector. Check continuity of wires U113C18 (M1(+) to P2-F) and U114C18 (M1(-) to P2-E). Replace as necessary. Reconnect battery cable plug connector.

Step 3. Disconnect connector P2 from GECM. Measure voltage between P2-M and P2-L.

If 3-5 Vdc present, go to Step 4.

If no voltage, check continuity of U141A18 (P2-M to P4-E) and U142A18 (P2-L to P4-F). If no continuity, repair or replace as necessary. If wires are good, replace EECM.

Step 4. Remove backshell of connector P1. Measure AC voltage between P1-B and P1-C.

If voltage is present, replace GECM (paragraph 4-30).

If no voltage, disconnect battery cable plug connector. Check continuity of wires U161A12 (P1-B to P16-B) and U162A12 (P1-C to P16-C). Repair or replace as necessary. If wires are good, refer to next higher level of maintenance for generator replacement.

#### 22. AN ATTEMPT TO LOAD DOES NOT SHOW ANY INDICATION ON OUTPUT CURRENT METER.

Step 1. Ensure that CONTACTOR CLOSED light is on and that VOLTAGE meter indicates 20-35 Vdc.

If CONTACTOR CLOSED light is on and VOLTAGE meter indicates 20-35 Vdc, go to Step 2.

If CONTACTOR CLOSED light is not on, go to Malfunction 19.



#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

#### MALFUNCTION

#### TEST OR INSPECTION

#### CORRECTIVE ACTION

If VOLTAGE meter incorrect, go to Malfunction 21.

Step 2. Verify that voltage is present and power is available for load.

If power available, ensure connections C and D on current shunt (R2) are secure. Check continuity of following wires.

U110A18 (R2-C to TB3-13) U109A18 (R2-D to TB3-14)  
U110B18 (TB3-13 to M2(+)) U109B18 (TB3-14 to M2(-))

Repair or replace wires as necessary. If wires check good, replace OUTPUT CURRENT meter (paragraph 4-76).

If no power is available, check continuity of wires V101B00 (S4-A2 to bulkhead connector) and V102B00N (S4-B2 to bulkhead connector).

If wires check good, replace contactor (paragraph 4-83c).

23. VOLTAGE METER INDICATES VOLTAGE BUT UNABLE TO ADJUST WITH VOLTAGE ADJUST KNOB.

#### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

Step 1. Disconnect connector P2 from GECM. Check continuity on wires U114C18 (M1(-) to P2-E) and U113C18 (M1(+) to P2-F).

If continuity good, go to Step 2.

If no continuity, repair or replace wires,

Step 2. With connector P2 disconnected from GECM, measure resistance between P2-P and P2-N while rotating VOLTAGE ADJUST knob.

If resistance measures between 0 and 10k ohms and is adjustable with VOLTAGE ADJUST knob, go to Step 3.

If resistance is not adjustable or is above 10k ohms, replace VOLTAGE ADJUST knob (paragraph (4-77b)).

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 3.	Reconnect connector P2 to GECM. Remove backshell of connector P1. Measure AC voltage between P1-B and P1-C while rotating VOLTAGE ADJUST knob.
		If voltage adjusts, replace GECM in accordance with paragraph 4-30.
		If voltage does not adjust, refer to next higher level of maintenance for generator replacement.
24. GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH ENGINE OVERTEMP MALFUNCTION LIGHT.	Step 1.	Ensure that operating load and temperature limits were not exceeded.
		If load and temperature were within limits, go to Malfunction 8.
		If limits were exceeded, allow generator set to cool. Restart and observe correct operating limits.
25. GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH OVERSPEED MALFUNCTION LIGHT.	Step 1.	Determine if there was a noticeable increase or decrease in engine RPM just prior to shutdown. This condition can be identified by a change in pitch while engine is running. A higher pitch indicates an increase in RPM.
		If engine RPM decreased, calculate load on generator set. This is determined by multiplying the reading on the VOLTAGE meter by the reading on the OUTPUT CURRENT meter. If load is 11 kW, go to Malfunction 13 and perform Steps 1,3, and 4. If load is less than 11 kW, go to Malfunction 29, Step 2. If load is greater than 11 kW, replace GECM (paragraph 4-30.)
		If engine RPM increased, verify that load limits were not exceeded. If established operating load limits were exceeded, allow generator set to cool. Restart generator set and operate within established operating limits. If established operating load limits were not exceeded, go to Malfunction 13, Step 3.

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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#### 26. GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH OVERLOAD MALFUNCTION LIGHT.

Step 1. Ensure that load on generator set did not exceed 11kW. This is determined by multiplying the reading on the VOLTAGE meter by the reading on the OUTPUT CURRENT meter.

If the result exceeds 11kW, inspect for shorts in load or power cable. Remove shorts and restart generator set.

If the result is 11kW or less, go to Malfunction 14.

#### 27. GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH OVERVOLTAGE MALFUNCTION LIGHT.

#### WARNING

To prevent injury, ensure that battery is disconnected before repairing or replacing damaged wires.

Step 1. Determine if reading on VOLTAGE meter exceeded 35 Vdc.

If voltage exceeded 35 Vdc, go to Step 2.

If voltage did not exceed 35 Vdc, shut down generator set and disconnect connector P4 from EECM. Place MASTER SWITCH in RUN position. If OVERVOLTAGE malfunction light comes on, replace EECM (paragraph 4-64). If OVERVOLTAGE malfunction light stays off, disconnect battery cable plug connector. Check wire U138A18 (P4-B to P2-B) for continuity and shorts. Repair as necessary. If problem still exists, replace GECM (paragraph 4-30). If generator set still shuts down, refer generator set to next higher level of maintenance for testing of generator.

Step 2. Ensure that VOLTAGE ADJUST knob was not set above 35 Vdc.

If knob set above 35 Vdc, restart and set knob in 20-35 Vdc range.

If knob is set within range and set still shuts down, go to Malfunction 15.

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
28. GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH GENERATOR OVERTEMP MALFUNCTION LIGHT.	<p>Step 1. Determine if generator set has been running for an extended period of time above rated load and established operating temperature.</p> <p>If generator set has been running above rated load and established operating temperature, allow generator set to cool. Restart and observe proper operating loads and temperatures.</p> <p>If generator set has been running within rated limits, remove engine housing access cover. Check for obstructions in generator air intake. Ensure that generator fan turns freely.</p> <p>If generator set continues to shut down with GENERATOR OVERTEMP malfunction light, go to Malfunction 16.</p>	
29. GENERATOR SET SHUTS DOWN UNDER FULL LOAD WITH UNDERVOLTAGE MALFUNCTION LIGHT.	<p>Step 1. Calculate load on generator set. This is determined by multiplying the reading on the VOLTAGE meter by the reading on the OUTPUT CURRENT meter.</p> <p>If the calculated load is less than 11kW, go to Step 2.</p> <p>If the calculated load exceeds 11kW, replace GECM (paragraph 4-30).</p> <p>Step 2. With generator set under full load, measure voltage at magnetic output contactor S4-A1(+) and S4-B1(-). Multiply that voltage by reading on OUTPUT CURRENT meter.</p> <p>If result is more than 150% of the calculated load obtained in Step 1, check power leads for excessive heat and signs of arcing (indication of poor/loose connections). Tighten connections.</p> <p>If result is less than 150% of the calculated load obtained in Step 1, go to Malfunction 17.</p>	

#### 4-10. GENERAL. (cont)

Table 4-3. Organizational Troubleshooting - Continued

#### MALFUNCTION

#### TEST OR INSPECTION

#### CORRECTIVE ACTION

#### 30. OIL SMOKE COMING FROM EXHAUST DURING OPERATION.

#### NOTE

It is not abnormal to occasionally see smoke come from the exhaust during startup and shutdown. This malfunction refers to steady oil smoke appearing during operation.

Step 1. Check oil level.

If normal or low, go to Step 2.

If high, drain to correct operating level (paragraph 4-8).

Step 2. Check for oil leaks throughout lubrication system and where gearbox mates with compressor inlet housing.

If no leaks, go to Step 3.

Repair leaks as necessary.

Step 3. Inspect exhaust duct for oil streaks.

If streaks present, refer engine to depot level for inspection and maintenance.

#### 31. SCRAPING/RUBBING NOISES DURING SHUTDOWN.

Step 1. Refer generator set to next higher level of maintenance.

### Section VII. RADIO INTERFERENCE SUPPRESSION

4-11. GENERAL METHOD USED TO ATTAIN PROPER SUPPRESSION. Suppression is through a low resistance path to ground. The methods include shielding, grounding, and filtering systems.

4-12. INTERFERENCE SUPPRESSION COMPONENTS. There are no components specifically identified to accomplish radio interference suppression.

## Section VIII. MAINTENANCE OF FRAME AND HOUSING

**4-13. GENERAL.** The generator set is enclosed in an all-weather housing mounted on a towable frame. Four tie-down rings provide attaching points for lifting the generator set with a crane or helicopter. The rings can also be used as tiedown points. Forklift tubes form a part of the chassis frame. A cable support assembly provides storage for the power cable when the generator set is not in operation. A battery holddown, consisting of two hook bolts, prevents shifting or movement of the battery. There are four access doors: the control panel access door that allows access to the control panel; the exhaust door that allows exhaust gas to discharge to the atmosphere; the fuel housing access door that allows access to fuel system components; and the inlet air housing access door that allows access to the air filter and electrical connections. Lifting the control panel allows access to the generator electronic control module (GECM). Four removable covers allow access to the plenum, engine housing, engine electronic control module (EECM), and, on the underside of the generator set, access to the fuel and oil drains. A bleed air connector is installed in the bleedport on top of the combustor housing and is connected to the air filter by the bleed air line. Bleed air from the combustor is directed to the air filter to help keep it free of foreign material.

### NOTE

If not specified in maintenance procedure, apply torque in accordance with-table 1-1, Torque Specifications.

**4-14. TIEDOWN RINGS.** Maintenance of the tiedown rings (figure 4-8) is limited to replacement.

#### a. Removal.

(1) Firmly grasp tiedown ring retainer (3) with wrench or socket.

(2) Unscrew and remove tiedown ring (1). Remove washer (2).

(3) Remove tiedown ring retainer (3) from chassis frame (4).

#### b. Installation.

(1) Place new tiedown ring retainer (3) in chassis frame (4).

(2) Lightly coat threaded portion of new tiedown ring (1) with thread-locking compound (MIL-S-46163).

(3) Place washer (2) over threaded portion of tiedown ring.

(4) Use wrench or socket to hold tiedown ring retainer. Screw tiedown ring securely into retainer.

**4-15. BATTERY HOLDDOWN.** Maintenance of the battery holddown (figure 4-8) consists of repair and replacement.

#### a. Removal.

### WARNING

To prevent injury, avoid contact with white powdery chemical deposits around battery.

(1) Remove power cable from cable support assembly.

(2) Remove wingnuts (5) and washers (6) from top of hook bolts (7).

4-15. BATTERY HOLDDOWN. (cont)

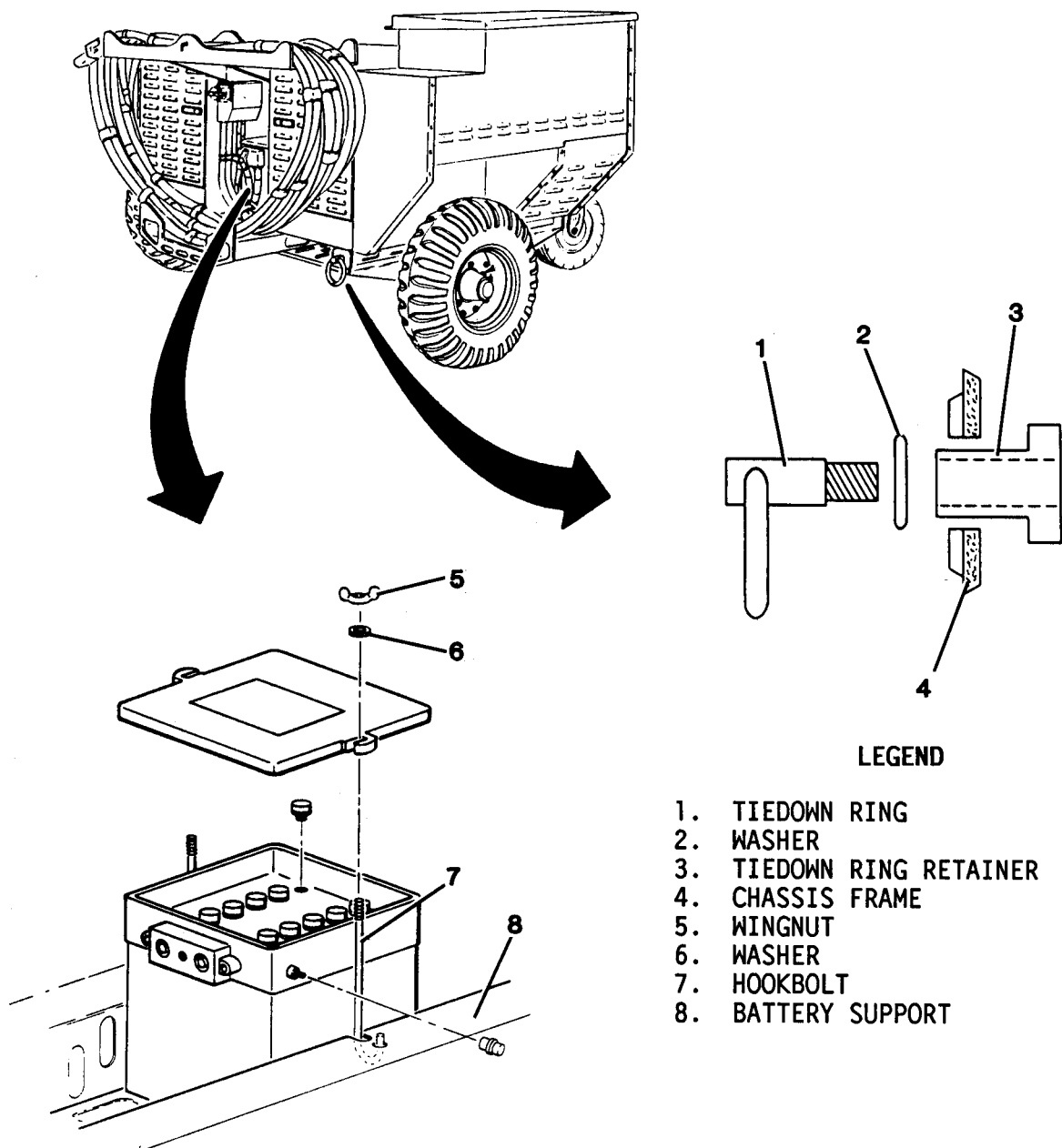


Figure 4-8. Tiedown Ring and Battery Holddown Replacement

#### 4-15. BATTERY HOLDDOWN. (cont)

##### a. Removal.

(3) Unhook and remove hook bolts from battery support (8).

b. Repair. Repair by straightening bent hook bolts and replacing any missing or defective attaching parts.

##### c. Installation.

(1) Install hook bolts (7) in battery support (8).

#### CAUTION

Battery holddown needs to be secure; however, excessive pressure may cause battery to buckle, causing internal shorting.

(2) Install washers (6) on top of hook bolts and secure firmly with wing-nuts (5). Do not overtighten.

(3) Stow power cable on cable support assembly.

#### 4-16. ACCESS DOORS. Maintenance of access doors is limited to replacement.

##### a. control Panel Access Door.

##### (1) Removal.

(a) Unlatch and open control panel access door (1, figure 4-9). Ensure that both support bars (2) are locked.

(b) Remove screws (3) and clamping catch (4).

(c) Remove screws (5), nuts (6), and washers (7) that secure support bars to door.

(d) Remove screws (8), nuts (9), and washers (10) that secure door to hinge (11). Remove door.

(e) Remove screws (12), nuts (13), and lockwashers (14) that secure operating instructions plate (15) and wiring diagram plate (16) to door.

##### (2) Installation.

(a) Install operating instructions plate (15) and wiring diagram plate (16) with screws (12), lockwashers (14), and nuts (13).

(b) Secure door to hinge (11) with screws (8), lockwashers (10), and nuts (9). Torque to 32-35 inch pounds (3.6-4 Nm).

(c) Align support bars (2) with door and secure with screws (5), lockwashers (7), and nuts (6). (Torque to 32-35 inch pounds (3.6-4 Nm).

(d) Install clamping catches (4) and secure with screws (3). Torque to 32-35 inch pounds (3.6-4 Nm).

(e) Close control panel access door.

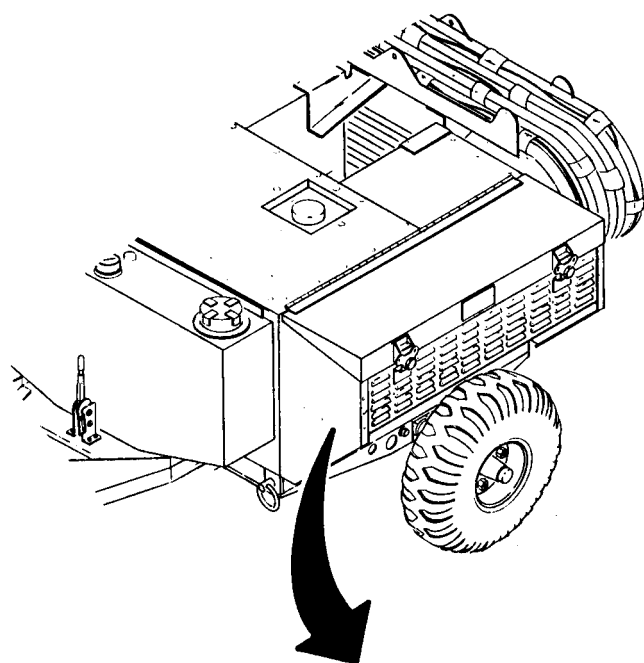
##### b. Exhaust Door.

(1) Removal. Remove screws (17), nuts (18), and lockwashers (19) that secure exhaust door (20) to hinge (21). Remove screws (22), and washers (23) to remove hinge.



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4-16. ACCESS DOORS. (cont)



LEGEND

1. CONTROL PANEL ACCESS DOOR
2. SUPPORT BAR
3. SCREW
4. CLAMPING CATCH
5. SCREW
6. NUT
7. WASHER
8. SCREW
9. NUT
10. WASHER
11. HINGE
12. SCREW
13. NUT
14. WASHER
15. OPERATING INSTRUCTIONS PLATE
16. WIRING DIAGRAM PLATE

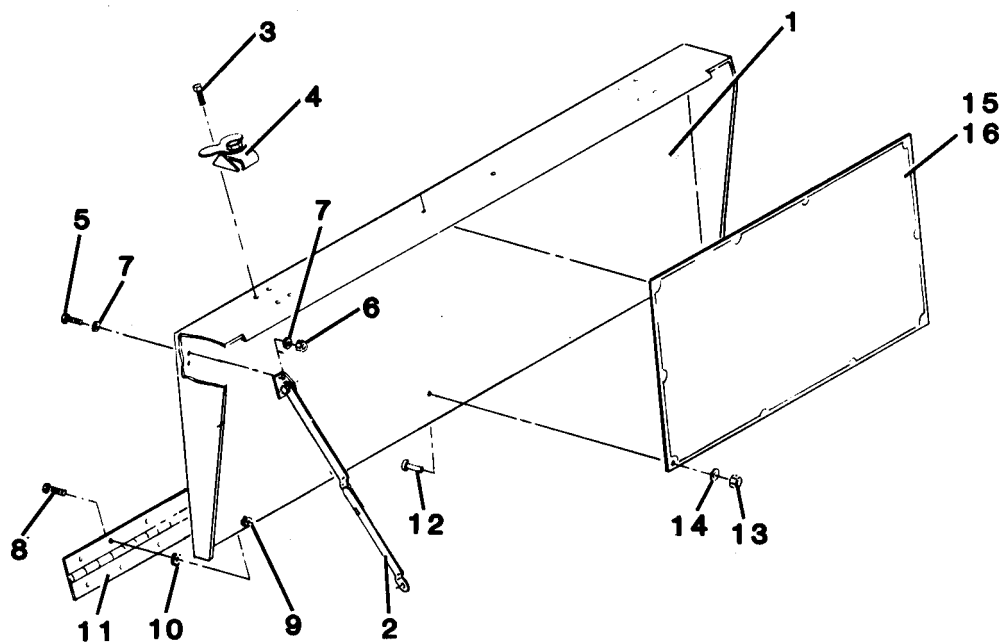
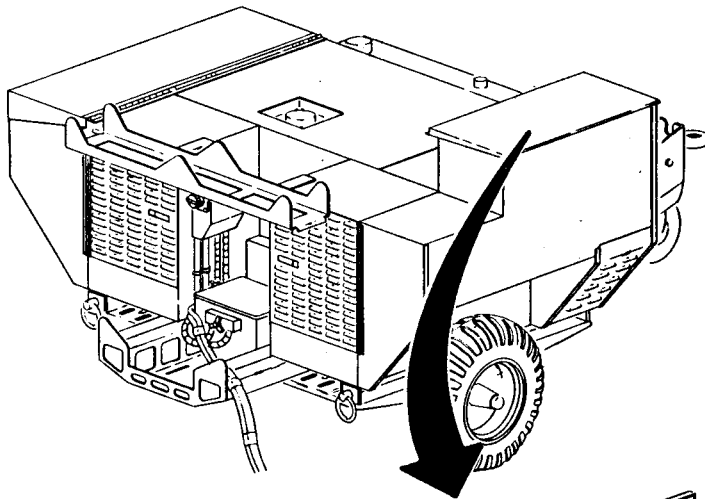


Figure 4-9. Access Door Replacement (Sheet 1 of 3)

4-16. ACCESS DOORS. (cont)



LEGEND (cont)

- 17. SCREW
- 18. NUT
- 19. WASHER
- 20. EXHAUST DOOR
- 21. HINGE
- 22. SCREW
- 23. WASHER

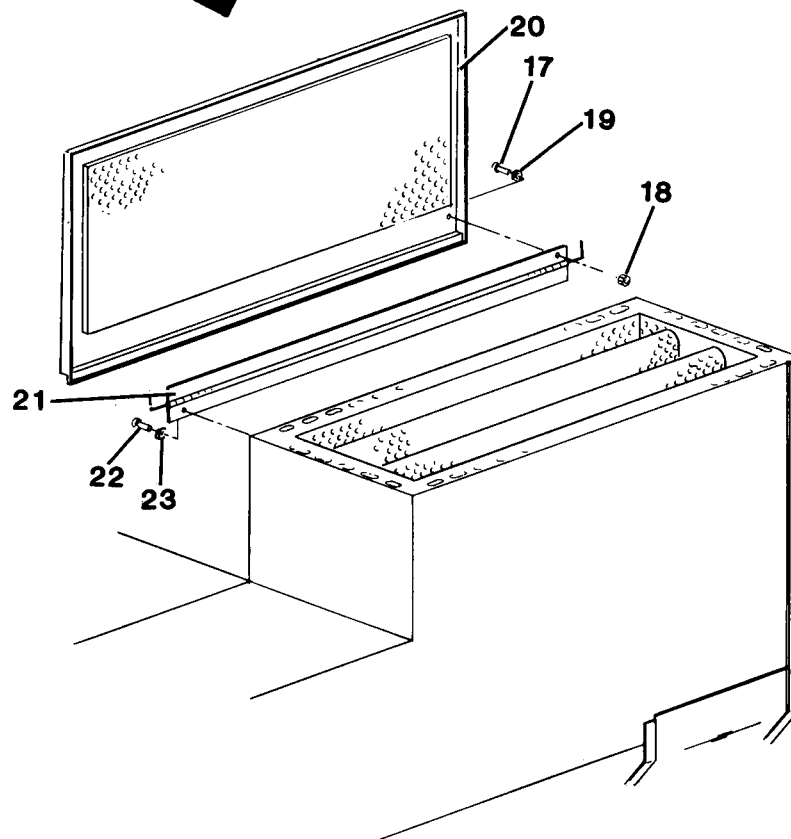


Figure 4-9. Access Door Replacement (Sheet 2 of 3)

4-16. ACCESS DOORS. (cont)

LEGEND (cont)

- 24. FUEL HOUSING ACCESS DOOR
- 25. SCREW
- 26. NUT
- 27. WASHER
- 28. HINGE
- 29. SCREW
- 30. NUT
- 31. WASHER
- 32. DOOR LATCH

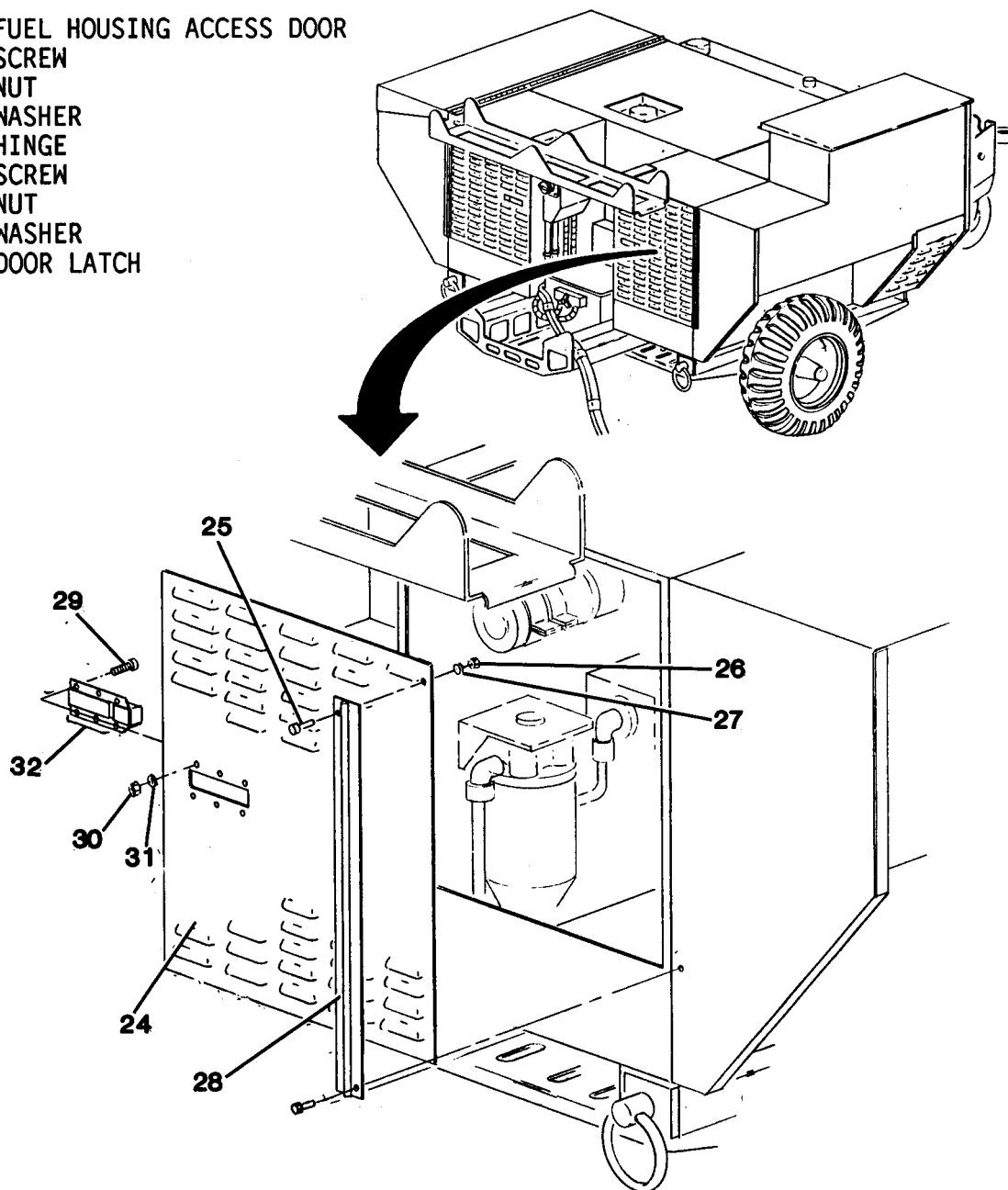


Figure 4-9. Access Door Replacement (Sheet 3 of 3)

#### 4-16. ACCESS DOORS. (cont)

##### b. Exhaust Door.

(2) Installation. Attach hinge (21) to exhaust with screws (22), and washers (23). Secure exhaust door (20) to hinge with screws (17), washers (19), and nuts (18). Torque to 36-40 Inch-pounds (4-4.5 Nm).

##### c. Fuel Housing Access Door.

###### (1) Removal.

(a) Remove power cable from cable support assembly.

(b) Unlatch and open door (24, figure 4-8).

(c) Remove screws (25), nuts (26), and washers (27) that secure door to hinge (28). Remove door.

(d) Remove screws (29), nuts (30), washers (31), and door latch (32).

###### (2) Installation.

(a) Install door latch (32) and secure with screws (29), washers (31), and nuts (30). Torque to 12-14 inch pounds (1.3-1.5 Nm).

(b) Secure door (24) to hinge (28) with screws (25), washers (27), and nuts (26). Torque to 36-40 inch pounds (4-4.5 Nm).

(c) Close and securely latch door.

(d) Stow power cable on cable Support assembly.

d. Inlet Air Housing Access Door. Procedure for removal and installation of the inlet air housing access door is the same as for removal and installation of the fuel housing access door.

**4-17. ACCESS COVERS.** Organizational maintenance of access covers (figure 4-10) consists of replacement. During replacement procedures on all access covers, inspect the gasketing, insulation, and turnlock fasteners for damage or defect. If damage or defect is found, refer to direct support maintenance.

##### a. Plenum Access Cover.

(1) Removal. Loosen turnlock fasteners and remove plenum access cover (1).

###### (2) Installation.

(a) Ensure that gasket and insulation are securely in place and undamaged.

(b) Aline plenum access cover (1) with mounting holes and secure with turnlock fasteners.

##### b. Engine Housing Access Cover.

(1) Removal. Loosen turnlock fasteners and remove engine housing access cover (2).

###### (2) Installation.

(a) Ensure that gasket and insulation are securely in place and undamaged.

(b) Aline engine housing access cover (2) with mounting holes and secure with turnlock fasteners.

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4-17. ACCESS COVERS. (cont)

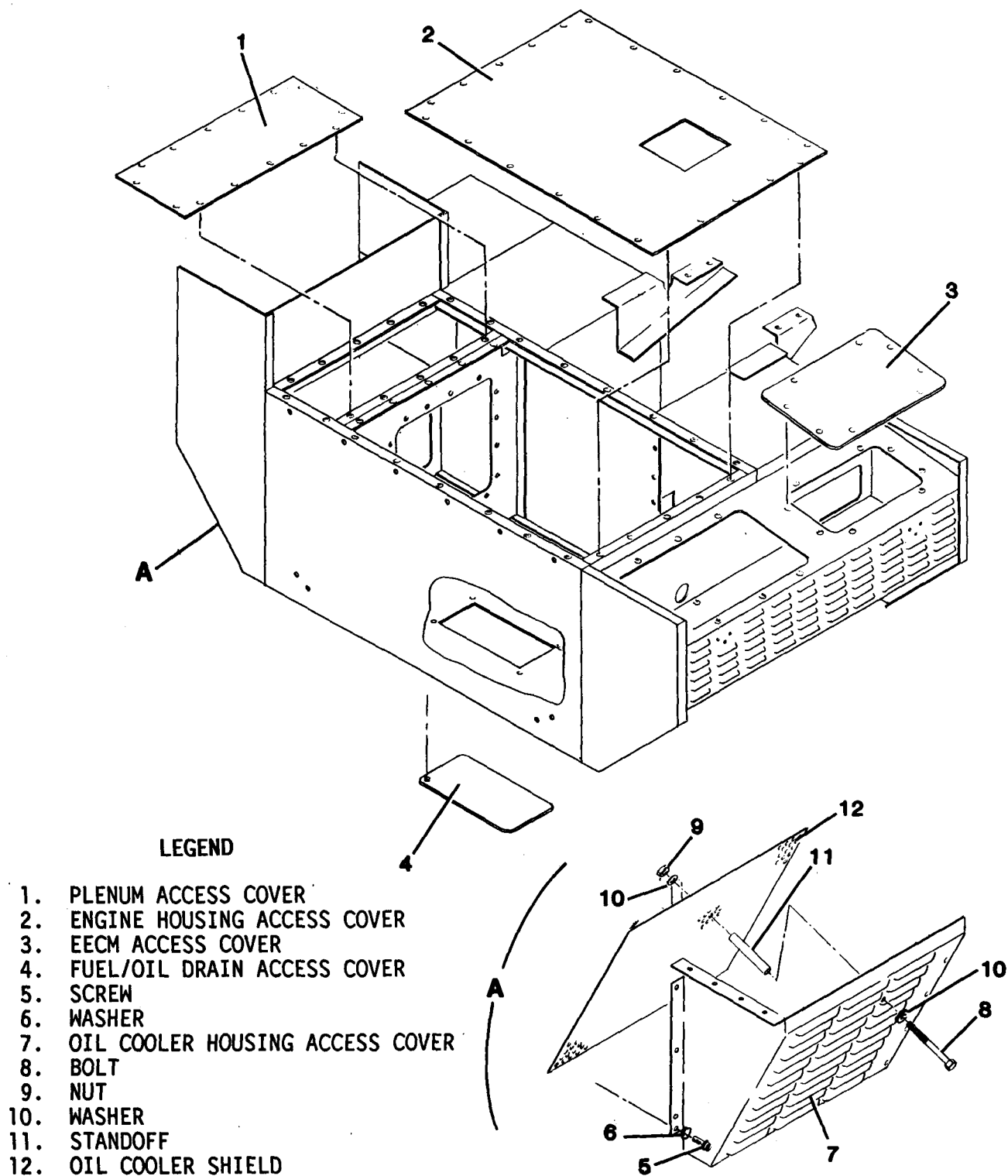


Figure 4-10. Access Cover Replacement

#### 4-17. ACCESS COVERS. (cont)

##### c. Engine Electronic Control Module (EECM) Access Cover.

###### (1) Removal.

(a) Open control panel access door.

(b) Loosen turnlock fasteners and remove EECM access cover (3).

###### (2) Installation.

(a) Ensure that gasket is securely in place and undamaged.

(b) Align EECM access cover (3) with mounting holes and secure with turnlock fasteners.

(c) Close control panel access door.

##### d. Fuel/Oil Drain Access Cover.

###### (1) Removal.

###### WARNING

To prevent injury, ensure that handbrake is set and wheels are chocked while working under generator set.

(a) Set handbrake and chock both wheels.

(b) On underside of generator set, loosen turnlock fasteners and remove fuel/oil drain access cover (4).

###### (2) Installation.

(a) Ensure that gasket is securely in place and undamaged.

(b) Install fuel/oil drain access cover (4) and secure with turnlock fasteners.

(c) Remove chocks and release handbrake.

##### e. Oil Cooler Housing Access Cover.

###### (1) Removal.

(a) Remove screws (5) and washers (6) that secure oil cooler access cover (7) to generator set.

(b) Remove bolts (8), nuts (9), washers (10), and standoffs (11) that connect oil cooler shield (12) to access cover.

###### (2) Installation.

(a) Place washers (10) on bolts (8). Insert bolts into oil cooler access cover (7).

(b) Place standoffs (11) on bolts (8).

(c) Place oil cooler shield (12) in position on bolts (8). Secure with remaining washers (10) and nuts (9). Torque to 24-36 inch pounds (2.7-4 Nm).

(d) Secure access cover (7) to generator set with washers (6) and screws (5).

4-17. ACCESS COVERS. (cont)

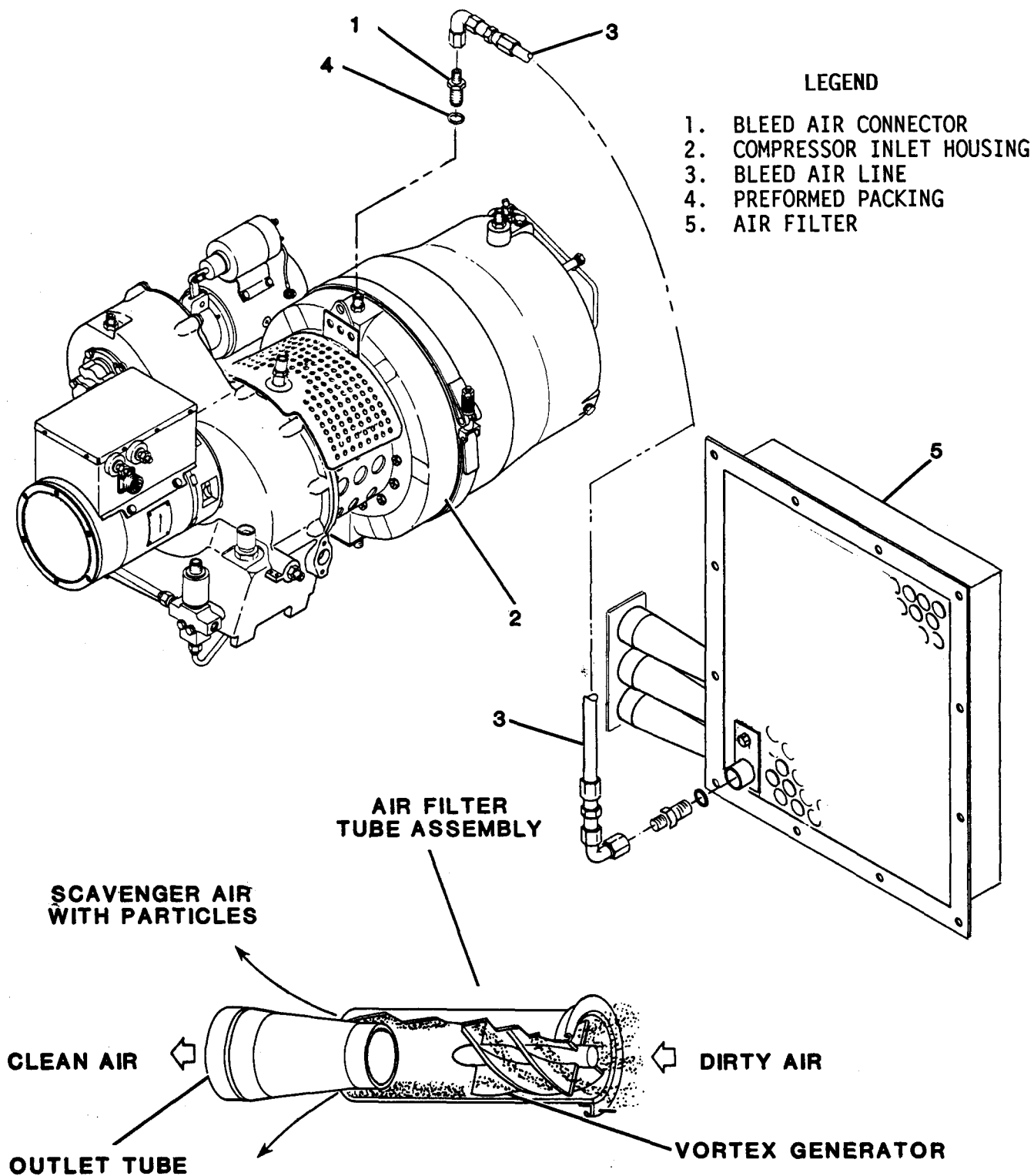


Figure 4-11. Bleed Air Connector and Bleed Air Line Replacement

**4-18. BLEED AIR CONNECTOR.** The bleed air connector (1, figure 4-11) is installed in the top of the inlet housing (2) and connected to the air filter (5) by the bleed air line (3). Bleed air at approximately 25 psi (172.38 kPa) goes from the inlet housing to the air filter where it is used to remove foreign matter. Foreign matter is removed from the air in the air filter tube assemblies.

a. Inspection.

(1) Loosen turnlock fasteners and remove engine housing access cover.

(2) Ensure that bleed air connector (1) is secure in compressor inlet housing (2). Torque to 135-150 inch pounds (15.3-17.0 Nm).

(3) Ensure that bleed air line (3) is securely attached.

(4) Install engine housing access cover and secure with turnlock fasteners.

b. Removal.

**WARNING**

To prevent injury, ensure that battery is disconnected before performing maintenance.

(1) Disconnect battery cable plug connector.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Unscrew bleed air line (3) from bleed air connector (1).

(4) Remove bleed air connector and preformed packing (4) from compressor inlet housing (2).

c. Installation.

(1) Place new preformed packing (4) on bleed air connector (1).

(2) Install bleed air connector in compressor inlet housing (2) and torque 135-150 inch pounds (15.3-17.0 Nm).

(3) Connect bleed air line (3) to bleed air connector (1).

(4) Install engine housing access cover and secure with turnlock fasteners.

(5) Connect battery cable plug connector.

**4-19. BLEED AIR LINE.** The bleed air line (3, figure 4-11) is connected between the bleed air connector (1) and the air filter (5). It provides a passage for bleed air at approximately 25 psi (172.38 kPa) from the compressor inlet housing (2) to the air filter.

a. Inspection.

(1) Loosen turnlock fasteners and remove engine housing access cover.

(2). Make sure that connectors are tight. Tighten if loose.

(3) Check hose for abrasions, kinks, or twists. Replace if damaged.

(4) Install engine housing access cover and secure with turnlock fasteners.



#### 4-19. BLEED AIR LINE. (cont)

##### b. Removal.

##### WARNING

To prevent Injury, ensure that battery is disconnected before performing maintenance.

(1) Disconnect battery cable plug connector.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Unscrew bleed air line (3) from bleed air connector (1) and from air filter (5).

##### c. Installation.

(1) Connect bleed air line (3) to bleed air connector (1) and tighten securely.

(2) Connect bleed air line (3) to air cleaner (5) and tighten securely.

(3) Install engine housing access cover and secure with turnlock fasteners.

**4-20. AIR FILTER.** Maintenance of the air filter (1, figure 4-12) consists of Inspection.

(1) Open control panel access door.

(2) Ensure that MASTER SWITCH is in OFF position.

(3) Close control panel access door.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance.

(4) Disconnect battery cable plug connector from battery.

(5) Loosen turnlock fasteners and remove engine housing access cover.

(6) Ensure that air filter is securely mounted and that filter is not damaged. Report damage to next higher level of maintenance.

(7) Ensure that bleed air line (2) is properly secured.

(8) Ensure that louvers of air inlet housing are free of obstruction.

(9) Install engine housing access cover and secure with turnlock fasteners.

(10) Connect battery cable plug connector to battery.

#### **4-21. AIR FILTER MUFFLER HOUSING.**

Maintenance of the air filter muffler housing (5, figure 4-12) consists of inspection, replacement, and repair.

a. Removal. Remove screws (3) and washers (4) that secure air filter muffler housing (5) to generator set. The housing is removed by lifting straight up.

b. Inspection. Inspect housing for damage. Ensure that sound controlling blanket (6) is securely in place and undamaged.

4-21. AIR FILTER MUFFLER HOUSING.  
(cont)

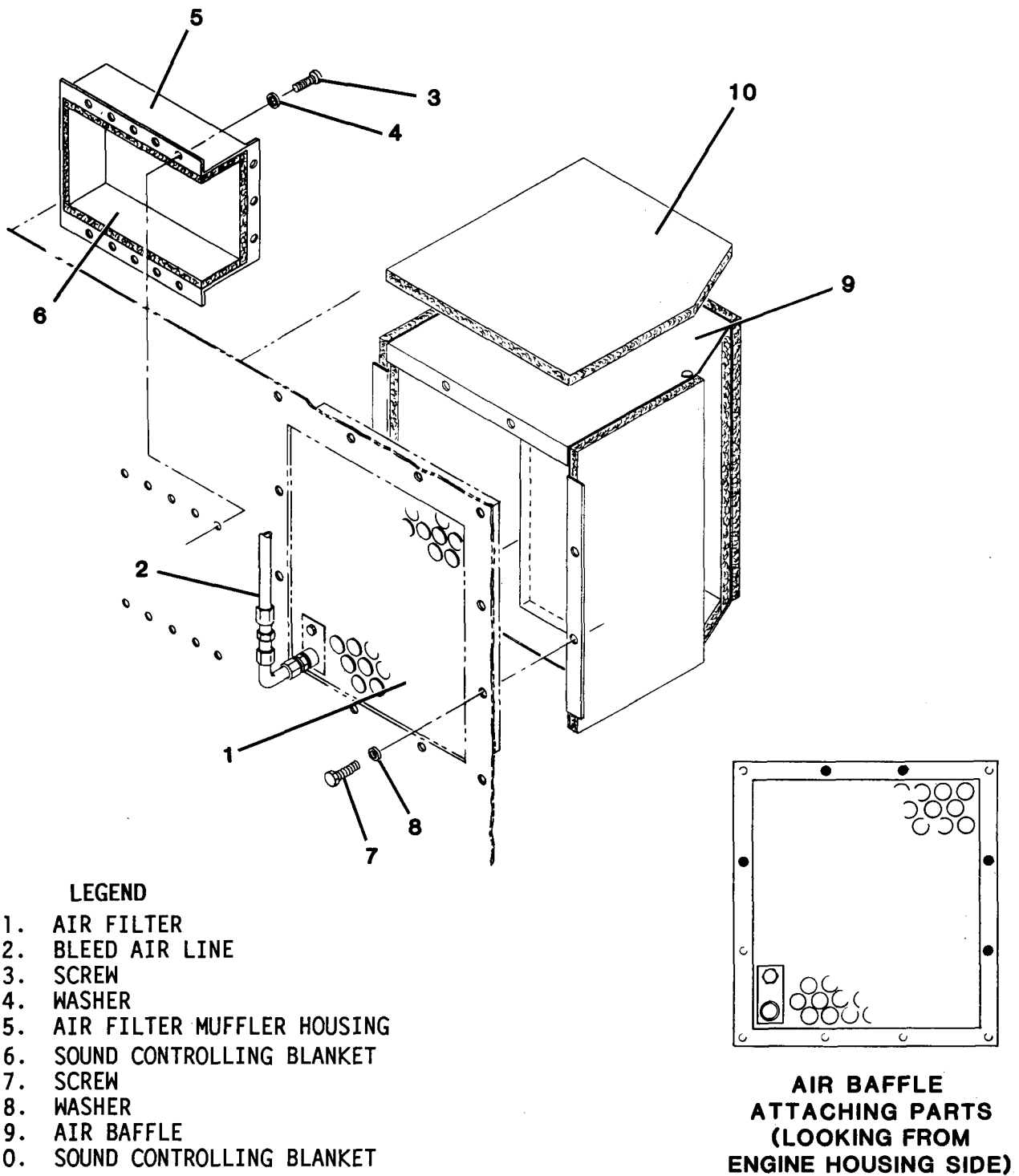


Figure 4-12. Air Filter, Air Filter Muffler Housing,  
and Air Baffle Maintenance

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#### 4-21. AIR FILTER MUFFLER HOUSING. (cont)

c. Repair. Repair of the air filter muffler housing is limited to replacing the sound controlling blanket material on the inside of the housing.

(1) Clean surfaces of housing with alcohol. Ensure that all dirt and grease are removed.

(2) Cut new piece of sound controlling blanket to fit area to be covered.

(3) Seal cut edges of blanket with edge sealer (ADM6SE80-PB).

(4) Peel covering from side of self-stick blanket that will face metal surface.

(5) Press blanket firmly into place in housing.

d. Installation. Aline air filter muffler housing (5) with mounting holes and secure with washers (4) and screws (3). Torque to 24-36 inch pounds (2.7-4.1 Nm).

4-22. AIR BAFFLE. Maintenance of the air baffle (9, figure 4-12) consists of inspection, replacement, and repair.

a. Removal.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance.

(1) Disconnect battery cable plug connector from battery.

(2) Remove power cable from cable support.

(3) Open inlet air housing access door. Secure in open position.

(4) Loosen turnlock fasteners and remove engine housing access cover.

(5) Refer to inset in figure 4-12 and note location of air baffle attaching parts.

(6) Remove screws (7) and washers (8) that secure air baffle (9). Carefully remove air baffle from inlet air housing.

b. Inspection. Inspect air baffle for damage. Ensure that sound controlling blanket (10) is securely in place and undamaged.

c. Repair. Repair of the air baffle is limited to replacing the sound controlling blanket.

(1) Clean surface of air baffle with alcohol. Ensure that all dirt and grease are removed.

(2) cut new piece of sound controlling blanket to fit area to be covered.

(3) Seal cut edges of blanket with edge sealer (ADM6SE80-PB).

(4) Peel covering from side of self-stick blanket that will face metal surface.

(5) Press blanket firmly into place on air baffle.

#### 4-22. AIR BAFFLE. (cont)

##### d. Installation.

(1) Carefully guide air baffle (9) into position in inlet air housing.

(2) Secure with washers (8) and screws (7).

(3) Torque to 36-40 inch pounds (4.1-4.6 Nm).

(4) Install engine housing access cover and secure with turnlock fasteners.

(5) Close inlet air housing access door.

(6) Stow power cable on cable support.

(7) Connect battery cable plug connector to battery.

**4-23. ENGINE HOUSING.** The engine housing contains the gas turbine engine, the generator, fuel lines, bleed air line, and electrical wiring. It provides access for clean inlet air. To ensure proper operation of the generator set, the engine housing must be inspected for damage or foreign objects that could hamper operations. See figure 1-1 for location of the engine housing. Use the following procedure to inspect the engine housing.

a. Loosen turnlock fasteners and remove engine housing access cover.

b. Check engine housing for dents, holes, sharp edges or damaged insulation.

Check for corrosion and chipped paint.

d. Check for fuel/oil leaks.

e. Report any damage to direct support maintenance.

f. Remove any tools, rags, or other foreign material from engine housing.

g. Install engine housing access cover and secure with turnlock fasteners.

**4-24. ENGINE SUPPORT ASSEMBLY.** The engine support assembly (figure 4-13) consists of the engine mounting frame and resilient mounts. It provides support, thermal expansion, and vibration isolation for the gas turbine engine and gearbox. Use the following procedure to inspect the engine support assembly.

a. Loosen turnlock fasteners and remove engine housing access cover.

b. Feel resilient mounts and check for cracking and other damage. If damaged, notify direct support maintenance.

c. Check for cracked welds.

d. Ensure that all fasteners are tight. If the fasteners are not tight, notify direct support maintenance.

e. Install engine housing access cover and secure with turnlock fasteners.

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NAVY AG-320B0-0MM-000

4-24. ENGINE SUPPORT ASSEMBLY.  
(cont)

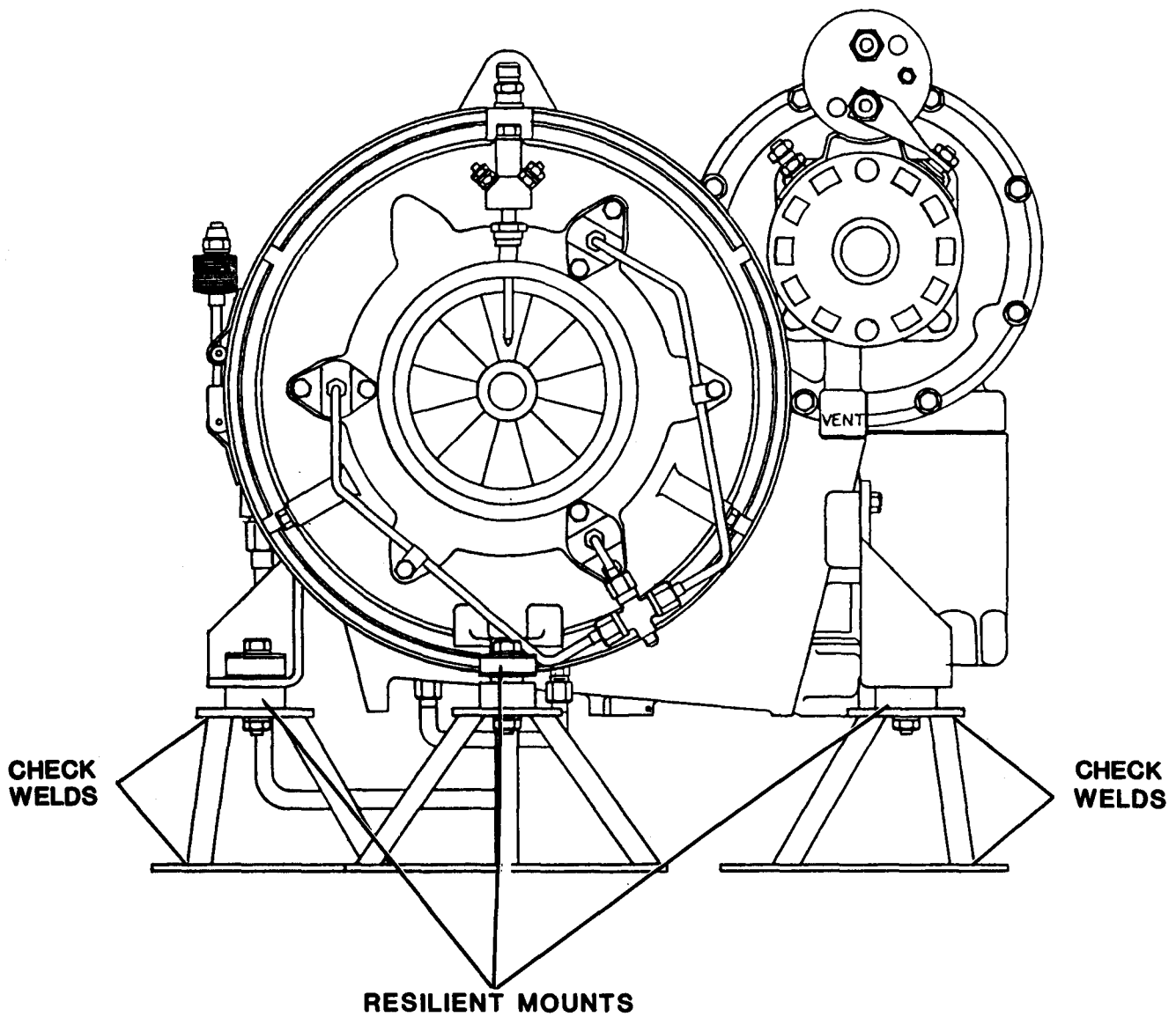


Figure 4-13. Engine Support Inspection

## Section IX. MAINTENANCE OF DC ELECTRICAL AND CONTROL SYSTEM

**4-25. GENERAL.** This section provides maintenance procedures for the DC electrical and control system. The system provides turbine rotation during startup, generator output control and sensing, generator protection, and battery charging. The system consists of the battery cable, battery wiring harness (W1), slave receptacle, generator electronic control module (GECM), circuit breaker, starter, and the 20 amp current shunt.

### NOTE

If not specified in maintenance procedure, apply torque in accordance with table 1-1, Torque Specifications.

**4-26. BATTERY CABLE ASSEMBLY.** Maintenance of the battery cable (figure 4-14) consists of servicing, replacement, and repair.

#### a. Removal.

(1) Remove power cable from cable support assembly.

### WARNING

To prevent Injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector.

(3) Remove screws (1), washers (2), and output/slave housing access cover (3).

(4) Remove screws (4), washers (5), nuts (6), and loop clamps (7). Nuts (6) are located in inlet air housing.

(5) Remove nuts (8) and washers (9). Tag slave receptacle leads (10) and battery cable leads (11) and remove from feedthrough terminals (12). Pull battery cable leads through bottom of output/slave housing (13).

(6) Loosen screw (14) to separate knob (15) and connector adapter (16) from case (17).

(7) Remove screws (18) to separate two halves of case.

(8) Tag battery cable. Remove nuts (19) and lockwashers (20) to disconnect battery cable from mounting studs (21).

#### b. Service.

### WARNING

To prevent injury, use cleaning solvent in well-ventilated area and avoid prolonged breathing of fumes. Ensure that protective clothing is worn to prevent contact with skin.

Clean cable and cable connector components with dry cleaning solvent P-D-680, type II.

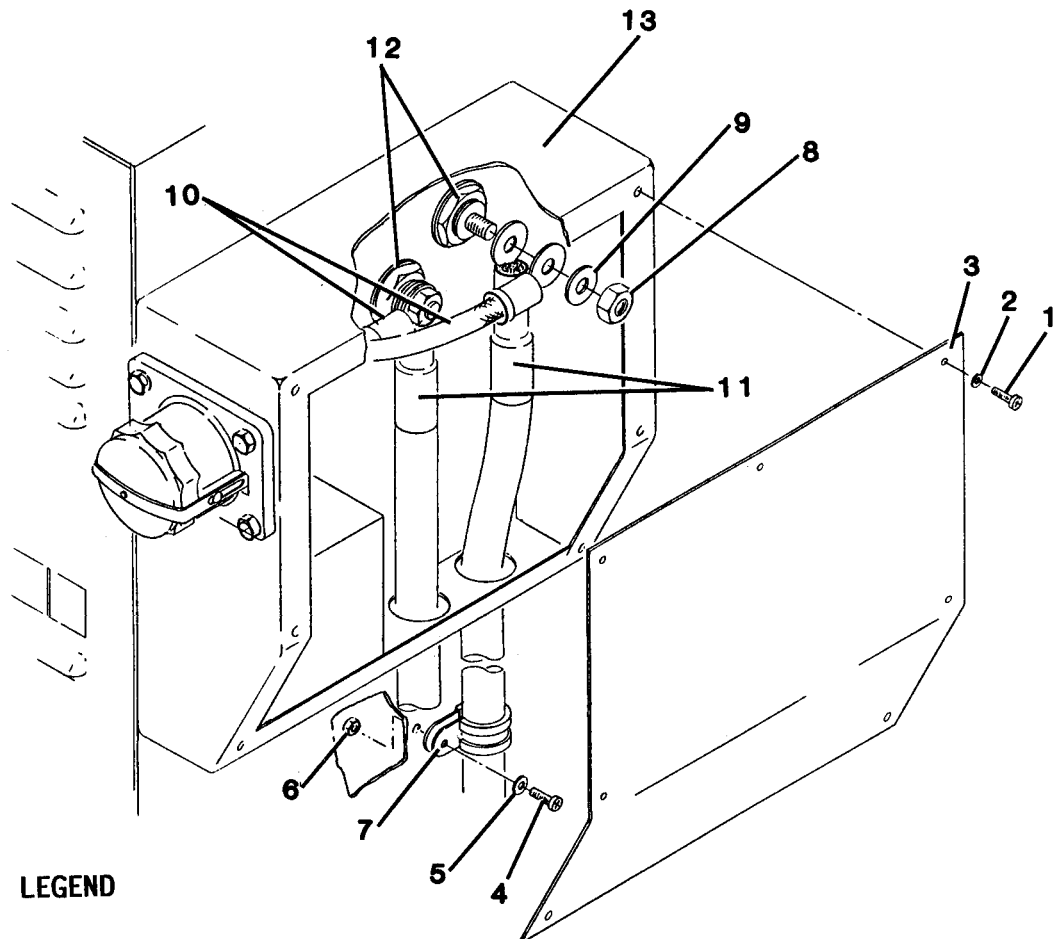
#### c. Repair.

(1) cut damaged terminal lugs from cable.

(2) If necessary to replace cable, use 2/0 AN black cable and cut positive (+) cable 41 inches (104 cm) and negative (-) cable 36 inches (91 cm).

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NAVY AG-320B0-0MM-000

4-26. BATTERY CABLE ASSEMBLY. (cont)

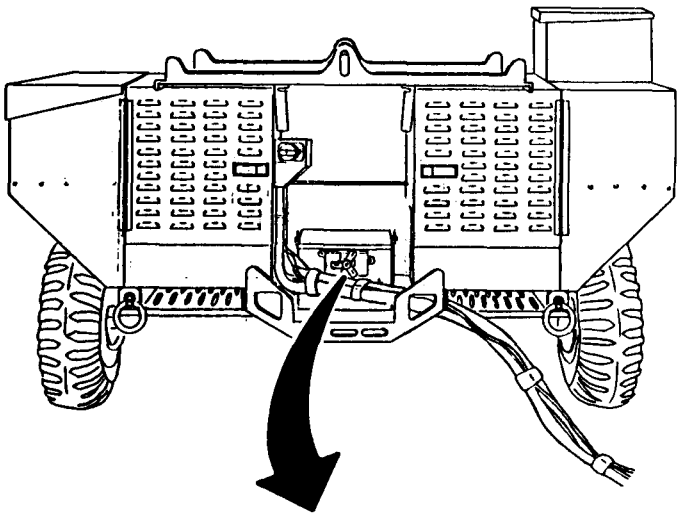


**LEGEND**

1. SCREW
2. WASHER
3. OUTPUT/SLAVE HOUSING COVER
4. SCREW
5. WASHER
6. NUT
7. LOOP CLAMP
8. NUT
9. WASHER
10. SLAVE RECEPTACLE LEAD
11. BATTERY CABLE LEAD
12. FEEDTHROUGH TERMINAL
13. OUTPUT/SLAVE HOUSING

Figure 4-14. Battery Cable Replacement (Sheet 1 of 2)

4-26. BATTERY CABLE ASSEMBLY. (cont)



LEGEND (cont)

- 14. SCREW
- 15. KNOB
- 16. CONNECTOR ADAPTER
- 17. CASE
- 18. SCREW
- 19. NUT
- 20. LOCKWASHER
- 21. MOUNTING STUD

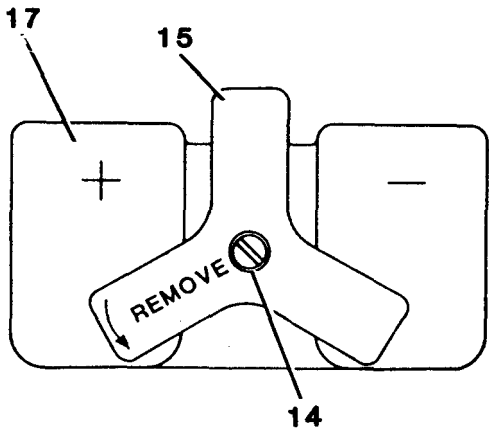
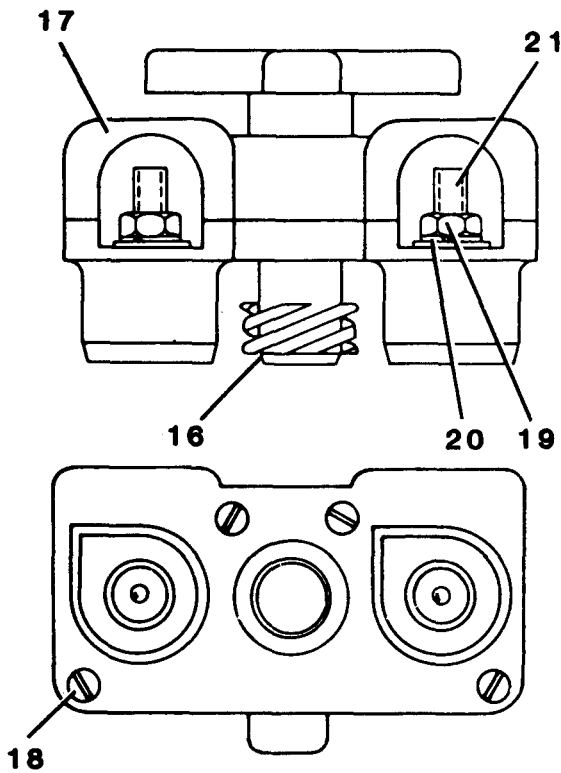


Figure 4-14. Battery Cable Replacement (Sheet 2 of 2)



#### 4-26. BATTERY CABLE ASSEMBLY. (cont)

##### c. Repair. (cont)

(3) Strip 3/4 inch (1.91 cm) insulation from cable ends.

(4) Install new terminal lugs on cable ends and crimp securely in place.

(5) Install shrink tube on cables. Mark polarity on both ends of each cable.

##### d. Installation.

(1) Place terminal lugs on mounting studs (21). Secure with lockwashers (20) and nuts (19). Torque to 5-10 ft lb (6.8-13.6 Nm).

(2) Place two halves of case (17) together and secure with screws (18).

(3) Install connector adapter (16) and knob (15) in case. Secure with screw (14).

(4) Pass battery cable (11) through bottom of output/slave housing (13).

(5) Install slave receptacle leads (10) and battery leads (11) on feed through terminals (12). Secure leads with washer (9) and nut (8). Torque nut on 3/8 inch stud 200-275 inch pounds (22.6-31.1 Nm). Torque nut on 1/2 inch stud 500-650 inch pounds (56.5-73.4 Nm).

(6) Install loop clamps (7) and secure with washers (5), and screws (4), and nuts (6). Torque to 36-40 inch pounds (4-4.5 Nm).

(7) Install output/slave housing access cover (3) and secure with washers (2) and screws (1). Torque to 24-36 inch pounds (2.7-4 Nm).

(8) Connect battery cable plug connector to battery.

(9) Stow power cable on cable support assembly.

**4-27. BATTERY.** Maintenance of the battery consists of test, servicing, and replacement.

##### a. Test.

(1) Remove power cable from cable support.

#### **WARNING**

To prevent injury, do not smoke or use open flame near battery. Spark or flame may cause battery cells to explode.

(2) Use multimeter to check voltage between positive ( + ) and negative ( - ) terminals. Normal voltage is 24 Vdc.

(3) Use hydrometer to check specific gravity of electrolyte in each cell.

#### **NOTE**

Correct the hydrometer reading to 80°F (27°C) by adding 0.004 for each 10°F (-5.5°C) that ambient temperature exceeds 80°F (27°C) or subtracting 0.004 for each 10°F (-5.5°C) that ambient temperature is below 80°F (27°C).

(4) If, after correction, the specific gravity of any cell measures below 1.270, the battery should be charged. If any cell cannot be charged (Para 4.27.b (2)) to a specific gravity of at least 1.270, the battery is not acceptable and should be replaced.

#### 4-27. BATTERY. (cont)

##### b. Service.

(1) Fill each cell with distilled water up to vent filler slots.

(2) The battery may now be charged at a rate equal to 1/10th of the one hour capacity rating as follows:

M83769/1-1 . . . . .	3.0Amperes
M83769/2-1 . . . . . (CB 24-20) . . . . .	1.8 Amperes
M83769/3-1 . . . . .	0.8Amperes
M83769/4-1 . . . . .	1.8 Amperes
M83769/5-1 . . . . .	3.0Amperes
M83769/6-1 . . . . .	3.0Amperes
M83769/7-1 . . . . . (CB 12-88) . . . . .	5.0 Amperes

Charge for a period of 16 to 24 hours or until voltage readings remain either unchanged or decrease slightly for three successive one-hour readings. Do not allow the battery temperature to rise above 46° (115°F) during the charge. Keep the battery and the surrounding area well ventilated during the charge. “

When the battery is completely charged, the specific gravity of the electrolyte should be between 1.275 and 1.295. Adjust specific gravity, if necessary, by removing electrolyte and adding suitable water or stronger electrolyte. Continue this process until all gravities are in the proper range. The battery will then be ready for service. Replace vent plugs in cells and wash off any spilled electrolyte.

##### WARNING

To prevent injury, use cleaning solvent in well-ventilated area and avoid prolonged breathing of fumes. Ensure that protective clothing is worn to prevent contact with skin.

(3) Clean parts with dry cleaning solvent P-D-680, type II, and dry thoroughly.

(4) Clean battery posts with battery terminal cleaner.

##### c. Removal.

(1) Remove power cable from cable support.

(2) Remove battery cable plug connector from battery.

(3) Loosen wingnuts and washers and remove battery holddown,

(4) Loosen turnlock fasteners and remove battery retainer.

##### WARNING

Front end of generator set may raise off ground if battery is removed when gas tank is less than full,

##### WARNING

The battery weighs approximately 76 pounds (35 kg). To prevent injury, use caution when lifting.

(5) Slide battery to front of battery support and remove from generator set.

##### d. Installation.

##### WARNING

The battery weighs approximately 76 pounds (35 kg). To prevent injury, use caution when lifting.

##### WARNING

Front end of generator set may raise off ground if battery is placed in generator set when gas tank is less than full,

(1) Place battery in generator set.

(2) Install battery retainer and secure with turnlock fasteners.

4-27. BATTERY. (cont)

d. Installation. (cont)

**CAUTION**

To prevent damage, do not overtighten battery holddown. Excessive tightening may buckle battery and cause internal shorts.

(3) Put battery holddowns in place. Secure battery with washers and wingnuts.

(4) Install battery cable plug connector on battery.

(5) Stow power cable on cable support.

4-28. WIRING HARNESS. See 1, FO-1 for location of wiring harness, W1. Maintenance of the wiring harness (figure 4-15) connecting the generator to the GECM consists of inspection, test, replacement, and repair,

a. Inspection.

**WARNING**

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Open control panel access door.

(4) Loosen turnlock fasteners and open control panel.

(5) Inspect for loose connections on GECM and generator. Tighten loose connections.

(6) Inspect for broken wires. Replace broken wires (paragraph 4-28d).

(7) Inspect for damaged insulation. If insulation is damaged to extent that bare wire is exposed, replace wire (paragraph 4-28d).

(8) Close control panel and secure with turnlock fasteners.

(9) Close control panel access door.

(10) Install engine housing access cover and secure with turnlock fasteners.

(11) Connect battery cable plug connector to battery.

b. Test. Testing consists of performing continuity checks on the wiring harness. All readings should show continuity and low resistance.

c. Removal.

**WARNING**

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

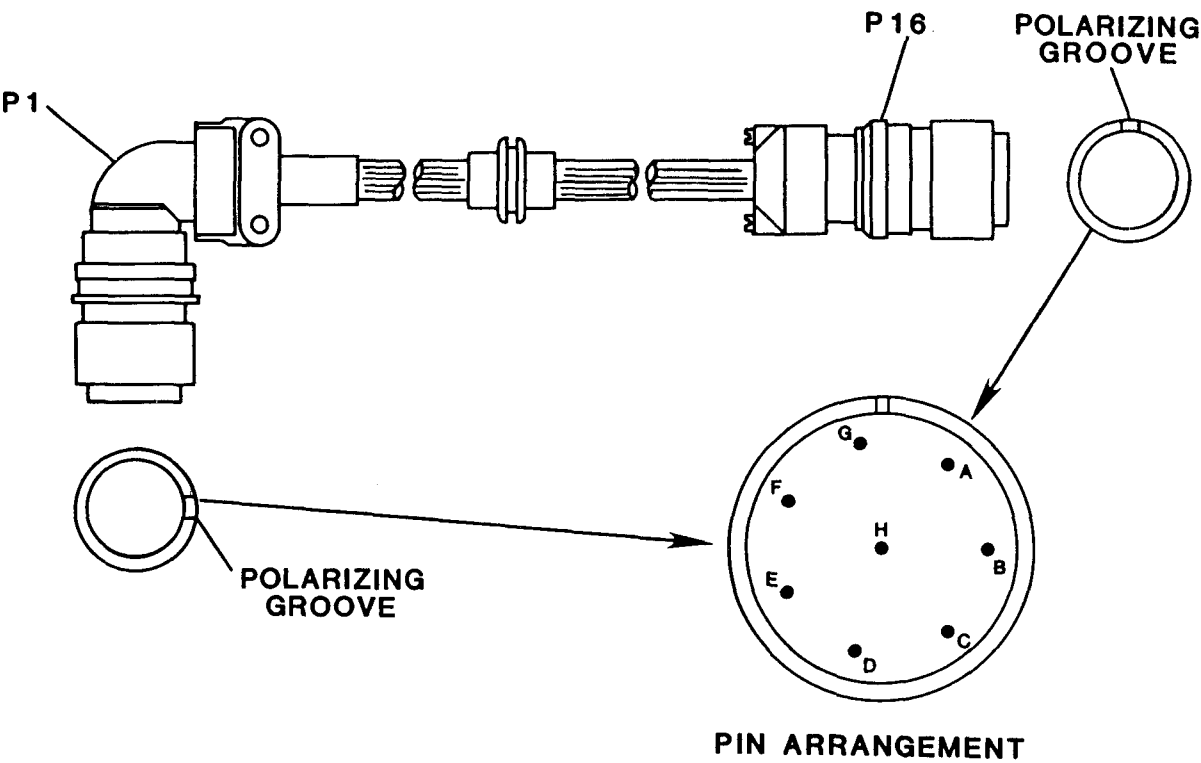
(3) Open control panel access door,

(4) Loosen turnlock fasteners and open control panel.

(5) Disconnect wiring harness from GECM and generator. Remove harness from generator set. Refer to figure 4-48 for grommet plate details.

d. Repair. Remove and replace damaged wiring and connectors as necessary. Refer to figure 4-15 for wire numbers and pin connections. Retest to ensure proper repair.

4-28. WIRING HARNESS. (cont)



HARNESS WIRE TERMINATIONS		
<u>Wire No.</u>	<u>From</u>	<u>To</u>
P160A12	P1-A	P16-A
U161A12	P1-B	P16-B
U162A12	P1-C	P16-C
U163A12	P1-D	P16-D
P164A12	P1-E	P16-E
U165A12	P1-F	P16-F
U167A12	P1-G	P16-G
P166A12	P1-H	P16-H

Figure 4-15. Generator to GECM Wiring Harness

#### 4-28. WIRING HARNESS. (cont)

##### e. Installation.

(1) Feed wiring harness through bulkhead and secure with grommet plate. Refer to figure 4-48 for grommet plate detail.

(2) Connect connector P1 to terminal J1 on GECM.

(3) Connect connector P16 to terminal J16 on generator.

(4) Close control panel and secure with turnlock fasteners.

(5) Close control panel access door.

(6) Install engine housing access cover secure with turnlock fasteners.

(7) Connect battery cable plug connector to battery.

**4-29. SLAVE RECEPTACLE.** Maintenance of the slave receptacle (figure 4-16) consists of testing and replacement.

##### a. Test.

(1) Remove power cable from cable support assembly.

(2) Remove screws (1), washers (2), and output/slave housing access cover (3).

(3) Set multimeter to OHMS scale.

(4) Check for continuity between positive (+) pin on slave receptacle (J18) through wire P103D0 to feedthrough terminal. Reading should show continuity.

(5) Check for continuity between negative (-) pin on J18 through wire V102AK0 to feedthrough terminal. Reading should show continuity and low resistance.

(6) If readings do not show continuity, replace slave receptacle (paragraph 4-29b).

(7) Install output/slave housing access cover (3) and secure with washers (2) and screws (1). Torque to 24-36 inch pounds (2.7-4 Nm).

(8) Stow power cable on cable support assembly.

##### b. Removal.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

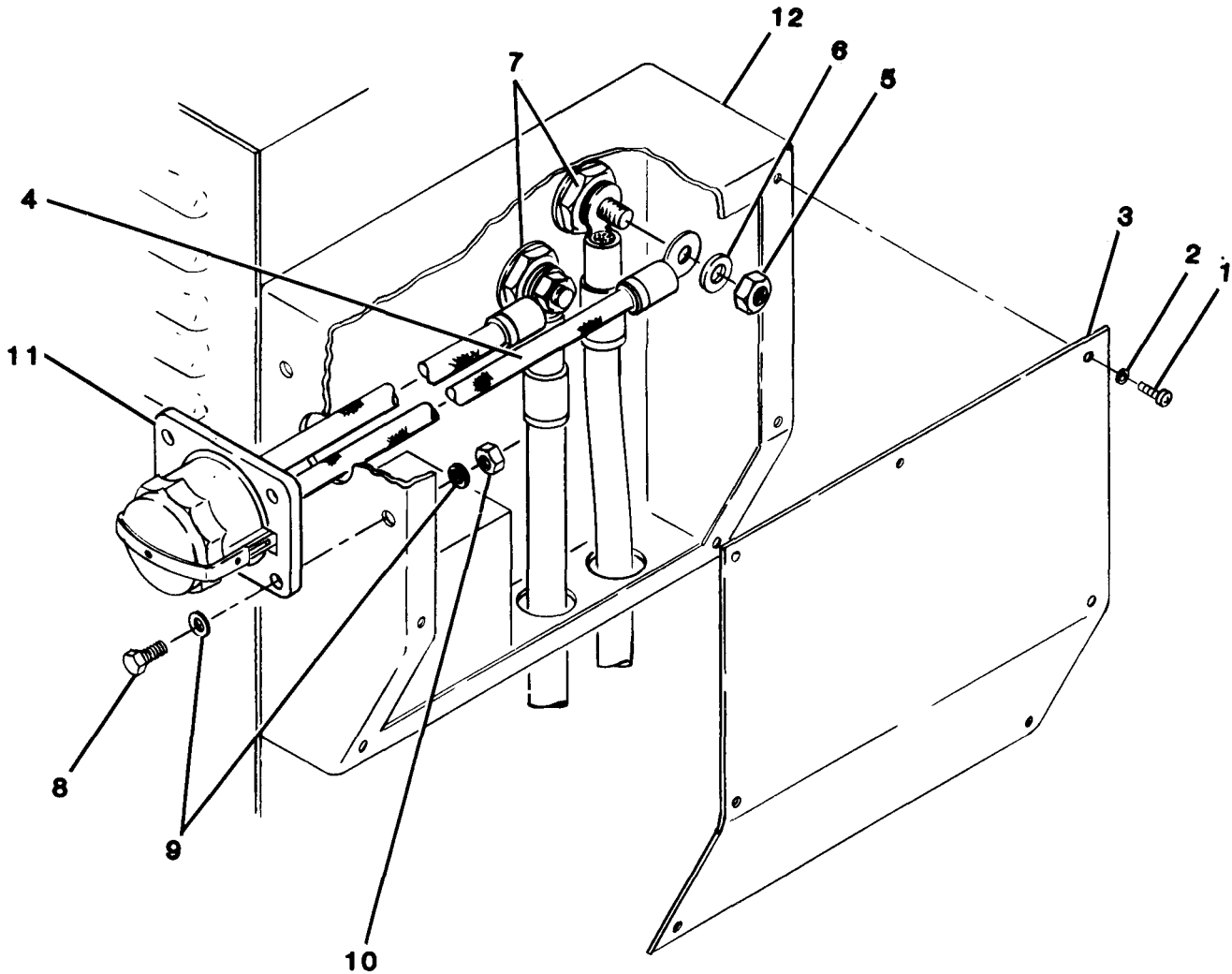
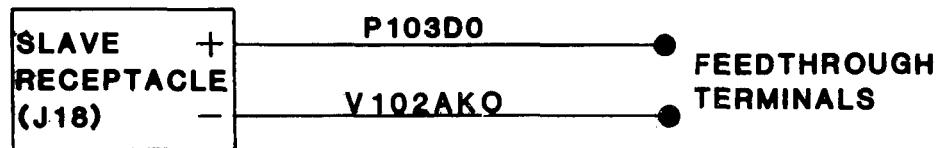
(2) Remove power cable from cable support assembly.

(3) Remove screws (1), washers (2), and output/slave housing access cover (3).

(4) Tag slave receptacle leads (4). Remove nuts (5), washers (6), and leads from feedthrough terminals (7).

(5) Remove screws (8), washers (9), self-locking nuts (10), and slave receptacle (11) from output/slave housing (12).

4-29. SLAVE RECEPTACLE. (cont)



LEGEND

- |                               |                          |
|-------------------------------|--------------------------|
| 1. SCREW                      | 7. FEEDTHROUGH TERMINAL  |
| 2. WASHER                     | 8. SCREW                 |
| 3. OUTPUT/SLAVE HOUSING COVER | 9. WASHER                |
| 4. SLAVE RECEPTACLE LEAD      | 10. NUT                  |
| 5. NUT                        | 11. SLAVE RECEPTACLE     |
| 6. WASHER                     | 12. OUTPUT/SLAVE HOUSING |

Figure 4-16. Slave Receptacle Maintenance

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#### 4-29. SLAVE RECEPTACLE. (cont)

##### c. Installation.

(1) Install slave receptacle (11) in output/slave housing (12) and secure with screws (8), washers (9), and self-locking nuts (10). Torque to 74-82 inch pounds (8.4-9.3 Nm).

(2) Install slave receptacle leads (4) on feedthrough terminals (7) and secure with washers (6) and nuts (5). Torque nut on 3/8 inch stud to 200-275 inch pounds (22.6-31.1 Nm). Torque nut on 1/2 inch stud 500-650 inch pounds (56.5-73.4 Nm).

(3) Install output/slave housing access cover (3) and secure with washers (2) and screws (1). Torque to 24-36 inch pounds (2.7-4 Nm).

(4) Stow power cable on cable support assembly.

(5) Connect battery cable plug connector to battery.

**4-30. GENERATOR ELECTRONIC CONTROL MODULE.** Maintenance of the generator electronic control module (GECM) (figure 4-17) consists of replacement. When testing/troubleshooting procedures isolate the GECM as the cause of a malfunction, remove the GECM and send to direct support maintenance for repair.

##### a. Removal.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Tag and disconnect cables from GECM connectors J1, J2, and J3.

(5) On underside of control fender, remove nuts (1) and washers (2).

(6) Remove capscrews (3) that secure GECM (4) in control fender.

(7) Lift GECM (4) out of control fender.

##### b. Installation.

(1) Place GECM (4) in control fender. Ensure that mounting holes are aligned.

(2) Secure with capscrews (3), washers (2), and nuts (1). Torque to 74-82 inch pounds (8.4-9.3 Nm).

(3) Connect cables to GECM connectors J1, J2, and J3.

(4) Close control panel and secure with turnlock fasteners.

(5) Close control panel access door.

(6) Connect battery cable plug connector to battery.

**4-31. CIRCUIT BREAKER.** See FO-1 for location of circuit breaker (CB1) on control panel. Maintenance of the circuit breaker (figure 4-18) consists of testing and replacement.

4-30. GENERATOR ELECTRONIC CONTROL  
MODULE. (cont)

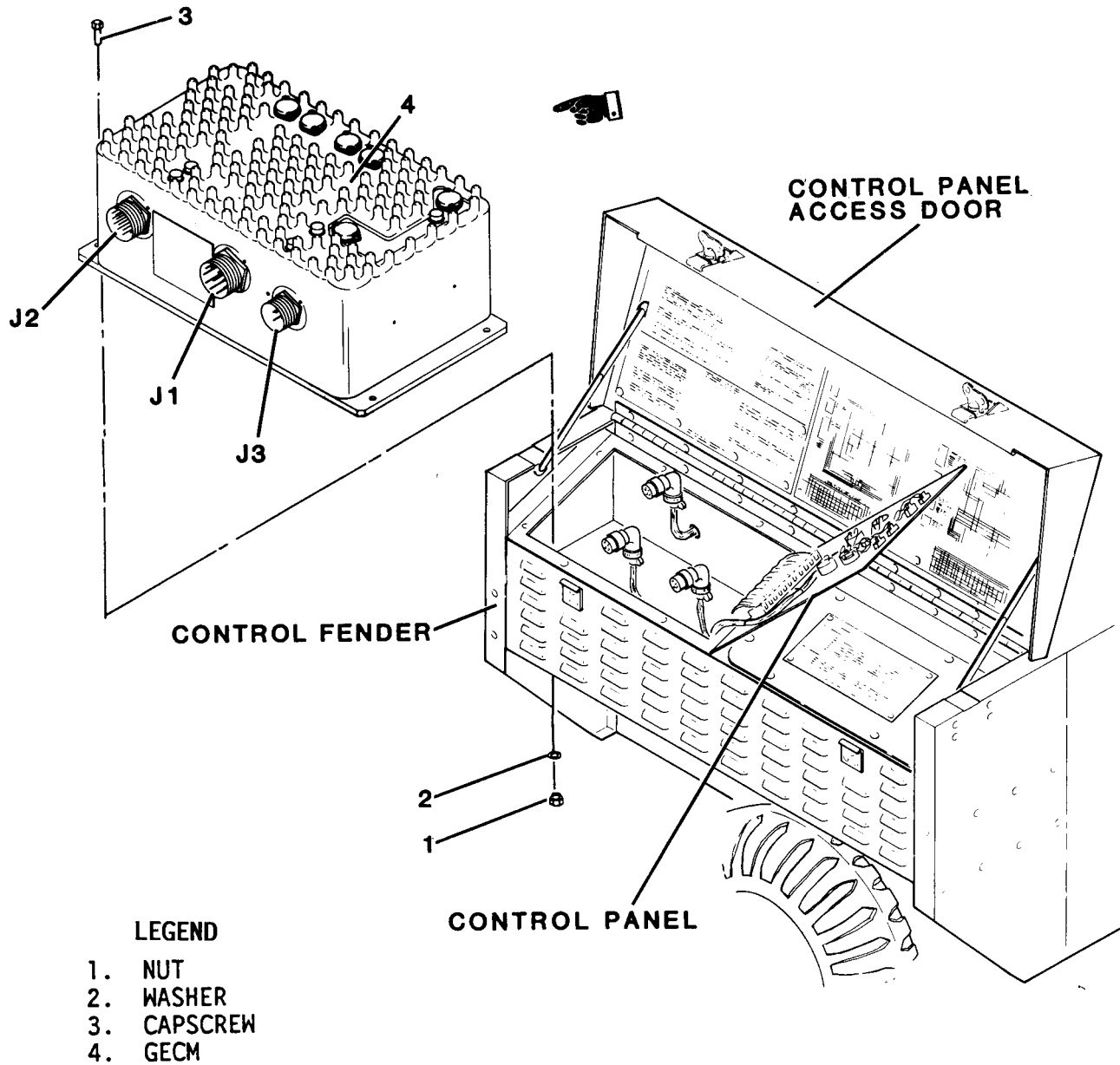


Figure 4-17. GECM Replacement



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4-31. CIRCUIT BREAKER. (cont)

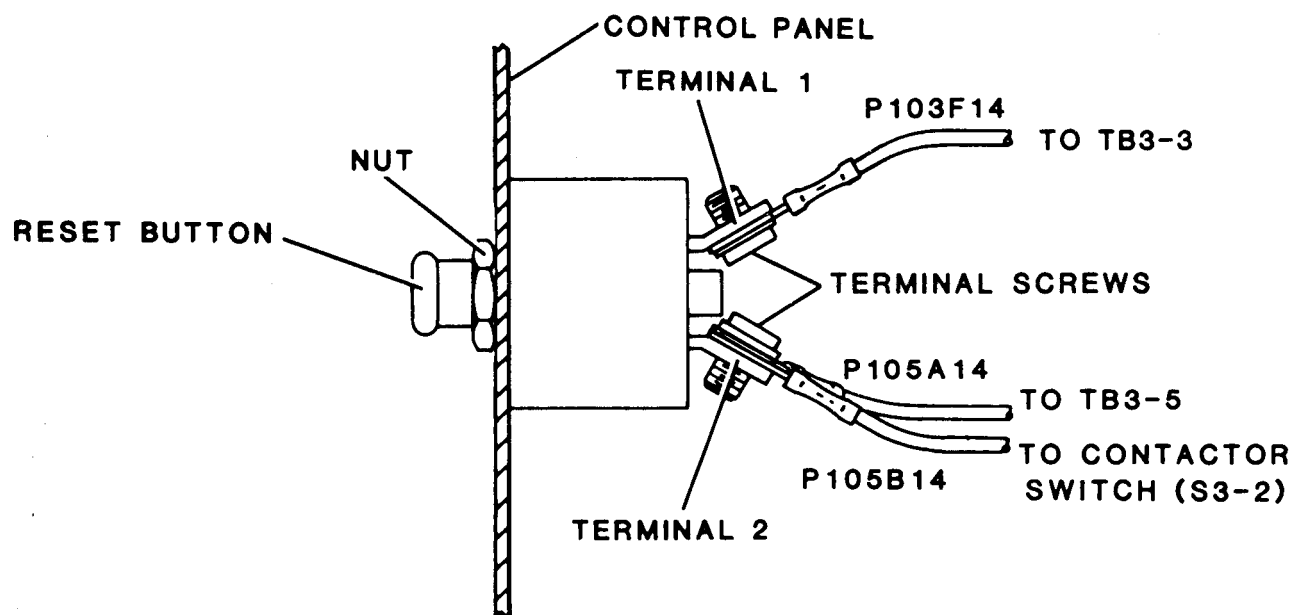


Figure 4-18. Circuit Breaker Test and Replacement

#### 4-31. CIRCUIT BREAKER. (cont)

##### a. Test.

###### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Set voltmeter to read resistance on the low scale.

(5) Connect positive (+) lead to CB1 terminal 1.

(6) Connect negative (-) lead to CB1 terminal 2.

(7) Press CB1 reset button. Meter should read zero ohms or full scale deflection. If not, replace CB1.

(8) Open circuit by pulling out on CB1. Repeat steps 5, 6, and 7. Meter should read infinity and show no deflection. If resistance is present, replace CB1.

(9) Close control panel and secure with turnlock fasteners.

(10) Close control panel access door.

(11) Connect battery cable plug connector to battery.

##### b. Removal.

###### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Tag and disconnect wires from terminals 1 and 2 of CB1.

(5) Remove nut and circuit breaker.

##### c. Installation.

(1) Insert circuit breaker into mounting hole. Secure with nut.

(2) Connect wires to terminals.

(3) Ensure that circuit breaker reset button is pushed all the way in.

(4) Close control panel and secure with turnlock fasteners.

(5) Close control panel access door.

(6) Connect battery cable plug connector to battery.

4-32. **STARTER ASSEMBLY.** Maintenance of the starter consists of testing and replacement.

4-32. STARTER ASSEMBLY. (cont)

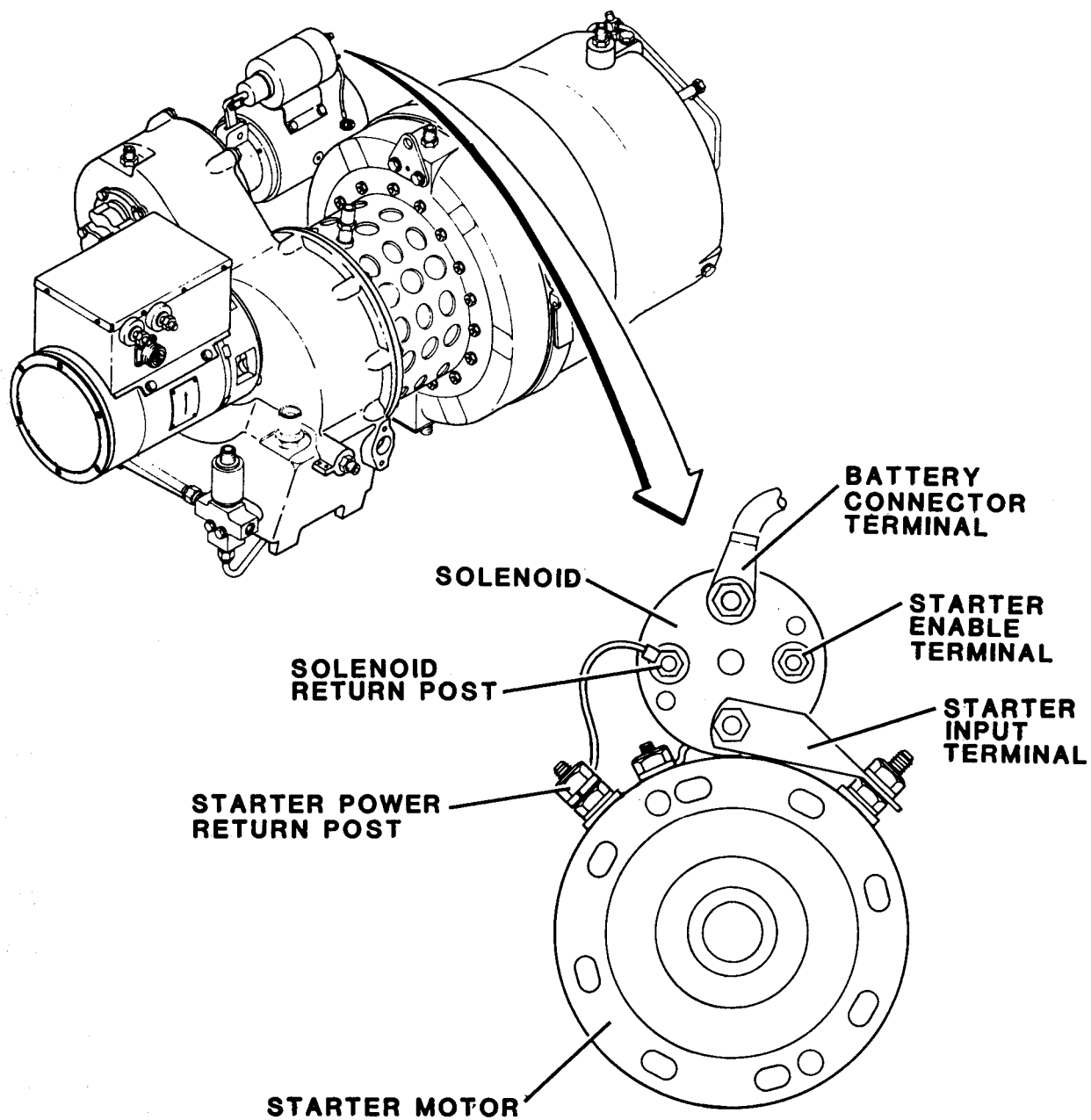


Figure 4-19. Starter Test Point Locations

#### 4-32. STARTER ASSEMBLY. (cont)

a. Test. Refer to figure 4-19 for starter test point locations.

(1) Loosen turnlock fasteners and remove engine housing access cover.

(2) Using multimeter, place positive lead on battery connector terminal and negative lead on starter power return post. Multimeter should read 24 Vdc. If not, check battery cable (paragraph 4-26).

(3) Move negative lead to solenoid return post. Multimeter should read 24V. If not, wire from solenoid return post to starter power return post is damaged and should be replaced.

(4) Open control panel access door.

(5) Move MASTER SWITCH to START position.

(6) Watch yoke for forward movement and listen for sound of solenoid moving. If no movement or sound, check voltage between starter enable terminal (+) and starter power return post (-). If 24 Vdc present, replace solenoid.

(7) If yoke moves but starter does not rotate, check for 24V at starter input terminal. If 24V are present, starter is bad. If no 24V reading, solenoid is bad.

(8) Move MASTER SWITCH to OFF position.

(9) Close control panel access door.

(10) Install engine housing access cover and secure with turnlock fasteners.

b. Removal.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Tag and disconnect all electrical connections to starter.

#### CAUTION

To prevent damage, do not let starter rest unsupported in gearbox. Severe damage to starter shaft or gearbox could result.

(4) Support starter. Remove lockwire, bolts (1, figure 4-20), and washers (2) that secure starter (3) to starter mounting plate (4).

(5) Carefully pull starter straight out of gearbox.

c. Installation.

#### CAUTION

To prevent damage, do not let starter rest unsupported in gearbox. Severe damage to starter shaft or gearbox could result.

(1) Carefully install starter shaft in gearbox. Support starter and install washers (2) and bolts (1). Torque to 45-55 inch pounds (5.1-6.2 Nm). Lockwire bolts.

4-32. STARTER ASSEMBLY. (cont)

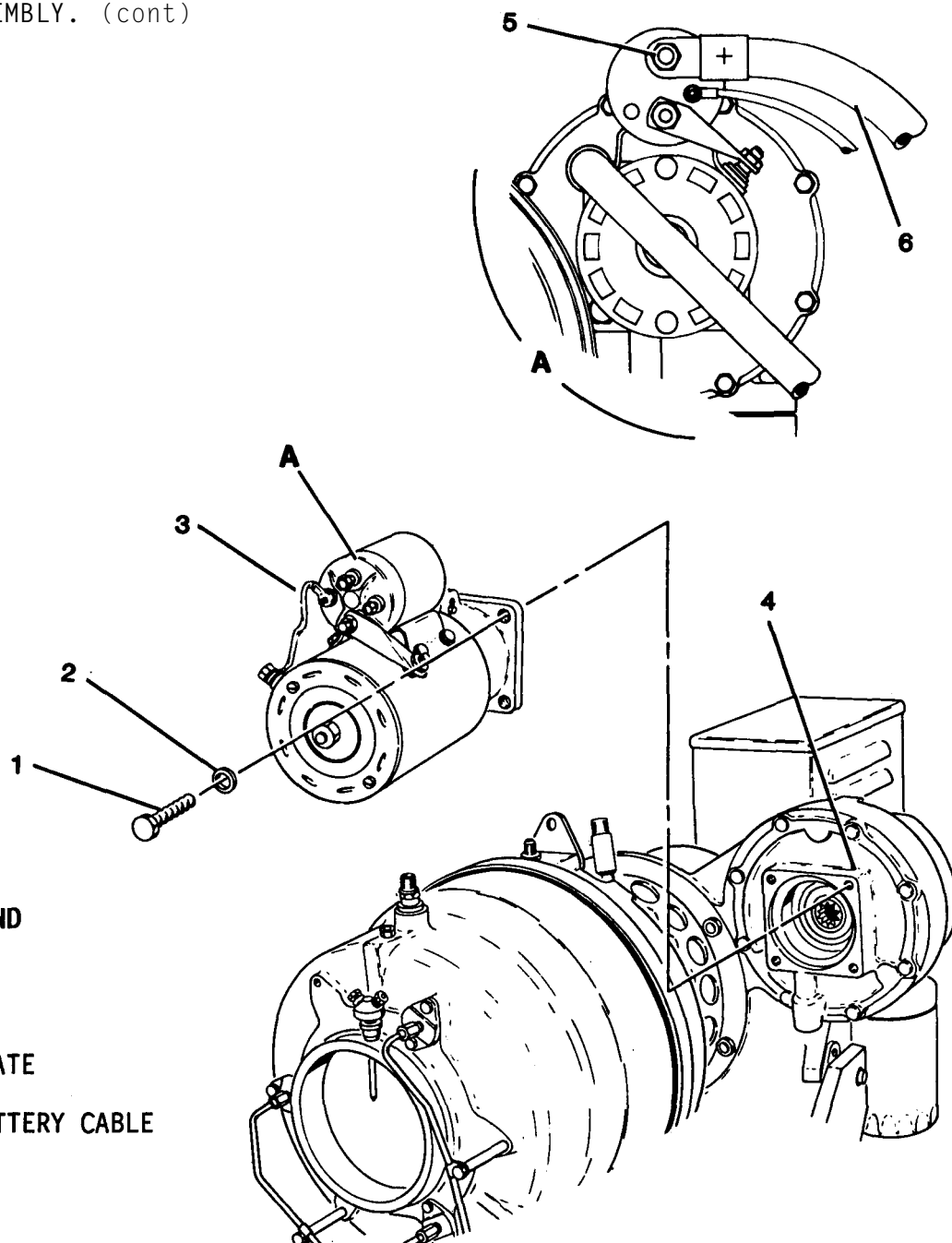


Figure 4-20. Starter Replacement

#### 4-32. STARTER ASSEMBLY. (cont)

##### c. Installation. (cont)

#### CAUTION

To prevent damage to solenoid cover and to ensure proper torque application, a backup wrench must be used when torque is applied to jamnut (5).

(2) Connect wiring to starter. When attaching positive battery cable (6) to starter terminal, use backup wrench on bottom nut while applying torque to jamnut (5). Torque jamnut (5) to 50-70 inch pounds (5.7-7.9 Nm).

(3) Install engine housing access cover and secure with turnlock fasteners.

(4) Connect battery cable plug connector to battery.

**4-33. CURRENT SHUNT (20 AMP).**  
Maintenance of the 20 amp current shunt (figure 4-21) consists of inspection and replacement.

##### a. Inspection.

(1) Remove power cable from cable support assembly.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector.

(3) Unlatch and open inlet air housing access door. Secure in open position.

(4) Check mounting points of current shunt. Tighten securely, if loose.

(5) Check input and output lugs for discoloration. Discoloration of lugs indicates loosening of connections during operation. Tighten any loose connections.

(6) Inspect for dirt on current shunt. If dirt is found, first try cleaning with compressed air. If unsuccessful, clean with electrical grade solvent.

(7) Check current shunt for physical damage. If damage is found, replace shunt.

(8) Close and securely latch inlet air housing access door.

(9) Connect battery plug connector.

(10) Stow power cable on cable support assembly.

##### b. Removal.

(1) Remove power cable from cable support assembly.

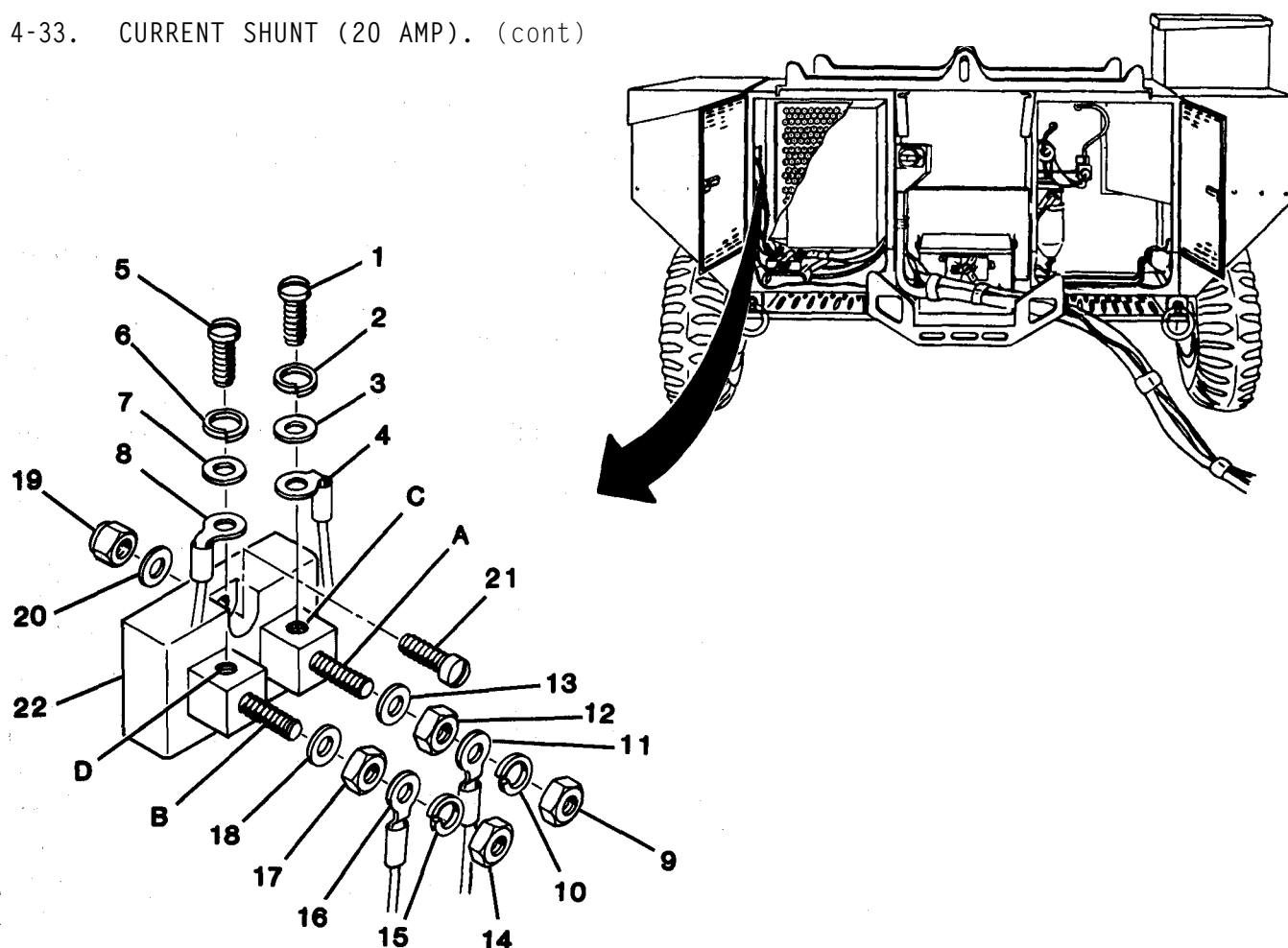
#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector.

(3) From terminal C, remove screw (1) figure 4-21 ), lockwasher (2), washer (3), and terminal lug (4) of wire U111A18.

4-33. CURRENT SHUNT (20 AMP). (cont)



LEGEND

- |                                |                                |
|--------------------------------|--------------------------------|
| 1. SCREW                       | 12. NUT                        |
| 2. LOCKWASHER                  | 13. WASHER                     |
| 3. WASHER                      | 14. NUT                        |
| 4. TERMINAL LUG, WIRE U111A18  | 15. LOCKWASHER                 |
| 5. SCREW                       | 16. TERMINAL LUG, WIRE P103B14 |
| 6. LOCKWASHER                  | 17. NUT                        |
| 7. WASHER                      | 18. WASHER                     |
| 8. TERMINAL LUG, WIRE U112A18  | 19. SELF-LOCKING NUT           |
| 9. NUT                         | 20. WASHER                     |
| 10. LOCKWASHER                 | 21. SCREW                      |
| 11. TERMINAL LUG, WIRE P103E14 | 22. CURRENT SHUNT              |

Figure 4-21. Current Shunt (20 Amp) Replacement

#### 4-33. CURRENT SHUNT (20 AMP). (cont)

##### b. Removal. (cont)

(4) From terminal D, remove screw (5), lockwasher (6), washer (7), and terminal lug (8) of wire U112A18.

(5) From terminal A, remove nut (9), lockwasher (10), terminal lug (11) of wire P103E14, nut (12), and washer (13) from terminal post.

(6) From terminal B, remove nut (14), lockwasher (15), terminal lug (16) of wire P103B14, nut (17), and washer (18) from terminal post.

(7) Remove self-locking nuts (19), washers (20), and screws (21) that secure current shunt (22) to bulkhead.

##### c. Installation.

(1) Secure current shunt (22) to bulkhead of inlet air housing with screws (21), washers (20), and self-locking nuts (19). Torque to 36-40 inch pounds (4-4.5 Nm).

(2) At terminal B, install washer (18), nut (17), and terminal lug (16) of wire P103B14. Secure with lockwasher (15) and nut (14).

(3) At terminal A, install washer (13), nut (12), and terminal lug (11) of wire P103E14. Secure with lockwasher (10) and nut (9).

(4) At terminal D, install terminal lug (8) of wire U112A18 and washer (7). Secure with lockwasher (6) and screw (5).

(5) At terminal C, install terminal lug (4) of wire U111A18 and washer (3). Secure with lockwasher (2) and screw (1).

(6) Close and securely latch inlet air housing access door.

(7) Connect battery cable plug connector.

(8) Stow power cable on cable support assembly.



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## Section X. MAINTENANCE OF FUEL SYSTEM

**4-34. GENERAL.** The fuel system (figure 4-22) provides a clean, efficient flowing supply of fuel to the turbine engine. The system is supported by an externally mounted, 32-gallon (121.13 l) fuel tank. A full tank provides approximately four hours operating time. Components mounted in the fuel housing are the fuel transfer pump, primary fuel filter, secondary fuel filter, high pressure pump, and the fuel shutdown/drain solenoid valve. These components combine to control the fuel flow to the fuel manifold mounted on the turbine engine. The fuel manifold has three fuel Injection nozzles that provide a fine mist of fuel to support combustion in the turbine combustion chamber. The fuel system provides the turbine engine with a fuel flow at the rate required to maintain proper combustion and engine speed under all load conditions. A block diagram of the fuel system is shown in figure 4-23.

### NOTE

If not specified in maintenance procedure, apply torque in accordance with table 1-1, Torque Specifications.

#### a. Fuel Housing Access.

(1) Remove power cable from cable support assembly.

### WARNING

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(2) Disconnect battery cable plug connector from battery.

(3) Unlatch and open fuel housing access door. Secure in open position.

#### b. Draining the Fuel system.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Place suitable container under drain of primary fuel filter.

### WARNING

To prevent injury from explosion or fire, drain fuel in a well-ventilated area. Keep away from all open flames and sparks. Do not smoke. Immediately clean up all spilled fuel.

(3) Tag and, disconnect inlet fuel line from transfer fuel pump. Cap fuel line.

(4) Open fuel drain valve on primary filter. Close drain when fuel stops draining.

(5) Carefully unscrew and remove bowl of secondary fuel filter. Dump fuel into container. Install bowl on filter and tighten hand tight.

#### c. Closing the Fuel Housing.

(1) Close and securely latch fuel housing access door.

(2) Connect battery cable plug connector to battery.

(3) Stow power cable on cable support assembly.

4-34. GENERAL. (cont)

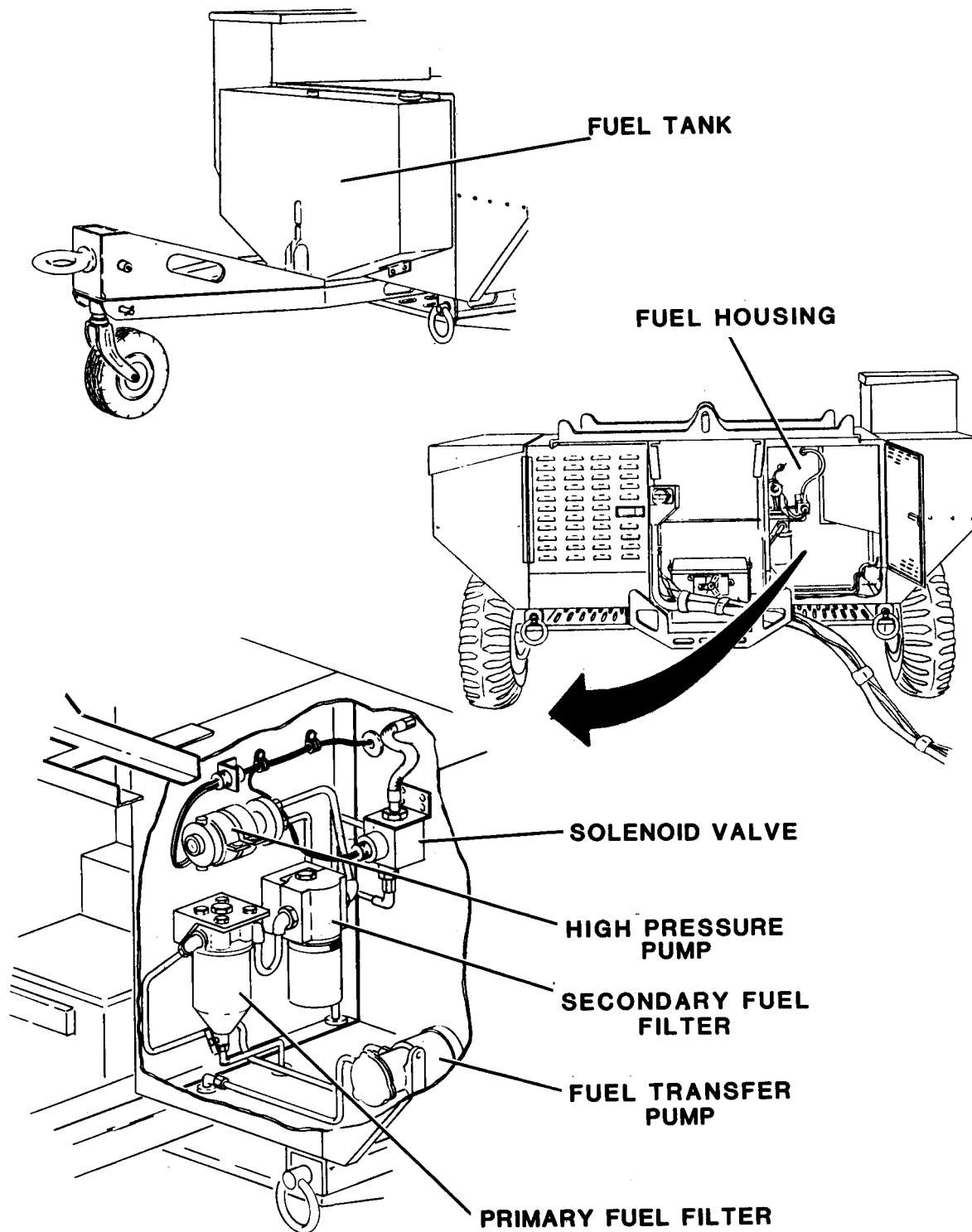


Figure 4-22. Fuel System Components

4-34. GENERAL. (cont)

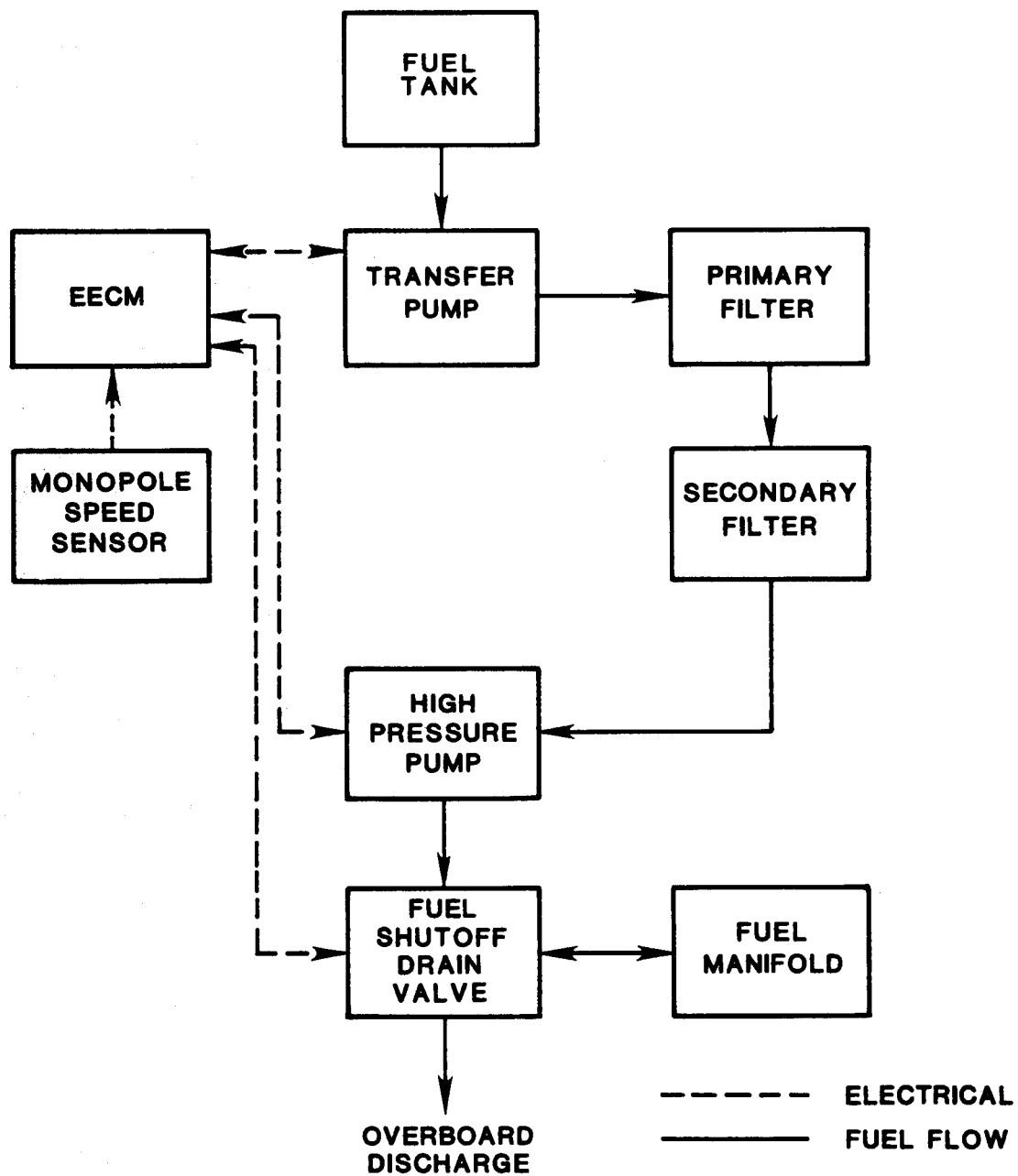


Figure 4-23. Fuel System Block Diagram

4-35. FUEL LINES, VALVES, FITTINGS (ENGINE HOUSING). Maintenance of the fuel lines, valves, and fittings located in the engine housing consists of inspection and replacement of the fuel manifold (figure 4-24).

a. Inspection.

**WARNING**

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Inspect for signs of leakage at solenoid valve bulkhead connection. Ensure that connection is secure.

(4) Inspect for signs of leakage at fuel manifold and fuel injection nozzle connections. Ensure that connections are secure.

(5) Install engine housing access cover and secure with turnlock fasteners.

(6) Connect battery cable plug connector to battery.

b. Removal.

**WARNING**

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Disconnect fuel line from solenoid valve bulkhead connection.

(4) Remove lockwire, bolts (1), washers (2), and spacers (3) so that fuel manifold (4) can be removed.

(5) Remove loop clamps (5) from fuel lines only if damaged.

(6) Disconnect damaged fuel lines from tube cross (6).

c. Installation.

(1) Connect fuel lines to tube cross (6).

(2) Position loop clamps (5), if removed, on fuel lines.

(3) Position fuel manifold and spacers (3). Secure with washers (2) and bolts (1). Torque to 10-15 inch pounds (1-1.7 Nm).

(4) Connect fuel line to solenoid valve.

(5) Install engine housing access cover and secure with turnlock fasteners.

(6) Connect battery cable plug connector to battery.

4-36. FUEL LINES, VALVES, FITTINGS (INTERNAL). Maintenance of the internal fuel lines, valves, and fittings is limited to replacement.

a. Removal.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Drain fuel system (paragraph 4-34b).

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4-35. FUEL LINES, VALVES, FITTINGS  
(ENGINE HOUSING). (cont)

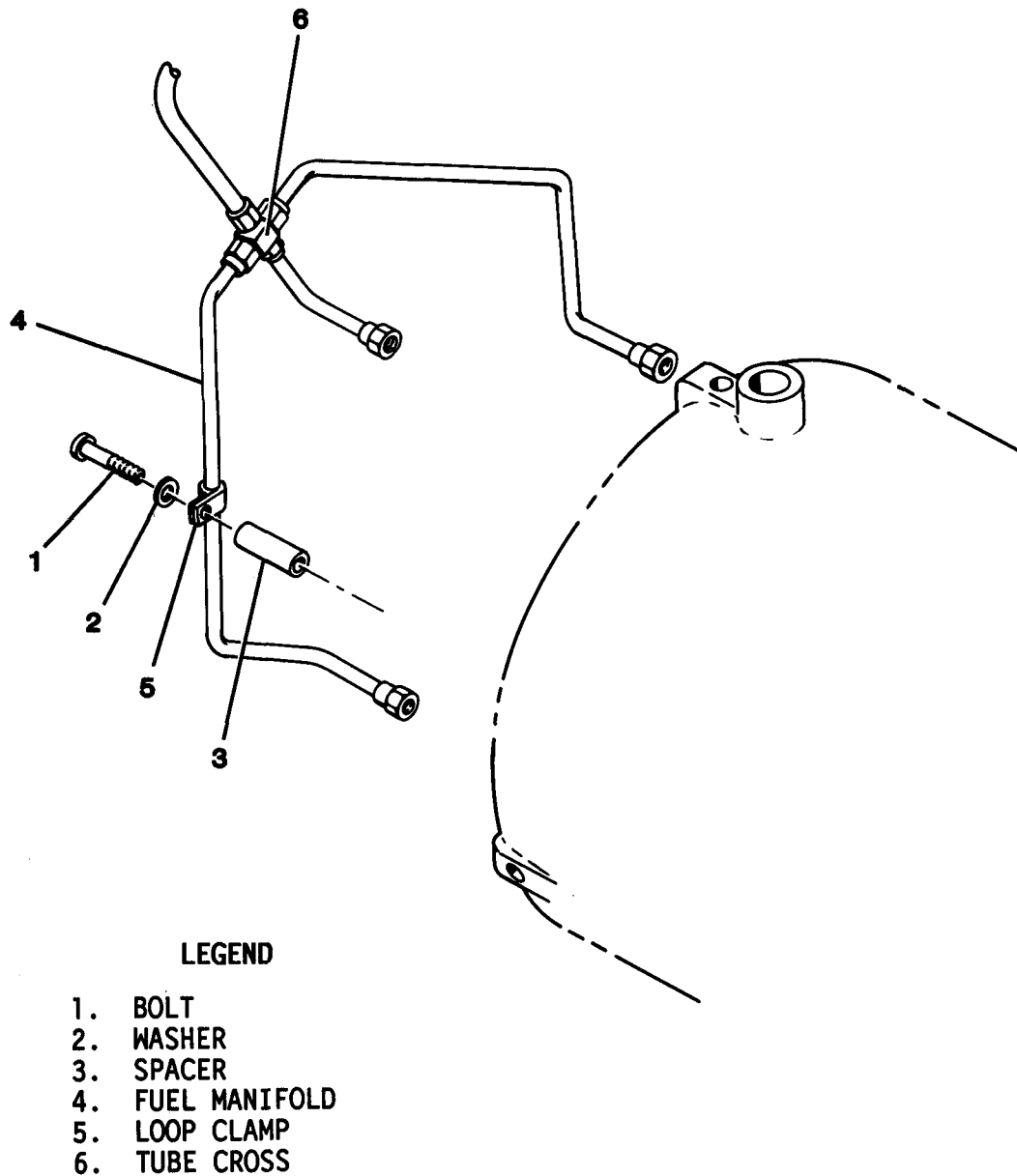
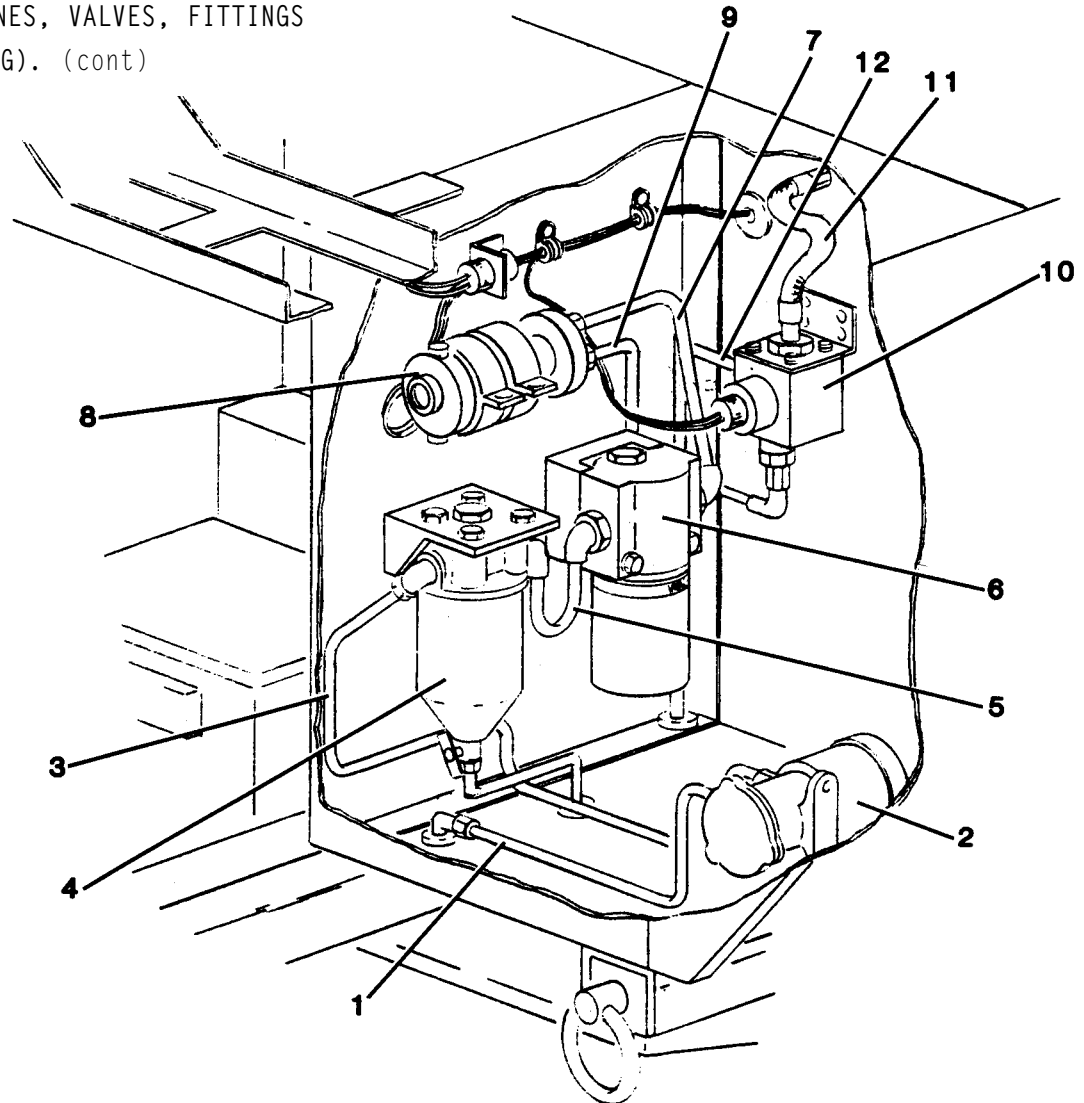


Figure 4-24. Fuel Manifold Removal

4-35. FUEL LINES, VALVES, FITTINGS  
(ENGINE HOUSING). (cont)



LEGEND

- |  |   |
|--|---|
| 1. TRANSFER PUMP INLET LINE FROM FUEL TANK       | 7. FUEL LINE, SECONDARY FILTER TO HIGH PRESSURE PUMP  |
| 2. TRANSFER PUMP                                 | 8. HIGH PRESSURE PUMP                                 |
| 3. FUEL LINE, TRANSFER PUMP TO PRIMARY FILTER    | 9. FUEL LINE, HIGH PRESSURE PUMP TO SOLENOID VALVE    |
| 4. PRIMARY FILTER                                | 10. SOLENOID VALVE                                    |
| 5. FUEL LINE, PRIMARY FILTER TO SECONDARY FILTER | 11. FUEL LINE, SOLENOID VALVE OUTLET TO FUEL MANIFOLD |
| 6. SECONDARY FILTER                              | 12. FUEL LINE, SOLENOID VALVE OVERBOARD DISCHARGE     |

Figure 4-25. Fuel Line Layout (Internal)

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#### 4-36. FUEL LINES, VALVES, FITTINGS (INTERNAL). (cont)

##### a. Removal. (cont)

(3) Refer to figure 4-25 for layout of fuel lines, valves, and fittings. Remove attaching parts and damaged components as required.

##### b. Installation.

(1) Install new components and secure with attaching parts.

(2) Close fuel housing (paragraph 4-34C).

#### 4-37. ELECTRICAL FUEL TRANSFER PUMP. Maintenance of the electrical fuel transfer pump consists of testing, servicing, and replacement.

##### a. Test.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Open control panel access door. Ensure that MASTER SWITCH is in OFF position.

(3) Disconnect fuel line at outlet port (8, figure 4-26) of fuel transfer pump. Connect direct reading pressure gage to outlet port.

(4) Place MASTER SWITCH in RUN position to pressurize fuel system. Pressure gage should read 5-7 psi (34-48 kPa). If not, pump is faulty and should be serviced (paragraph 4-37b) or replaced (paragraph 4-37c).

(5) Place MASTER SWITCH in OFF position. Close control panel access door.

(6) Remove direct reading pressure gage from outlet port and reconnect fuel line.

(7) Close fuel housing (paragraph 4-34C).

##### b. Service.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Place suitable container under fuel transfer pump.

(3) Remove screws (1, figure 4-26), cover (2), gasket (3), and filter (4) from body (5).

#### WARNING

Compressed air used for cleaning or drying can create airborne particles that may enter the eyes. Pressure shall not exceed 30 psi (207 kPa). Wear eye protection to prevent eye injury.

(4) Clean filter (4) with compressed air.

(5) Install filter (4) and new gasket (3).

(6) Install cover (2) and secure with screws (1).

(7) Close fuel housing (paragraph 4-34C).

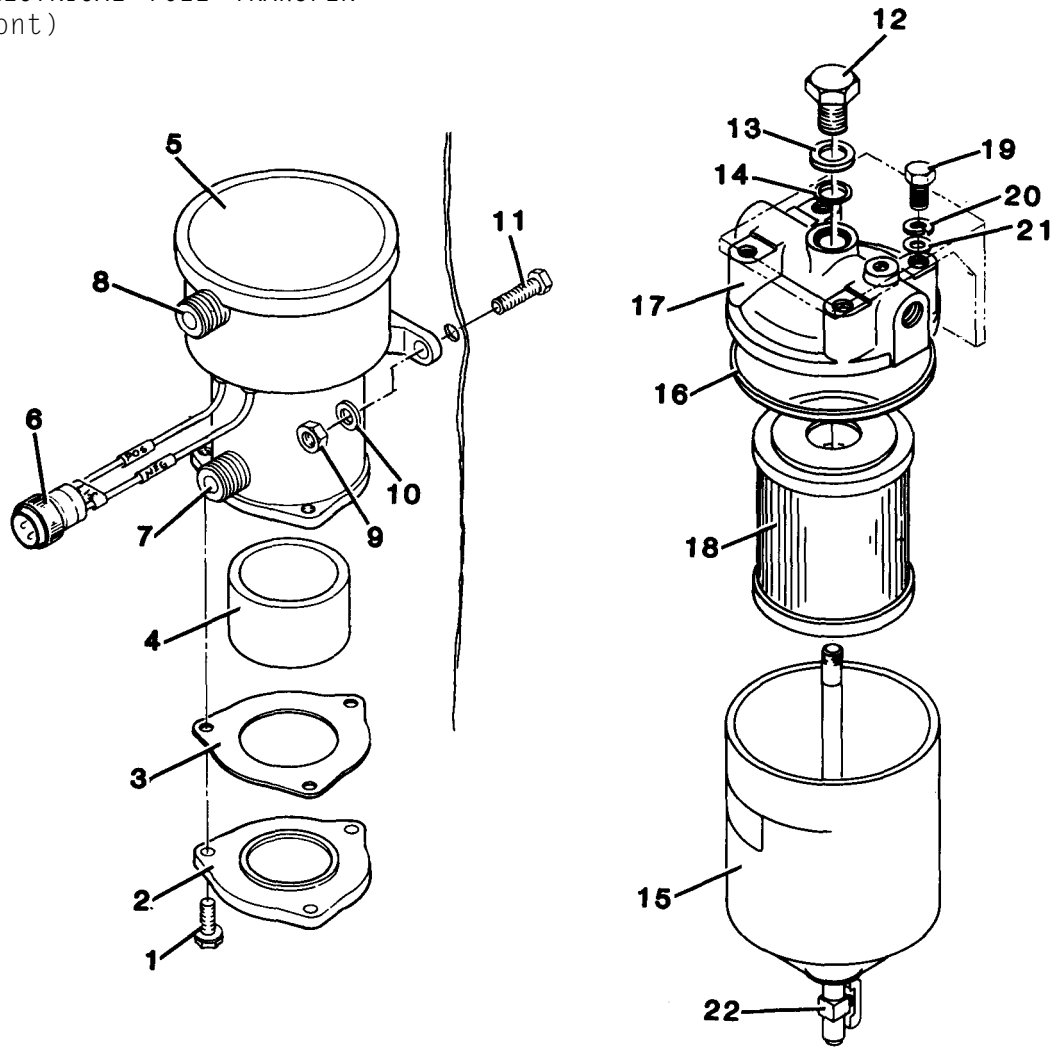
##### c. Removal.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Drain fuel system (paragraph 4-34b).

(3) Tag and disconnect fuel transfer pump electrical connector (6).

4-37. ELECTRICAL FUEL TRANSFER  
PUMP. (cont)



LEGEND

- |                         |                       |
|-------------------------|-----------------------|
| 1. SCREW                | 12. RETAINING SCREW   |
| 2. COVER                | 13. WASHER            |
| 3. GASKET               | 14. PREFORMED PACKING |
| 4. FILTER               | 15. BOWL              |
| 5. BODY                 | 16. GASKET            |
| 6. ELECTRICAL CONNECTOR | 17. HOUSING           |
| 7. INLET PORT           | 18. FILTER ELEMENT    |
| 8. OUTLET PORT          | 19. CAPSCREW          |
| 9. NUT                  | 20. LOCKWASHER        |
| 10. WASHER              | 21. SPACER            |
| 11. SCREW               | 22. FUEL DRAIN VALVE  |

Figure 4-26. Electrical Fuel Pump (Transfer) and  
Fuel (Fluid) Filter (Primary)



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4-37. ELECTRICAL FUEL TRANSFER  
PUMP . (cont)

c. Removal. (cont)

(4) Tag and disconnect fuel lines from inlet (7) and outlet (8) ports.

(5) Remove nuts (9), washers (10), and capscrews (11) that secure pump. Remove pump.

d. Installation.

(1) Aline pump with mounting holes and secure with capscrews (11), washers (10), and nuts (9). Torque to 40-60 inch pounds (4.5-6.8 Nm).

(2) Remove tags and connect inlet line to inlet port (7) and outlet line to outlet port (8).

(3) Remove tags and connect electrical connector (6).

(4) Close fuel housing (paragraph 4-34c).

4-38. PRIMARY FUEL (FLUID) FILTER.

Maintenance of the primary fuel (fluid) filter is limited to servicing and replacement. Filter element replacement is recommended every 300 hours minimum.

a. service

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Place suitable container under filter. Open fuel drain valve and drain all fuel from filter.

(3) Remove retaining screw (12, figure 4-26), washer (13), and preformed packing (14) to separate bowl (15) from housing (17). It may be necessary to use a pick to remove gasket (16) from housing (17).

(4) Remove and discard filter element (18).

(5) Clean bowl and housing with P-D-680. Dry thoroughly.

(6) Install new filter element (18) in bowl (15).

(7) Install new gasket (16) in housing (17).

(8) Install bowl in housing. Install new preformed packing (14) on top of housing. Secure assembly with washer (13) and retaining screw (12).

(9) Close fuel housing (paragraph 4-34c).

b. Removal.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Drain fuel system (paragraph 4-34b).

(3) Tag and disconnect inlet and outlet fuel lines.

(4) Remove capscrews (19), lockwashers (20), and spacers (21) that secure filter to mounting bracket.

c. Installation.

(1) Aline filter with mounting holes in mounting bracket. Secure with spacers (21), lockwashers (20), and capscrews (19). Torque to 60-80 inch pounds (6.8-9.1 Nm).

(2) Connect inlet and outlet fuel lines.

#### 4-38. PRIMARY FUEL (FLUID) FILTER.

(cont)

c. Installation. (cont)

(3) Close fuel housing (paragraph 4-34c)

#### 4-39. ENGINE FUEL TANK ASSEMBLY.

Maintenance of the engine fuel tank (figure 4-27) consists of replacement.

a. Removal.

(1) Ensure that fuel tank has been completely drained. There is a drain plug located on bottom of tank.

(2) When removing fuel tank it is necessary to also remove the oil cooler (figure 4-34; Para. 4-54).

#### WARNING

To prevent injury, ensure that handbrake is set and both wheels are chocked while performing maintenance under the generator set.

(3) Set handbrake and chock both wheels.

#### WARNING

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(4) Disconnect battery cable plug connector from battery,

(5) Disconnect fuel line (1) from bottom of fuel tank. Install protective cap.

(6) Loosen turnlock fasteners and remove engine housing access cover and plenum access cover.

(7) Remove capscrews (2), nuts (3), washers (4), and tank support channels (5). Nuts, washers, and tank support channels are located in engine housing and plenum.

(8) Remove capscrews (6), nuts (7), and washers (8).

(9) Carefully lift fuel tank (9) off generator set.

(10) Replace pad (10) if damaged.

b. Installation.

#### WARNING

To prevent injury, ensure that the handbrake is set and both wheels are chocked while performing maintenance under the generator set,

(1) Set handbrake and chock both wheels.

(2) Install pad (10).

(3) Lift fuel tank (9) and position in place on generator set.

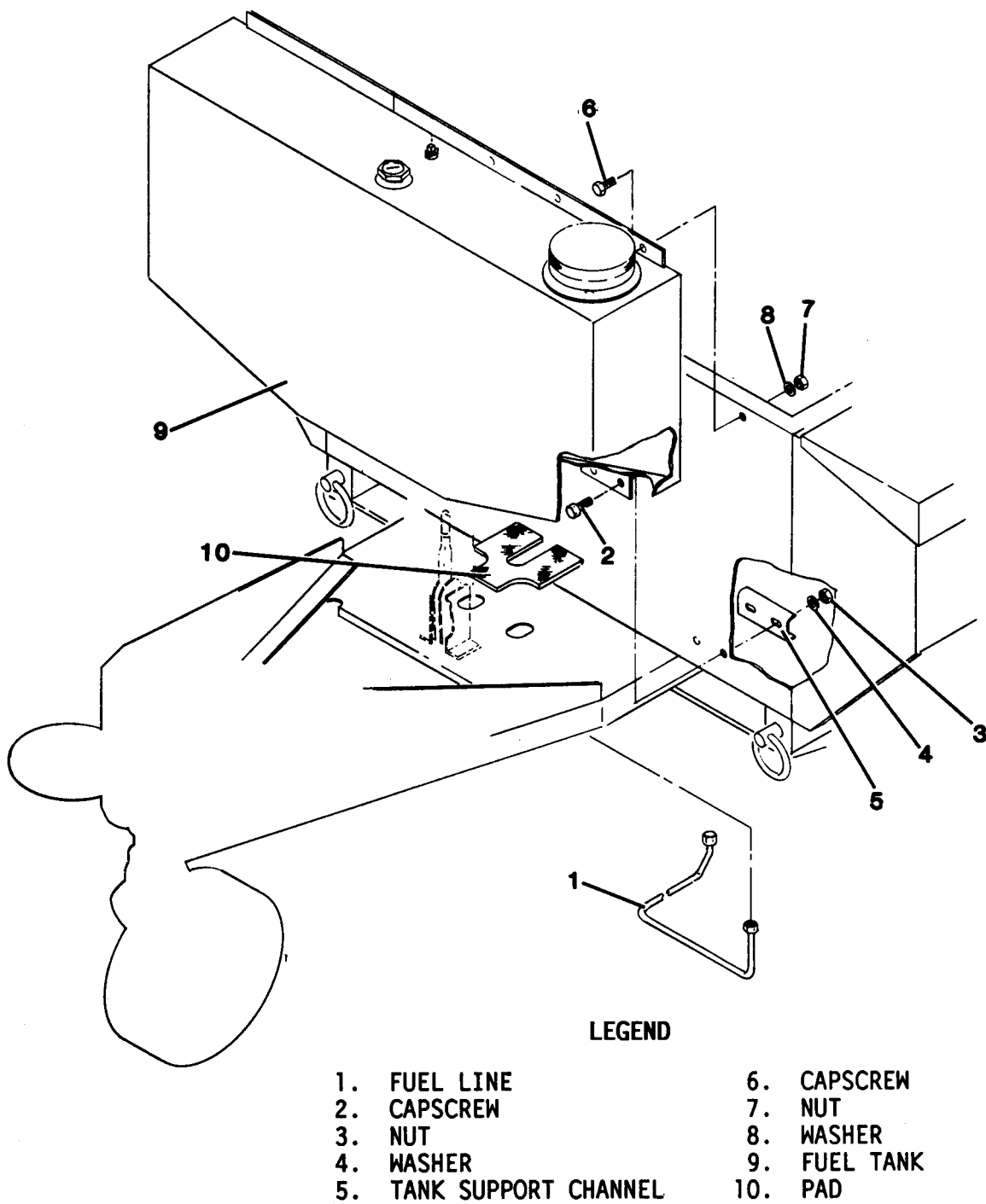
(4) Secure top of tank to generator set with capscrews (6), washers (8), and nuts (7).

(5) Secure bottom of tank to generator set with capscrews (2), tank support channels (5), washers (4), and nuts (3).

(6) Torque fasteners to 160-175 inch pounds (18-20 Nm).

(7) Remove protective cap and connect fuel line to fuel tank.

4-39. ENGINE FUEL TANK ASSEMBLY.  
(cont)



LEGEND

- |                         |              |
|-------------------------|--------------|
| 1. FUEL LINE            | 6. CAPSCREW  |
| 2. CAPSCREW             | 7. NUT       |
| 3. NUT                  | 8. WASHER    |
| 4. WASHER               | 9. FUEL TANK |
| 5. TANK SUPPORT CHANNEL | 10. PAD      |

Figure 4-27. Engine Fuel Tank Replacement

#### 4-39. ENGINE FUEL TANK ASSEMBLY. (cont)

##### b. Installation. (cont)

(8) Install engine housing and plenum access covers and secure with turnlock fasteners.

(9) Connect battery cable plug connector to battery.

(10) Remove chocks and release handbrake.

#### 4-40. SECONDARY FUEL (FLUID) FILTER. Maintenance of the secondary fuel (fluid) filter is limited to servicing and replacement. Filter element replacement is recommended every 300 hours minimum.

##### a. Service.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Unscrew filter bowl (1, figure 4-28) from filter housing (7). Discard fuel in filter bowl.

(3) Remove filter element (2) from filter housing and discard.

(4) Thoroughly clean filter bowl with P-D-680.

(5) Remove packing (3) from filter housing (7).

(6) Install new preformed packing (3) in filter housing (7).

(7) Install new filter element (2) in filter housing (7).

(8) Screw bowl (1) into filter housing (7) hand tight.

(9) Close fuel housing (paragraph 4-31C).

##### b. Removal.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Drain fuel system (paragraph 4-34b).

(3) Tag and disconnect filter inlet and outlet fuel lines.

(4) Remove nuts (4), washers (5), and capscrews (6) that secure filter housing (7) to filter bracket (8).

##### c. Installation.

(1) Install washers (5) on capscrews (6). Insert capscrews through filter housing (7) and secure to filter bracket (8) with remaining washers (5) and nuts (4). Torque to 40-60 inch pounds (4.5-6.8 Nm).

(2) Remove tags and connect filter inlet and outlet fuel lines.

(3) Close fuel housing (paragraph 4-34C).

#### 4-41. ELECTRICAL HIGH PRESSURE FUEL PUMP. Maintenance of the electrical high pressure fuel pump is limited to replacement. When testing/troubleshooting procedures isolate the high pressure pump as the cause of a malfunction, remove the pump and send to direct support for repair.

##### a. Removal

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Drain fuel system (paragraph 4-34b).

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4-40. SECONDARY FUEL (FLUID) FILTER.  
(cont)

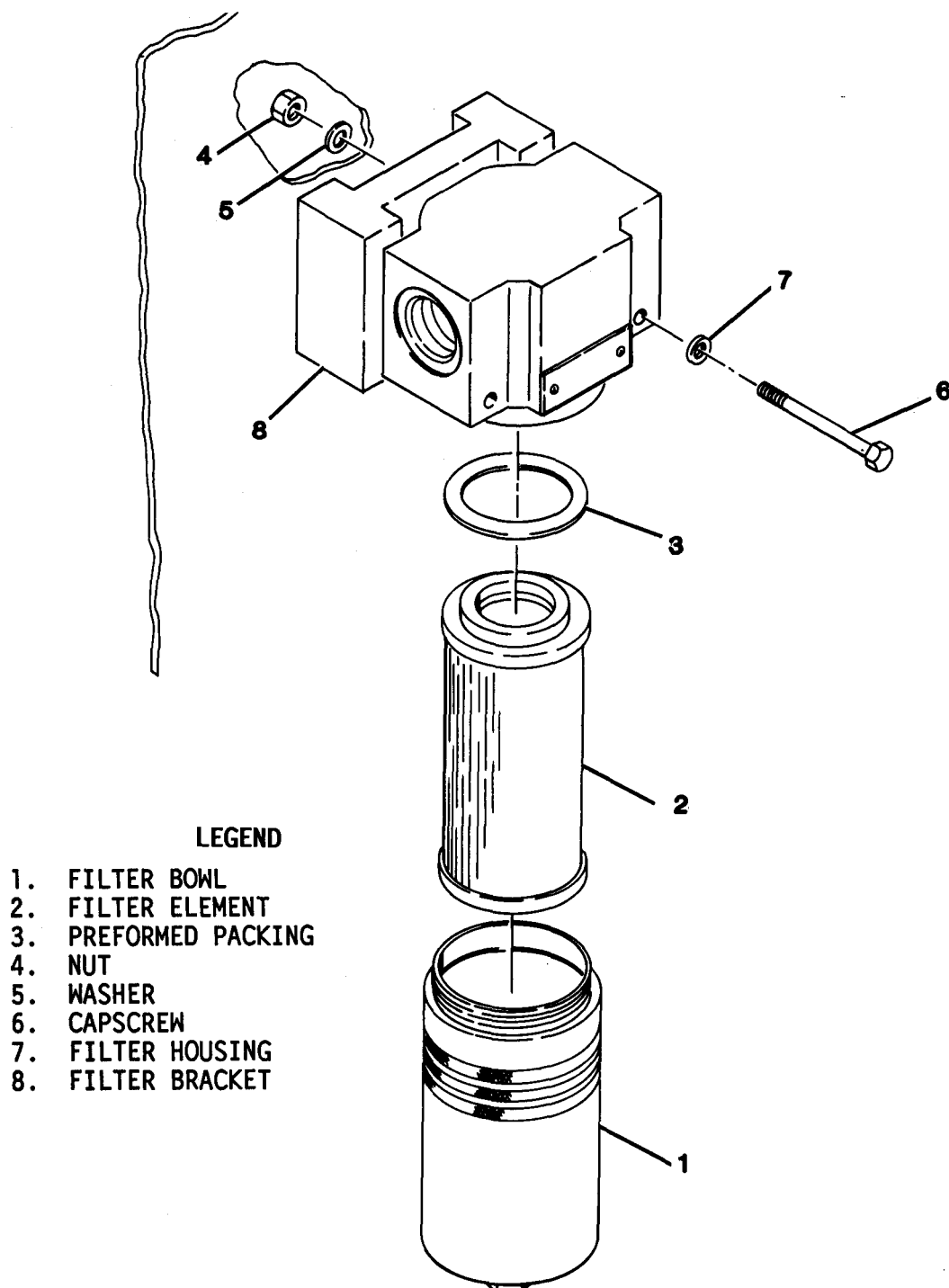


Figure 4-28. Fuel Filter (Secondary)



#### 4-41. ELECTRICAL HIGH PRESSURE FUEL PUMP. (cont)

##### a. Removal. (cont)

(3) Tag and disconnect fuel pump electrical connector.

(4) Tag and disconnect fuel pump inlet (1, figure 4-29) and outlet fuel lines (2).

(5) Remove self-locking nuts (3), washers (4), and capscrews (5) that secure fuel pump (7), in mounting brackets (6).

(6) Remove pump (7).

##### b. Installation.

(1) Install fuel pump (7) in mounting brackets (6) and secure with capscrews (5), washers (4), and self-locking nuts (3). Torque to 40-60 Inch pounds (4.5-6.8 Nm).

(2) Remove tags and connect outlet (2) and inlet (1) fuel lines to pump.

(3) Remove tag and connect pump electrical connector.

(4) Close fuel housing (paragraph 4-34C).

**4-42. SOLENOID VALVE.** Maintenance of the solenoid valve is limited to replacement.

##### a. Removal.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Tag and disconnect solenoid valve electrical connector.

(3) Tag and disconnect valve inlet (2, figure 4-29) drain (8), and outlet (9) lines from solenoid valve (13).

(4) Remove screws (10), lockwashers (11), washers (12) and solenoid valve (13) from mounting bracket (14).

##### b. Installation.

(1) Install solenoid valve (13) on mounting bracket (14) and secure with washers (12), lockwashers (11), and screws (10). Torque to 10-20 inch pounds (1-2.3 Nm).

(2) Remove tags and connect solenoid valve inlet (2), drain (8), and outlet (9) lines.

(3) Remove tag and connect electrical connector to solenoid valve.

(4) Close fuel housing (paragraph 4-34C).

**4-43. FUEL INJECTION NOZZLES.** Maintenance of the fuel injection nozzles is limited to inspection, servicing, and replacement.

##### a. Removal.

#### WARNING

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(1) Disconnect battery cable plug connector from battery.

4-43. FUEL INJECTION NOZZLES. (cont)

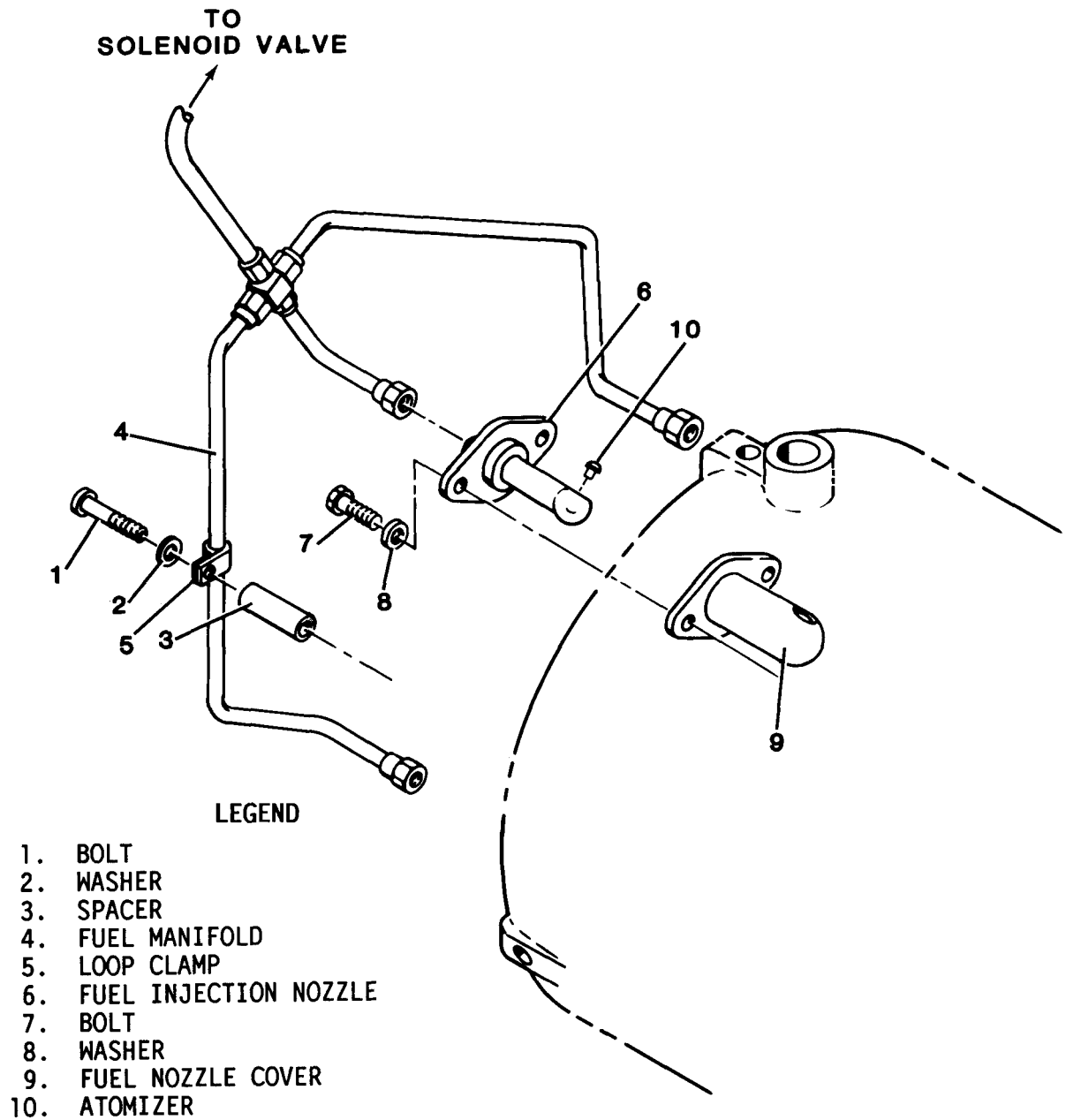


Figure 4-30. Fuel Injection Nozzles



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#### 4-43. FUEL INJECTION NOZZLES. (cont)

##### a. Removal. (cont)

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Remove lockwire, bolts (1, figure 4-30), washers (2), and spacers (3) so that fuel manifold (4) can be removed.

(4) Remove loop clamps (5) from fuel line only if damaged.

(5) Disconnect fuel manifold (4) from fuel injection nozzles (6).

(6) Remove lockwire, bolts (7), washers (8), and fuel injection nozzles (6) from nozzle covers (9).

(7) Remove atomizers (10) from fuel injection nozzles (6).

##### b. Inspection.

(1) Inspect fuel injection nozzles for wear and damage. Replace if excessively worn or damaged.

(2) Inspect orifice in atomizer (10) for damage and carbon deposits.

##### c. Service.

(1) Soak parts in P-D-680 to remove dirt and grease. Refer to table 3-1 for approved compound for carbon removal.

#### CAUTION

To prevent damage, do not use wire brush or abrasive material.

(2) Use soft-bristled brush to remove deposits.

#### WARNING

Compressed air used for cleaning or drying can create airborne particles that may enter the eyes. Pressure shall not exceed 30 psi (207 kPa). Wear eye protection to prevent injury.

(3) Dry parts thoroughly with compressed air.

##### d. Installation.

(1) Install atomizers (10) in fuel injection nozzles (6). Torque to 85-95 inch pounds (9.6-10.8 Nm).

(2) Install fuel (9) injection nozzles into nozzle covers. Secure to engine with washers (8) and bolts (7). Torque to 20-25 inch pounds (2.3-2.8 Nm). Lockwire with 0.032 inch (0.081m) diameter lockwire.

(3) Connect fuel manifold (4) to fuel injection nozzles (6). Torque fittings to 130-140 inch pounds (14.7-15.8 Nm).

(4) Position loop clamps (5), if removed, on fuel manifold (4).

(5) Position fuel manifold (4) and spacers (3). Secure with washers (2) and bolts (1). Torque to 10-15 inch pounds (1-1.7 Nm).

(6) Install engine housing access cover and secure with turnlock fasteners.

(7) Connect battery cable plug connector to battery.

## Section XI. MAINTENANCE OF IGNITION SYSTEM

**4-44. GENERAL.** The ignition system consists of a spark igniter, ignition coil, and the high tension electrical leads. The purpose of the ignition system is to ignite the fuel-air mixture in the engine combustor. Input voltage to the ignition coil charges a capacitor. As the capacitor becomes fully charged, current is forced from the ignition coil, through the high tension electrical leads, to the spark igniter. As this action continues, resistance in the air gap of the spark igniter is overcome, causing the capacitor to discharge completely. The discharge is in the form of a spark with a minimum 5000 volts. This entire process is repeated 240 times per minute.

### NOTE

If not specified in maintenance procedure, apply torque in accordance with table 1-1, Torque Specifications.

**4-45. IGNITION SYSTEM TEST.** The following test procedure can be used to isolate the ignition system component requiring service or replacement.

#### a. Access.

(1) Gain access to fuel housing (paragraph 4-34a).

(2) Disconnect electrical connector from electrical high pressure fuel pump.

(3) Loosen turnlock fasteners and remove engine housing access cover.

(4) Open control panel access door.

#### b. Test.

### WARNING

High voltage is present when ignition system is energized. To prevent injury, use extreme caution when working with energized equipment.

(1) Remove spark igniter (1, figure 4-31) and place on top of engine.

(2) On the control panel, move MASTER SWITCH to RUN, then place in START position.

(3) Observe sparking on spark igniter.

(4) If there is a steady, blue spark, ignition system components are operating properly.

(5) If there is a weak, intermittent orange spark, disconnect input lead (4) from ignition coil (13). Check voltage at input lead. Voltage should read 16-24 Vdc.

(6) If voltage is incorrect and battery is good, problem is in engine electronic control module (EECM) or associated wiring. Refer to paragraph 4-64.

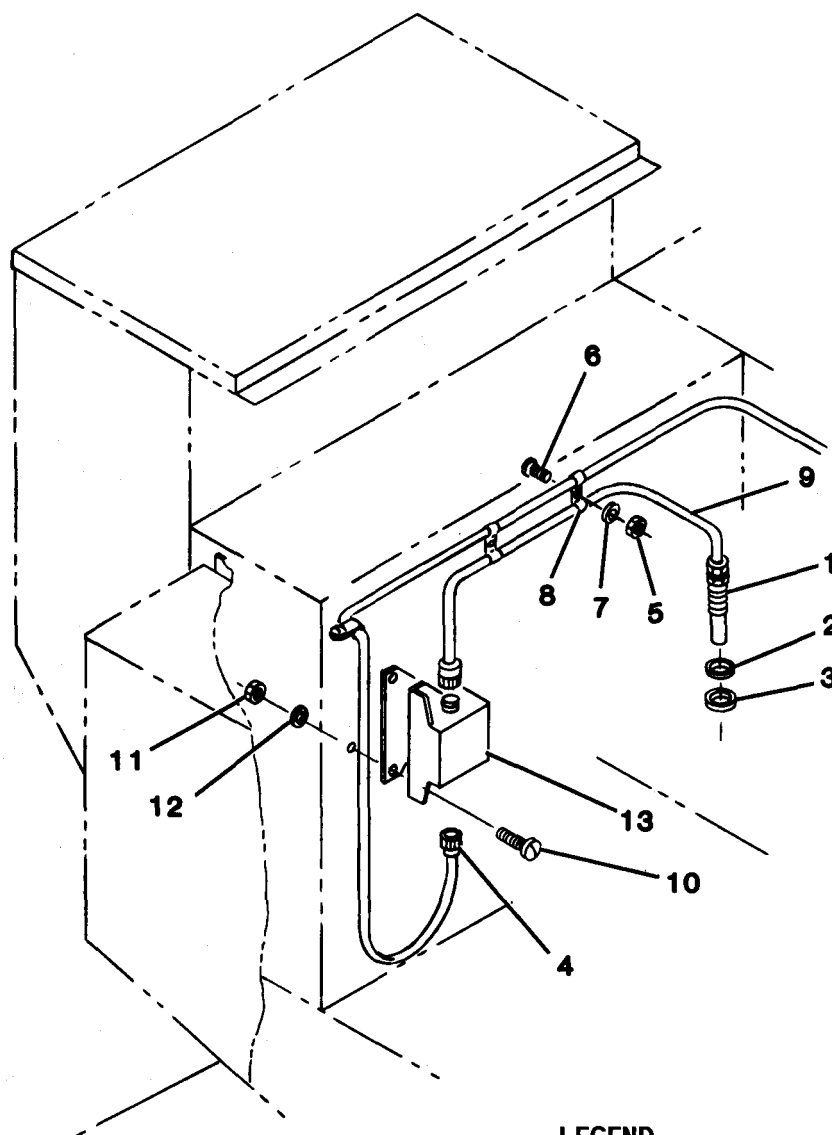
(7) If voltage is correct, reconnect input lead (4) to ignition coil (13) and replace high tension lead (9) (paragraph 4-46).

(8) Repeat test. If spark is still weak, intermittent, and orange, service or replace spark Igniter (paragraph 4-47).

(9) Repeat test. If spark is still weak, intermittent, and orange, replace ignition coil (paragraph 4-48).

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4-45. IGNITION SYSTEM TEST. (cont)



LEGEND

- |                             |                      |
|-----------------------------|----------------------|
| 1. SPARK IGNITER            | 8. LOOP CLAMP        |
| 2. WASHER                   | 9. HIGH TENSION LEAD |
| 3. METAL GASKET             | 10. SCREW            |
| 4. IGNITION COIL INPUT LEAD | 11. NUT              |
| 5. NUT                      | 12. WASHER           |
| 6. SCREW                    | 13. IGNITION COIL    |
| 7. WASHER                   |                      |

Figure 4-31. Ignition System Components

#### 4-45. IGNITION SYSTEM TEST. (cont)

##### b. Test. (cont)

(10) Ensure that MASTER SWITCH is in OFF position.

(11) Close control panel access door.

(12) Connect electrical connector to electrical high pressure fuel pump.

(13) Close fuel housing (paragraph 4-34c).

(14) Install engine housing access door and secure with turnlock fasteners.

**4-46. HIGH TENSION LEAD.** Maintenance of the high tension lead (9, figure 4-31) is limited to inspection and replacement.

##### a. Removal.

(1) Loosen turnlock fasteners and remove engine housing access cover and plenum access cover.

#### WARNING

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(2) Disconnect battery cable plug connector from battery.

(3) Remove nuts (5), screws (6), washers (7), and loop clamps (8) that secure high tension lead (9) to engine housing.

#### WARNING

High voltage may exist in ignition system even though generator set is shut down. To prevent injury, ensure that ignition system components are discharged to ground before performing maintenance.

(4) Disconnect high tension lead (9) from spark igniter (1) and discharge to ground.

(5) Disconnect high tension lead (9) from ignition coil (13).

##### b. Inspection.

(1) Inspect high tension lead (9) for loose connectors, chafing, abrasions, cuts, burned areas, and insulation breakdown. Replace lead if any of these conditions are present.

(2) Inspect high tension lead connectors for cracks, pitting, and damage caused by arcing. Replace high tension lead (9) if connectors are damaged.

Test. Test high tension lead in accordance with paragraph 4-45.

##### d. Installation.

(1) Connect high tension lead (9) to output of ignition coil (13).

(2) Connect high tension lead (9) to spark igniter (1).

(3) Secure high tension lead (9) to engine housing wall with loop clamps (8), screws (6), washers (7), and nuts (5). Torque to 36-40 inch pounds (4-4.5 Nm).

#### 4-46. HIGH TENSION LEAD. (cont)

##### d. Installation. (cont)

(4) Connect battery cable plug connector to battery.

(5) Install engine housing access cover and plenum access cover. Secure with turnlock fasteners.

**4-47. SPARK IGNITER.** Maintenance of the spark Igniter (1, figure 4-31) is limited to test, Inspection, service and replacement.

a. Test. Test spark igniter in accordance with paragraph 4-45.

##### b. Removal.

(1) Loosen turnlock fasteners and remove engine housing access cover.

#### WARNING

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(2) Disconnect battery cable plug connector from battery.

#### WARNING

High voltage may exist in ignition system even though generator set is shut down. To prevent injury, ensure that ignition system components are discharged to ground before performing maintenance.

(3) Disconnect high tension lead (9) from spark igniter (1) and discharge to ground.

(4) Remove spark igniter (1), washer (2), and metal gasket (3) from combustor housing.

##### c. Inspection.

#### CAUTION

To prevent damage, do not attempt to remove deposits or residue from the firing end. Spark igniter utilizes a semiconductor material at the firing end that can be damaged through improper cleaning.

(1) If necessary, carefully brush firing end with stiff-bristled non-metallic brush, or carefully wipe with P-D-680 and cloth.

(2) Use dry cloth or fiber bristle brush to remove residue from exterior of spark igniter shell.

(3) Inspect spark igniter for electrical or thermal damage. Replace if damaged.

(4) Inspect threads for damage. Replace spark igniter if damaged.

(5) Inspect thermal well for cracked or loose ceramic. Replace spark igniter if damaged.

(6) Inspect firing end insulator for chips, grooves, and cracks. Replace spark igniter if damaged.

(7) Inspect mounting flange for damage.

(8) Inspect electrode for excessive erosion. See figure 4-32. Compare electrode with electrode on new spark igniter. If electrode has eroded more than 50%, replace spark igniter.

4-47. SPARK IGNITER. (cont)

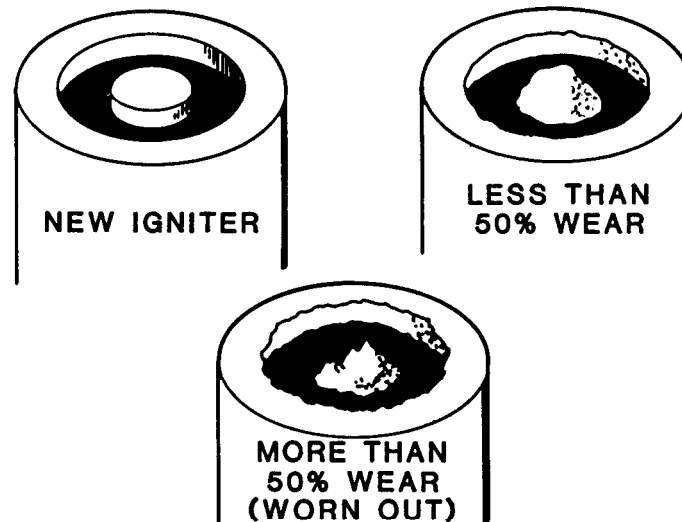


Figure 4-32. Typical Electrode Erosion

d. Service.

CAUTION

To prevent damage, do not attempt to remove deposits or residue from the firing end. Spark igniter utilizes a semiconductor material at the firing end that can be damaged through improper cleaning.

(1) Use a wire brush or a stiff-bristled fiber brush to remove residue from shell and shield threads.

WARNING

To prevent injury, all cleaning solvents shall be used in a well-ventilated area. Avoid prolonged breathing and skin contact. Do not take internally. Do not use near open flame.

CAUTION

To prevent damage, do not use an abrasive blast to clean spark igniter shield.

(2) Clean spark igniter shield with decreasing agent such trichloroethylene 1,1,1 (MIL-T-81533). Dry with clean cloth.

(3) Clean interior of ceramic upper barrel with soft swab soaked in P-D-680. Dry with compressed air.

e. Installation.

(1) Apply anti seize compound (MIL-A-907) to first two threads of spark igniter (1).

(2) Install gasket (3), washer (2), and spark igniter (1). Torque to 120-160 inch pounds (13.5-18 Nm).

4-47. SPARK IGNITER. (cont)

e. Installation. (cont)

(3) Connect high tension lead (9) to spark igniter.

(4) Connect battery cable plug connector to battery.

(5) Install engine housing access cover and secure with turnlock fasteners.

4-48. IGNITION COIL. Maintenance of the ignition coil (13, figure 4-31) is limited to test and replacement.

a. Test. Test ignition coil in accordance with paragraph 4-45.

b. Removal.

(1) Loosen turnlock fasteners and remove engine housing and plenum access covers.

WARNING

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(2) Disconnect battery cable plug connector from battery.

WARNING

High voltage may exist in ignition system even though generator set is shut down. To prevent injury, ensure that ignition system components are discharged to ground before performing maintenance.

(3) Disconnect ignition coil input lead (4) and discharge to ground.

(4) Disconnect high tension lead (9) and discharge to ground.

(5) Remove screws (10), nuts (11), and washers (12) to separate ignition coil (13) from engine housing.

c. Installation.

(1) Aline ignition coil (13) with mounting holes in engine housing. Secure with screws (10), washers (12), and nuts (11). Torque to 24-36 inch pounds (2.7-4 Nm).

(2) Connect high tension lead (9) to ignition coil (13).

(3) Connect input lead (4) to ignition coil (3).

(4) Install engine housing access cover and plenum access cover. Secure with turnlock fasteners.

(5) Connect battery cable plug connector to battery.

## Section XII. MAINTENANCE OF LUBRICATION SYSTEM

**4-49. GENERAL.** The lubrication system consists of an oil reservoir. Oil filler/breather assembly, oil filter, oil drains, lines and fittings, oil pressure relief valve, oil cooler, and an oil pump. The purpose of the system is to lubricate rotating components within the gearbox. Lubrication is begun when the control panel MASTER SWITCH is placed in START, causing the starter shaft to rotate. The starter shaft rotates the oil pump shaft until the turbine shaft can take over. The oil pump draws lubricating oil from the reservoir through a small strainer. The oil is then pumped through the oil filter and into the lubrication system where it lubricates gears and bearings on the turbine shaft and the generator shaft.

### NOTE

If not specified in maintenance procedure, apply torque in accordance with table 1-1, Torque Specifications.

**4-50. OIL FILLER/BREATHER ASSEMBLY.** The oil filler/breather assembly (figure 4-33) provides the means for checking and adding oil. It also provides ventilation for the reservoir. It consists of a filler cap and oil level gage and a breather. Maintenance consists of inspection, replacement, and repair.

#### a. Inspection.

(1) Loosen turnlock fasteners and remove engine housing and plenum access covers.

(2) Make sure breather vent tube is securely in place. Inspect tube for damage. Replace if damaged.

(3) Tighten hose clamps (2).

(4) Inspect filler hose (3) for damage. Replace if damaged.

(5) Unscrew and remove filler cap and oil level gage (1). Inspect threads in cap and threaded adapter in mounting bracket (10) for damage. Replace damaged components as necessary.

(6) Inspect mounting bracket drain tube (13) for damage or obstruction. Remove obstruction or replace damaged drain tube.

(7) Inspect breather housing drain tube (5) for damage or obstruction. Remove obstruction or replace damaged breather drain.

(8) Install engine housing and plenum access covers. Secure with turnlock fasteners.

#### b. Removal

(1) Loosen turnlock fasteners and remove engine housing and plenum access covers.

### WARNING

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(2) Disconnect battery cable plug connector from battery.

(3) Unscrew and remove filler cap and oil level gage (1).

(4) Loosen hose clamps (2) and remove filler hose (3).

(5) Disconnect breather vent tube (4) from breather housing (9). Replace hose clamps (15) and gasket (16) if damaged.



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4-50. OIL FILLER/BREATHER ASSEMBLY.  
(cont)

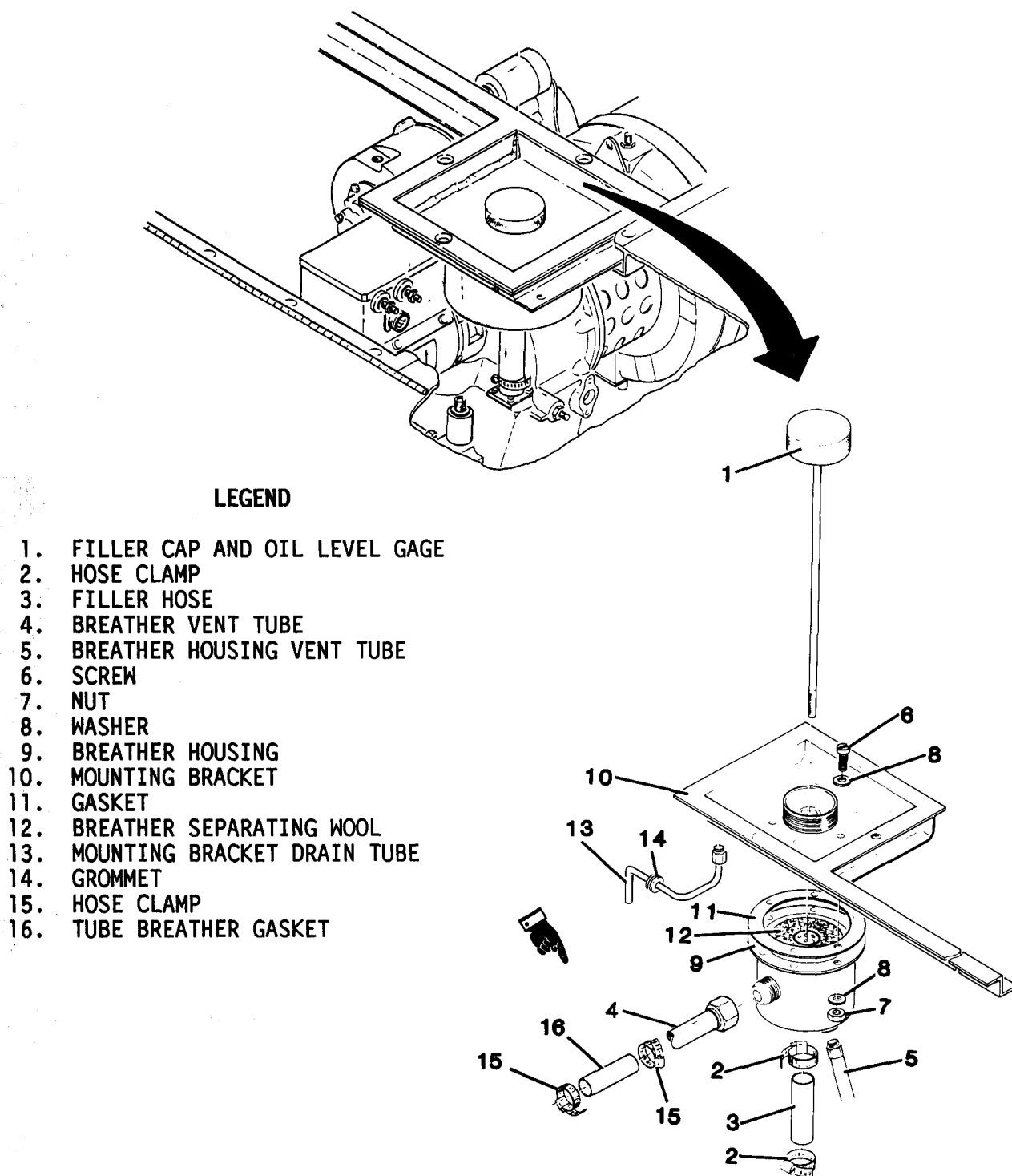


Figure 4-33. Oil Filler/Breather Assembly

#### 4-50. OIL FILLER/BREATHER ASSEMBLY. (cont)

##### b. Removal. (cont)

(6) Disconnect breather housing drain tube (5) from breather housing (9).

(7) Remove screws (6), nuts (7), and washers (8) to separate breather housing (9) from mounting bracket (10).

(8) Remove and discard gasket (11).

(9) Remove and discard breather separator wool (12).

(10) Remove mounting bracket drain tube (13) and grommet (14) from mounting bracket (10).

c. Repair. Repair consists of replacing damaged components.

##### d. Installation.

(1) Install mounting bracket drain tube (13) and grommet (14) in mounting bracket (10).

(2) Coil new breather separating wool (12) around a mandrel with a diameter of 1.25 inch (3.2 cm). Coil wool to a maximum outside diameter of 4.44 inch (11.3 cm).

(3) Install coiled wool in breather housing (9).

(4) Install gasket (11).

(5) Align breather housing and gasket with holes in mounting bracket (10). Secure with screws (6), washers (8), and locknuts (7).

(6) Connect breather housing drain tube (5) to breather housing (9).

(7) Connect breather vent tube (4) to breather housing (9).

(8) Install filler hose (3) and secure with hose clamps (2).

(9) Install filler cap and oil level gage (1) and hand tighten.

(10) Install engine housing and plenum access covers and secure with turnlock fasteners.

(11) Connect battery cable plug connector to battery.

4-51. OIL FILTER ASSEMBLY. Maintenance of the oil filter is limited to replacement. Refer to paragraph 4-8.

4-52. OIL DRAINS. Maintenance of the oil drains (figure 4-7) is limited to inspection and replacement. The oil drains consist of the reservoir drain hose and the output pad seal drain. They are reached by removing the fuel/oil drain access cover on the bottom of the generator set. The reservoir drain allows for draining of the gearbox. The output pad seal drain allows for drainage of oil that has seeped past the generator drive seal on the gearbox. The oil drains should be inspected for damaged threads, hoses, and fittings each time the oil is changed. Refer to paragraph 4-8.

4-53. LINES AND FITTINGS (EXTERNAL). Maintenance of the external lines and fittings is limited to inspection and replacement. The lubrication system lines and fittings consist of oil lines and flare adapter fittings used to connect the lubrication system to the oil cooler.

4-53. LINES AND FITTINGS (EXTERNAL).  
(cont)

a. Inspection.

(1) Loosen turnlock fasteners and remove engine housing access cover and plenum access cover.

(2) Inspect oil lines and cooler lines for wear due to chafing or rubbing. Inspect fittings for evidence of leakage or damage. Replace damaged lines and fittings as necessary.

(3) Inspect flare fittings for damage or leakage. Inspect T-fittings for damage or leakage. Tighten or replace as necessary.

(4) Install engine housing and plenum access covers. Secure with turnlock fasteners.

b. Removal.

(1) Drain oil from lubrication system (paragraph 4-8a).

(2) To prevent twisting or damaging tubing, use two wrenches. Hold fitting stationary with one wrench while loosening flare nuts with other wrench. Remove damaged lines and fittings as necessary.

c. Installation.

(1) To prevent cross-threading and damage to fittings or nuts, start all flare nuts on fittings by hand.

(2) To prevent twisting or damaging tubing, use two wrenches. Hold fitting stationary with one wrench while tightening flare nuts with other wrench. Install new lines and fittings as necessary. After installing new lines, ensure that tubes will not rub or vibrate against engine or housing during operation.

(3) Fill reservoir (paragraph 4-8 b).

4-54. OIL COOLER. Maintenance of the oil cooler (figure 4-34) is limited to inspection and service. Oil is pumped from the gearbox reservoir, through the low oil pressure switch, and then to the oil cooler where it is cooled. The oil then flows through the return line back to the reservoir.

a. Inspection.

(1) Loosen turnlock fasteners and remove engine housing and plenum access covers.

(2) Ensure that oil cooler supply line is securely connected to low oil pressure switch (figure 4-7).

(3) Ensure that oil cooler return line is securely connected to reservoir return port (figure 4-7).

WARNING

To prevent injury, ensure that handbrake is set and wheels are chocked while working under generator set.

(4) Set handbrake and chock both wheels.

(5) Remove screws (1, figure 4-34), washer (2), and oil cooler housing (3).

(6) Inspect oil cooler fins for bends or tears. Straighten bent fins. If fins are torn, refer to direct support for maintenance.

(7) Ensure that oil cooler supply and return lines (7) are securely connected.

4-54. OIL COOLER. (cont)

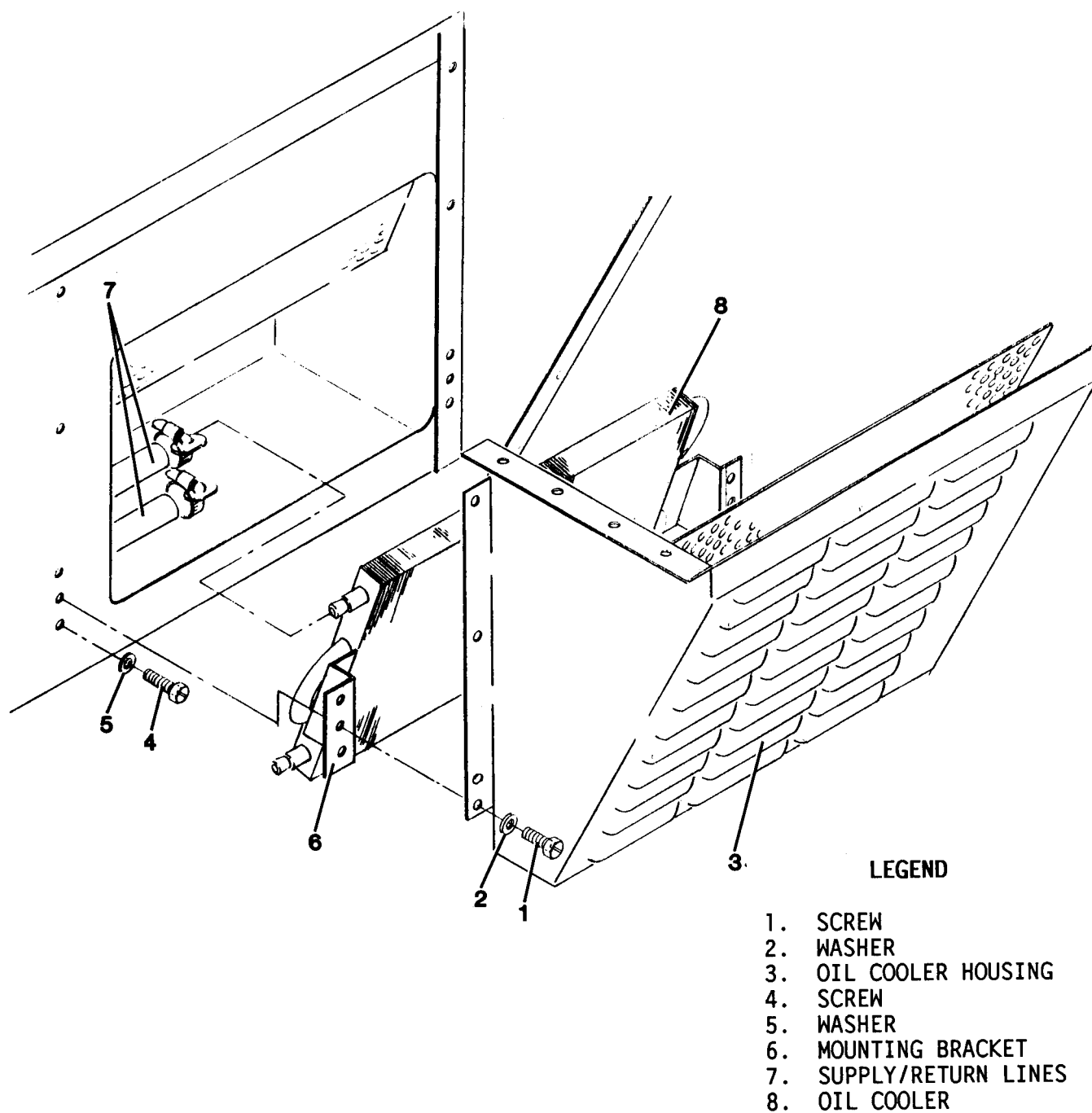


Figure 4-34. Oil Cooler Service

#### 4-54. OIL COOLER. (cont)

##### a. Inspection. (cont)

(8) Ensure that oil cooler (8) is securely attached to mounting brackets (6).

(9) Install oil cooler housing (3) and secure with washers (2) and screws (1).

(10) Install plenum and engine housing access covers. Secure with turnlock fasteners.

(11) Remove chocks and release handbrake.

##### b. service.

#### WARNING

To prevent Injury, ensure that handbrake is set and wheels are chocked while working under generator set.

(1) Set handbrake and chock both wheels.

(2) Remove screws (1), washers (2), and oil cooler housing (3).

(3) Remove screws (4) and washers (5) that secure Oil cooler mounting brackets (6) to generator set.

(4) Tag, disconnect, and cap oil cooler supply and return lines (7). Remove oil cooler (8), with mounting brackets (6) attached, from generator set.

#### WARNING

Dry cleaning solvent, P-D-680, type II, is flammable and toxic to the skin, eyes, and respiratory tract. Skin, eye, and respiratory protection is required.

(5) Using a soft bristle brush and cleaning solvent P-D-680, type II, clean core and cooling fins. Straighten bent fins.

#### WARNING

Compressed air used for cleaning or drying can create airborne particles that may enter the eyes. Pressure shall not exceed 30 psi (207 kPa). Wear eye protection to prevent injury.

(6) Dry core and fins by directing compressed air over the fins and through the core.

(7) Place oil cooler (8), with mounting brackets (6) attached, into generator set.

(8) Uncap and connect oil cooler supply and return lines (7). Remove tags.

(9) Secure oil cooler mounting brackets (6) to generator set with washers (5) and screws (4). Torque to 24-36 inch pounds (2.7-4.1 Nm).

(10) Put oil cooler housing (3) into position and secure with washers (2) and screws (1).

(11) Remove chocks and release handbrake.

### Section XIII. MAINTENANCE OF ENGINE

**4-55. GENERAL.** The gas turbine engine consists of the combustor, turbine, compressor, and gearbox assemblies. The gas turbine engine provides rotational-force at a constant speed to drive the 10kW generator mounted on the front of the gearbox. In addition, the engine provides bleed air to the air filter. The engine is a single-shaft design with the compressor and turbine wheels mounted on a common shaft. Air is drawn in through the compressor air inlet, compressed by the vanes of the compressor wheel, and distributed to the outer chamber of the combustor housing. The air then passes through holes in the combustor liner and through three fuel injection nozzles spaced evenly around the liner. Fuel is atomized in the fuel injection nozzles, mixed with the air, and injected into the combustor, where it is ignited. The burning fuel expands rapidly and is forced through the vanes of the turbine nozzle and against the vanes of the turbine wheel causing the turbine wheel to rotate. Power produced by the rotating turbine wheel is transmitted by the turbine shaft to the generator drive assemblies in the gearbox.

#### NOTE

If not specified in maintenance procedure, apply torque in accordance with table 1-1, Torque Specifications.

**4-56. FOREIGN OBJECT DEFLECTION SHIELD.** Maintenance of the foreign object deflection shield (figure 4-35) is limited to replacement.

#### a. Removal.

##### WARNING

To prevent injury, ensure that battery cable plug connector is disconnected from battery before performing maintenance.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Disconnect electrical connector (1) from monopole speed sensor (2).

(4) Remove lockwire, bolts (3), and washers (4) that secure foreign object deflection shield (5) and padeye (6) to compressor inlet housing (7).

(5) Carefully lift foreign object deflection shield (5) off monopole speed sensor (2).

#### b. Installation.

(1) Carefully slide foreign object deflection shield (5) over monopole speed sensor (2).

(2) Align mounting holes in compressor inlet housing (7), padeye (6), and foreign object deflection shield (5). Secure with washers (4) and bolts (3). Torque to 50-70 inch pounds (5.6-7.9 Nm).

(3) Connect electrical connector (1) to monopole speed sensor (2).

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4-56. FOREIGN OBJECT DEFLECTION  
SHIELD. (cont)

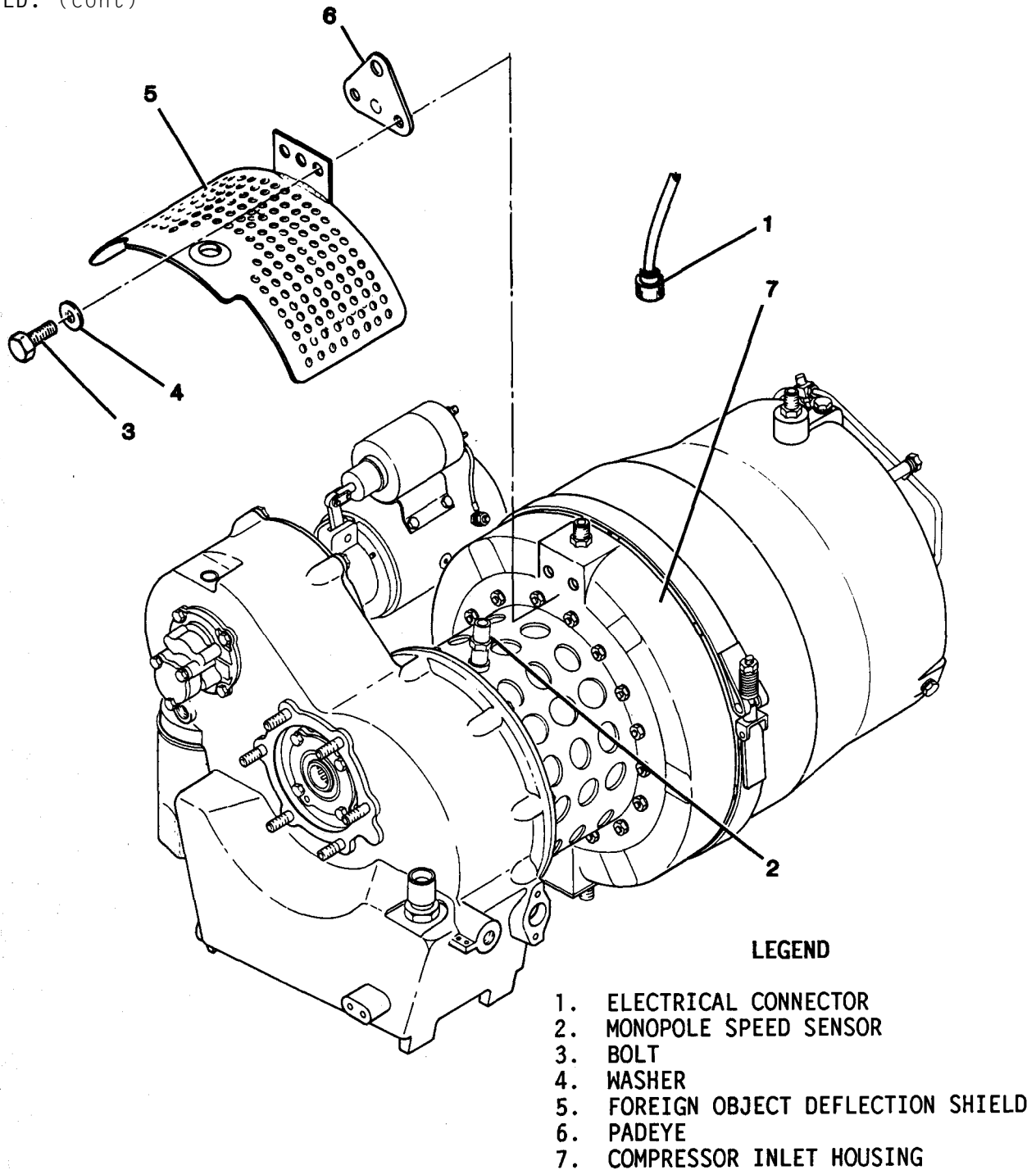


Figure 4-35. Foreign Object Deflection Shield Removal

**4-56. FOREIGN OBJECT DEFLECTION SHIELD. (cont)**

b. Installation. (cont)

(4) Install lockwire as required.

(5) Install engine housing access cover and secure with turnlock fasteners.

(6) Connect battery cable plug connector to battery.

**4-57. RIM CLENCHING CLAMP.** Maintenance of the rim clenching (V-band) clamp (1, figure 4-36) is limited to inspection.

a. Loosen turnlock fasteners and remove engine housing access cover.

b. Check rim clenching clamp for tightness, cracks, and other damage.

Check for loose, missing, or broken lockwire.

d. If clamp is damaged in any way, refer to direct support for maintenance.

e. Install engine housing access cover and secure with turnlock fasteners.

**4-58. COMBUSTOR HOUSING.** Maintenance of the combustor housing (2, figure 4-36) is limited to inspection.

a. Loosen turnlock fasteners and remove engine housing access cover.

b. Inspect for loose alignment bolts (3). Tighten as required. Bolts should be torqued to 30-40 inch pounds (3.4-4.5 Nm).

c. Inspect for cracks and other damage to housing. If repair is required, notify direct support maintenance.

d. Install engine housing access cover and secure with turnlock fasteners.

**4-59. COMPRESSOR INLET HOUSING.** Maintenance of the compressor inlet housing (4, figure 4-36) is limited to inspection.

a. Loosen turnlock fasteners and remove engine housing access cover.

b. Remove foreign object deflection shield (paragraph 4-56).

c. Inspect for foreign object damage, cracks, and broken or missing lockwire.

d. Ensure monopole speed sensor is securely mounted. Bolt should be torqued to 70-80 inch pounds (7.9-9 Nm). Ensure that lockwire is secure.

e. If compressor inlet housing is damaged in any way, refer to depot level for maintenance.

f. Install foreign object deflection shield (paragraph 4-56).

g. Install engine housing access cover and secure with turnlock fasteners.

**4-60. GEARBOX ASSEMBLY.** Maintenance of the gearbox assembly (5, figure 4-36) is limited to inspection.



4-57. RIM CLENCHING CLAMP. (cont)

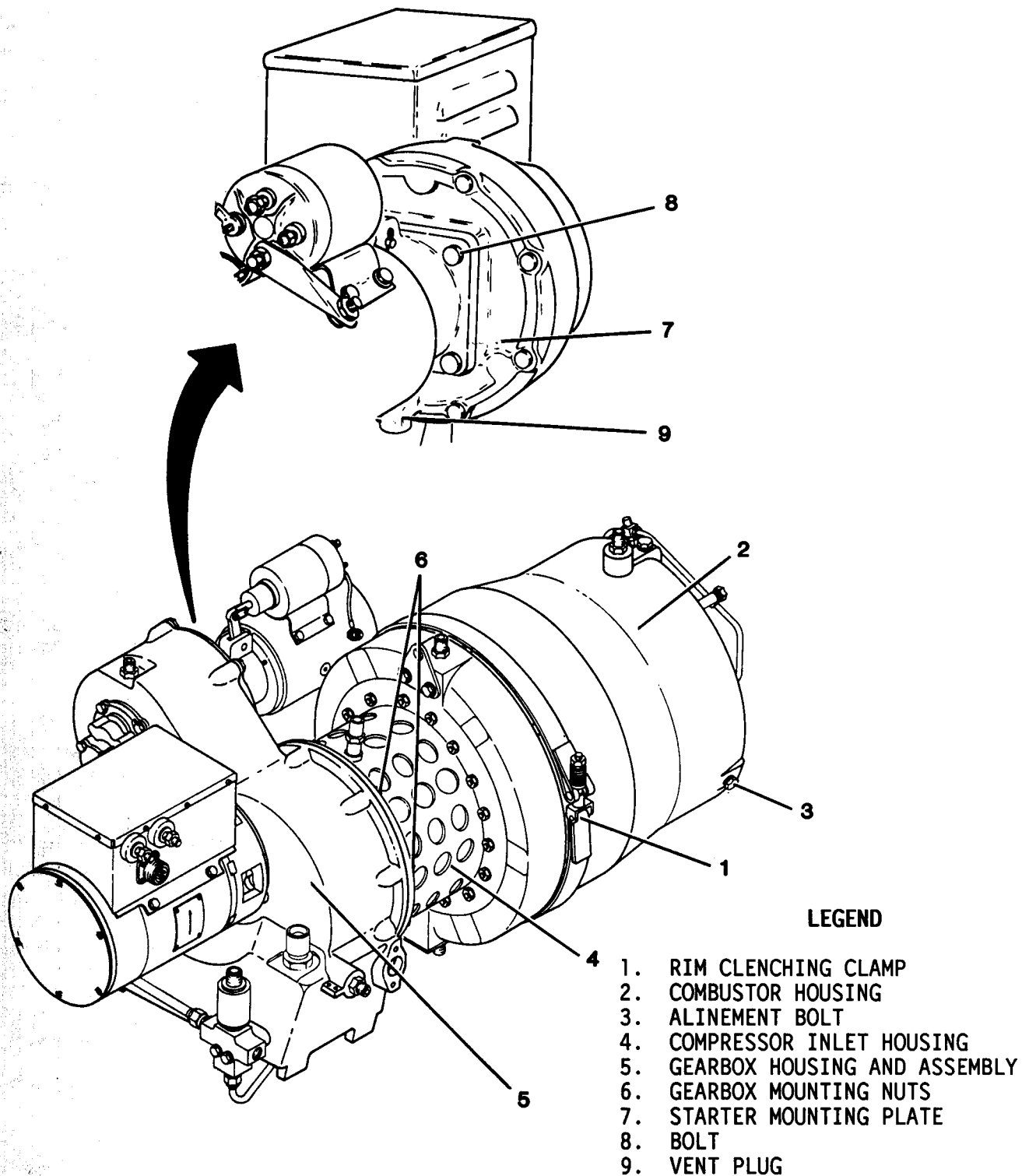


Figure 4-36. Turbine Maintenance Points

#### 4-60. GEARBOX ASSEMBLY. (cont)

a. Loosen turnlock fasteners and remove engine housing access cover.

b. Remove foreign object deflection shield (paragraph 4-56).

c. Inspect for oil leaks. If oil leaks are present, notify depot for maintenance.

d. Ensure that gearbox is securely mounted to engine. Tighten as required. Nuts (6) should be torqued to 70-80 inch pounds (7.9-9 Nm). Ensure that nuts are properly lockwired.

e. Install foreign object deflection shield (paragraph 4-56).

f. Install engine housing access cover and secure with turnlock fasteners.

(3) Check for oil leaks around mounting plate. If leaking, notify depot for repair.

(4) Check vent plug (9) for obstructions.

(5) If starter mounting plate is damaged, refer to depot level for maintenance.

(6) Clean starter mounting plate (paragraph 4-61b).

##### b. Service.

(1) Use approved cleaning solvent (P-D-680) to remove accumulated oil and dirt. Ensure that vent plug is clean.

(2) Dry with clean, lint-free cloth.

(3) Install engine housing access cover and secure with turnlock fasteners.

#### 4-61. STARTER MOUNTING PLATE. Maintenance of the starter mounting plate (7, figure 4-36) is limited to inspection and service.

##### a. Inspection.

(1) Loosen turnlock fasteners and remove engine housing access cover.

(2) Check for loose, missing, or damaged attaching parts. Tighten or replace as necessary. Bolts (8) should be torqued to 45-55 inch pounds (5-6.2 Nm). Ensure that lockwire is secure.

#### 4-62. GEARBOX HOUSING. Maintenance of the gearbox housing (5, figure 4-36) is limited to inspection.

a. Loosen turnlock fasteners and remove engine housing access cover.

b. Inspect gearbox housing for cracks and other damage. If damaged, notify depot for maintenance.

c. Install engine housing access cover and secure with turnlock fasteners.

#### Section XIV. MAINTENANCE OF ENGINE AND GENERATOR CONTROLS AND INSTRUMENTS

4-63. GENERAL. This section contains information on the engine and generator controls and instruments. The controls and instruments include the engine electronic control module (EECM), monopole speed sensor, exhaust gas temperature (EGT) thermocouple, control panel, and the associated wiring harnesses.

a. Purpose. The engine and generator controls and instruments control and monitor operation of the gas turbine engine and generator, and control power to the aircraft being serviced. Controls on the control panel allow the operator to start the gas turbine engine and to apply generated power to the aircraft. Control panel meters show generator set voltage, output current, total operating hours, and battery current charging rate. The EECM monitors the monopole speed sensor, the EGT thermocouple, and the generator power output. Sensors tell the EECM how the engine is running. Malfunctions in the engine and generator are sensed by the EECM and sent to the control panel. Malfunction indicator lamps on the control panel will then come on to alert the operator. A voltage adjust control allows the operator to adjust load voltage. Panel lights are provided for night operation.

##### b. Physical Description.

(1) Engine Electronic Control Module. There are three multi-pin connectors and four finned heat sinks mounted on the outside of the EECM. Three transistors and a voltage regulator are mounted on the heat sinks. All other electrical components of the EECM are on printed circuit cards inside the EECM housing.

(2) Exhaust Gas Temperature Thermocouple. The exhaust gas temperature (EGT) thermocouple is about four inches long with a pointed probe tip on one end and a housing on the other on which are mounted two electrical terminals. A collar nut on the shaft of the probe secures the probe in the engine housing.

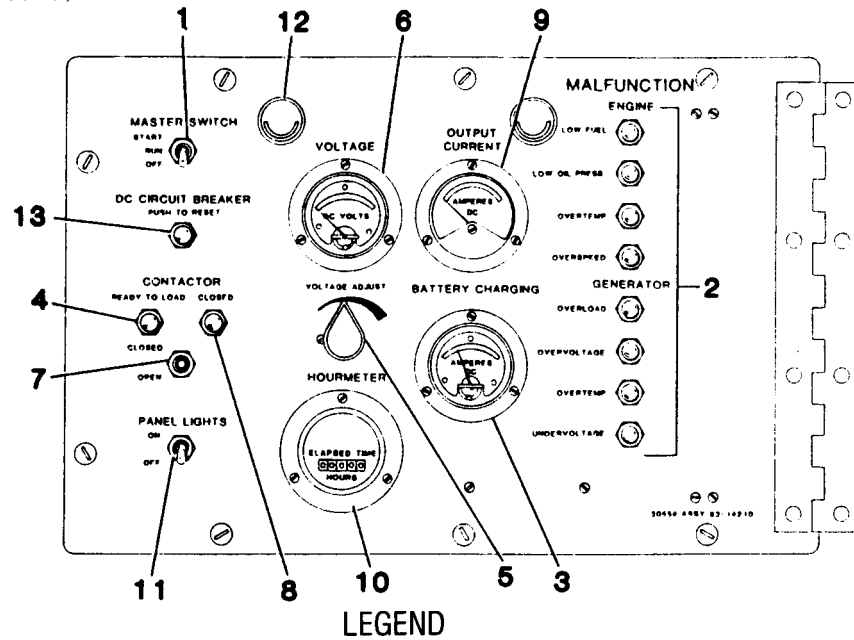
(3) Monopole Speed Sensor. The monopole speed sensor is mounted at one end of an aluminum housing and is electrically connected to a two-pin connector at the other end of the housing. The entire assembly slides into the engine block and is fastened to the block by a screw-down mounting collar that fits around a mounting ring on the sensor body.

(4) Control Panel and Wiring Harness. Figure 4-37 shows the control panel and a view of the control panel with the wiring harness attached. Components mounted on the control panel include incandescent lamps, meters, a voltage adjust knob, panel lights, toggle switches, and a circuit breaker. The purpose and function of each control are listed in table 2-1.

C. Electrical Function. This paragraph covers operation of the equipment from engine startup through the time when power from the generator is applied to the load, and then to shutdown. Refer to figures 4-37 and 4-38.

(1) Initial Power Application. Power from the battery is applied to the control panel through terminal board (TB1). When the MASTER SWITCH is placed in the RUN position, two signals are sent to the EECM. One signal provides power to run the circuits in the EECM. The other signal indicates to

4-63. GENERAL. (cont)



- |                                 |                            |
|---------------------------------|----------------------------|
| 1. MASTER SWITCH                | 8. CONTACTOR CLOSED SWITCH |
| 2. MALFUNCTION INDICATOR LIGHTS | 9. OUTPUT CURRENT AMMETER  |
| 3. BATTERY CHARGING AMMETER     | 10. HOURMETER              |
| 4. READY TO LOAD LIGHT          | 11. PANEL LIGHTS SWITCH    |
| 5. VOLTAGE ADJUSTMENT KNOB      | 12. PANEL LIGHTS           |
| 6. DC VOLTAGE VOLTMETER         | 13. DC CIRCUIT BREAKER     |
| 7. CONTACTOR SWITCH             |                            |

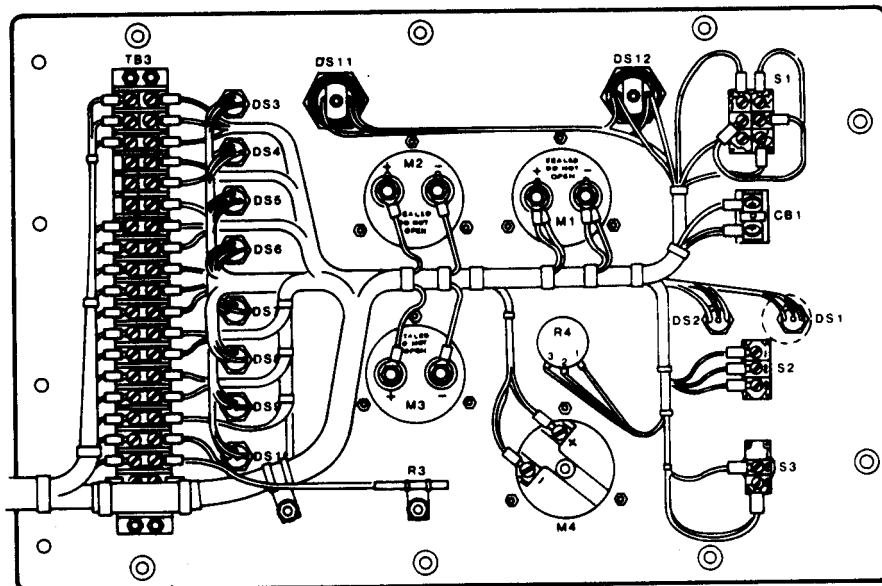


Figure 4-37. Control Panel and Control Panel Wiring Harness

4-63. GENERAL. (cont)

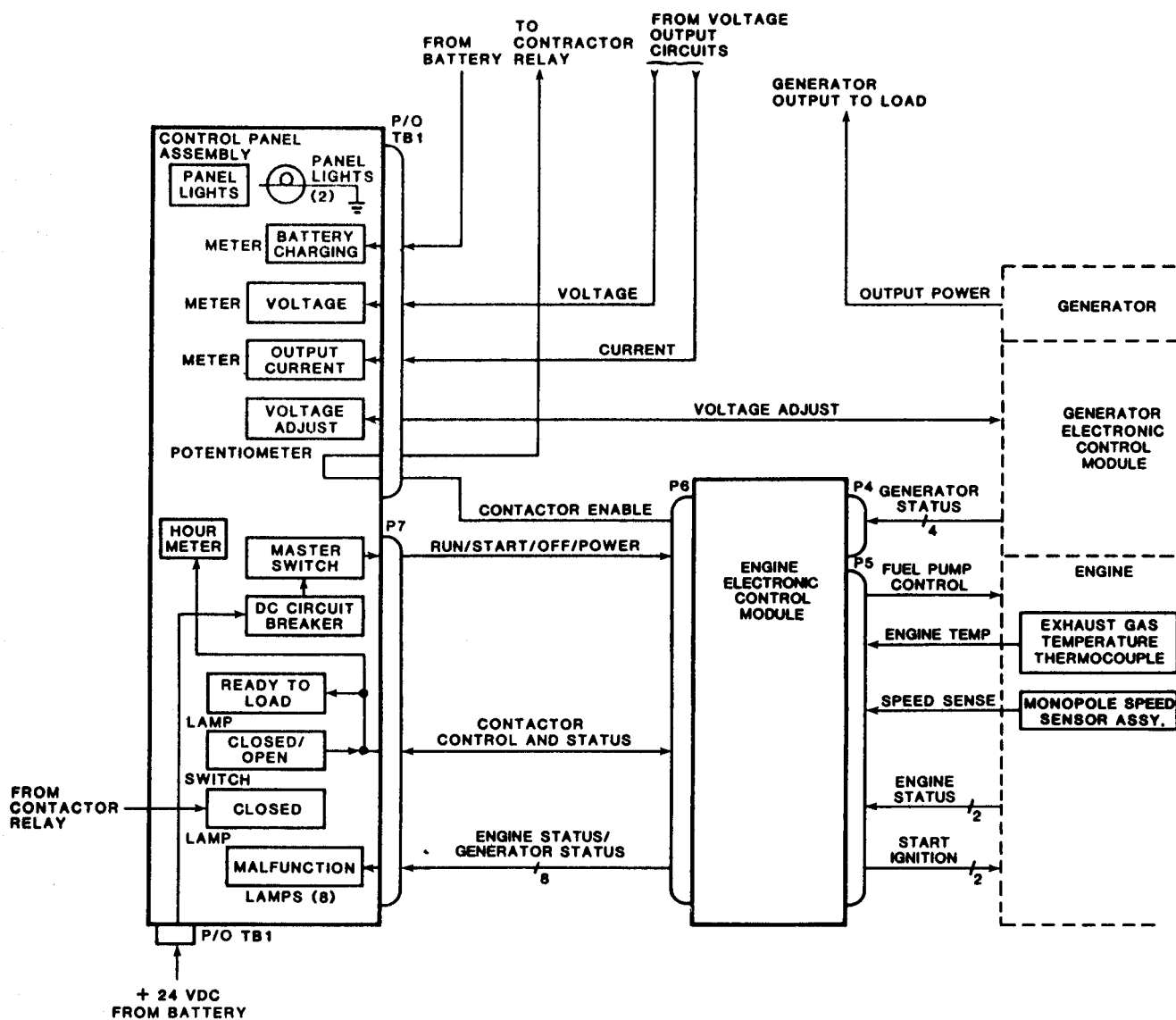


Figure 4-38. Engine and Generator Controls and Instruments Block Diagram

#### 4-63. GENERAL. (cont)

##### c. Electrical Function. (cont)

the EECM logic that an engine startup is beginning, and it begins to monitor the status of the engine. Power is also provided to the electric fuel transfer pump. The pump operates to pressurize the fuel system.

(2) Engine Startup. When the MASTER SWITCH is momentarily placed in the START position and then released, a start signal is sent to the EECM. The EECM then checks the status of the monopole speed sensor. If the EECM senses a reading of other than zero, it will not continue the start sequence. If it senses a reading of zero, it shows that the engine is not running and the EECM will provide a signal to start the high pressure fuel pump. It also sends signals to the Igniter, fuel shutoff/drain solenoid valve, and the starter. The starter turns and cranks the engine. As the engine starts, the EECM monitors engine speed through the monopole speed sensor, and exhaust gas temperature through the EGT thermocouple. If engine speed does not reach 10 percent of full speed within 5 seconds, the EECM will disable the igniter, high pressure fuel pump, and starter, stopping the engine. If engine speed is correct, the engine is allowed to continue building speed. If exhaust temperature does not rise after the start signal is sent, the EECM senses that ignition did not take place and will stop the engine. If exhaust temperature does rise, the engine is allowed to continue building speed. The EECM continues to monitor engine speed through the monopole speed sensor. Engine speed is compared to speed values stored in the EECM. If there is a difference between engine speed and the stored value, the EECM will signal the fuel system to increase or decrease

fuel flow. This allows the engine to build speed at the proper rate. When the engine reaches 60 percent of maximum speed, the EECM will disable the start sequence and allow the engine to build speed by itself.

(3) Contactor Enabling. When the engine reaches maximum speed, the EECM will turn on the CONTACTOR READY TO LOAD lamp and start the HOURMETER. This tells the operator that the generator has developed rated load and is ready to supply electrical power. When the CONTACTOR switch is momentarily placed in the CLOSED position, the EECM senses the signal and generates an enable signal through the control panel to the contactor relay. This closes the contactor relay and allows electrical power to pass from the generator, through the power cable, to the aircraft. It also turns on the CONTACTOR CLOSED lamp on the control panel to show the operator that the circuit is complete between the generator set and the aircraft.

(4) Output Power Adjustment. Output power can be adjusted by using the VOLTAGE ADJUST knob on the control panel. The knob controls a potentiometer that will send signals from the control panel to the generator electronic control module (GECM). The GECM will signal the generator to adjust output to the load.

(5) Battery Charging Ammeter. The battery is continually being charged when the engine is running. The charging rate is shown on the BATTERY CHARGING ammeter on the control panel. The signal displayed on the ammeter is brought to the control panel by a line from a shunt located in the inlet air housing.

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#### 4-63. GENERAL. (cont)

##### c. Electrical Function. (cont)

(6) Status Monitoring and Control. Engine and generator status are monitored by the EECM. If malfunction is detected, the EECM either corrects the problem or shuts down the engine. The EECM checks for low oil pressure, overtemperature, and overspeed. The EECM checks the generator for an overload, overvoltage, overtemperature, and undervoltage. If a malfunction is detected, the EECM waits three-fourths of a second before taking action. The EECM will try to correct a detected malfunction before an automatic shutdown is initiated. An automatic shutdown decision causes the EECM to deenergize the contactor relay. The EECM then signals the contactor control and status line to turn off the READY TO LOAD lamp and stop the HOURMETER. The EECM enables the shutdown control line, shuts off the high pressure fuel pump and the fuel solenoid valve, and stops the engine. When the automatic shutdown occurs, the EECM signals the engine status/generator status lines on the control panel to light the appropriate MALFUNCTION indicator Light. The malfunction must be corrected before attempting to restart the engine.

(7) Manual Contactor Disabling. Placing the CONTACTOR switch in the O P E N position opens the contactor relay, stops electric power, and turns off the CONTACTOR CLOSED lamp. The engine will continue to run.

(8) Manual Shutdown. Placing the MASTER SWITCH in the OFF position causes the EECM to deenergize the contactor relay, activate engine shutdown control line, deenergize the solenoid valve and the high pressure fuel pump, shutting down the engine.

##### NOTE

If not specified in maintenance procedure, apply torque in accordance with table 1-1, Torque Specifications.

4-64. ENGINE ELECTRONIC CONTROL MODULE. Maintenance of the engine electronic control module (EECM) consists of replacement. When testing/troubleshooting procedures isolate the EECM as the cause of a malfunction, remove the EECM and send to direct support maintenance for repair.

##### a. Removal.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and remove EECM access cover (1, figure 4-39).

(4) Remove nuts (2) and washers (3).

(5) Lift EECM off resilient mounts (7) and out of control fender.

(6) Tag and disconnect electrical connectors J4 (4), J5 (5), and J6 (6).

(7) Inspect resilient mounts (7) and ground strap (8). Replace if damaged.

4-64. ENGINE ELECTRONIC CONTROL  
MODULE. (cont)

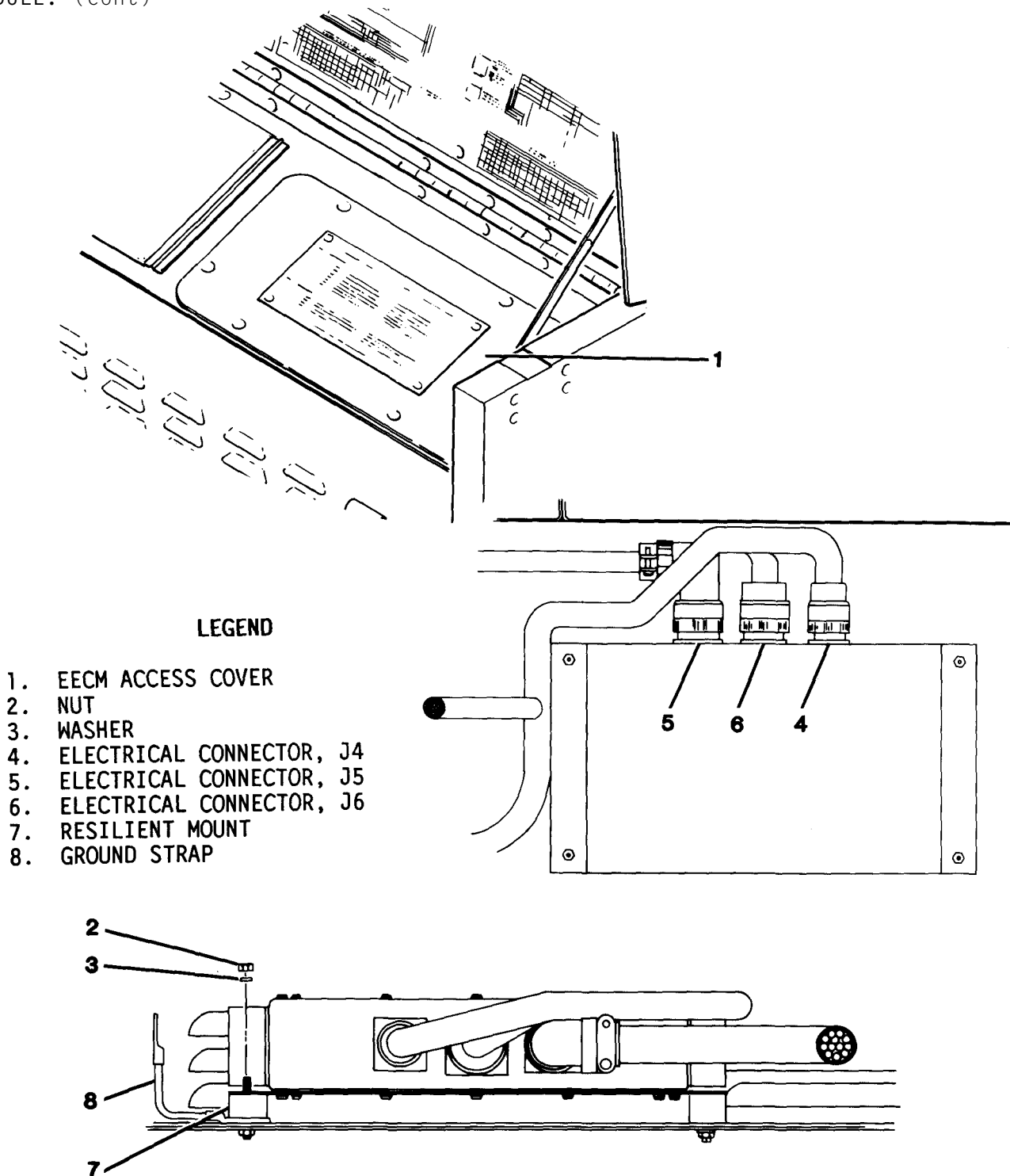


Figure 4-39. EECM Replacement



A R M Y            TM 5-6115-612-12  
MARINE   CORPS   TM 6115-12/7  
AIR        FORCE   TO 35C2-3-471-1  
N A V Y        AG-320B0-0MM-000

#### 4-64. ENGINE ELECTRONIC CONTROL MODULE. (cont)

##### b. Installation.

(1) Ensure that rubber shock mounts (1) and ground strap (8) are in place.

(2) Remove tags and connect electrical connectors to EECM

(3) Place EECM on resilient mounts (7).

(4) Install washers (3) and nuts (2). Torque to 74-82 inch pounds (8.4-9.3).

(5) Install EECM access cover (1) and secure with turnlock fasteners.

(6) Close and secure control panel access cover.

(7) Connect battery cable plug connector to battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Disconnect electrical connector from monopole speed sensor.

(4) Set multimeter on R1 and measure resistance across sensor terminals. If no continuity is indicated, monopole speed sensor is faulty and should be replaced (paragraph 4-65b).

(5) If continuity in excess of 1000 ohms is indicated, monopole speed sensor is good.

(6) Connect electrical connector to monopole speed sensor.

(7) Install engine housing access cover and secure with turnlock fasteners.

(8) Connect battery cable plug connector to battery.

##### b. Removal.

4-65. MONOPOLE SPEED SENSOR. Maintenance of the monopole speed sensor consists of testing and replacement.

##### a. Test

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Disconnect electrical connector (1, figure 4-40) from monopole speed sensor (10)

4-65. MONOPOLE SPEED SENSOR. (cont)

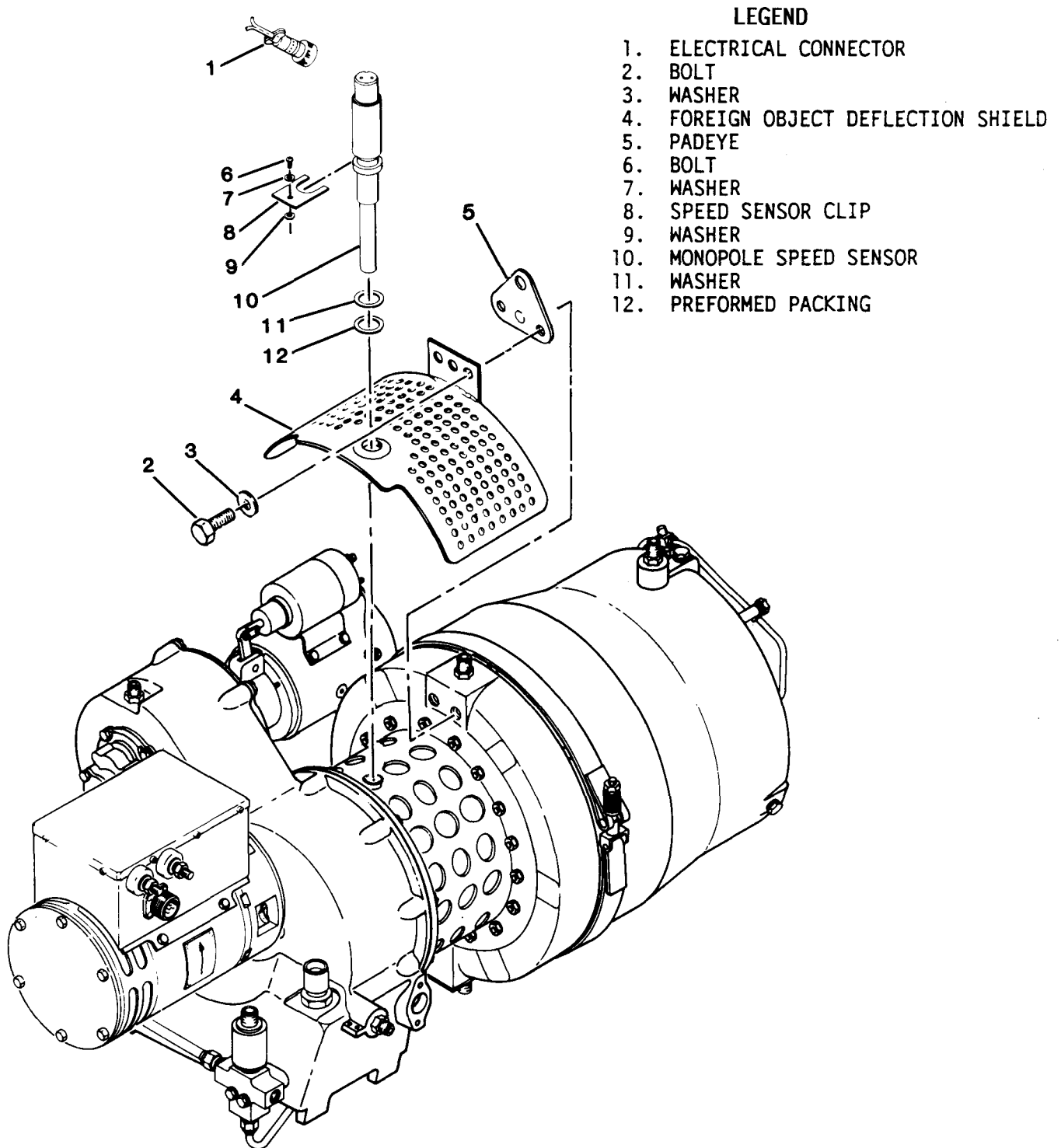


Figure 4-40. Monopole Speed Sensor Replacement

#### 4-65. MONOPOLE SPEED SENSOR. (cont)

##### b. Removal. (cont)

(4) Remove lockwire, bolts (2), and washers (3) that secure foreign object deflection shield (4) and padeye (5) to compressor inlet housing.

(5) Carefully lift foreign object deflection shield (4) off monopole speed sensor (10).

##### CAUTION

To prevent damage, use caution when removing speed sensor clip so that washer under clip does not fall into compressor inlet.

(6) Remove lockwire, bolt (6), washer (7), speed sensor clip (8), and washer (9).

(7) Remove monopole speed sensor (10) from compressor inlet housing.

(8) Remove washer (11) from compressor inlet housing.

(9) Remove and discard preformed packing (12).

##### c. Installation.

(1) Install new preformed packing (12).

(2) Install washer (11).

(3) Install monopole speed sensor (10) in compressor inlet housing.

(4) Install washer (9), speed sensor clip (8), washer (7), and bolt (6). Torque to 70-80 inch pounds (7. 9-9 Nm). Install lockwire.

(5) Carefully slide foreign object deflection shield (4) over monopole speed sensor.

(6) Align mounting holes in compressor inlet housing, padeye (5), and foreign object deflection shield (4). Secure with washers (3) and bolts (2).

(7) Torque to 50-70 inch pounds (5.6-7.9 Nm) and lockwire.

(8) Connect electrical connector (1) to monopole speed sensor.

(9) Install engine housing access cover and secure with turnlock fasteners.

(10) Connect battery cable plug connector to battery.

**4-66. EXHAUST GAS TEMPERATURE THERMO-COUPLE.** Maintenance of the exhaust gas temperature (EGT) thermocouple consists of testing and replacement.

##### a. Test.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Disconnect electrical connections from EGT thermocouple terminals. Larger terminal is negative (-) and smaller terminal is positive (+).

4-66. EXHAUST GAS TEMPERATURE THERMO-  
COUPLE. (cont)

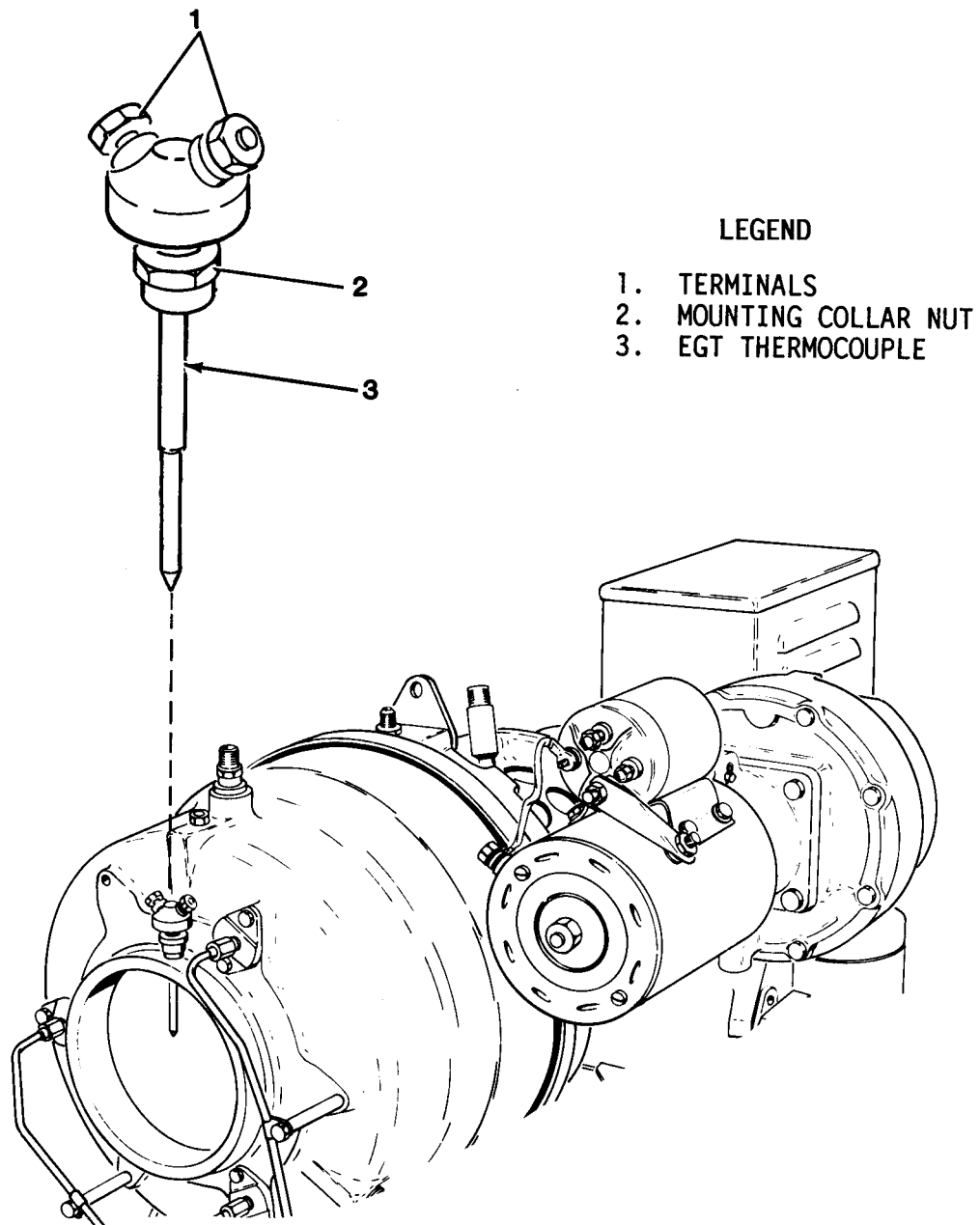


Figure 4-41. EGT Thermocouple Replacement

ARMY TM 5-6115-612-12  
MARINE CORPS TM 6115-12/7  
AIR FORCE TO 35C2-3-471-1  
NAVY AG-320B0-0MM-000

#### 4-66. EXHAUST GAS TEMPERATURE THERMO- COUPLE. (cont)

##### a. Test. (cont)

(4) With multimeter set on R1, measure resistance across EGT thermocouple terminals. Resistance should be less than 1 ohm.

(5) If resistance reading is greater than 1 ohm, or if an open circuit is indicated, replace EGT thermocouple (paragraph 4-66b).

(6) Connect electrical connections to EGT thermocouple.

(7) Install engine housing access cover secure with turnlock fasteners.

(8) Connect battery cable plug connector to battery.

##### b. Removal.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Tag and disconnect electrical connections from EGT thermocouple terminals (1, figure 4-41). Larger terminal is negative (-), smaller is positive (+).

(4) Unscrew mounting collar nut (2) and remove EGT thermocouple (3).

##### c. Installation.

(1) Coat mounting collar nut threads with antisieze compound.

(2) Install EGT thermocouple and tighten mounting collar nut (2). Torque to 150-250 inch pounds (16.9-28.3 Nm).

(3) Connect electrical connections to EGT thermocouple terminals (1).

(4) Install engine housing access cover and secure with turnlock fasteners.

(5) Connect battery cable plug connector to battery.

#### 4-67. LOW OIL PRESSURE SHUTDOWN SWITCH. Maintenance of the low oil pressure shutdown switch consists of inspection, testing, and replacement.

##### a. Inspection.

#### WARNING

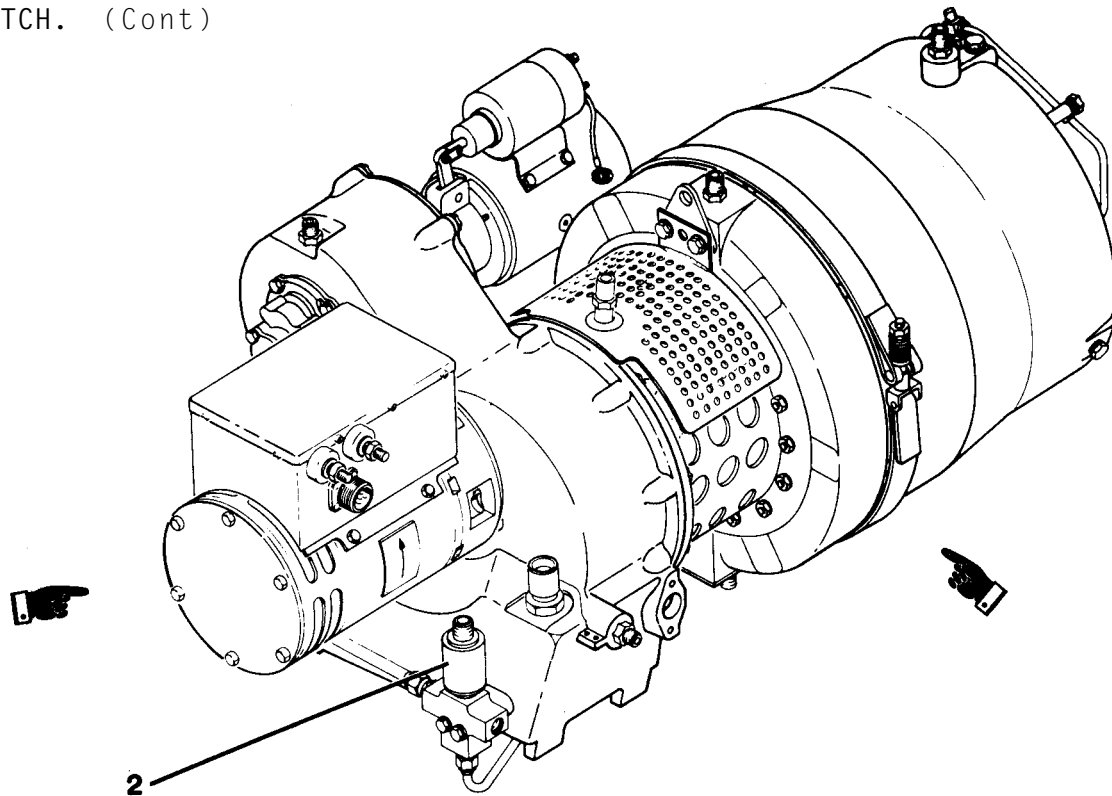
To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Inspect switch fittings (1, figure 4-42) and area between switch (2) and tube cross (5) for leaks. Tighten fittings as necessary. If leaks persist between switch and tube cross, replace preformed packing (4).

4-67. LOW OIL PRESSURE SHUTDOWN SWITCH. (Cont)



LEGEND

1. SWITCH FITTINGS
2. LOW OIL PRESSURE SWITCH
3. ELECTRICAL CONNECTOR
4. PREFORMED PACKING
5. TUBE CROSS

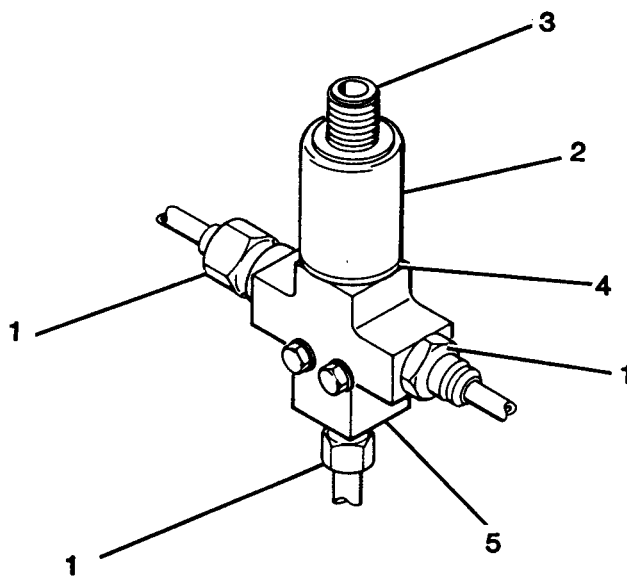


Figure 4-42. Low Oil Pressure Switch Replacement

ARMY TM 5-6115-612-12  
MARINE CORPS TM 6115-12/7  
AIR FORCE TO 35C2-3-471-1  
NAVY AG-320B0-0MM-000

#### 4-67. LOW OIL PRESSURE SHUTDOWN SWITCH. (cont)

##### a. Inspection. (cont)

(4) Inspect switch (2) for cracks or other damage. Replace switch if cracked or damaged.

(5) Inspect electrical connector (3) for damaged pins, burns, or corrosion. Replace switch if connector is damaged.

(6) Install engine housing access cover and secure with turnlock fasteners.

(7) Connect battery cable plug connector to battery.

##### b. Test.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Disconnect electrical connector from low oil pressure switch (2). Use multimeter and measure resistance between contacts of switch electrical connector (3). Resistance should be a minimum of 5.0 megohms.

(4) If resistance is not within limits, replace switch.

(5) Install engine housing access cover and secure with turnlock fasteners.

(6) Connect battery cable plug connector to battery.

##### c. Removal.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Loosen turnlock fasteners and remove engine housing access cover.

(3) Disconnect electrical connector from oil pressure switch electrical connector (3).

(4) Remove oil pressure switch (2) and preformed packing (4) from tube cross (5). Discard packing.

##### d. Installation.

(1) Install new preformed packing and oil pressure switch (2) into tube cross (5).

(2) Connect electrical connector to switch electrical connector (3).

(3) Install engine housing access cover and secure with turnlock fasteners.

(4) Connect battery cable plug connector to battery.

4-68. CONTROL PANEL ASSEMBLY. Maintenance of control panel (figures 4-43 and F0-4) consists of inspection, testing, and repair.

#### 4-68. CONTROL PANEL ASSEMBLY. (cont)

##### a. Inspection.

###### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Inspect front of panel for broken or missing turnlock fasteners, cracked meter faces, chipped paint, and missing knobs or lamps.

(4) Loosen turnlock fasteners and open control panel.

(5) Inspect rear of control panel for loose, broken, or detached wires, bent or broken connector pins, missing tie wraps, or missing mounting or connecting hardware. Refer to paragraph 4-68c for repair procedures.

(6) Close control panel and secure with turnlock fasteners.

(7) Close control panel access door.

(8) Connect battery cable plug connector to battery.

b. Test. Testing of the control panel consists of resistance and continuity checks of the wires running from component to component and to the four connectors on the back of the panel.

###### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Refer to control panel electrical wiring diagram (F0-4). Disconnect cable connectors that mate to panel connectors P2 and P6.

(5) With multimeter, make continuity checks between connector terminals and connection points on each panel component. All readings should be less than 1.0 ohm. If readings exceed limit, notify direct support.

(6) Close control panel and secure with turnlock fasteners.

(7) Close control panel access door.

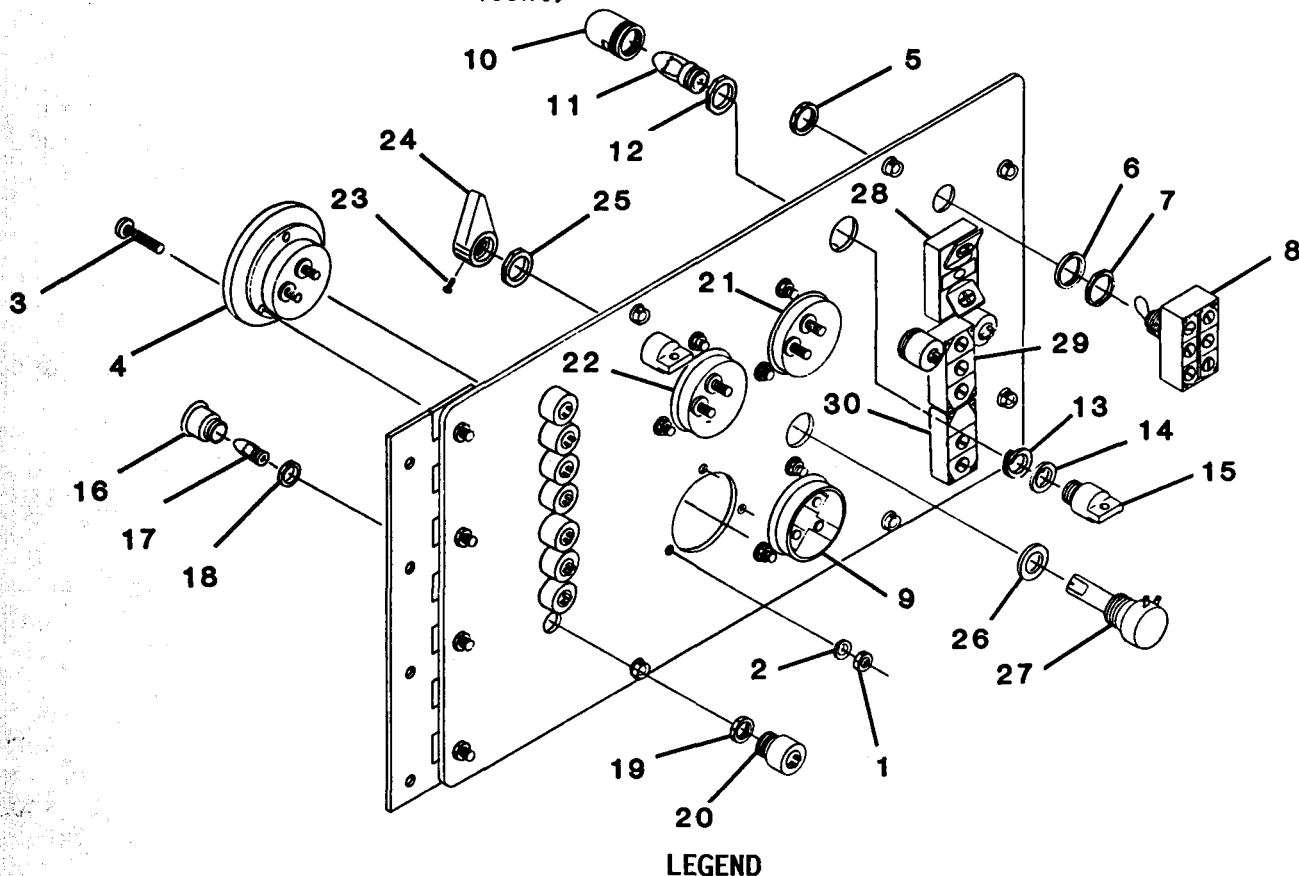
(8) Connect battery cable plug connector to battery.

c. Repair/Replacement. Repair of the control panel consists of replacement of individual panel components. Replacement procedures are described in paragraphs below under a heading for each component.

4-69. **BATTERY CHARGING AMMETER.** Maintenance of the BATTERY CHARGING ammeter (4, figure 4-43) consists of adjustment and replacement.



4-68. CONTROL PANEL ASSEMBLE. (cont)



LEGEND

- |                             |                               |
|-----------------------------|-------------------------------|
| 1. NUT                      | 16. LAMP HOUSING              |
| 2. LOCKWASHER               | 17. LAMP                      |
| 3. SCREW                    | 18. NUT                       |
| 4. BATTERY CHARGING AMMETER | 19. NUT                       |
| 5. NUT                      | 20. INDICATOR LIGHT SOCKET    |
| 6. LOCKWASHER               | 21. VOLTMETER                 |
| 7. LOCKING RING             | 22. OUTPUT CURRENT AMMETER    |
| 8. MASTER SWITCH            | 23. SETSCREW                  |
| 9. HOURMETER                | 24. VOLTAGE ADJUST KNOB       |
| 10. COVER                   | 25. NUT                       |
| 11. LAMP                    | 26. WASHER                    |
| 12. NUT                     | 27. POTENTIOMETER             |
| 13. LOCKWASHER              | 28. DC CIRCUIT BREAKER SWITCH |
| 14. LOCKING RING            | 29. CONTACTOR SWITCH          |
| 15. PANEL LIGHT SOCKET      | 30. PANEL LIGHTS SWITCH       |

Figure 4-43. Control Panel Component Replacement

#### 4-69. BATTERY CHARGING AMMETER. (cont)

Adjustment. Adjustment of the BATTERY CHARGING ammeter consists of zero setting the meter needle. No other adjustment shall be attempted.

(1) Open control panel access door.

(2) Ensure that MASTER SWITCH is in OFF position.

(3) Needle adjustment screw is located on face of meter just below center of dial face.

(4) Looking straight down on meter face, use screwdriver and carefully turn needle adjustment screw until needle points directly at "0" tick mark on meter scale.

(5) Close control panel access door.

#### b. Removal.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Tag and disconnect wiring from back of BATTERY CHARGING ammeter (4, figure 4-43).

(5) Remove nuts (1), lockwashers (2), and screws (3).

(6) Remove BATTERY CHARGING ammeter from control panel.

#### c. Installation.

(1) Carefully place BATTERY CHARGING ammeter (4) in control panel.

(2) Install screws (3), lockwashers (2), and nuts (1). Tighten securely.

(3) Remove tags and connect wiring to back of ammeter. Adjust meter (paragraph 4-69a).

(4) Close control panel and secure with turnlock fasteners.

(5) Close and latch control panel access door.

(6) Connect battery cable plug connector to battery.

4-70. MASTER SWITCH. Maintenance of the MASTER SWITCH (8, figure 4-43) consists of testing and replacement.

#### a. Test.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

4 - 70. MASTER SWITCH. (cont)

- a. Test. (cont)
- (3) Loosen turnlock fasteners and open control panel.

(4) Use multimeter and check continuity across MASTER SWITCH terminals in accordance with figure 4-44.

(5.) If continuity is not indicated, replace MASTER SWITCH (paragraph 4-70b).

(6) Close control panel and secure with turnlock fasteners.

(7) Close control panel access door.

(8) Connect battery cable plug connector to battery.

- b. Removal.

WARNING

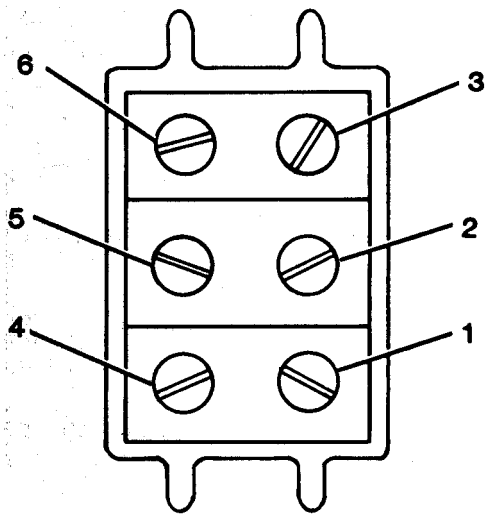
To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

- (1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Tag and disconnect wiring from terminals on back of MASTER SWITCH (8).



<u>Switch position</u>	<u>Check across terminals</u>	<u>Reading</u>
START	1-2, 4-5	< 1.0 ohm
RUN	1-2, 5-6	< 1.0 ohm
OFF	2-3, 5-6	< 1.0 ohm

Figure 4-44. Master Switch Continuity Check

#### 4-70. MASTER SWITCH. (cont)

##### b. Removal. (cont)

(5) On front of panel, remove nut (5). This allows removal of MASTER SWITCH from back of control panel.

(6) Remove lockwasher (6) and locking ring (7) from MASTER SWITCH.

##### c. Installation.

(1) Screw locking ring (7) onto MASTER SWITCH (8).

(2) Place lockwasher (6) on top of locking ring.

(3) From back of control panel, insert threaded portion of new switch through mounting hole.

(4) On front of control panel, secure switch with nut. Tighten nut until switch is securely mounted.

(5) Remove tags and connect wiring to terminals on back of MASTER SWITCH.

(6) Close control panel and secure with turnlock fasteners.

(7) Close control panel access door.

(8) Connect battery cable plug connector to battery.

**4-71. HOURMETER.** Maintenance of the HOURMETER (9, figure 4-43) consists of replacement. Replacement procedures for the HOURMETER are the same as those for the BATTERY CHARGING ammeter (paragraph 4-69).

**4-72. PANEL LIGHTS.** Maintenance of the panel lights consists of replacement of the lamp socket.

##### a. Removal.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Tag and disconnect wiring from terminals of panel light socket (15, figure 4-43).

(5) Remove cover (10) and lamp (11) from front of control panel.

(6) Remove nut (12). This allows removal of the panel light socket from back of panel.

(7) Remove lockwasher (13) and locking ring (14) from panel light socket (15).

##### b. Installation.

(1) Screw locking ring (14) onto panel light socket (15).

(2) Place lockwasher (13) on top of locking ring.

(3) From back of control panel, insert new panel light socket through mounting hole.

(4) On front of panel, secure socket with nut (12). Tighten nut until socket is securely mounted.

#### 4-72. PANEL LIGHTS. (cont)

##### b. Installation. (cont)

(5) Install lamp (11) and (12) cover.

(6) Remove tags and connect wiring to terminals on back of socket.

(7) Close control panel and secure with turnlock fasteners.

(8) Close control panel access door.

(9) Connect battery cable plug connector to battery.

#### 4-73. INDICATOR LIGHTS. Maintenance of indicator lights (2, 4, 8, figure 4-37) consists of testing and

##### a. Test.

(1) Open control panel access door.

(2) Check press-to-test feature of each indicator light. If light fails to come on, replace lamp (paragraph 4-74). If light still fails to come on, proceed to next step.

##### WARNING

To Prevent Injury, ensure that battery is disconnected before performing maintenance on electrical components.

(3) Disconnect battery cable plug connector from battery.

(4) Loosen turnlock fasteners and open control panel.

(5) Use multimeter and check continuity between pin 1 and pin 2. (See figure 4-45.) If continuity is not indicated, replace lamp socket (paragraph 4-73 b).

(6) Place multimeter leads between pins 2 and 3. Press lamp housing inward. If continuity is not indicated, replace lamp socket (paragraph 4-73 b).

(7) Close control panel and secure with turnlock fasteners.

(8) Close control panel access door.

(9) Connect battery cable plug connector to battery.

##### b. Removal.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

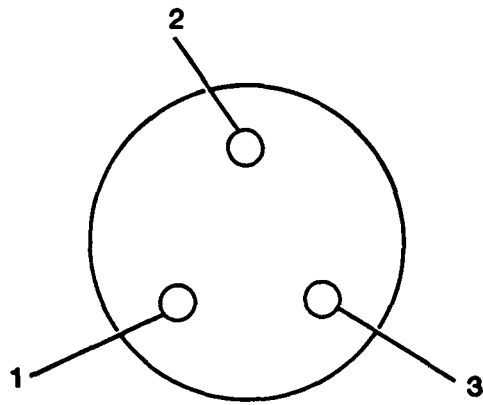
(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen fasteners and open control panel.

(4) Tag and disconnect wiring from terminals of indicator light socket (20, figure 4-43).

4-73. INDICATOR LAMPS. (cont)



<u>Switch position</u>	<u>Check across terminals</u>	<u>Reading</u>
OPEN	1-2	Continuity
CLOSED	2-3	Continuity

Figure 4-45. Indicator Lamp Test

b. Removal. (cont)

(5) Unscrew and remove lamp housing (16) and lamp (17).

(6) Remove nut (18). This allows removal of indicator light socket from back of panel.

(7) Remove nut (19) from indicator light socket (20).

c. Installation.

(1) Screw nut (19) onto indicator light socket (20).

(2) From back of panel, insert new indicator light socket into mounting hole.

(3) On front of panel, secure socket with nut (18). Tighten nut until socket is securely mounted.

(4) Install lamp (17) and lamp housing (16).

(5) Remove tags and connect wiring to terminals on back of socket.

(6) Close control panel and secure with turnlock fasteners. Retest lights and adjust dimmers.

(7) Close control panel access door.

(8) Connect battery cable plug connector to battery.

**4-74. INCANDESCENT LAMPS.** Maintenance of the incandescent lamps (17, figure 4-43) is limited to replacement.

a. Removal.

**WARNING**

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Unscrew and remove light cover. Remove lamp from cover.

b. Installation.

(1) Insert new lamp into cover. Ensure that lamp base sticks out of light cover.

(2) Insert light cover with lamp into light housing and screw in finger tight. Do not use a tool.

(3) Close control panel access door.

(4) Connect battery cable plug connector to battery.

**4-75. VOLTMETER.** Maintenance of the voltmeter (21, figure 4-43) consists of adjustment and replacement.

a. Adjustment. The procedure for adjusting the voltmeter is the same as that for adjusting the BATTERY CHARGING ammeter (paragraph 4-69a).

b. Replacement. The procedure for replacing the voltmeter is the same as that for replacing the BATTERY CHARGING ammeter (paragraph 4-69b).

**4-76. AMMETER.** Maintenance of the OUTPUT CURRENT ammeter (22, figure 4-43) consists of adjustment and replacement.

a. Adjustment. The procedure for adjusting the OUTPUT CURRENT ammeter is the same as that for adjusting the BATTERY CHARGING ammeter (paragraph 4-69a).

b. Replacement. The procedure for replacing the OUTPUT CURRENT ammeter is the same as that for replacing the BATTERY CHARGING ammeter (paragraph 4-69b).

**4-77. POTENTIOMETER.** Maintenance of the VOLTAGE ADJUST potentiometer consists of testing and replacement.

a. Test.

**WARNING**

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Tag and disconnect wires from potentiometer (27, figure 4-43).

#### 4-77. POTENTIOMETER. (cont)

##### a. Test. (cont)

(5) Set multimeter to measure resistance. Place one probe on right contact and one on center contact.

(6) On front of control panel, turn VOLTAGE ADJUST knob (24) from all the way to the left to all the way to the right. Resistance reading should go from 0 to 10k ohms. If not, replace potentiometer (paragraph 4-77b.)

(7) Remove tag and connect wires to potentiometer.

(8) Close control panel and secure with turnlock fasteners.

(9) Close control panel access door.

(10) Connect battery cable plug connector to battery.

##### b. Removal.

### **WARNING**

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Tag and disconnect wiring from terminals of VOLTAGE ADJUST potentiometer (27).

(5) Turn VOLTAGE ADJUST knob (24) counterclockwise until it stops.

(6) Remove setscrew (23) and VOLTAGE ADJUST knob (24).

(7) Remove nut (25). This allows removal of potentiometer from back of panel.

(8) Remove washer (26) from potentiometer (27).

##### c. Installation.

(1) Turn shaft on new potentiometer (27) counterclockwise until it stops.

(2) Place washer (26) on potentiometer.

(3) From back of panel, insert new potentiometer into mounting hole.

(4) Secure potentiometer with nut (25). Before tightening nut, ensure that potentiometer shaft is positioned so that VOLTAGE ADJUST knob will be pointing all the way left when looking at front of control panel. Tighten nut until potentiometer is securely mounted.

(5) Place VOLTAGE ADJUST knob (24) on shaft and secure with setscrew (23).

(6) Remove tags and connect wiring to terminals on back of potentiometer.

(7) Close control panel and secure with turnlock fasteners.

(8) Close control panel access door.

(9) Connect battery cable plug connector to battery.



4-78. SWITCHES. Maintenance of the control panel switches consists of testing and replacement.

a. Test.

WARNING

To prevent Injury, ensure that battery is disconnected before performing maintenance on electrical components.

- (1) Disconnect battery cable plug connector from battery.
- (2) Open control panel access door.
- (3) Loosen turnlock fasteners and open control panel.

(4) Perform continuity check on DC CIRCUIT BREAKER (28, figure 4-43).

(a) Ensure that reset button on front of panel is pressed in.

(b) Place multimeter probes across terminals of DC CIRCUIT BREAKER. Multimeter reading should show less than 1 ohm. If reading is more than 1 ohm, replace DC CIRCUIT BREAKER (paragraph 4-78b).

(5) Perform continuity check on CONTACTOR switch (29, figure 4-43.)

- (a) Refer to figure 4-46 and place multimeter probes on terminals 2 and 3 of CONTACTOR switch.
- (b) Place CONTACTOR switch in OPEN position. Multimeter reading should be less than one ohm. If reading is more than one ohm, replace CONTACTOR switch (paragraph 4-78b).

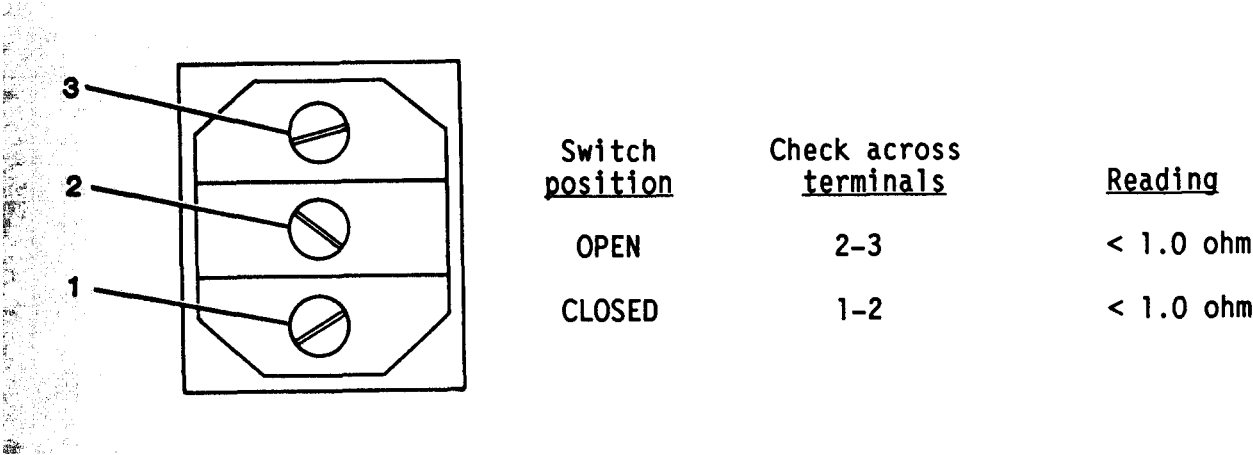


Figure 4-46. Contactor Switch Test

#### 4-78. SWITCHES. (cont)

##### a. Test. (cont)

(c) Place multimeter probes on terminals 1 and 2 of CONTACTOR switch.

(d) Place CONTACTOR switch in CLOSED position. Multimeter reading should be less than one ohm. If reading is more than one ohm, replace CONTACTOR switch (paragraph 4-78b).

(6) Tag and disconnect wires and perform continuity check on PANEL LIGHTS switch (30, figure 4-43).

(a) Place multimeter probes across terminals of PANEL LIGHTS switch.

(b) Move switch between ON and OFF. Multimeter reading should go from about one ohm (ON) to a very high resistance (OFF). If not, replace PANEL LIGHTS switch (paragraph 4-78b).

(7) Close control panel and secure with turnlock fasteners.

(8) Close control panel access door.

(9) Connect battery cable plug connector to battery.

b. Replacement. Replacement procedures for the DC CIRCUIT BREAKER switch, CONTACTOR switch, and the PANEL LIGHTS switch are the same as those for the MASTER SWITCH (paragraph 4-70).

**4-79. WIRING HARNESSES.** Maintenance of the wiring harnesses consists of inspection, testing, repair, and replacement. Each wiring harness is made up of tie-wrapped cables that interconnect all of the sensing/control inputs and outputs leading to the engine and generator. See FO-1 for wiring harness locations.

##### a. Inspection.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Disconnect wiring harness connectors one at a time from terminals on back of control panel.

(5) Inspect wiring harness connectors for evidence of excess wear or damage such as broken or bent connector pins, broken wires, or unsoldered wires.

(6) Connect wiring harness connectors to control panel.

(7) Close control panel and secure with turnlock fasteners.

(8) Loosen turnlock fasteners and remove EECM access cover.

(9) Disconnect wiring harnesses that mate to EECM. Inspect for bent pins, loose or broken wires, or damaged mechanical parts on the connector bodies.

(10) Connect wiring harness connectors to EECM.

#### 4-79. WIRING HARNESSES. (cont)

##### a. Inspection. (cont)

(11) Gain access to other areas of generator set where wiring harnesses connect (EGT thermocouple, monopole speed sensor, engine, and generator). Inspect each connecting wire for broken connections, bent connecting terminals, or loose or broken terminals.

(12) Close and secure all access points.

(13) Connect battery cable plug connector to battery.

b. Test. Testing the wiring harnesses is done by making continuity checks from point to point on the harnesses wires and connectors. Access must be gained to every location where a wiring harness terminates in a connector, lug, or other terminal. Interconnecting points on the harness are shown in F0-3. If any abnormal indication is noted during the following procedure, refer to paragraph 4-79d for repair.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Gain access to areas where wiring harness ends in a connection point and testing is to be done.

(3) Use multimeter to make continuity checks. If an open circuit is discovered, refer to paragraph 4-79d for repair.

##### c. Wiring Harness W2 Removal.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector.

(2) Open control panel access door.

(3) Loosen turnlock fasteners and open control panel.

(4) Tag and disconnect wiring harness W2 from GECM connectors J2 and J3.

(5) On back of control panel, tag and disconnect all wiring connections to control panel components and terminal board TB3.

(6) Close control panel.

(7) Loosen turnlock fasteners and remove EECM access cover.

(8) Tag and disconnect wiring harness W2 from EECM connectors J4 and J6.

(9) Remove power cable from cable support.

(10) Unlatch and open inlet air housing access door. Secure in open position.

(11) Remove air baffle (paragraph 4-22).

#### 4-79. HIRING HARNESSES. (cont)

##### Hiring Harness W2 Removal. (Cont)

(12) Pull wiring harness W2 out of control fender and into inlet air housing.

(13) Tag and disconnect wiring harness W2 connections from terminal board TB1 and other electrical components mounted in inlet air housing.

(14) Remove wiring harness W2 from inlet air housing.

d. Wiring Harness W2 Repair.  
Remove connectors and replace damaged wiring as necessary.

##### e. Wiring Harness W2 Installation.

(1) Pass wiring harness W2 through inlet air housing into control fender.

(2) Remove tags and connect wiring harness W2 connections to terminal board TB1 and other electrical components mounted in inlet air housing.

(3) Install air baffle (paragraph 4-22).

(4) Close and securely latch inlet air housing access door.

(5) Stow power cable on cable support.

(6) Remove tags and connect wiring harness W2 to EECM connectors J4 and J6.

(7) Install EECM access cover and secure with turnlock fasteners.

(8) Open control panel.

(9) On back of control panel, connect wiring harness W2 to control panel components.

(10) Remove tags and connect wiring harness W2 to GECM connectors J2 and J3.

(11) Close control panel and secure with turnlock fasteners.

(12) Close control panel access door.

(13) Connect battery cable plug connector to battery.

##### f. Wiring Harness W3 Removal.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(1) Disconnect battery cable plug connector from battery.

(2) Remove power cable from cable support.

(3) Unlatch and open fuel housing access door. Secure in open position.

(4) Tag and disconnect electrical connectors from transfer pump, solenoid valve, and high pressure pump.

(5) Remove nuts, washers, and screws to free wiring harness from loop clamps in fuel housing. (See figure 4-47.)

(6) Loosen turnlock fasteners and remove engine housing access cover.

4-79. WIRING HARNESSES. (CONT)

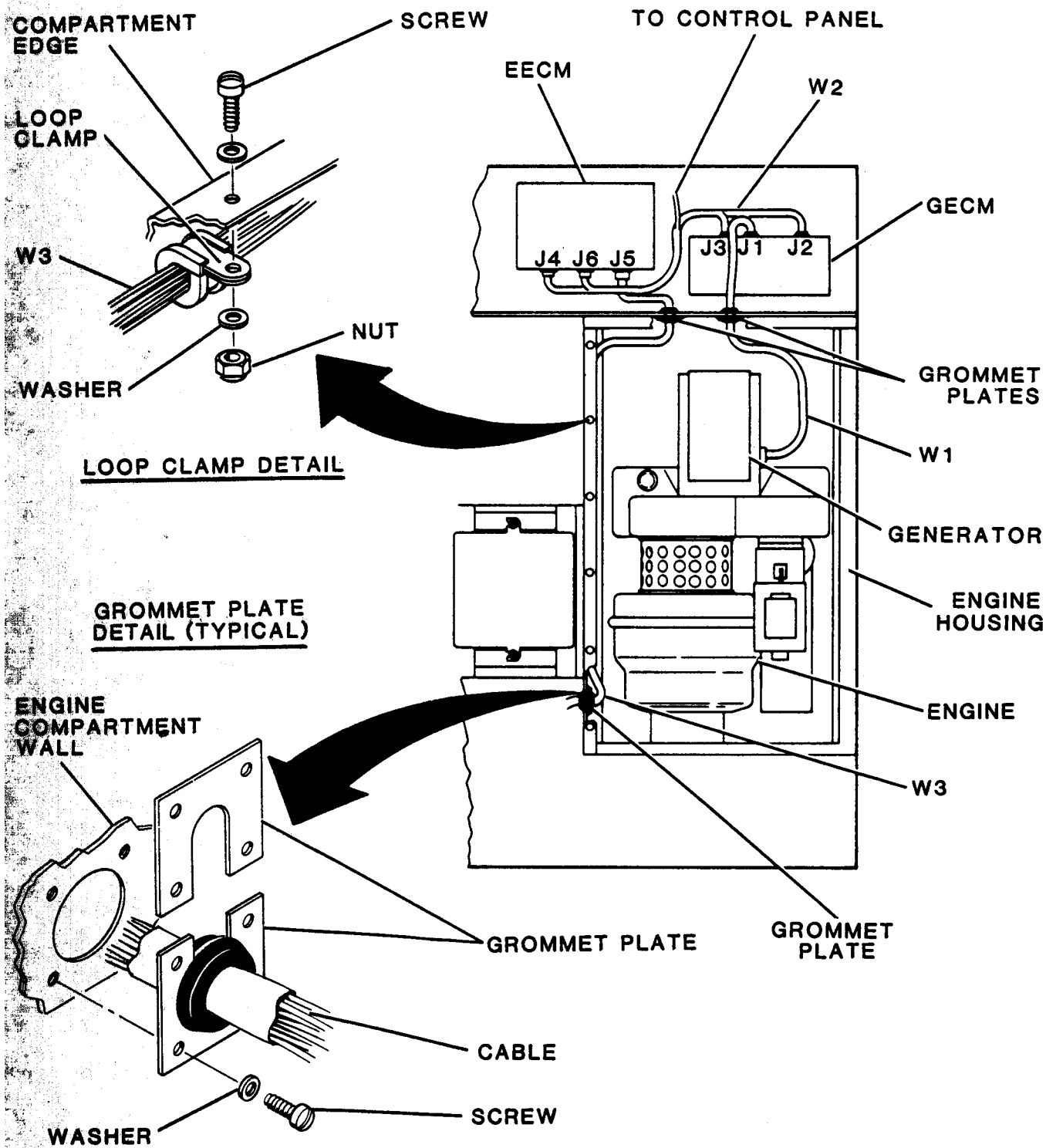


Figure 4-47. Wiring Harness Loop Clamp and Grommet Plate Details

#### 4-79. WIRING HARNESSES. (cont)

##### f. Wiring Harness W3 Removal. (cont)

(7) Tag and disconnect electrical connectors/leads from low oil pressure switch, monopole speed sensor, EGT thermocouple, ignition coil, and starter.

(8) Where wiring harness W3 passes through engine housing bulkhead to fuel housing, remove screws and washer that secure grommet plate to bulkhead. See figure 4-44. Carefully pull wiring harness W3 through bulkhead into engine housing.

(9) Remove nuts, washers, and screws and loop clamps that secure wiring harness W3 to engine housing.

(10) Open control panel access door.

(11) Loosen turnlock fasteners and open control panel.

(12) Tag and disconnect wiring harness W3 connections on TB3, terminals 1 and 19.

(13) Close control panel.

(14) Loosen turnlock fasteners and remove EECM access cover.

(15) Tag and disconnect wiring harness W3 from EECM connector J5.

(16) In engine housing, locate grommet plate mounted on bulkhead separating engine housing from EECM compartment. Remove screws and washers that secure grommet plate to bulkhead.

(17) Carefully pull wiring harness W3 through-bulkhead into engine housing.

(18) Remove wiring harness W3 from engine housing.

g. Wiring Harness W3 Repair.  
Remove connectors and replace damaged wiring as necessary.

##### h. Wiring Harness W3 Installation.

(1) Carefully place wiring harness W3 in engine housing.

(2) Pass connector through bulkhead into EECM housing. Connect to EECM connector J5.

(3) Install EECM access cover and secure with turnlock fasteners.

(4) Open control panel.

(5) Remove tags and connect wiring harness W3 connections to TB3, terminals 1 and 19.

(6) Close control panel and secure with turnlock fasteners.

(7) Close control panel access door.

(8) Use washers and screws to secure grommet plate to bulkhead separating engine housing from EECM. See figure 4-47.

(9) Secure wiring harness W3 to edge of engine housing compartment with Loop clamps, screws, washers, and nuts. See figure 4-44.

(10) Remove tag and connect lead to starter.

A R M Y                    TM 5-6115-612-12  
MARINE CORPS   TM 6115-12/7  
AIR   FORCE        TO 35C2-3-471-1  
N A V Y            AG-320B0-0MM-000

#### 4-79. WIRING HARNESSES. (cont)

h.     Wiring Harness W3 Installation.  
(cont)

(11) Remove tag and connect wiring harness W3 electrical connectors to low oil pressure switch, monopole speed sensor, EGT thermocouple, and ignition coil.

(12) Pass remainder of wiring harness W3 through bulkhead into fuel housing.

(13) Secure grommet plate to bulkhead with washers and screws. See figure 4-47.

(14) Remove tags and connect wiring harness W3 electrical connectors to transfer pump, solenoid valve, and high pressure pump.

(15) Install loop clamps with screws, washers, and nuts.

(16) Close and securely latch fuel housing access door.

(17) Install engine housing access cover and secure with turnlock fasteners.

(18) Stow power cable on cable support.

(19) Connect battery cable plug connector to battery.

## Section XV. MAINTENANCE OF LOAD CONNECTION

**4-80. GENERAL.** The load connection provides a central location for connecting all electrical components that provide power for generator set operation and aircraft startup. The load connection is located in the inlet air housing. The system includes the power cable assembly. The remaining components are mounted on a component mounting panel and include the magnetic output contactor, 1000 amp current shunt, terminal boards, an RF filter, capacitor, and a resistor.

### NOTE

If not specified in maintenance procedure, apply torque in accordance with table 1-1, Torque Specifications.

**4-81. POWER CABLE ASSEMBLY.** Maintenance of the power cable assembly is limited to replacement. Refer to figure 4-48.

#### a. Removal.

(1) Remove power cable from cable support.

### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector from battery.

(3) Remove screws (1), washers (2), and output/slave housing access cover (3).

(4) Unlatch and open inlet air housing access door. Secure in open position.

(5) Tag power cable sense wire leads. Remove nuts (4), washers (5), and power cable sense wire leads from terminal board (TB6). This connection is located on the component mounting panel in the inlet air housing. Pull power cable sense wire through bulkhead grommet into battery housing.

(6) Remove screws (6), washers (7), and output cable housing (8). The screws and washers are mounted in the inlet air housing.

(7) Remove screws (9), washers (10), nuts (11), and loop clamps (12).

(8) Remove nuts (13), washers (14), and power cable lugs from bulkhead feedthrough studs. Pull leads through bottom of output/slave housing.

(9) If necessary to remove capacitors (18), remove nut (15), washers (16), and screw (17).

#### b. Installation.

(1) If necessary to replace capacitors (18), install with screw (17), washers (16), and nut (15). Torque to 36-40 inch pounds (4-4.5 Nm).

(2) Pass power cable leads through bottom of output/slave housing. Install leads on bulkhead feedthrough studs and secure with washers (14) and nuts (13). Torque assembly on smaller stud 200-270 inch pounds (22.6-30.5 Nm). Torque assembly on larger stud 500-650 inch pounds (56.5-73.4 Nm).

(3) Pass power cable sense wire through bulkhead grommet into inlet air housing. Install sense wire leads on terminal board (TB6) and secure with



4 - 81 . POWER CABLE ASSEMBLY. (cont)

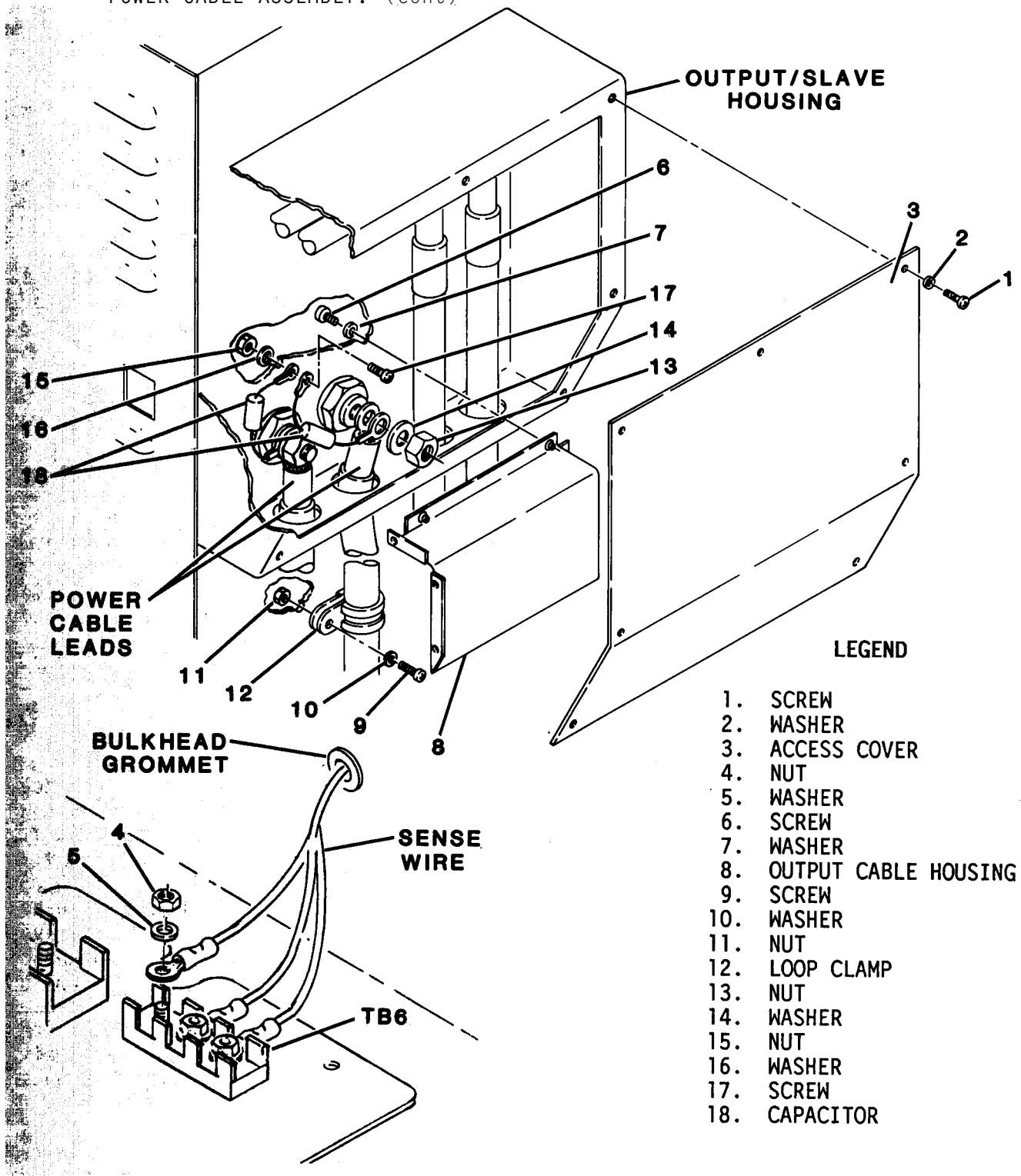


Figure 4-48. Power Cable Replacement

#### 4-81. POWER CABLE ASSEMBLY. (cont)

##### b. Installation. (cont)

washers (5) and nuts (4). Torque to 24-36 inch pounds (2.7-4 Nm)

(4) Install loop clamps (12) and secure with washers (10), screws (9), and nuts (11). Torque to 36-40 inch pounds (4-4.5 Nm).

(5) Install output cable housing (8) and secure with washers (7) and screws (6).

(6) Close and securely latch inlet air housing access door.

(7) Install output/slave housing access cover (3) and secure with washers (2) and screws (1). Torque to 24-36 inch pounds (2.7-4 Nm).

(8) Connect battery cable plug connector to battery.

(9) Install power cable on cable support.

#### 4-82. COMPONENT MOUNTING PANEL.

Maintenance of the component mounting panel (figure 4-49) is limited to replacement.

##### a. Removal.

(1) Remove power cable from cable support.

##### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector.

(3) Unlatch and open inlet air housing access door. Secure in open position.

(4) Loosen turnlock fasteners and remove engine housing access cover.

(5) Remove air baffle from inlet air housing (paragraph 4-22).

(6) Carefully tag and disconnect all wiring connected to components installed on mounting panel.

(7) Remove screws (1), washers (2), and self-locking nuts (3) that secure mounting panel (4) in inlet air housing. Carefully remove panel.

(8) Remove components from mounting panel. Component removal procedures are presented in paragraphs 4-83 through 4-88.

##### b. Installation.

(1) Refer to paragraphs 4-83 through 4-88 and install components on mounting panel (4).

(2) Carefully place panel in position in inlet air housing. Secure with bolts (1), washers (2), and self-locking nuts (3). Torque to 36-40 inch pounds (4-4.5 Nm).

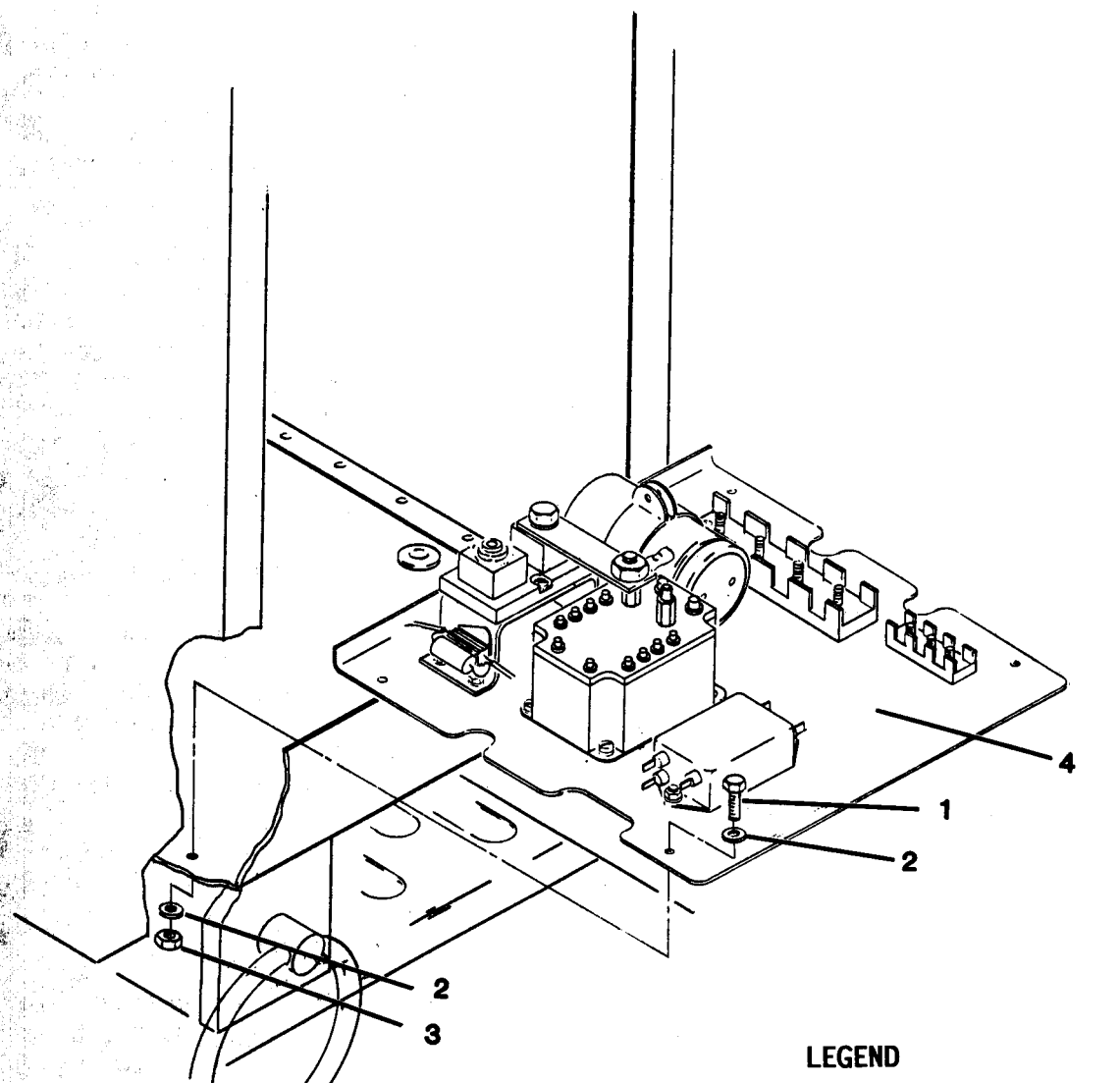
(3) Connect wiring to components. Remove tags.

(4) Refer to paragraph 4-22 and install air baffle.

(5) Install engine housing access cover and secure with turnlock fasteners.

(6) Close and securely latch inlet air housing access door.

4-82. COMPONENT MOUNTING PANEL.  
 (cont)



LEGEND

- 1. SCREW
- 2. WASHER
- 3. SELF-LOCKING NUT
- 4. COMPONENT MOUNTING PANEL

Figure 4-49. Component Mounting Panel Replacement

#### 4-82. COMPONENT MOUNTING PANEL. (cont)

##### b. Installation. (cont)

(7) Connect battery cable plug connector.

(8) Stow power cable on cable support.

#### 4-83. MAGNETIC CONTACTOR. Maintenance of the magnetic (output) contactor consists of inspection, testing, and replacement.

##### a. Inspection.

(1) Remove power cable from cable support.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector from battery.

(3) Unlatch and open inlet air housing access door. Secure in open position.

(4) Loosen turnlock fasteners and remove engine housing access cover.

(5) Remove air baffle from inlet air housing (paragraph 4-22).

(6) Inspect output contact terminals for loose connections. Tighten if necessary.

(7) Inspect for corrosion and signs of arcing. Replace if damaged.

(8) Ensure that output contactor is securely mounted. Tighten if necessary.

(9) Install air baffle (paragraph 4-22).

(10) Install engine housing access cover and secure with turnlock fasteners.

(11) Close and securely latch inlet air housing access door.

(12) Connect battery cable plug connector.

(13) Stow power cable on cable support.

b. Test Refer to the magnetic contactor schematic (figure 4-50).

(1) Remove power cable from cable support.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector from battery.

(3) Unlatch and open inlet air housing access door. Secure in open position.

(4) Loosen turnlock fasteners and remove engine housing access cover.

(5) Remove air baffle from inlet air housing (paragraph 4-22).

#### 4-83. MAGNETIC CONTACTOR. (cont)

##### b. Test. (cont)

(6) Tag and disconnect wiring. perform continuity check on output contactor. If shorts and opens are present, replace output contactor.

(7) Install air baffle (paragraph 4-22).

(8) Install engine housing access cover and secure with turnlock fasteners.

(9) Close and securely latch Inlet air housing access door.

(10) Connect battery cable plug connector.

(11) Stow power cable on cable support.

##### c. Removal. Refer to figure 4-51.

(1) Remove component mounting panel (paragraph 4-82).

(2) Tag and disconnect all wiring from output contactor (6).

(3) Disconnect conductor bus (1) from current shunt (2).

(4) Remove nuts (3), washers (4), and self-locking nuts (5) that secure contactor to component mounting panel.

##### d. Installation.

(1) Place contactor (6) in position on component mounting panel. Secure with screws (5), washers (4), and nuts (3). Torque to 32-35 inch pounds (3.6-3.9 Nm).

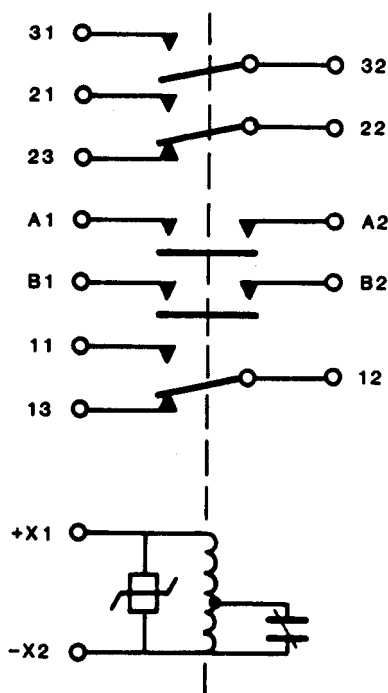
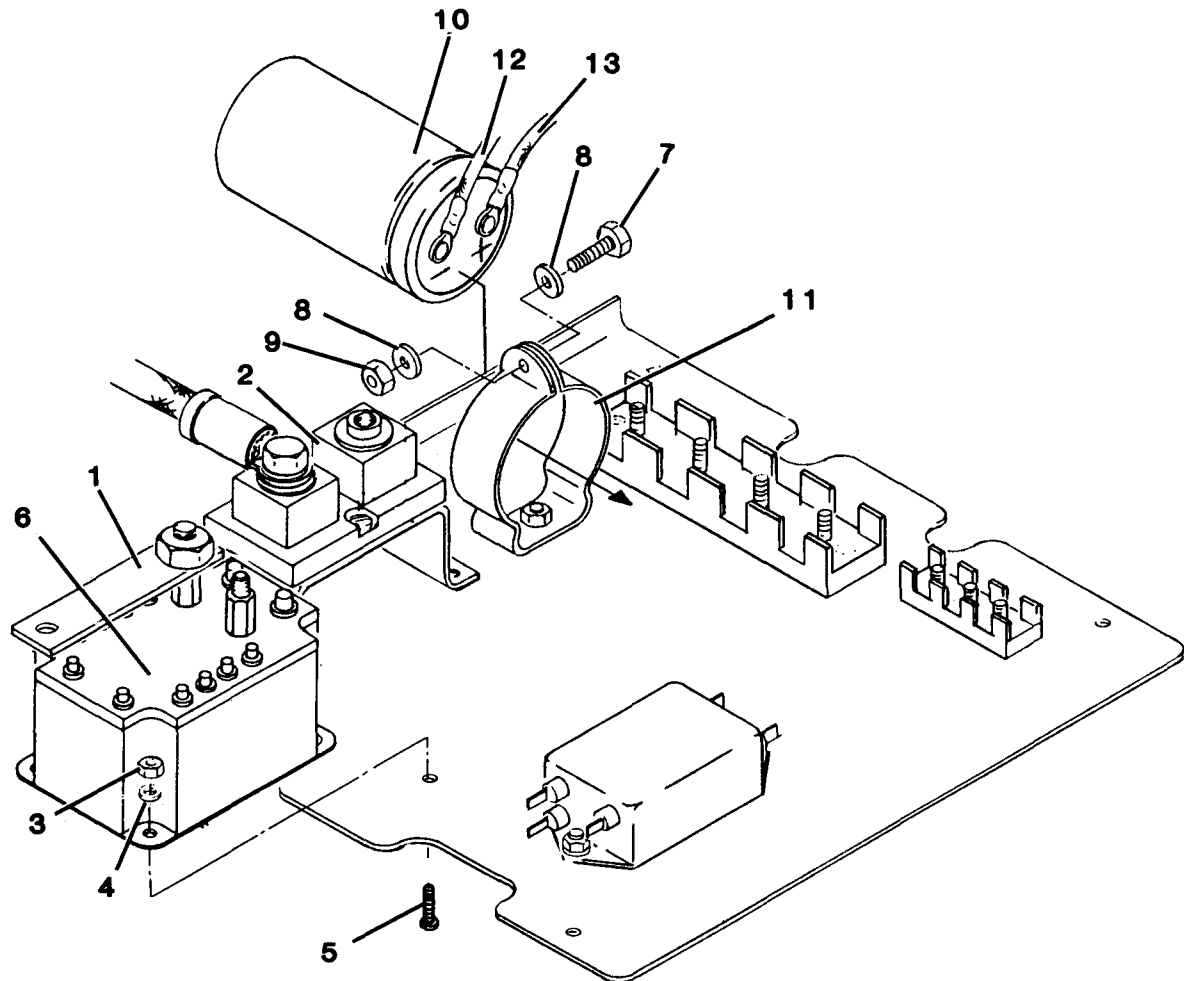


Figure 4-50. Magnetic Contactor Schematic (Off Position)

4-83. MAGNETIC CONTACTOR. (cont)



LEGEND

- |                       |                                 |
|-----------------------|---------------------------------|
| 1. CONDUCTOR BUS      | 8. WASHER                       |
| 2. CURRENT SHUNT      | 9. NUT                          |
| 3. NUT                | 10. CAPACITOR (C4)              |
| 4. WASHER             | 11. MOUNTING BRACKET            |
| 5. SCREW              | 12. ELECTRICAL LEAD V102AK06(-) |
| 6. MAGNETIC CONTACTOR | 13. ELECTRICAL LEAD P107C06 (+) |
| 7. SCREW              |                                 |

Figure 4-51. Magnetic Contactor/Capacitor (C4) Replacement

#### 4-83. MAGNETIC CONTACTOR. (cont)

##### d. Installation. (cont)

(2) Connect conductor bus (1) to current shunt (2).

(3) Connect wiring to contactor. Remove all tags.

(4) Install component mounting Panel (paragraph 4-82).

**4-84. CURRENT SHUNT (1000 AMP).** Maintenance of the 1000 amp current shunt (figure 4-52) is limited to inspection and replacement.

##### a. Inspection.

(1) Remove power cable from cable Support.

#### WARNING

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector.

(3) Unlatch and open inlet air housing access door. Secure in open position.

(4) Loosen turnlock fasteners and remove engine housing access cover.

(5) Remove air baffle from inlet air housing (paragraph 4-22).

(6) Ensure that current shunt (9, figure 4-52) is securely mounted. Tighten any loose connections.

(7) Check input and output lugs for discoloration. Discoloration could indicate a loosening of connections while the generator set is operating. Tighten any loose connections.

(8) If current shunt is dirty, clean with compressed air or with an electrical grade solvent.

(9) Check current shunt for damage. Replace shunt if physically damaged.

(10) Install air baffle (paragraph 4-22).

(11) Install engine housing access cover and secure with turnlock fasteners.

(12) Close and securely latch inlet air housing access door.

(13) Connect battery cable plug connector.

(14) Stow power cable on cable support.

##### b. Removal.

(1) Remove component mounting panel (paragraph 4-82).

(2) Tag wire U109A18 (1, figure 4-52). Remove screw (2) and lockwasher (3) to disconnect wire from terminal D.

(3) Tag wire U110A18 (4). Remove screw (5) and lockwasher (6) to disconnect wire from terminal C.

(4) Tag wire P108A00 (9). Remove bolt (7), lockwasher (8), wire P108A00 (9), and washer (10) from current shunt (11).

4-84. CURRENT SHUNT (1000 AMP).  
(cont)

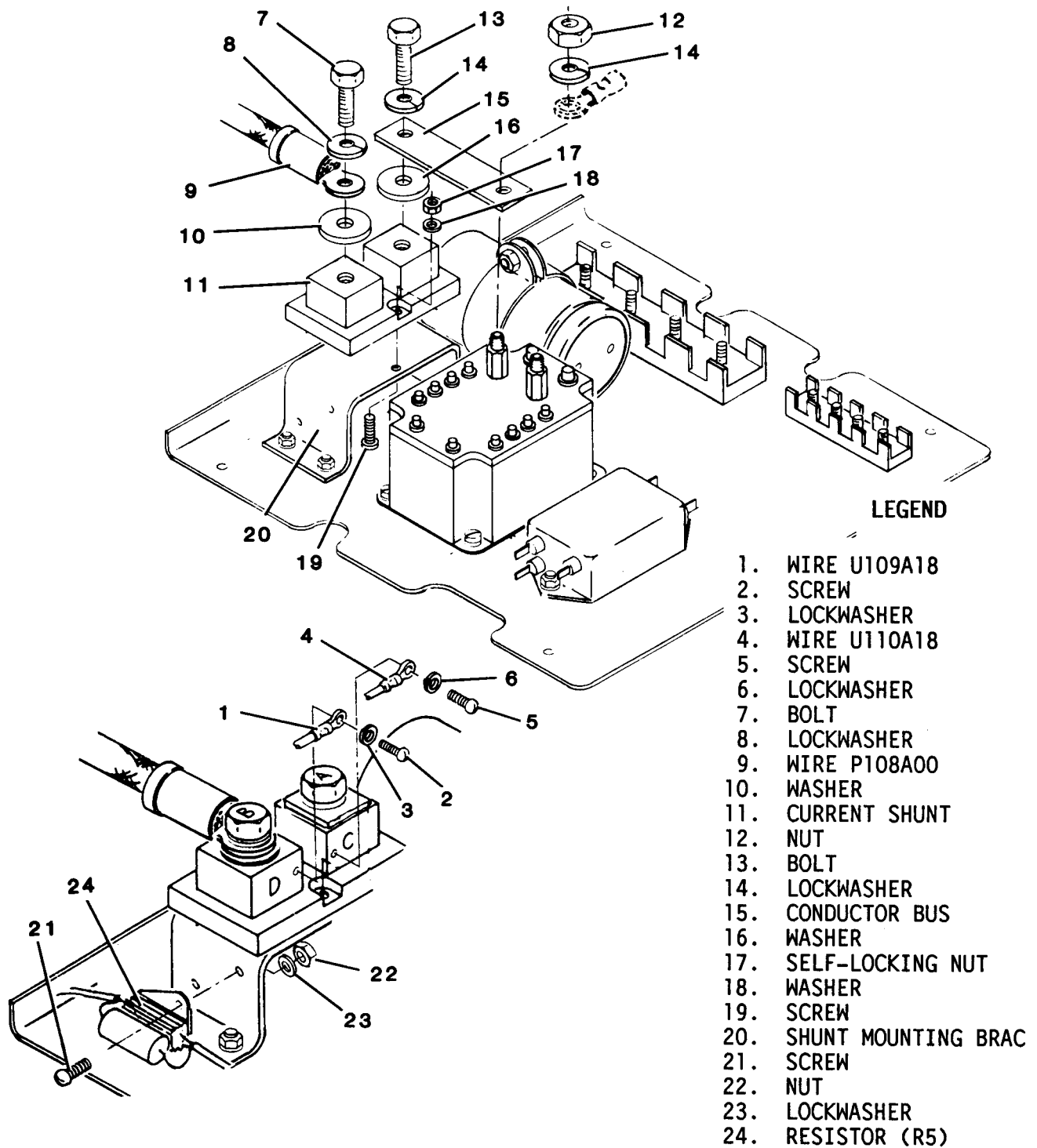


Figure 4-52. Current Shunt (1000 Amp)/Resistor (R5)  
Replacement



**4-84. CURRENT SHUNT (1000 AMP).**  
(cont)

b. Removal. (cont)

(5) Loosen nut (12).

(6) Remove bolt (13) and lockwasher (14). Rotate conductor bus (15) away from current shunt. Remove washer (16).

(7) Remove self-locking nut (17), washer (18), and screw (19) that secure current shunt to shunt mounting bracket (20). Remove current shunt.

c. Installation.

(1) Place current shunt (11) on shunt mounting bracket (20).

(2) Install screw (19) through shunt and shunt mounting bracket. Secure with washers (18) and self-locking nuts (17). Torque to 32-35 inch pounds (3.6-3.9 Nm).

(3) Place washer (16) on terminal A of current shunt. Rotate conductor bus (15) toward terminal A until mounting holes are aligned. Secure conductor bus to terminal A with lockwasher (14) and bolt (13).

(4) Tighten nut (12).

(5) Place washer (10) and wire P108A00 (9) on terminal B. Secure with lockwasher (6) and bolt (7).

(6) Connect wire U109A18 (1) to terminal D with lockwasher (3) and screw (2) and tighten. Remove tag.

(7) Connect wire U110A18 (4) with lockwasher (6) and screw (5) and tighten. Remove tag.

(8) Install component mounting panel (paragraph 4-82).

**4-85. TERMINAL BOARDS.** Maintenance of terminal boards TB1 and TB6 (figure 4-53) consists of inspection and replacement. Procedures are the same for both boards.

a. Inspection.

(1) Remove power cable from cable support.

**WARNING**

To prevent injury, ensure that battery is disconnected before performing maintenance on electrical components.

(2) Disconnect battery cable plug connector.

(3) Unlatch and open inlet air housing access door. Secure in open position.

(4) Loosen turnlock fasteners and remove engine housing access cover.

(5) Remove air baffle (paragraph 4-22).

(6) Ensure that terminal boards are securely mounted. Tighten if loose.

(7) Ensure that all wires are securely attached. Tighten if loose.

(8) If terminal boards are dirty, clean with compressed air or electrical grade solvent.

(9) Replace terminal boards if damaged.

4-85. TERMINAL BOARDS. (cont)

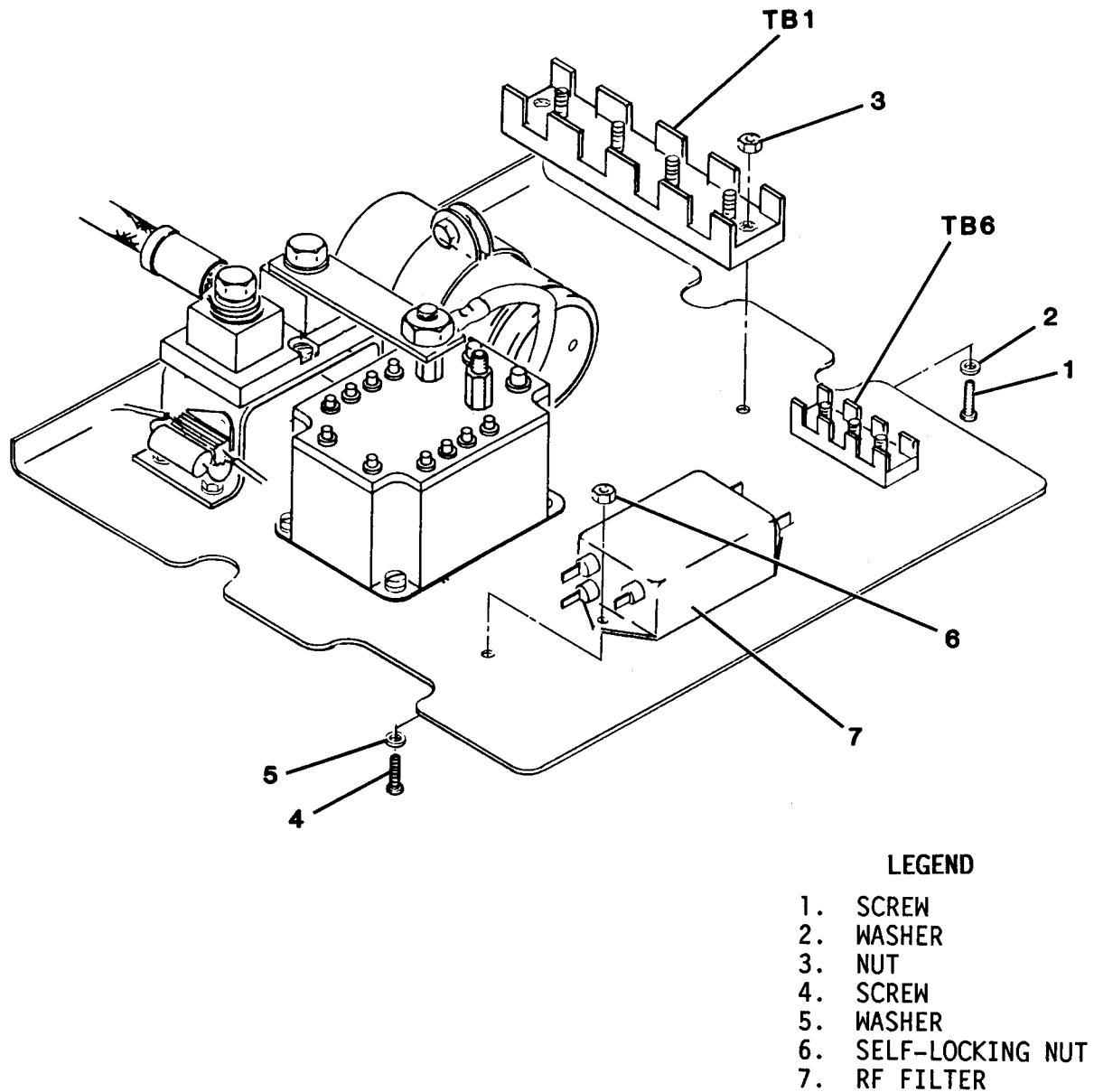


Figure 4-53. Terminal Board/RF Filter (FL1) Replacement

#### 4-85. TERMINAL BOARDS. (cont)

##### a. Inspection. (cont)

(10) Install air baffle (paragraph 4-22).

(11) Install engine housing access cover and secure with turnlock fasteners.

(12) Close and securely latch inlet air housing access door.

(13) Connect battery cable plug connector.

(14) Stow power cable on cable support.

##### b. Removal.

(1) Remove component mounting panel (paragraph 4-82).

(2) Tag and disconnect wiring from terminal board to be replaced.

(3) Remove screws (1, figure 4-53), washers (2) and nuts (3) that secure terminal board to component mounting panel.

c. Repair. The terminal boards are not repairable. If damaged, replace with a new terminal board.

##### d. Installation.

(1) Put terminal board in position and secure with screws (1), washers (2), and nuts (3). Torque on TB1 is 12-14 inch pounds (1.3-1.5 Nm). Torque on TB6 is 4.5-6 inch pounds (0.5-0.6 Nm).

(2) Connect wiring to terminal board. Remove tags.

(3) Install component mounting panel (paragraph 4-82).

**4-86. RF FILTER (FL1).** Maintenance of the RF filter (figure 4-53) is limited to replacement.

##### a. Removal.

(1) Remove component mounting panel (paragraph 4-82).

(2) Tag and disconnect electrical leads from filter terminals.

(3) Remove screws (4), washers (5), and self-locking nuts (6) that secure filter (7) to component mounting panel.

##### b. Installation.

(1) Place filter (7) in position on component mounting panel and secure with screws (4), washers (5), and self-locking nuts (6). Torque to 23-26 inch pounds (2.6-2.9 Nm).

(2) Connect electrical leads to filter terminals with screws. Remove tags.

(3) Install component mounting panel (paragraph 4-82).

**4-87. CAPACITOR (C4).** Maintenance of capacitor C4 (10, figure 4-51) is limited to replacement.

##### a. Removal.

(1) Remove component mounting panel (paragraph 4-82).

#### WARNING

To prevent injury, ensure that capacitor is discharged to ground prior to removal.

(2) Discharge capacitor to ground.

#### 4-87. CAPACITOR (C4). (cont)

##### a. Removal. (cont)

(3) Tag and disconnect electrical leads (12, 13) from capacitor.

(4) Remove screw (7), washers (8), and self-locking nut (9) that secure capacitor (10) in mounting bracket (11). Remove capacitor.

##### b. Installation.

(1) Place capacitor (10) in mounting bracket (11) and secure with screw (7), washers (8), and nut (9). Torque to 74-82 inch pounds (8.4-9.3 Nm).

(2) Connect electrical leads (12, 13) to capacitor. Remove tags.

(3) Install component mounting panel (paragraph 4-82).

4-88. RESISTOR (R5). Maintenance of resistor R5 (24, figure 4-52) is limited to replacement.

##### a. Removal.

(1) Remove component mounting panel (paragraph 4-82).

(2) Tag and disconnect electrical leads from resistor.

(3) Remove screws (21), nuts (22), and lockwashers (23) that secure resistor (24) to current shunt mounting bracket (20).

##### b. Installation.

(1) Position resistor (24) on current shunt mounting bracket (20) and secure with screws (21), washers (23), and nuts (22). Torque to 2-4 inch pounds (0.2-0.5 Nm).

(2) Connect electrical leads to resistor.

(3) Install component mounting panel (paragraph 4-82).

## Section XVI. MAINTENANCE OF RUNNING GEAR

**4-89. GENERAL.** The running gear provides the means for moving the generator set manually or with a tow vehicle. The brake control, consisting of a handbrake and adjustable linkage, will prevent movement of the generator set when the handbrake lever is placed in the set position. A torsion axle and the associated wheels, tires, and tubes are the components that allow easy movement of the generator set. The lunette eye is the connecting point for a towing vehicle. A swivel caster provides support for the front of the generator set and can be rotated from the down position when the set is being towed.

### NOTE

If not specified in maintenance procedure, apply torque in accordance with table 1-1, Torque Specifications.

**4-90. BRAKE CONTROL.** Maintenance of the brake control consists of servicing, adjustment, replacement, and repair.

a. Service. Ensure that all connection points are kept clean and properly lubricated.

### b. Adjustment.

(1) Set handbrake and attempt to move generator set. If neither wheel moves, brakes do not require adjustment. If both wheels move, proceed to step (2). If only one wheel moves, proceed to step (7).

(2) If both wheels move, a minor adjustment can be accomplished by turning the grip on the handbrake lever clockwise.

### WARNING

To prevent injury, ensure that both wheels are chocked while performing maintenance on the brakes.

(3) If both wheels continue to move with handbrake set and grip adjusted, chock both wheels.

(4) Remove cotter pin (1, figure 4-54) and straight pin (2) that attach clevis (3) to cable equalizing bar (4).

(5) Loosen jamnut (5). Turn clevis clockwise.

(6) Tighten jamnut and attach clevis to cable equalizing bar with straight pin and cotter pin. Repeat procedure until wheels no longer move.

(7) If only one wheel moves, an adjustment of the brake cable link to that wheel is required.

### WARNING

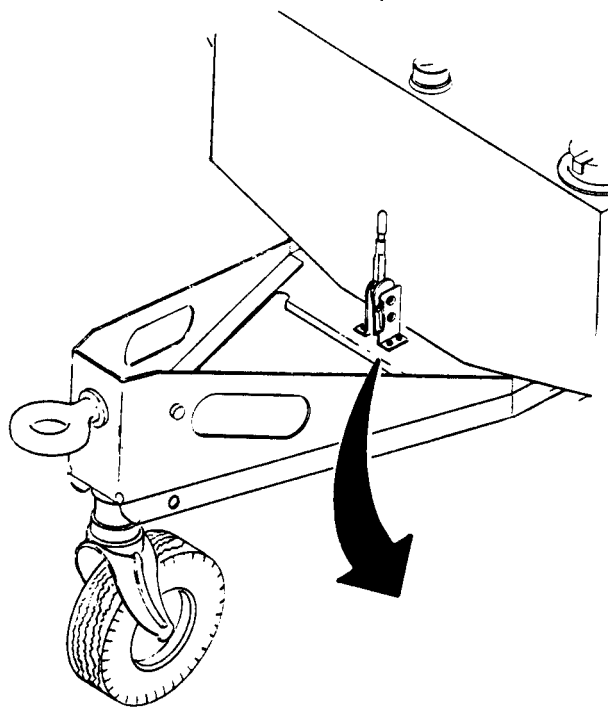
To prevent injury, ensure that both wheels are chocked while performing maintenance on the brakes.

(8) Chock both wheels.

(9) On side that moves, remove cotter pin (6) and straight pin (7) that attach clevis (8) to cable equalizing bar (4).

(10) Loosen jamnut (9). Turn clevis clockwise.

4-90. BRAKE CONTROL. (cont.)



LEGEND

1. COTTER PIN
2. STRAIGHT PIN
3. CLEVIS
4. CABLE EQUALIZING BAR
5. JAMNUT
6. COTTER PIN
7. STRAIGHT PIN
8. CLEVIS
9. JAMNUT

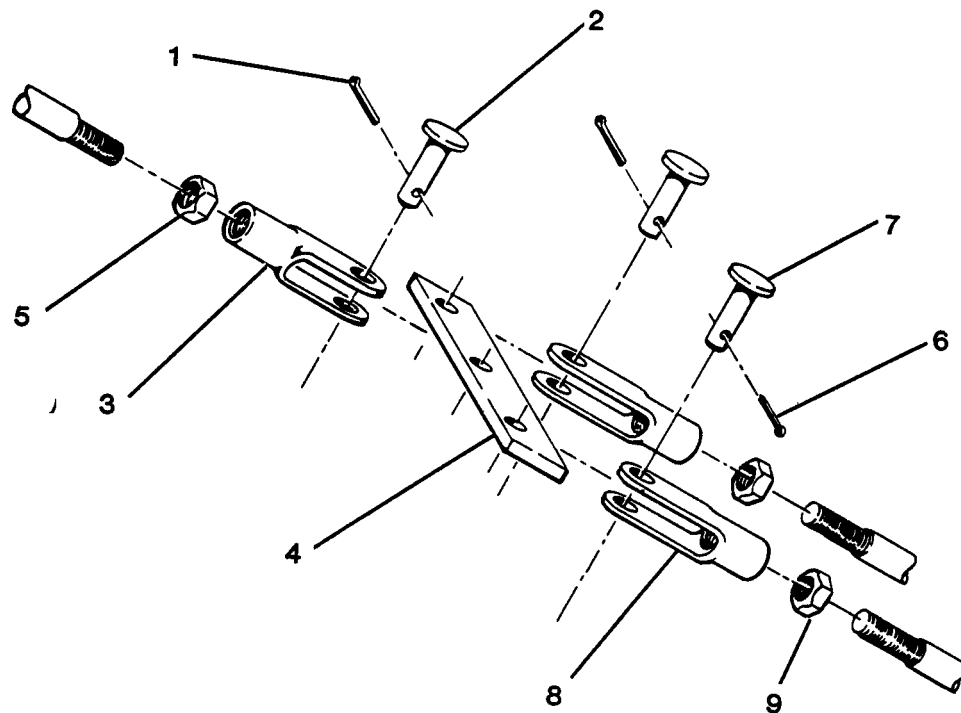


Figure 4-54. Brake Control Adjustment

#### 4-90. BRAKE CONTROL. (cont)

##### b. Adjustment. (cont)

(11) Tighten jamnut and attach clevis to cable equalizing bar with straight pin and cotter pin. Repeat procedure until wheel no longer moves.

##### c. Removal.

#### WARNING

To prevent injury, ensure that both wheels are chocked while performing maintenance on the brakes.

(1) Chock both wheels.

(2) On inside of wheel, remove cotter pins (1, figure 4-55) and straight pins (2) that release brake cables (17) from remote control levers on brake.

(3) Remove nuts (3), washers (4), capscrews (5), lockwashers (6), and retaining straps (7) to release brake cables (17) from cable mounting brackets (8) and generator set frame.

(4) Remove cotter pin (9) and straight pin (10) to disconnect clevis (11) from cable equalizing bar (12).

(5) Remove cotter pins (13) and straight pins (17) to disconnect brake cables (17) from cable equalizing bar (12).

(6) Unscrew clevis (15) and jamnut (16) from brake cables (17).

(7) Unscrew jamnuts (18, 19) to remove brake rod (20) from clevis (11) and clevis (21).

(8) Remove cotter pin (22) and straight pin (23) to remove clevis (21) from bellcrank (24).

(9) Remove cotter pin (22) and straight pin (26) to free bellcrank (24) from bellcrank mounting brackets (36).

(10) Remove cotter pin (27) and straight pin (28) to remove bellcrank (24) from clevis (30).

(11) Unscrew jamnuts (29) and clevis (30) to remove those items and brake rod (31) from handbrake control lever (32).

(12) Remove nuts (33), washers (34), capscrews (35), and bellcrank mounting brackets (36).

(13) Remove nuts (37), washers (38), spacers (39), capscrews (40), and washers (41) to separate handbrake mounting brackets (42) from handbrake control lever.

d. Repair. Repair is accomplished by replacing damaged parts.

##### e. Installation.

(1) Align handbrake control lever mounting holes in handbrake mounting brackets (42).

(2) Place washers (41) on capscrews (40). Place spacers (39) in position inside handbrake control lever (32) and insert capscrews.

4-90. BRAKE CONTROL. (cont)

LEGEND

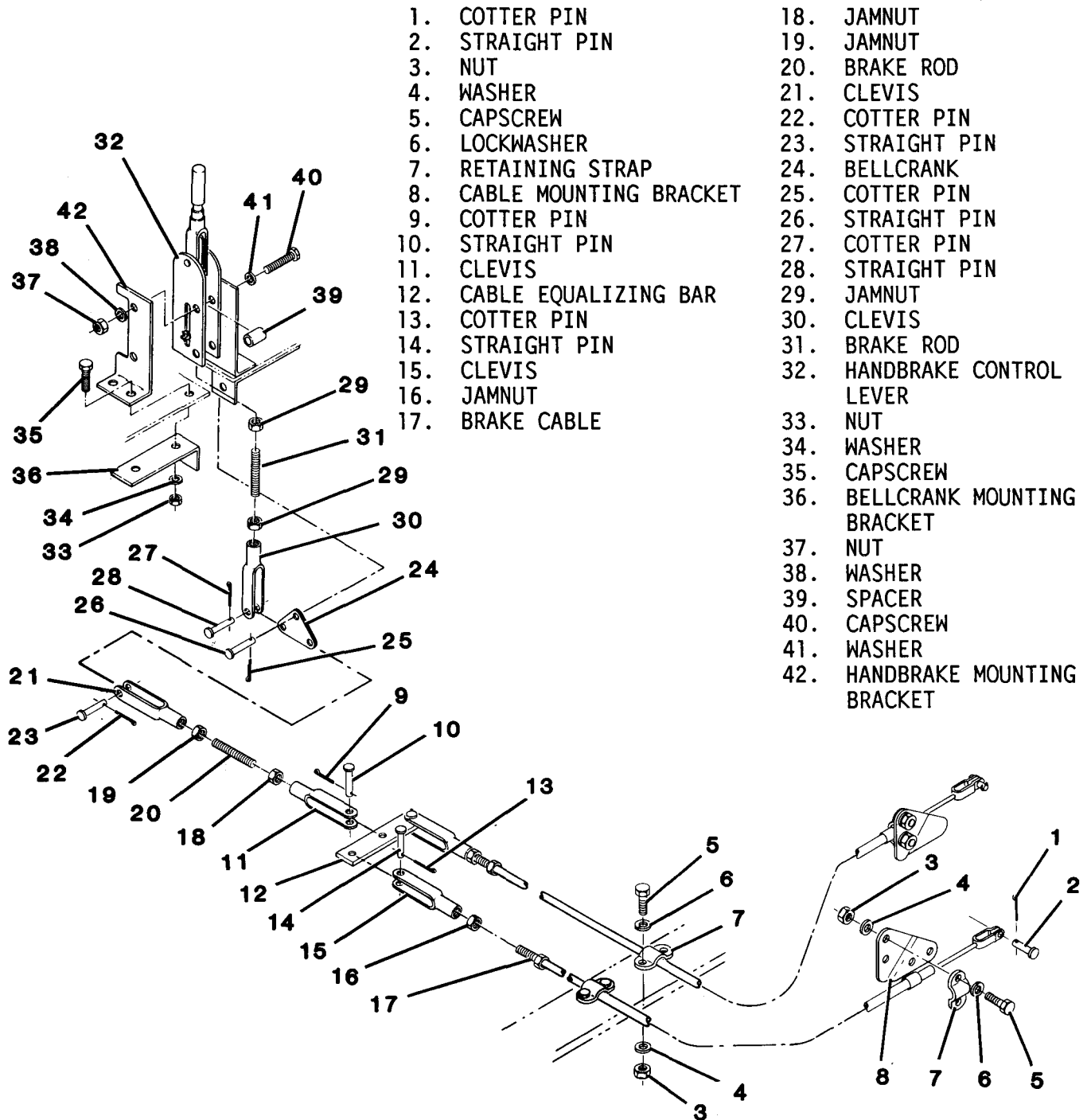


Figure 4-55. Brake Control Replacement



#### 4-90. BRAKE CONTROL. (cont)

##### e. Installation. (cont)

(3) Install washers (38) and nuts (37). Torque to 270-300 inch pounds (30.5-33.9 Nm).

(4) Install bellcrank mounting brackets (36) and secure with capscrews (35), washers (34), and nuts (33). Torque to 74-82 inch pounds (8.4-9.3 Nm).

(5) Screw jamnuts (29) on brake rod (31). Screw one end of brake rod into clevis (30) and one end into handbrake control lever.

(6) Secure clevis (30) to bellcrank (24) with straight pin (28) and cotter pin (27).

(7) Secure bellcrank mounting bracket (36) with straight pin (26) and cotter pin (25).

(8) Secure clevis (21) to bellcrank with straight pin (23) and cotter pin (22).

(9) Screw jamnuts (18, 19) on brake rod (20). Screw clevis (12) on one end of brake rod and clevis (21) on other end.

(10) Attach clevis (21) to cable equalizing bar (12) with straight pin (10) and cotter pin (9).

(11) Screw jamnuts (16) and clevis (15) on ends of brake cables (17).

(12) Secure clevis (15) to cable equalizing bar with straight pins (14) and cotter pins (13).

(13) Secure brake cable to generator set frame with retaining straps (7), lockwashers (6), capscrews (5), washers (4), and nuts (3). Torque to 50-70 inch pounds (5.6-7.9 Nm).

(14) Secure brake cable to cable mounting brackets (8) with remaining retaining straps, lockwashers, capscrews, washers, and nuts. Torque to 50-70 inch pounds (5.6-7.9 Nm).

(15) Secure end of brake cables to remote control levers on brake with straight pins (2) and cotter pins (1).

(16) Adjust handbrake as necessary (paragraph 4-90b).

**4-91. TORSION AXLE ASSEMBLY.** Maintenance of the torsion axle assembly (figure 4-56) is limited to inspection.

#### WARNING

To prevent injury, ensure that handbrake is set and wheels are chocked before inspecting torsion axle.

a. Set handbrake and chock both wheels.

b. Inspect torsion axle assembly for damage and loose or missing attaching parts. Tighten loose parts. Report damage to direct support for maintenance.

c. Remove grease cap and ensure that cotter pin is securely installed through spindle.

4-91. TORSION AXLE ASSEMBLY. (cont)

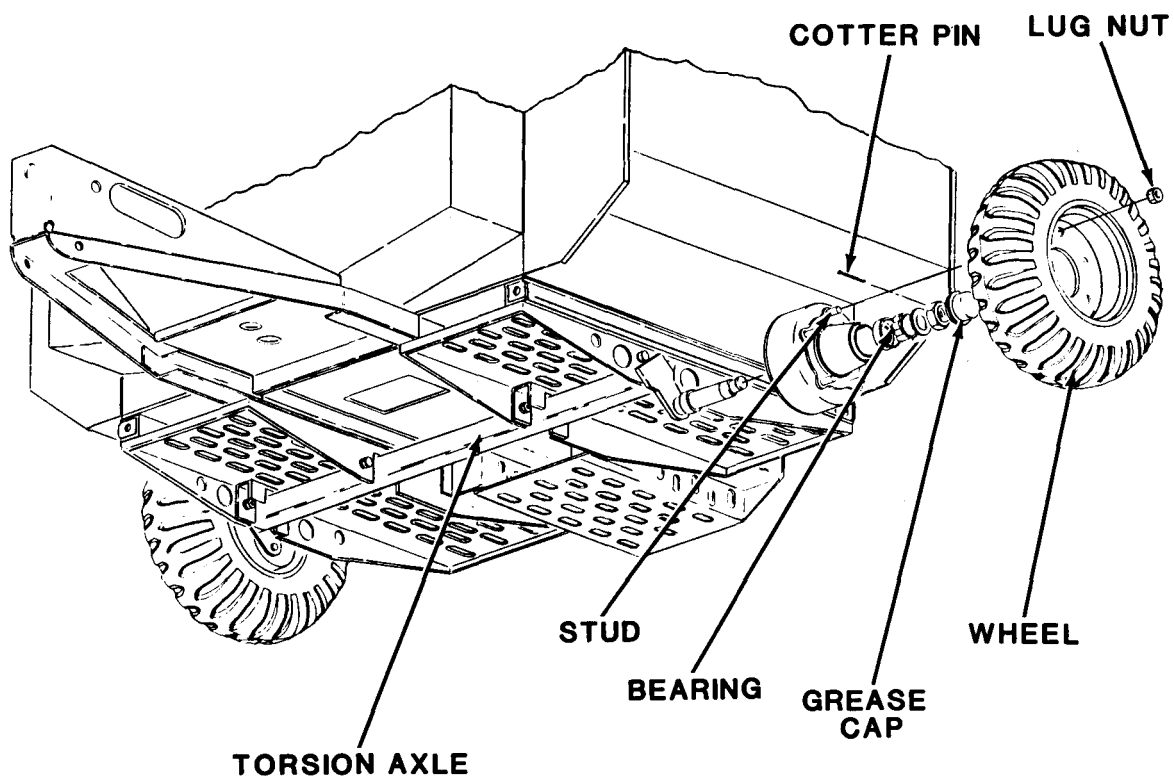


Figure 4-56. Torsion Axle Assembly and Wheel Assembly

#### 4-91. TORSION AXLE ASSEMBLY. (cont)

d. Ensure that bearings are properly greased. Grease should appear wet and cover all bearing surfaces. If grease appears dry, is thin or non-existent, bearings should be cleaned and greased.

e. Jack generator set up to allow wheel to rotate freely.

f. Release handbrake and rotate wheel. If wheel drags or makes unusual noise, refer to direct support for maintenance.

g. Replace grease cap and lower generator set to ground.

h. Remove chocks and release handbrake.

**4-92. WHEEL ASSEMBLY.** Maintenance of the wheel assembly is limited to replacement (figure 4-56).

a. Removal.

**WARNING**

To prevent injury, ensure that handbrake is set and opposite wheel is chocked.

(1) Set handbrake and chock wheel opposite one to be replaced.

(2) Loosen lug nuts.

(3) Jack generator set up. Remove lug nuts and wheel.

b. Installation.

(1) Install wheel on studs. Install lug nuts.

(2) Lower generator set to ground. Tighten lug nuts and torque to 580 inch pounds (65.53 Nm).

**4-93. TIRES/TUBES.** Maintenance for tires and tubes (figure 4-57) is limited to replacement and repair.

a. Removal.

(1) Remove wheel from generator set in accordance with paragraph 4-92a.

**WARNING**

To prevent injury, do not disassemble wheel until air pressure in tube has been discharged to less than 5 psi (34.47 kPa).

(2) Release air pressure in tube by removing cap (1, figure 4-57) and threaded valve (2) from tube stem (3).

(3) Remove nuts (4), washers (5), and capscrews (6) to separate wheel halves (7).

(4) Remove tube (8) from tire (9).

b. Repair.

(1) Use standard procedure to plug punctures in tires.

(2) Use standard procedure to patch damaged inner tubes.

#### 4-93. TIRES/TUBES. (cont)

##### c. Installation.

(1) Install tube in tire. Remove folds and kinks from tube.

(2) Place tire (9) on front wheel half. Pull tube stem (3) through opening in wheel. Place back half of wheel on and secure with capscrews (6), washers (5), and nuts (4). Torque to 180 inch pounds (20.34 Nm).

(3) Install valve (2) in tube stem.

(4) Inflate tire to approximately 30 psi (206.84 kPa).

(5) Install wheel on generator set in accordance with paragraph 4-92b.

4-94. BRAKE ASSEMBLY. Maintenance of the brake assembly consists of inspection, replacement, and repair.

##### a. Inspection.

(1) Remove wheel (paragraph 4-92a).

(2) Remove grease cap (1, figure 4-58).

(3) Remove cotter pin (2), nut (3), washer (4), and bearing (5).

(4) Remove hub and drum assembly (6) from brake assembly (7).

(5) Ensure that shoe retaining and return springs are secure.

(6) Ensure that bellcrank is securely installed.

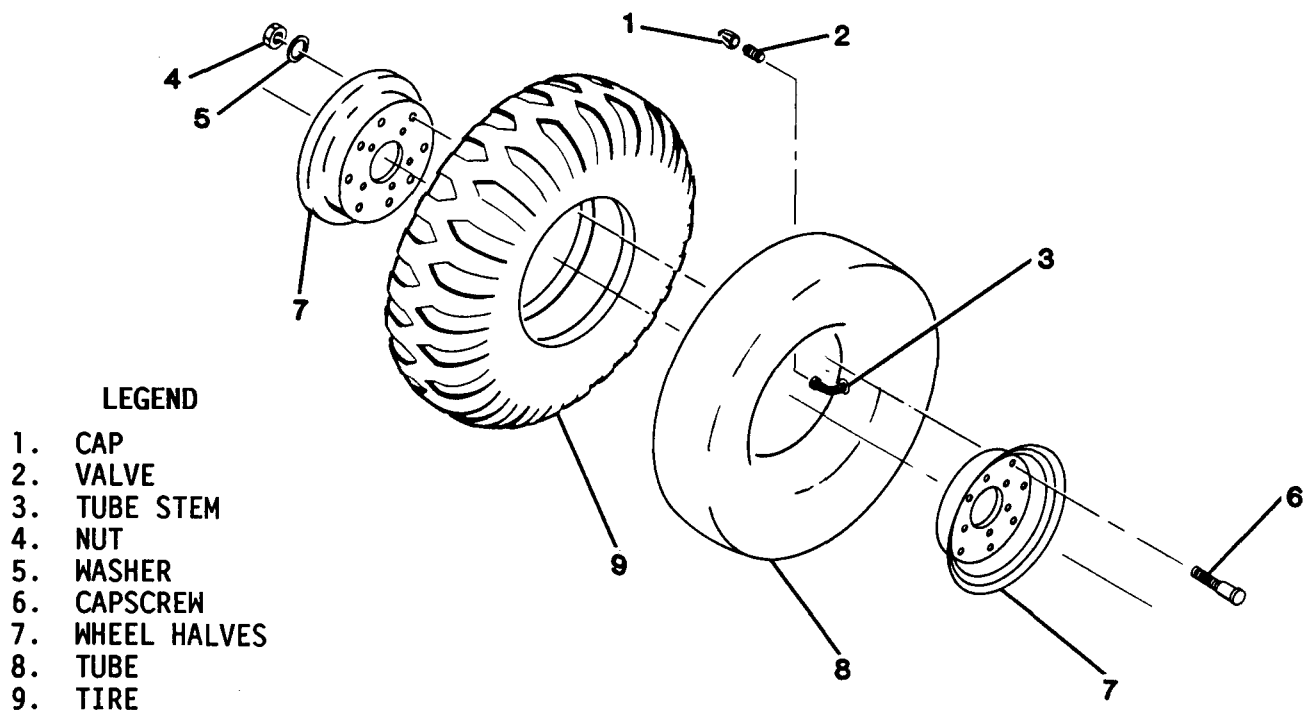


Figure 4-57. Tire and Tube Replacement

4-94. BRAKE ASSEMBLY. (cont)

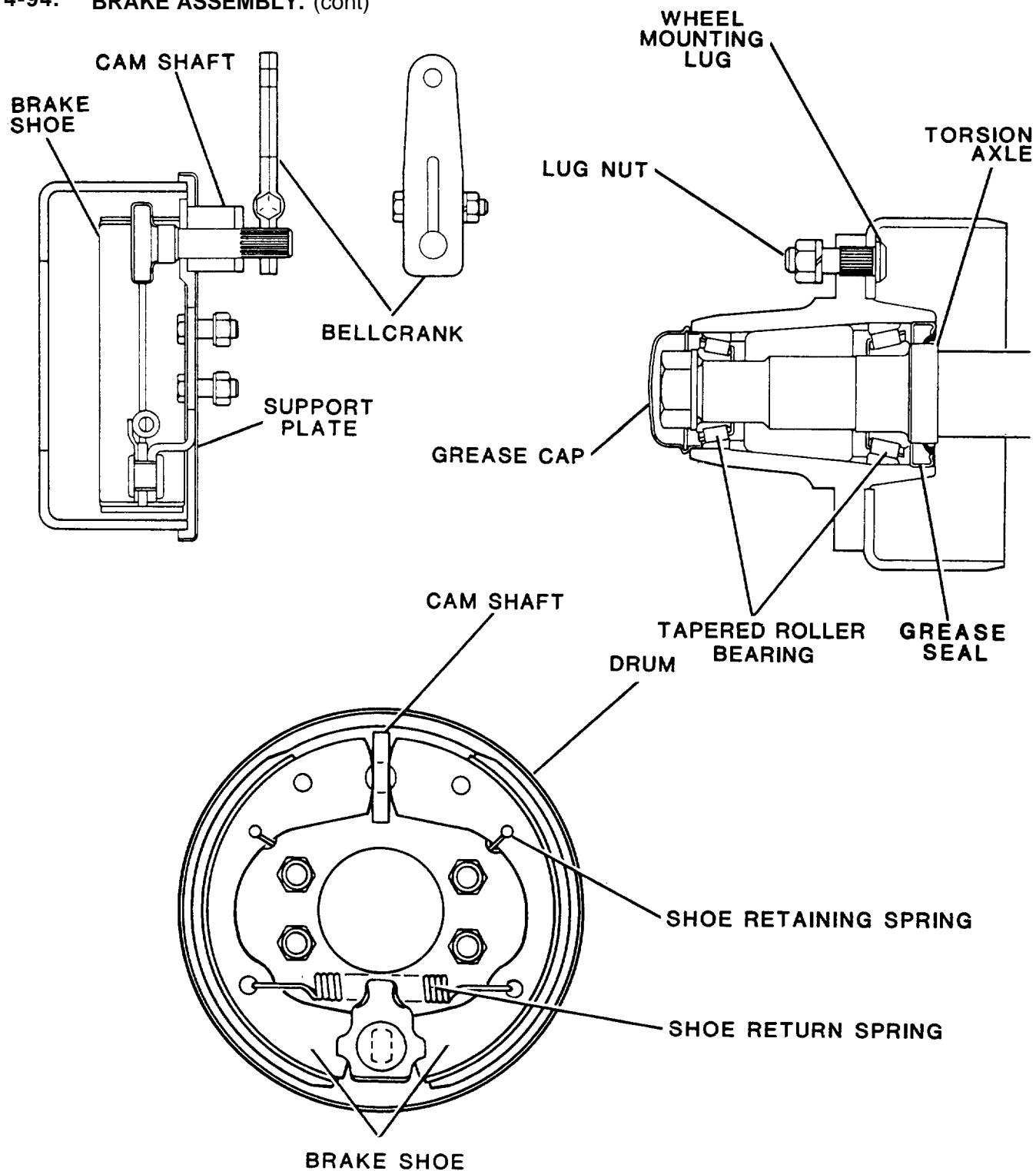


Figure 4-58. Brake Assembly Inspection

4-94. BRAKE ASSEMBLY. (cont)

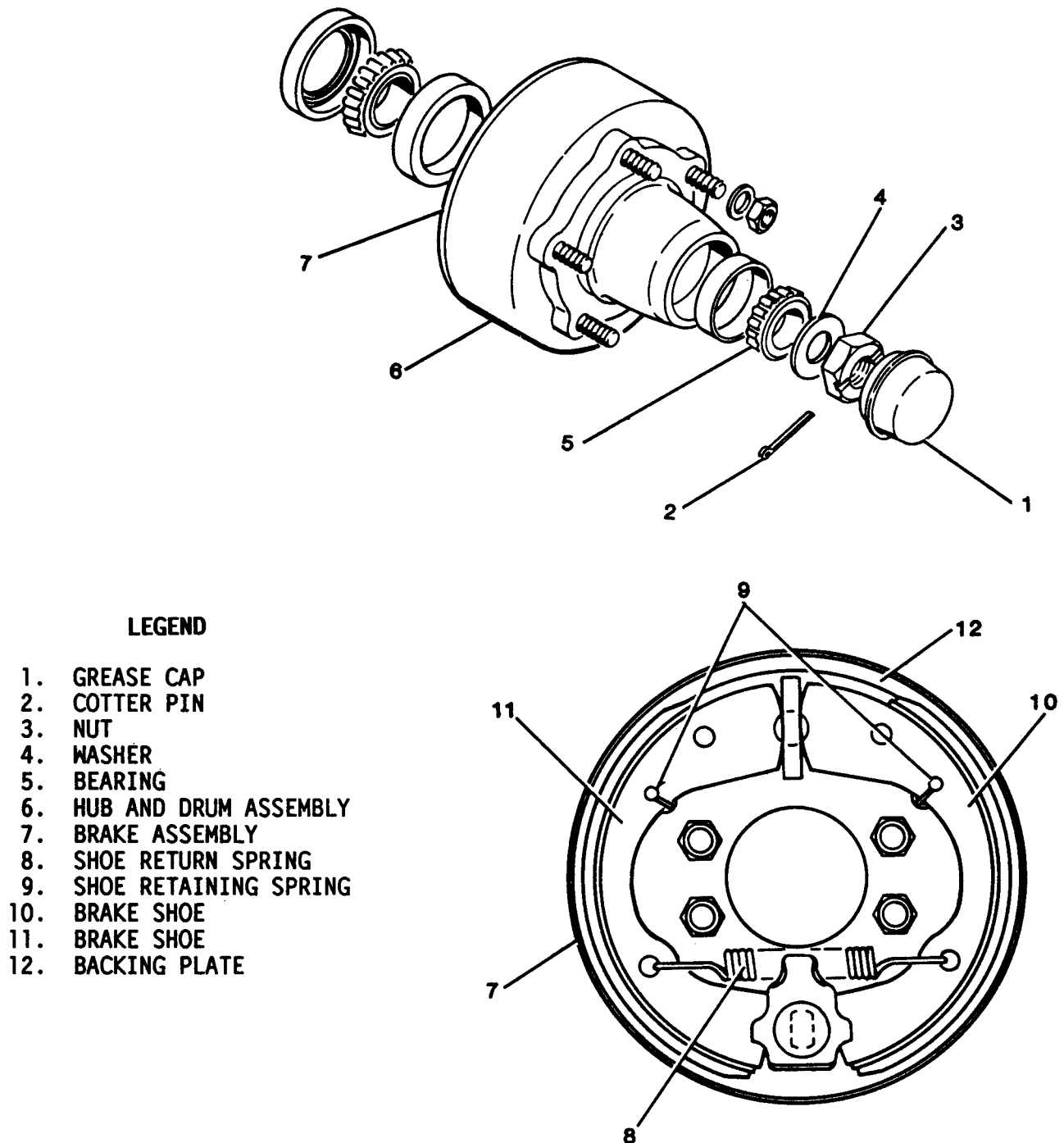


Figure 4-59. Brake Assembly Replacement

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#### 4-94. BRAKE ASSEMBLY. (cont)

##### a. INSPECTION (cont)

(7) Inspect brake shoe lining for cracks, excessive wear, exposed shoe metal and rivets. If metal or rivets are exposed, inspect drum for scoring. Replace damaged components.

##### WARNING

To prevent injury, ensure that proper eye and skin protection is worn when using compressed air.

(8) Use compressed air to remove dirt and residue from around brake shoes, backing plate, and drum.

(9) Install wheel in accordance with paragraph 4-92b.

##### b. Removal.

(1) Remove wheel in accordance with paragraph 4-92a.

(2) Release handbrake.

(3) Remove grease cap (1, figure 4-59).

(4) Remove cotter pin (2), nut (3), washer (4) and bearing (5).

(5) Remove hub and drum assembly (6) from brake assembly (7).

(6) Remove shoe return spring (8), shoe retaining springs (9) and both brake shoes (10) and (11) from backing plate (12).

c. Repair. Replace damaged components noted during inspection. Use standard procedure to clean and repack bearings.

(1) Install shoes (10, 11) in backing plate (12) and secure with shoe retaining springs (9).

(2) Attach shoe return spring (8) to each shoe. Lightly tap shoe assembly with rubber mallet to firmly seat shoe in backing plate.

(3) Install bearing (5) and washer (4).

(4) Install nut (3) on spindle and tighten snugly. Loosen nut until hub and drum assembly rotates freely. Align hole in spindle.

(5) Insert new cotter pin (2) in spindle. Bend both legs of cotter pin to secure installation.

(6) Install grease cap (1).

(7) Install wheel assembly in accordance with paragraph 4-92b.

4-95. **LUNETTE EYE.** Maintenance of the lunette eye (figure 4-60) is limited to replacement.

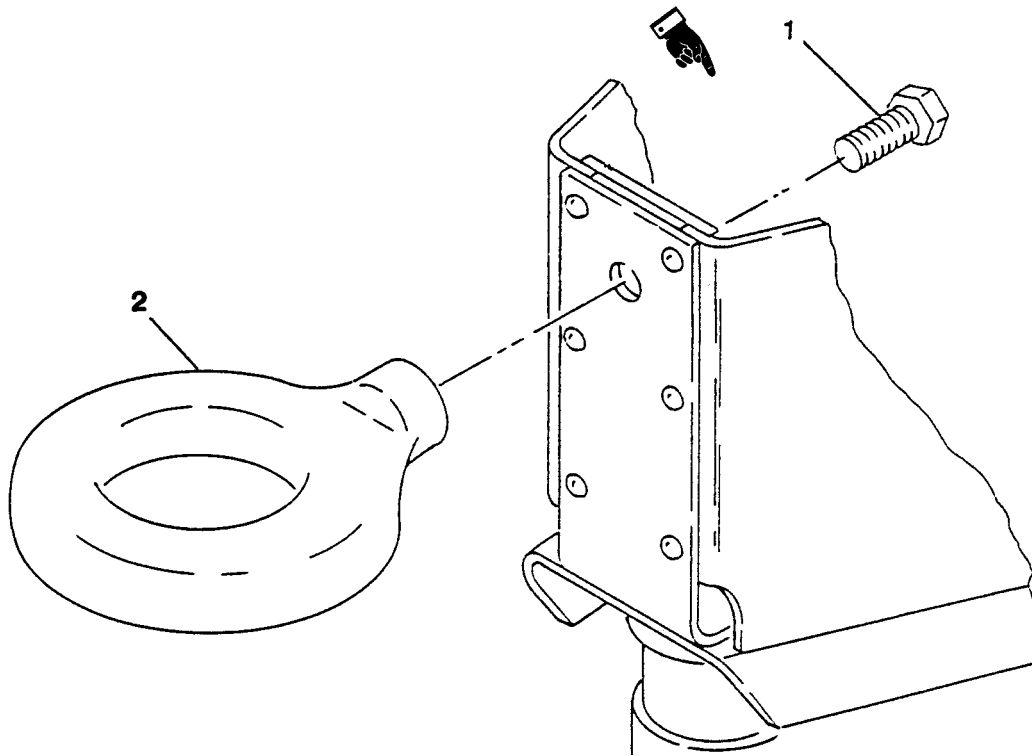
a. Removal. Remove capscrew (1) and lunette eye (2).

##### b. Installation.

(1) Secure lunette eye (2) to generator set with capscrew (1).

(2) Torque assembly to 208-237 foot pounds (282-321 Nm).

4-95. LUNETTE EYE. (cont)



**LEGEND**

- 1. CAPSCREW
- 2. LUNETTE EYE

Figure 4-60. Lunette Eye Replacement



4-95. LUNETTE EYE. (cont)

b. Installation. (cont)

(3) Deleted.

4-96. SWIVEL CASTER WHEEL AND TIRE.  
Maintenance of swivel caster wheel and tire consists of service, replacement, and repair.

a. Service.

(1) Inflate tire to 35-40 psi (241.3-275.8 kPa).

(2) Lubricate in accordance with lubrication order (figure 3-2).

b. Removal.

**WARNING**

To prevent injury, ensure that handbrake is set and both wheels are chocked to prevent accidental movement of generator set during maintenance.

(1) Set handbrake and chock both wheels.

(2) Loosen nut (1, figure 4-61).

**WARNING**

To prevent injury, do not attempt to lift front of generator set with less than two persons.

(3) Raise generator set and block front corners.

(4) Remove nut (1) and bolt (2) to remove wheel and tire assembly from fork.

(5) Deflate tire (3).

(6) Remove inner tube (4) from tire.

(7) Remove tire from wheel rim.

(8) Remove nuts (5), lockwashers (6), and bolts (7).

(9) Remove tapered nuts (8) and knurled bolts (9). Separate and remove female wheel disk (10) and male wheel disk (11) from flanged tube (15).

(10) Remove bearing retainers (12) and roller bearings (13) from flanged tube (15).

(11) Remove grease fitting (14) from flanged tube (15).

c. Repair. Use standard procedures to plug tire punctures and to patch damaged inner tube. Replace damaged rim components.

d. Installation.

(1) Install grease fitting (14) in flanged tube (15).

(2) Place roller bearings (13) in flanged tube (15) and secure with bearing retainers (12).

(3) Align female wheel disk (10) and male wheel disk (11) with mounting holes in flange of flanged tube (15). Secure with knurled bolts (9) and tapered nuts (8).

(4) Install bolts (7) and secure with lockwashers (6) and nuts (5).

(5) Install tire (3) on wheel rim (5).

4-96. SWIVEL CASTER WHEEL AND TIRE.  
(cont)

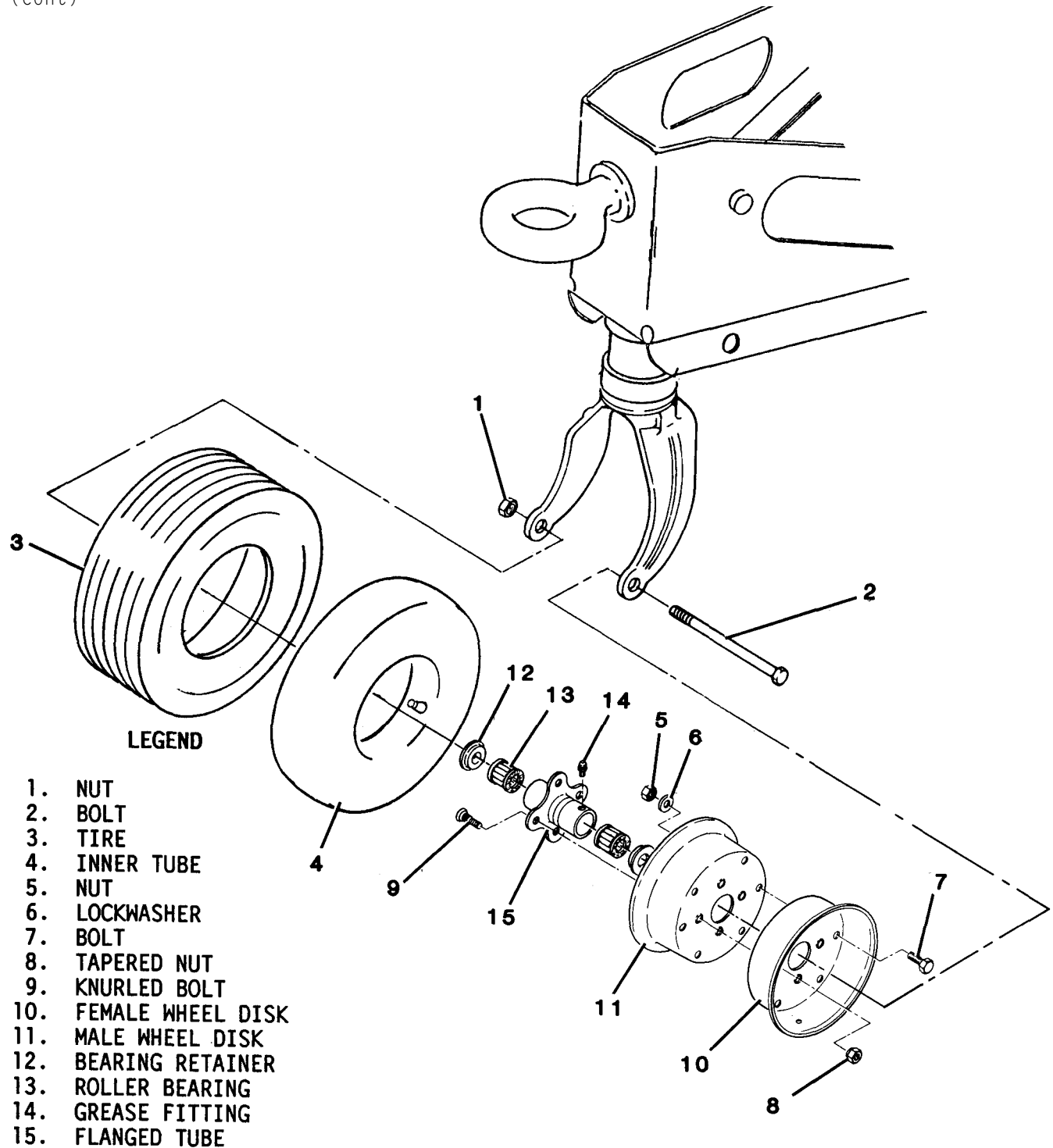


Figure 4-61. Swivel Caster Wheel and Tire

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4-96. SWIVEL CASTER WHEEL AND TIRE.  
(cont)

d. Installation. (cont)

(6) Place Inner tube (4) in tire. Ensure that valve stem is properly placed in opening in rim.

(7) Ensure that all folds and kinks are removed from tube.

(8) Inflate tire to approximately 35 psi (241.3 kPa).

(9) Install wheel in fork and secure with bolt (2) and nut (1).

(10) Remove blocks and Lower generator set to ground.

(11) Remove chocks and release handbrake.

## APPENDIX A

### REFERENCES

A-1. **SCOPE.** Operation and maintenance procedures for the generator set specified in this technical manual may be supplemented by use of additional reference manuals and specifications listed in this appendix.

A-2. **GENERAL INFORMATION.** The reference manuals listed below are coded to indicate the service to which they pertain. The codes are (A) Army, (F) Air Force, (N) Navy, and (MC) Marine Corps. Reference manuals with no code are applicable to all services.

#### 1. FIRE PROTECTION

TB 5-4200-200-10 (A)	Hand Portable Fire Extinguishers Approved for Army Use
TB MED 251	Noise and Conservation of Hearing

#### 2. LUBRICATION

C9100-IL	Fuels, Lubricants, Oils and Waxes
C6800-IL	Chemicals and Chemical Products
LO 5-6115-612-12	Lubrication Order

#### 3. PAINTING

TM 9-213 (A)	Painting Instructions for Field Use
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#### 4. RADIO SUPPRESSION

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

#### 5. MAINTENANCE

AMCR 700-11 (A)	Equipment Data Plates and Data Marking
AR 750-43 (A)	Test, Measurement, and Diagnostic Equipment (including Prognostic Equipment and Calibration Test/Measurement Equipment) with Supplement 1

ARMY	TM 5-6115-612-12
MARINE CORPS	TM 6115-12/7
AIR FORCE	TO 35C2-3-471-1
N A V Y	AG-320B0-0MM-000

## A-2. GENERAL INFORMATION. (cont)

### 5. MAINTENANCE (cont)

DAPAM 738-750 (A)	The Army Maintenance Management System (TAMMS)
DARCOM-R 702-7 (A)	Logistics Product Assurance
DESCOM-R 702-1 (A)	Depot Quality System
FM 20-31	Grounding Techniques
MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-HDBK-705	Generator Sets, Electrical, Measurements and Instrumentations
MIL-I-45208A	Inspection System Requirements
MIL-I-45607B	Inspection Equipment, Acquisition, Maintenance and Disposition of
MIL-P-514	Plate, Identification, Instruction and Marking, Blank
MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-248	Welding and Brazing Procedure and Performance Qualification
MIL-STD-410	Nondestructive Testing Personnel Qualification and Certification (Eddy Current, Liquid Penetrant, Magnetic Particle, Radiographic and Ultrasonic)
MIL-STD-481A	Configuration Control-Engineering Changes, Deviations and Waivers (Short Form)
MIL-STD-705	Generator Sets, Engine Driven, Methods of Test and Instructions
MIL-STD-794	Part and Equipment, Procedures for Packaging and Packing of
MIL-STD-1595	Aerospace Welder Performance Qualification (Supplement to ASME Boiler, Section IX, 1974)
MIL-W-8604	Welding of Aluminum Alloys, Process for
TB 55-1500-307-24	Aircraft Components Requiring Maintenance Management and Historical Data

A-2. GENERAL INFORMATION. (cont)

5. MAINTENANCE (cont)

TM 9-6140-200-14(A) 24 Sept 1981	Maintenance of Storage Batteries; Lead Acid Type
TM 55-1500-323-25(A) 14 Aug 1968	Installation Practices for Aircraft Electric and Electronic Wiring
TM 9-2610-200-20(A) 28 Feb 1977	Organizational Care, Maintenance and Repair of Pneumatic Tires and Inner Tubes
TM 5-6115-612-24P	Organizational, Intermediate (Field) (Direct Support and General Support) and Depot Maintenance Repair Parts and Special Tools List
TM 5-6115-612-34	Intermediate (Field) (Direct and General Support) and Depot Level Maintenance Manual

6. SHIPMENT AND STORAGE

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-1188	Commerical Packaging of Supplies and Equipment
PPP-8-601	Boxes, Wood, Cleated Plywood
PP-8-636	Box, Shipping, Fiberboard
TM 38-230-1 (A) TM 38-230-2 (A)	Preservation, Packaging and Packing of Military Supplies and Equipment
TB 740-97-2	Preservation of USA Mechanical Equipment for Shipment and Storage
TM 740-90-1 (A) 12 Mar 1971	Administrative Storage of Equipment

7. DESTRUCTION TO PREVENT ENEMY USE

TM 750-244-3 (A) 14 Dec 1971	Procedures for Destruction of Equipment to Prevent Enemy Use
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8. FIRST AID

FM21-11	First Aid for Soldiers
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## APPENDIX B

### BASIC ISSUE ITEMS LIST AND TROOP INSTALLED OR AUTHORIZED ITEMS LIST

#### Section I. INTRODUCTION

B-1. SCOPE. This appendix lists basic issue and troop installed or authorized items.

B-2. 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 (SMR) Codes (column a).

(1) source code. Source codes are assigned to show the manner of acquiring basic issue and troop installed items. The two-letter codes are entered in the first and second positions of the SMR code. The following are source code definitions.

Code	Definition
PA	Item procured and stocked for normal usage.
PB	Item procured and stocked for insurance purposes because essentiality dictates that a minimum quantity be available in the supply systems.
PC	Item procured and stocked which otherwise would be coded PA except that shelf life is less than 60 months.
PD	Support item, excluding support equipment, procured and stocked for Initial issue or outfitting only. Not subject to automatic replenishment.
PE	Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.
PF	Support equipment which will not be stocked, but which will be procured on demand.
PG	Item procured and stocked to provide for sustained support for the life of the equipment. This code is applied to an item peculiar to the equipment which, because of probable discontinuance or shutdown of production facilities, would prove uneconomical to reproduce at a later time.
KD	An item of a depot overhaul/repair kit and not purchased separately. A depot kit is one that provides items required at the time of overhaul or repair.



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## B-2. EXPLANATION OF COLUMNS. (cont)

Code	Definition
KF	An item of a maintenance kit and not purchased separately. A maintenance kit is one that provides an item that can be replaced at organizational or intermediate levels of maintenance.
KB	Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	Item to be manufactured or fabricated at organizational level.
MF	Item to be manufactured or fabricated at direct support maintenance level.
MD	Item to be manufactured or fabricated at depot maintenance level.
AO	Item to be assembled at organization levels.
AF	Item to be assembled at direct support maintenance levels.
AH	Item to be assembled at general support maintenance level.
AD	Item to be assembled at depot maintenance level.
XA	Item is not procured or stocked. Order the next higher assembly.
XB	Item is not procured or stocked. If not available through salvage, order by part number.
xc	Installation drawings, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD	A support item that is not stocked. When required, item will be procured through normal supply channels.

(2) Use (third position) The maintenance code entered in the third position indicates the lowest maintenance level authorized to use, remove, and replace the item.

Code	Definition
C	Operator/Crew
0	Organizational

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## B-2. EXPLANATION OF COLUMNS. (cont)

Code	Definition
F	Direct Support
H	General Support
D	Depot

b. National Stock Number (column b). This column indicates the national stock number assigned to the item and is used for requisitioning purposes.

c. Description (column c). This column indicates the federal item name and any additional description of the item required.

d. Unit of Measure (column d). 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 Authorized (column e). This column indicates the quantity of an item furnished with the equipment.

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 MARINE CORPS    TM 6115-12/7  
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 N A V Y         AG-320B0-0MM-000

Section II. BASIC ISSUE ITEMS LIST

(a)	(b)	(c)	(d)	(e)
SMR code	National stock number	Description	Unit of meas	Qty auth
PAO	7520-00-559-9618	Case, Maintenance and Operational Manual	EA	1
PAO	5975-00-878-3791	Rod, Ground w/attachments and wire	EA	1
PAO	5120-01-013-1676	Driver/Puller, Ground Rod	EA	1
PAO	4210-01-087-4989	Fire Extinguisher	EA	1
PAO	4210-00-899-9653	Fire Extinguisher Bracket	EA	1

## APPENDIX C

### MAINTENANCE ALLOCATION CHART

#### Section I.

##### C-1. GENERAL.

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

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

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

d. Section IV contains supplemental instructions, explanatory notes, and/or illustrations required for a particular maintenance function.

##### C-2. EXPLANATION OF COLUMNS IN SECTION II.

a. Group Number. Column 1. The assembly group is a numerical group assigned to each assembly in a top down breakdown sequence. The applicable assembly groups are listed on the MAC in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. Assembly Group. Column 2. This column contains a brief description of the components of each assembly group.

c. Maintenance Functions. Column 3. This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

- c - Operator or crew
- o - Organizational maintenance
- F - Direct support maintenance
- H - General support maintenance
- D - Depot maintenance

The maintenance functions are defined as follows:

A - Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

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## C-2. EXPLANATION OF COLUMNS IN SECTION II. (cont)

B - Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C - Service. To clean, to preserve, to charge, and add fuel, lubricants, cooling agent, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

D - Adjust. To rectify to the extent necessary to bring into proper operating range.

E - Align. To adjust specified variable elements of an item to bring to optimum performance.

F - Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

G- Install. To set up for use in an operational environment such as an emplacement, site, or vehicle.

H - Replace. To replace unserviceable items with serviceable like items.

I - Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage or a specific failure. Repair may be accomplished at each category of maintenance.

J - Overhaul. Normally the highest degree of maintenance performed by the Army. In order to minimize time, work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standard in technical publications for each item of equipment. Overhaul normally does not restore an item to like new, zero mileage, or zero hour condition.

K- Rebuild. The highest degree of material maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment or component thereof, has been in use.

## C-2. EXPLANATION OF COLUMNS IN SECTION II. (cont)

d. Symbols. The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

e. Tools and Equipment. Column 4. This column is provided for referencing by code the special tools and test equipment (Section III) required to perform the maintenance functions (Section II).

f. Remarks. Column 5. This column is provided for referencing by code the remarks (Section IV) pertinent to the maintenance functions.

## C-3. EXPLANATION OF COLUMNS IN SECTION III.

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T and TE requirements column on the MAC. The letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. Maintenance Category. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number or National Stock Number of tools and test equipment.

## C-4. EXPLANATION OF COLUMNS IN SECTION IV.

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to Section II. The first letter references column 5, and the second letter references a maintenance function from column 3, A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, Section II.

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# SECTION II - MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
01	FRAME AND HOUSING													
	TIEDOWN RINGS	C							O					
	CABLE SUPPORT ASSEMBLY	C							H	H				
	BATTERY HOLDDOWN	C							O	O				
	ACCESS DOORS	C							O	F				
	ACCESS COVERS	C							O	F				
	CONTROL FENDER PANELS	C							H	H				
	EXHAUST FENDER ASSEMBLY	C							H	H				
	FUEL HOUSING	C							H	H				
	INLET AIR HOUSING	C							H	H				

# Section II. MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
01	FRAME AND HOUSING (cont)													
	BLEED AIR CONNECTOR	O							O					
	BLEED AIR LINE	O							O	F				
	AIR FILTER	O							H					
	AIR BAFFLE	O							O	O				
	AIR FILTER MUFFLER	O							O	O				
	ENGINE HOUSING	O							H	H				
	ENGINE SUPPORT ASSEMBLY	O							F	F				
	FRAME ASSEMBLY, CHASSIS	C							H	H				
	TURNLOCK FASTENER (STUD AND RECEPTACLE)	C							F					
	LOCKBOLT	C							H					



## Section II. MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
02	DC ELECTRICAL & CONTROL SYSTEM													
	BATTERY CABLE ASSEMBLY	C		O					O	O				M-I
	BATTERY	C	O	O					O				16-B, C	A-B
	WIRING HARNESS	O	O						O	O			4-B	B-B, G-1
	SLAVE RECEPTACLE	C	O						O				4-B	B-B
	GENERATOR ELECTRONIC CONTROL MODULE		O						O	H			4-B	B-B, K-I, L-I
	PC BOARD		F						H	D				
	GECM WIRING HARNESS		F						F	F				
	CIRCUIT BREAKER		O						O				4-B	B-B
	STARTER ASSEMBLY		O						O	F			4-B	B-B
	CURRENT SHUNT (20 AMP)	O							O					

SECTION II - MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A INSPECT	B TEST	C SERVICE	D ADJUST	E ALIGN	F CALIBRATE	G INSTALL	H REPLACE	I REPAIR	J OVERHAUL	K REBUILD		
03	ELECTRICAL POWER GENERATION & CONTROL SYSTEM													
	GENERATOR ASSEMBLY		F						F	F	D			
	FILTER BOX ASSEMBLY		F						F	F				
	GENERATOR FAN	F							F					
	ARMATURE ASSEMBLY	F	F						F					
	BEARINGS	F							F					
	RECTIFIER ASSEMBLY								F	F				
	STATOR ASSEMBLY		F						F	D				
	DIODES		F						F					

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## SECTION II - MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A INSPECT	B TEST	C SERVICE	D ADJUST	E ALIGN	F CALIBRATE	G INSTALL	H REPLACE	I REPAIR	J OVERHAUL	K REBUILD		
04	FUEL SYSTEM													
	FUEL LINES, VALVES, FITTINGS (ENGINE HOUSING)	O							O					
	FUEL LINES, VALVES, FITTINGS (INTERNAL)	C							O					
	ELECTRICAL FUEL PUMP (TRANSFER)	C	O	O					O				5-B	C-B, H-C
	FLUID FILTER (PRIMARY)	C		O					O					H-C
	ENGINE FUEL TANK	C							O	F			5-B	C-B
	FLUID FILTER (SECONDARY)	C		O					O					H-C
	ELECTRICAL FUEL PUMP (HIGH PRESSURE)	C	F						O	F			5-B, 6-B, I	D-D

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# SECTION II - MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
04	FUEL SYSTEM (cont)													
	SOLENOID VALVE	C	F						0	F			5-B,6-B,I	D-D
	FUEL INJECTION NOZZLES (3)	0	F	0					0				5-B,6-B,H	D-D
05	IGNITION SYSTEM													
	HIGH TENSION LEAD	0	0						0				4-B	B-B
	SPARK IGNITER	0	0	0					0				4-B	B-B
	IGNITION COIL		0						0				4-B	B-B
06	LUBRICATION ASSEMBLY													
	OIL FILLER/BREATHER ASSEMBLY	0		0					0	0				
	OIL LEVEL GAGE	C							0					

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SECTION II - MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
06	LUBRICATION ASSEMBLY (cont)													
	OIL FILTER ASSEMBLY								0					
	OIL DRAINS	0							0					
	LINES & FITTINGS (EXTERNAL)	0							0					
	OIL PRESSURE RELIEF VALVE		F						F	F				
	OIL COOLER	0		0					F	F				
	ROTARY PUMP	F							H	H				
07	ENGINE													
	FOREIGN OBJECT DEFLECTION SHIELD (FODS)								0					
	GAS TURBINE ENGINE ASSEMBLY								F	F	D		1-J, 17-H	N-I

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## SECTION II MAINTENANCE CHART

(1) GROUP NUMBER	(2)  FUNCTIONAL GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
07	ENGINE (cont)													
	RIM CLENCHING CLAMP	O								F				
	COMBUSTION CHAMBER CASE	F								F	D			
	COMBUSTION CHAMBER	F								F	D			
	TURBINE NOZZLE	D								D				1-H, 8-A,H
	TURBINE WHEEL	D								D				8-H, 17-H
	TURBINE BACKSHROUD	D								D				
	COMPRESSOR DIFFUSE	D	D							D				8-H
	BEARING AND SEAL	D								D				1-H, 8-H, 18-H
	ASSEMBLY													E-D, F-F
Change 7 C11														

SECTION II - MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
07	ENGINE (cont)													
	COMPRESSOR IMPELLER/ SHAFT ASSEMBLY	D							D				17-H	
	PAD EYE	F							F					
	COMPRESSOR INLET HOUSING	O							D	D				
	GEARBOX ASSEMBLY	O							F	D	D			
	SEDIMENT STRAINER	F		F					F					
	STARTER MOUNTING COVER	O		O					D	D				
	STARTER SPUR GEAR, SHAFT, BEARING & SEAL	D							D				1-H, 8-H, 18-H	E-D, F-F

# Section II. MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
07	ENGINE (cont)													
	GENERATOR SHOULDERED SHAFT, BEARING & SEALS	D							D				1-H, 8-H, 18-H	E-D, F-F
	OUTPUT SPUR GEAR & BEARING	D							D				1-H, 8-H, 18-H	E-D, F-F
	PINION SPUR GEAR & BEARINGS	D							D				1-H, 8-H, 18-H	E-D, F-F
	LINES & FITTINGS (INTERNAL)	D							D					
	GEARBOX HOUSING	O							D	D				
08	ENGINE EXHAUST													
	EXHAUST DUCT ASSEMBLY	F							F	F				
	EXHAUST RIM CLENCHING CLAMP (1)	F							F					



## Section II. MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
08	ENGINE EXHAUST (cont)													
	EXHAUST NOZZLE	F							F	F				
09	ENGINE AND GENERATOR CONTROLS & INSTRUMENTS													
	ENGINE ELECTRONIC CONTROL MODULE		O						O	H	D		19-I	K-I, L-I
	PC BOARD (POWER)		F						H	D	D			
	PC BOARD (SWITCH)		F						H	D	D			
	PC BOARD (MPU)		F						H	D	D			
	MONOPOLE SPEED SENSOR ASSEMBLY	O							O				4-B	B-B
	THERMOCOUPLE (EGT)		O						O				4-B	B-B
	LOW OIL PRESSURE SHUTDOWN SWITCH	O	O						O				4-B	B-B
	CONTROL PANEL ASSEMBLY	O	O						O	O			4-B	B-B

**SECTION II - MAINTENANCE CHART**

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
09	ENGINE AND GENERATOR CONTROLS & INSTRUMENTS (cont)													
	AMMETER, BATTERY CHARGER	C			0				0					
	MASTER SWITCH		0						0				4-B	B-B
	HOURLMETER	C	0						0					
	PANEL LIGHTS	C	0						0					
	INDICATOR LIGHTS (ALL)	C	0						0					
	LAMPS, INCANDESCENT (ALL)		C						C					
	VOLTMETER	C			0				0					
	AMMETER	C			0				0					

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(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
09	ENGINE AND GENERATOR CONTROLS (INSTRUMENTS) (cont)													
	POTENTIOMETER		0						0				4-B	B-B
	SWITCHES		0						0				4-B	B-B
	WIRING HARNESSSES (2)	0	0						0	0			4-B	B-B,G-1
10	LOAD CONNECTION													
	POWER CABLE ASSEMBLY	C							0	F				
	COMPONENT MOUNTING PANEL								0					
	MAGNETIC CONTACTOR (OUTPUT)	0	0						0				4-B	B-B
	CURRENT SHUNT (1000 AMP)	0							0					

# SECTION II - MAINTENANCE CHART

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
10	LOAD CONNECTION (cont)													
	TERMINAL BOARDS	0							0	0				
	RF FILTER (FL1)								0	0				
	CAPACITORS								0					
	RESISTORS								0					
11	RUNNING GEAR													
	BRAKE CONTROL INSTALLATION	C		0	0				0	0			17-H,18-H	
	TORSION AXLE ASSEMBLY	0							F					
	WHEEL ASSEMBLY	C							0				17-H	
	TIRES/TUBES	C		C					0	0				

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(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
11	RUNNING GEAR (cont)													
	BRAKE ASSEMBLY	O							O	O				
	LUNETTE EYE	C							O					
	SWIVEL CASTER WHEEL AND TIRE	C		O					O	O			17-H,I	
	SWIVEL CASTER	C		O					F	F			17-H,I	

### Section III. TOOLS, TEST AND SUPPORT EQUIPMENT REQUIREMENTS

Reference code	Maintenance category	Nomenclature	NSN
1-A,H,I,J	O,F,H,D	Micrometers (inside, outside)	
2-B	D	Wheatstone Bridge	
3-B	D	Kelvin Bridge	
4-B	O,F,H,D	Multimeter	6625-00-581-2466
5-B	O,F	Pressure Gage (0-25 psig)	
6-B,I	F,H,D	Variable DC Power Supply (15 Amp)	
7-B,I	F,H,D	Frequency Meter	
8-A,H,I,J	F,D	Thickness Gage	5210-00-221-1999
9-B,I	O,D	Decade Resistance Box	(44655) 3420
10-B,I	O,D	Digital Counter	(80009) DC509
11-B,I	O,D	Digital Multimeter	(80009) DC5024
12-B,I	O,D	Pulse Generator	(80009) PG508
13-B,I	O,D	Oscilloscope	(80009) 2465
14-B,H	O	Thermocouple Calibrator	(80009) CL-505
15-B,I	O,D	Power Supply	(85604) ATE36-15M
16-B,C	o	Hydrometer	6630-00-171-5126
17-H,I,J	O,F,H,D	Torque Wrench (0-600 inch pound)	
18-H,I,J	D	Universal Puller Kit	5180-00-701-8046
19-1	D	Engine Electronic Control Module (EECM) Test Fixture	(51913)
20-1	F,H	Hydraulic Installation Tool Nose Assembly	(29666) 211, 223 (29666) 99-1121

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#### Section IV. REMARKS

Reference code	Remarks
A-B	Hydrometer test
B-B	Continuity check
C-B	Pressure test - component installed
D-D	Bench test
E-D	Replace gears, bearings
F-F	Measure shim thickness
G-I	Fabricate new harness
H-C	Clean filter element
I-C	Lubricate
K-I	Replace defective circuit cards
L-I	Repair limited to connectors
M-I	Repair limited to replacing terminal lugs
N-I	Repair at direct support level limited to items that do not require disassembly of rotating group

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ARMY TM 5-6115-612-12  
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AIR FORCE TO 35C2-3-471-1  
NAVY AG-320B0-0MM-000

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1		
B1		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 Cylinders. The engine on my set only has 4 Cylinders. Change the manual to show 4 Cylinders.

Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a skin. Please correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2 910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

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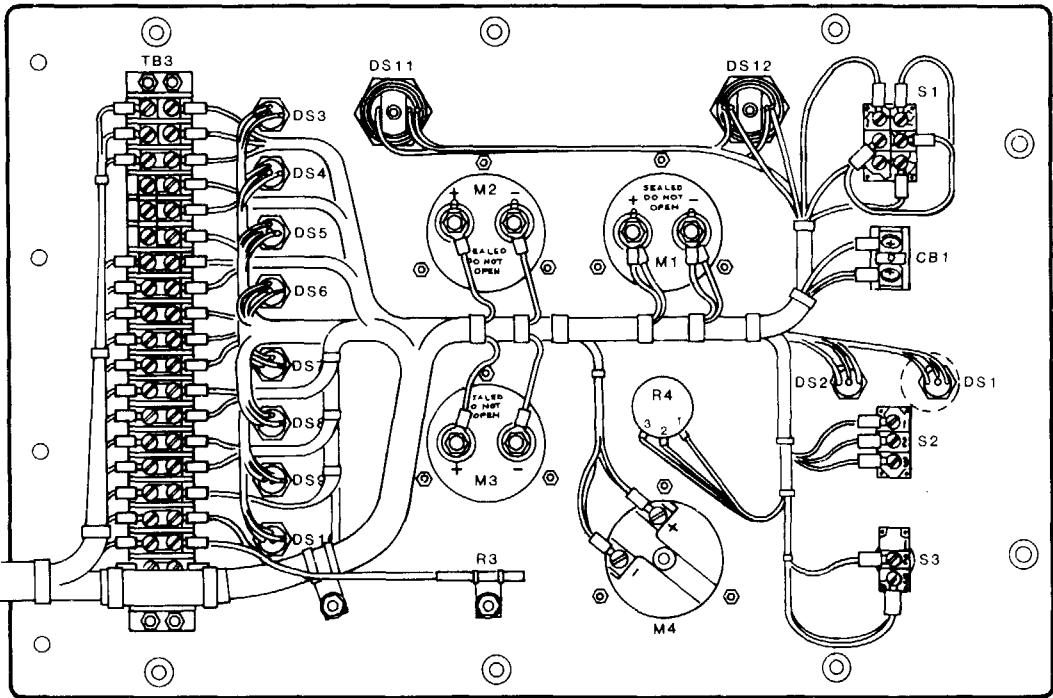


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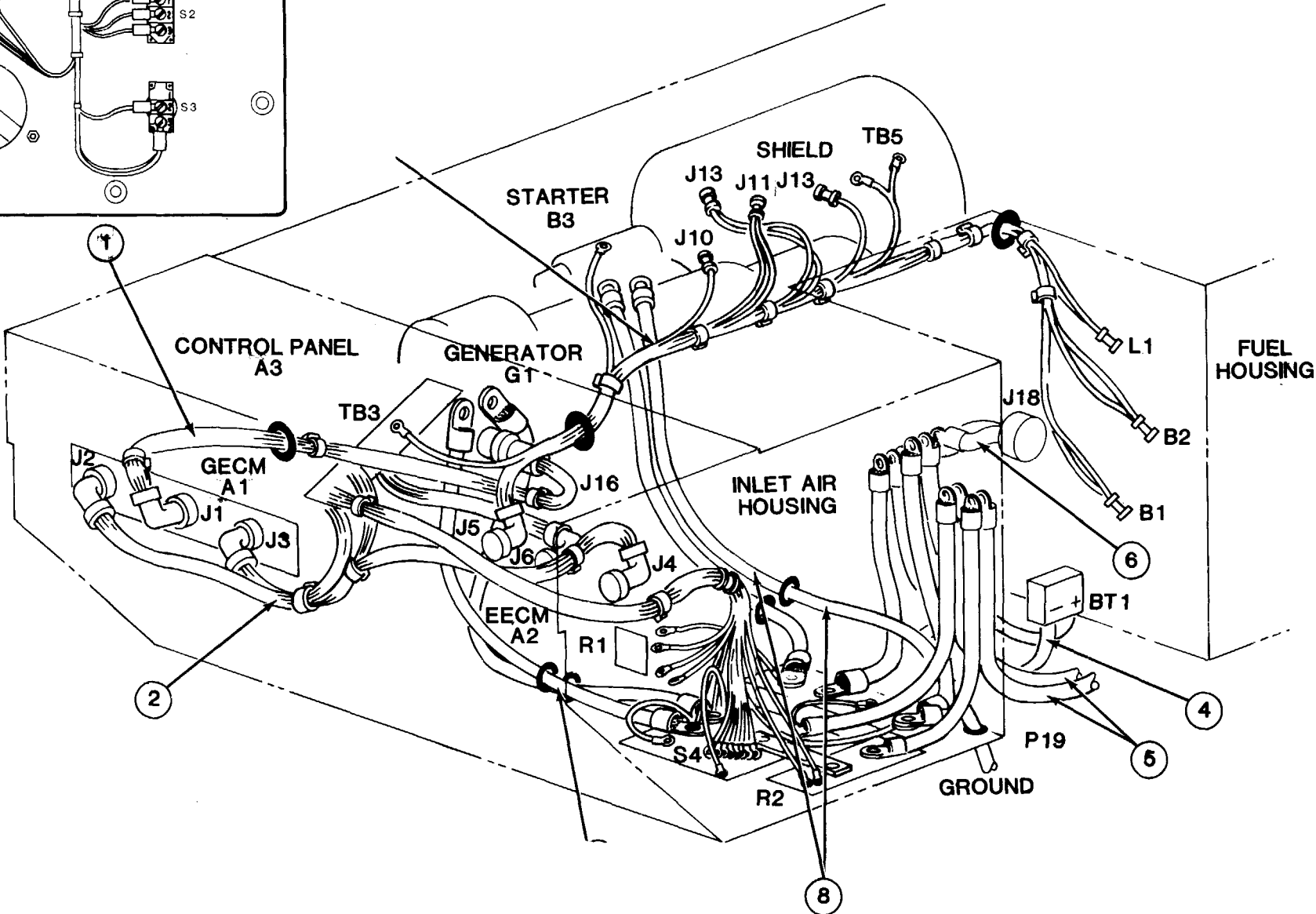
REF DESIG	NOMENCLATURE
B1	ELECTRICAL FUEL PUMP (TRANSFER)
B2	ELECTRICAL FUEL PUMP (HIGH PRESS)
BT1	BATTERY
CB1	DC CIRCUIT BREAKER
	PRESS-TO-TEST
DS1	CONTACTOR READY TO LOAD LIGHT
DS2	CONTACTOR CLOSED LIGHT
	ENGINE
DS3	LOW FUEL LIGHT (NOT OPERABLE)
DS4	LOW OIL PRESSURE LIGHT
DS5	OVERTEMP LIGHT
DS6	OVERSPEED LIGHT
	GENERATOR
DS7	OVERLOAD
DS8	OVERVOLTAGE
DS9	OVERTEMP
DS10	UNDERVOLTAGE
DS11	PANEL LIGHT
DS12	PANEL LIGHT
J1	GECM
J2	GECM
J3	GECM
J4	EECM
J5	EECM
J6	EECM
J7	NOT USED
J8	NOT USED
J9	NOT USED
J10	LOW OIL PRESSURE SHUTDOWN SWITCH
J11	SPARK IGNITOR
J12	NOT USED
J13	MONOPOLE SPEED SENSOR
J14	NOT USED
J15	NOT USED
J16	GENERATOR
J17	NOT USED
J18	SLAVE RECEPTACLE
L1	SOLENOID VALVE
M1	OUTPUT CURRENT AMMETER
M2	DC VOLTMETER
M3	BATTERY CHARGING AMMETER
M4	HOURLMETER
P19	POWER OUTPUT
R1	SHUNT (20A)
R2	SHUNT (1000A)
R3	TEMPERATURE SENSING RESISTOR
R4	POTENTIOMETER (VOLTAGE ADJUST)
S1	MASTER SWITCH
S2	CONTACTOR SWITCH
S3	PANEL LIGHT SWITCH
S4	OUTPUT CONTACTOR
S5	NOT USED
S6	ENGINE FUEL TANK (DAYTANK)
TB1	TERMINAL BOARD
TB3	TERMINAL BOARD
TB5	EGT THERMOCOUPLE



CONTROL PANEL

LEGEND

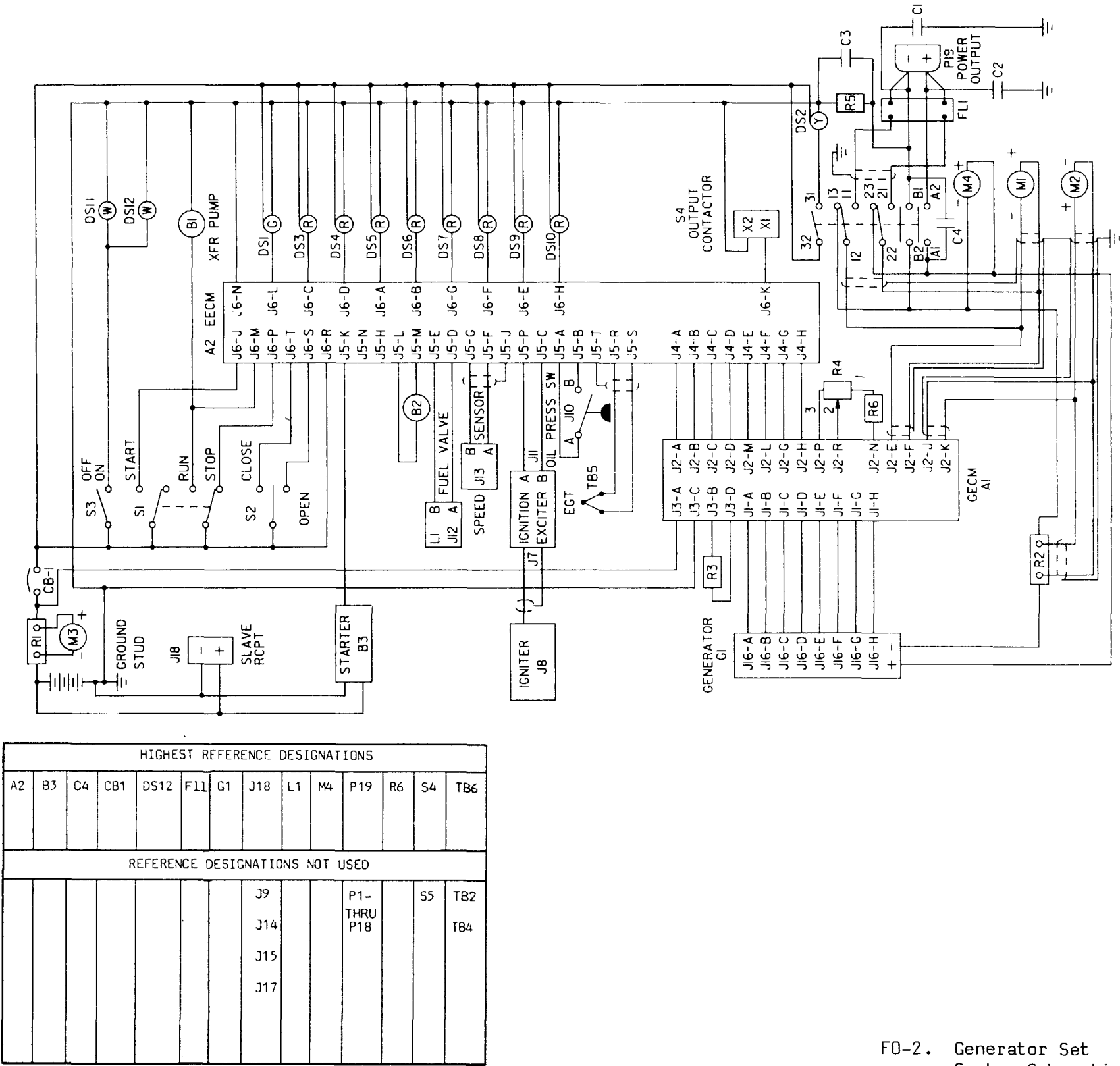
1. W1 GENERATOR TO GECM WIRING HARNESS
2. W2 BRANCHED GECM TO CONTROL PANEL AND EECM WIRING HARNESS
3. W3 BRANCHED EECM TO ENGINE WIRING HARNESS
4. W7 BATTERY WIRING
5. W8 POWER OUTPUT WIRING
6. SLAVE RECEPTACLE WIRING
7. GENERATOR WIRING
8. STARTER WIRING



F0-1. Generator Set Wiring Installation

ELEC REF DESIG	DESCRIPTION
A1	ELECTRONIC CONT MDL,GENERATOR
A2	ELECTRONIC CONT MDL,ENGINE
B1	PUMP,FUEL,TRANSFER
B2	PUMP,FUEL,HIGH PRESSURE
B3	STARTER,ENGINE
C1	CAPACITOR, 0.1 F
C2	CAPACITOR, 0.1 F
C3	CAPACITOR, 1.0 F
C4	CAPCIATOR, 18K F
CB1	CIRCUIT BREAKER,10A 24VDC
DS1	LIGHT,INDICATOR,PRESS-TO-TEST,GREEN
DS2	LIGHT,INDICATOR,PRESS-TO-TEST,YELLOW
DS3	LIGHT,INDICATOR,PRESS-TO-TEST,RED
DS4	LIGHT,INDICATOR,PRESS-TO-TEST,RED
DS5	LIGHT,INDICATOR,PRESS-TO-TEST,RED
DS6	LIGHT,INDICATOR,PRESS-TO-TEST,RED
DS7	LIGHT,INDICATOR,PRESS-TO-TEST,RED
DS8	LIGHT,INDICATOR,PRESS-TO-TEST,RED
DS9	LIGHT,INDICATOR,PRESS-TO-TEST,RED
DS10	LIGHT,INDICATOR,PRESS-TO-TEST,RED
DS11	LIGHT,PANEL,ILLUMINATING
DS12	LIGHT,PANEL,ILLUMINATING
FL1	RF FILTER (EMI)
G1	GENERATOR,10KW 28VDC
J1	GECM CONNECTOR,RECEPTACLE,ELECTRICAL
J2	GECM CONNECTOR,RECEPTACLE,ELECTRICAL
J3	GECM CONNECTOR,RECEPTACLE,ELECTRICAL
J4	EECM CONNECTOR,RECEPTACLE,ELECTRICAL
J5	EECM CONNECTOR,RECEPTACLE,ELECTRICAL
J6	EECM CONNECTOR,RECEPTACLE,ELECTRICAL

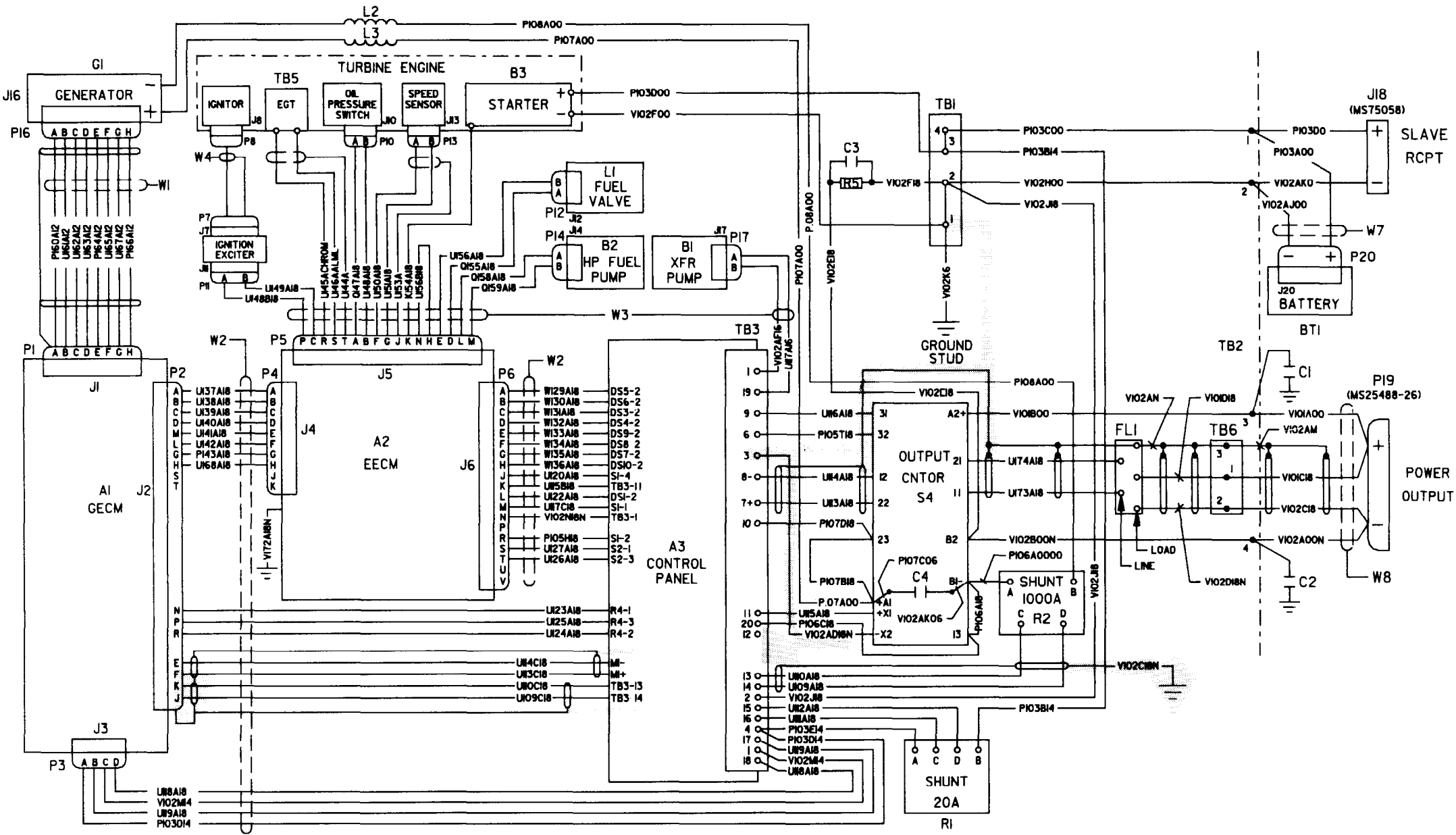
ELEC REF DESIG	DESCRIPTION
J7	ELECTRICAL RECEPTACLE, IGNITION EXCITER
J8	SPARK IGNITER
J10	LOW OIL PRESSURE SHUTDOWN SWITCH ELEC RECEPTACLE
J11	SPARK IGNITOR ELEC RECEPTACLE
J12	SOLENOID VALVE ELEC RECEPTACLE
J13	DIGITAL SPEED SENSOR ELEC RECEPTACLE
J16	GENERATOR ELEC RECEPTACLE
J18	SLAVE RECEPTACLE ASSY
L1	VALVE,SHUTOFF,FUEL
M1	METER,DC VOLTAGE
M2	AMMETER,OUTPUT CURRENT
M3	METER,DC,BATTERY CHARGING
M4	INDICATOR,ELAPSED TIME
P19	CONNECTOR,PLUG,ELEC
R1	SHUNT,20 AMP
R2	SHUNT,1000 AMP
R3	RESISTOR,TEMP SENSING
R4	POTENTIOMETER,2W,10K OHM
R5	RESISTOR,5W,1K OHM
R6	RESISTOR,5W,750 OHM
S1	SWITCH,TOGGLE,2 POLE (MASTER)
S2	SWITCH,TOGGLE,1 POLE (CONTACTOR)
S3	SWITCH,TOGGLE,1 POLE (PANEL LIGHTS)
S4	CONTACTOR,OUTPUT
TB5	TERMINALS THERMOCOUPLE,ENGINE



F0-2. Generator Set System Schematic

REF DES	DESCRIPTION	REF DES	DESCRIPTION
A1	ELECTRONIC CONT MDL, GEN	L2	CABLE ASSY
A2	ELECTRONIC CONT MDL, ENG	L3	CABLE ASSY
A3	CONTROL PANEL ASSY	P1	CONNECTOR, PLUG, ELEC
B1	PUMP, FUEL, TRANSFER	P2	CONNECTOR, PLUG, ELEC
B2	PUMP, FUEL, HIGH PRESSURE	P3	CONNECTOR, PLUG, ELEC
B3	STARTER, ENGINE	P4	CONNECTOR, PLUG, ELEC
BT1	BATTERY, 24VDC	P5	CONNECTOR, PLUG, ELEC
C1	CAPACITOR ASSY	P6	CONNECTOR, PLUG, ELEC
C2	CAPACITOR ASSY	P7	CONNECTOR, IGNITION LEAD
C3	CAPACITOR	P8	CONNECTOR, IGNITION LEAD
C4	CAPACITOR	P10	CONNECTOR, PLUG, ELEC
FL1	RF FILTER	P11	CONNECTOR, PLUG, ELEC
G1	GENERATOR, 10KW 28VDC	P12	CONNECTOR, PLUG, ELEC
J1	RECEPTACLE, ELECTRIC	P13	CONNECTOR, PLUG, ELEC
J2	RECEPTACLE, ELECTRIC	P14	CONNECTOR, PLUG, ELEC
J3	RECEPTACLE, ELECTRIC	P16	CONNECTOR, PLUG, ELEC
J4	RECEPTACLE, ELECTRIC	P17	CONNECTOR, PLUG, ELEC
J5	RECEPTACLE, ELECTRIC	P19	CONNECTOR, PLUG, ELEC
J6	RECEPTACLE, ELECTRIC	P20	PLUG, ELEC, 2 WIRE
J7	RECEPTACLE, ELECTRIC	R1	SHUNT, 20 AMP
J8	RECEPTACLE, ELECTRIC	R2	SHUNT, 1000 AMP
J10	RECEPTACLE, ELECTRIC	R5	RESISTOR, 5W, 1K OHM
J11	RECEPTACLE, ELECTRIC	S4	CONTACTOR, OUTPUT
J12	RECEPTACLE, ELECTRIC	TB1	BOARD, TERMINAL
J13	RECEPTACLE, ELECTRIC	TB3	BOARD, TERMINAL
J14	RECEPTACLE, ELECTRIC	TB5	TERMINALS, THERMOCOUPLE
J16	RECEPTACLE, ELECTRIC	TB6	BOARD, TERMINAL
J17	RECEPTACLE, ELECTRIC	W1	WIRING HARNESS, GECM-GEN
J18	SLAVE RECEPTACLE	W2	WIRING HARNESS, CONTROL PANEL
J20	BATTERY RECEPTACLE	W3	WIRING HARNESS, ENGINE
L1	VALVE, SHUTOFF, FUEL	W4	LEAD, IGNITION
		W7	CABLE ASSY, BATTERY
		W8	CABLE ASSY, 40 FOOT

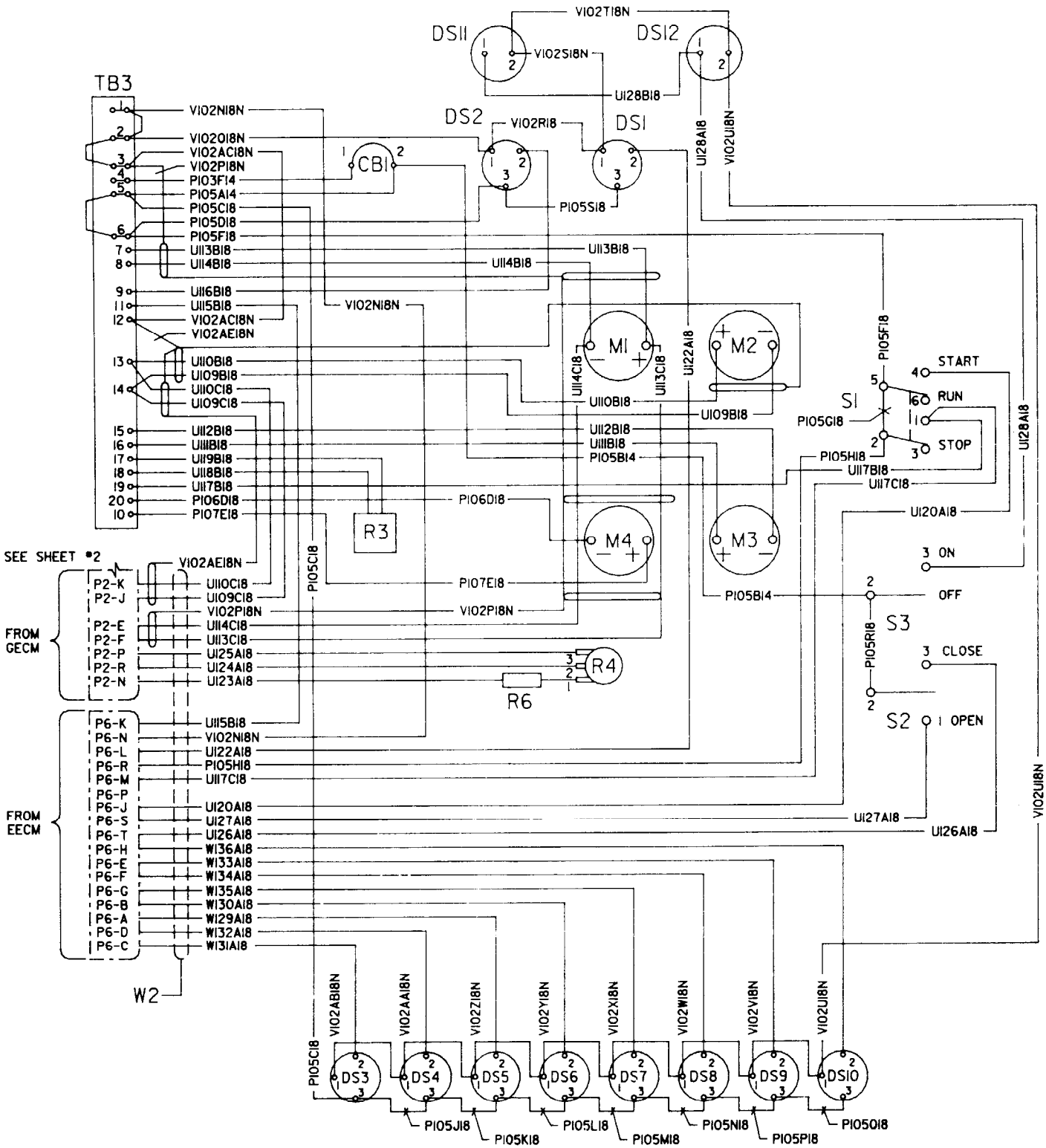
HIGHEST REFERENCE DESIGNATIONS											
A3	B3	BT1	C4	FL1	G1	J20	L3	P20	R5	S4	W8
REFERENCE DESIGNATIONS NOT USED											
						J9		P9	R3	S1	TB2
						J15		P15	R4	S2	TB4
						J19		P18		S3	W5
											W6



FO-3. Generator Set Wiring Diagram

REF DES	DESCRIPTION
CB1	CIRCUIT BREAKER, 10A 24VDC
DS1	LIGHT, INDICATOR, PRESS-TO-TEST, GREEN
DS2	LIGHT, INDICATOR, PRESS-TO-TEST, YELLOW
DS3	LIGHT, INDICATOR, PRESS-TO-TEST, RED
DS4	LIGHT, INDICATOR, PRESS-TO-TEST, RED
DS5	LIGHT, INDICATOR, PRESS-TO-TEST, RED
DS6	LIGHT, INDICATOR, PRESS-TO-TEST, RED
DS7	LIGHT, INDICATOR, PRESS-TO-TEST, RED
DS8	LIGHT, INDICATOR, PRESS-TO-TEST, RED
DS9	LIGHT, INDICATOR, PRESS-TO-TEST, RED
DS10	LIGHT, INDICATOR, PRESS-TO-TEST, RED
DS11	LIGHT, PANEL, ILLUMINATING
DS12	LIGHT, PANEL, ILLUMINATING
M1	METER, DC VOLTAGE
M2	AMMETER, OUTPUT CURRENT
M3	METER, DC, BATTERY CHARGING
M4	INDICATOR, ELAPSED TIME
P2	CONNECTOR, PLUG, ELECTRIC
P6	CONNECTOR, PLUG, ELECTRIC
R3	RESISTOR, TEMP SENSING
R4	POTENTIOMETER, 2W, 10K OHM
R6	RESISTOR, 5W, 750 OHM
S1	SWITCH, TOGGLE, 2 POLE (MASTER)
S2	SWITCH, TOGGLE, 1 POLE (CONTACTOR)
S3	SWITCH, TOGGLE, 1 POLE (PANEL LIGHTS)
TB3	TERMINAL BOARD, MOLDED BARRIER
W2	WIRING HARNESS, CONTROL PANEL

HIGHEST REFERENCE DESIGNATIONS							
CB1	DS12	M4	P6	R4	S3	TB3	W2
REFERENCE DESIGNATIONS NOT USED							
			P1	R1		TB1	W1
			P3	R2		TB2	
			P4				
			P5				



FO-4. Control Panel Wiring Diagram

# 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 dekagram = 10 grams = .35 ounce  
 1 hectogram = 10 dekagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

## Liquid Measure

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