ARMY TM 9-6115-641-24
AIR FORCE TO 35C2-3-456-12

TECHNICAL MANUAL
UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

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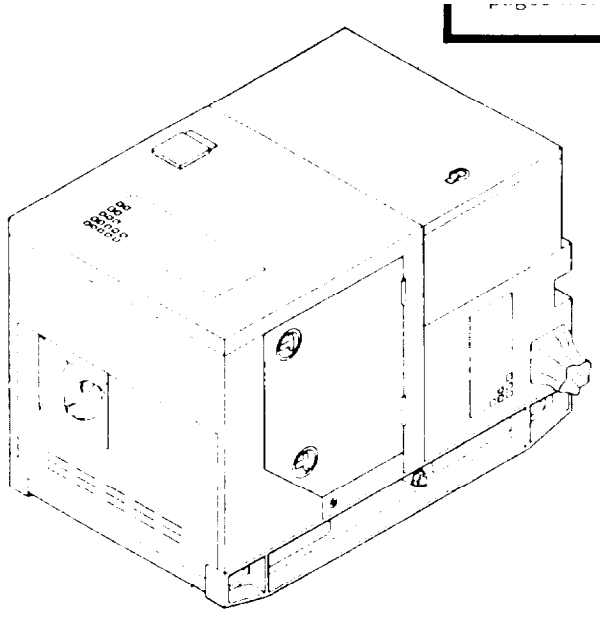

GENERATOR SET,
SKID MOUNTED, TACTICAL QUIET

5 KW, 60 AND 400 Hz

MEP-802A (60 Hz) 6115-01-274-7387

MEP-812A (400 Hz) 6115-01-274-7391

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1 SEPTEMBER 1993

CHANGE

No. 3

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WASHINGTON, DC., 30 September 1995

UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

GENERATOR SET, SKID MOUNTED, TACTICAL QUIET

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2-135 and 2-136	2-135 and 2-136
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AIR FORCE TO 35C2-3-456-12
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NO. 2

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Unit, Direct Support and
General Support Maintenance Manual

GENERATOR SET,
SKID MOUNTED, TACTICAL QUIET

5KW, 60 AND 400 Hz
MEP-802A (60Hz) 6115-01-274-7387
MEP-812A (400Hz) 6115-01-274-7391

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2-57 and 2-58	2-57 and 2-58
2-65 and 2-66	2-65 and 2-66
2-105 and 2-106	2-105 and 2-106
2-123 and 2-124	2-123 and 2-124

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HEADQUARTERS
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WASHINGTON, D.C., 15 DECEMBER 1993

TECHNICAL MANUAL

UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL GENERATOR SET, SKID MOUNTED, TACTICAL QUIET 5 KW, 60 AND 400 HZ, MEP-802A (60 Hz) 6115-01-274-7387 MEP-812A (400 Hz) 6115-01-274-7391

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C-1 and C-2	C-1 and C-2

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AIR FORCE TO35C2-3-456-12
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High voltage is produced when this generator set is in operation. Improper operation could result in personal injury or death.

Battery acid can cause burns to unprotected skin. Wear protective clothing including rubber gloves and eye protection when servicing the batteries. Failure to observe this warning could result in severe injury or death.

Batteries give off flammable gas. Do not smoke or use open frame when performing maintenance. Flames and explosion could result in severe personal injury or death.

Exhaust discharge contains deadly gases. Do not operate generator sets in enclosed areas unless exhaust discharge is properly vented outside. Severe personal injury or death due to carbon monoxide poisoning could result.

The fuels used in this generator set are highly explosive. Do not smoke or use open frames when performing maintenance. Fire or explosion could cause serious injury or death.

When filling the fuel tank, maintain metal-to-metal contact between filler nozzle and fuel tank opening. Failure to observe this warning could result in explosion, injury, or death.

Diesel fuel is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

Liquids under pressure are generated as a result of operation of the generator set. High pressure leaks could cause severe personal injury or death.

The coolant system operates at high temperatures. Personal injury or death from burns or scalding could result from high pressure steam.

With any access door open, the noise level of this generator set when operating could cause hearing damage. Hearing protection must be worn when operating or working near the generator set while running.

Never attempt to start the generator set if it is not properly grounded. Failure to observe this warning could result in serious injury or death by electrocution.

Hot refueling of generator set, while operating, presents a safety hazard and should not be attempted. Hot engine surfaces and sparks from the engine and generator circuitry are possible sources of ignition. Severe injury or death could result.

Dry cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

Remove metal jewelry when working on electrical system/components. Failure to observe this warning could cause severe personal injury or death by electrocution.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

FOR FiRST AiD REFER TO FM 21-11

TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND AIR FORCE
WASHINGTON, D. C., 1 SEPTEMBER 1993

Unit, Direct Support and General Support Maintenance Manual
GENERATOR SET, SKID MOUNTED, TACTICAL QUIET

5 KW, 60 and 400 Hz

MEP-802A (60 Hz) 6115-01-274-7387
MEP-812A (400 Hz) 6115-01-274-7391

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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.

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U.S. ARMY AVIATION AND TROOP COMMAND
ATTN: AMSAT–I–MP
4300 Goodfellow Blvd.
St. Louis, MO 63120-1798

(F) Air Force - AFTO Form 22 directly to:

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McClellan AFB, CA 95652-5990 (AFMC)

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HOW TO USE THIS MANUAL

In this manual (TM 9-6115-641-24), paragraphs are underlined and the sections and chapters appear in capital letters. The location of additional material that must be referenced is clearly marked. Illustrations in this text are located as close as possible to their references.

Chapter 1- INTRODUCTION. Contains general information, equipment description and data, and principles of operation for the generator set.

Chapter 2- UNIT MAINTENANCE INSTRUCTIONS. Contains information on servicing the generator set and components upon receipt, Unit level Preventive Maintenance Checks and Services (PMCS), troubleshooting procedures used to recognize and correct generator set malfunctions, and all maintenance procedures authorized at Unit level.

Chapter 3- GENERAL MAINTENANCE INSTRUCTIONS. Contains Direct Support level troubleshooting procedures used to recognize and correct generator set malfunctions, and procedures for the removal and installation of major components.

Chapter 4- DIRECT SUPPORT MAINTENANCE INSTRUCTIONS. Contains all maintenance procedures authorized to be performed on the generator set at the Direct Support level.

APPENDICES.

Appendix A is a list of publications referenced in this manual and should be used in conjunction with this manual.

Appendix B is the Maintenance Allocation Chart (MAC) which designates all maintenance and repair functions authorized to be performed at the different maintenance levels.

Appendix C is the Expendable/Durable Supplies and Materials List (EDSML) which lists all expendable/durable supplies and materials required in performing the maintenance procedures presented in this manual.

Appendix D lists all parts that require fabrication or assembly for the maintenance of the generator set. Materials and procedures required are included.

Index. The index contains key technical manual subjects arranged in alphabetical order. If you require information on a specific subject (i.e., Time Meter), but you are not sure where to look, use the index to locate specific paragraph.

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE.

This manual contains Unit, Direct Support and General Support maintenance instructions for the Tactical Quiet (TQ), 5 kW 60 and 400 Hz Generator Sets (FIGURE 1–1), herein referred to as generator sets. Included are descriptions of major components and their functions in relation to other components.

Mode Number	Equipment Name
MEP-802A	Generator Set, Skid Mounted, Tactical Quiet 5 kW 60 Hz
MEP-812A	Generator Set, Skid Mounted, Tactical Quiet 5 Kw 400 Hz

The generator set provides tactical quiet AC power. The generator set is easily transported, operated, and maintained.

1-2. LIMITED APPLICABILITY.

Some portions of this publication are not applicable to all services. These portions are prefixed to indicate the service(s) to which they pertain: (A) for Army, (F) for Air Force, and (N) for Navy.

1-3. MAINTENANCE FORMS AND RECORDS.

1-3-1. (A) Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3-2. (F) Maintenance forms and records maintained by the Air Force are prescribed in AFR 66-1 and the applicable TO 00-20 Series Technical Orders.

1-3-3. (N) Navy users should refer to their service peculiar directives to determine the 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:

1-4-1. (A) Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to:

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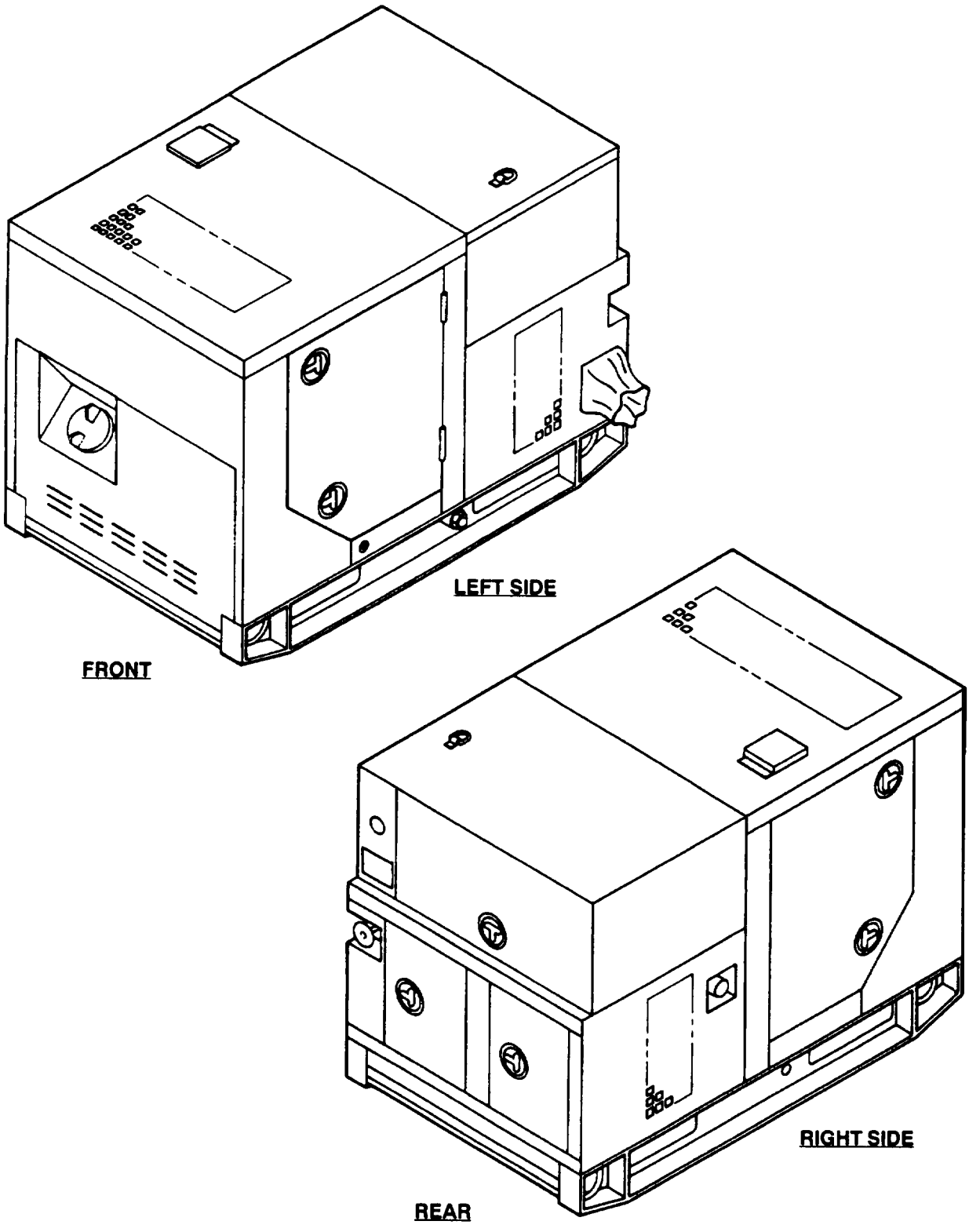

Figure 1-1. Generator Set, 5 kW, Tactical Quiet

1-5. EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

1-5-1. If your generator set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. We will send you a reply.

1-5-2. (A) Put it on an SF 368 (Product Quality Deficiency Report). EIRs should be mailed directly to:

Commander
U.S. Army Aviation and Troop Command
Attn: AMSTR–MOF
4300 Goodfellow Blvd.
St. Louis, MO 63120-1798

1-5-3. (N) Put it on applicable Navy form and mail it directly to:

Naval Construction Battalion Center
Attn: Code 157
Civil Engineer Support Office (CESO)
Port Hueneme, CA 93043-5000

1-5-4. (F) Send QDR/MDR by electric message to:

SMALC
McClellan AFB CA//TlLBE//

For technical assistance notify:

SM-ALC/LIEAE
Attn: Equipment Specialist, TQG
McClellan AFB, CA 95652–5990

1-6. LEVELS OF MAINTENANCE

1-6-1. (A) Army users shall refer to the Maintenance Allocation Chart (MAC) for tasks and levels of maintenance to be performed.

1-6-2. (F) Refer to the Source Maintenance Recoverability (SMR) Codes for maintenance to be performed.

1-6-3. (N) Navy users shall determine their maintenance levels in accordance with their service directives.

1-7. DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE.

1-7-1. (A) Destruction of the generator set to prevent enemy use shall be in accordance with TM 750-244-3.

1-7-2. (F) (N) Air Force and Navy users shall refer to their service directives to obtain procedures for destruction of materiel to prevent enemy use.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. GENERAL.

The generator sets, models MEP-802A and MEP-81 2A, (Figure 1–1) are fully enclosed, self-contained, skid–mounted, portable units. They are equipped with controls, instruments, and accessories necessary for operation as single units. The generator sets consist of a diesel engine, brushless generator, excitation system, speed governing system, fuel system, 24 VDC starting system, control system and fault system.

1-9. TABULATED/ILLUSTRTED DATA.

For a list of Tabulated Data refer to Table 1–1.

Table 1-1. Tabulated Data

	MEP-802A	MEP-812A
1 Generator Set:		
a. National Stock Number	6115-01-274-7387	6115-01-274-7391
b. Overall Length	50.6 in. (128.6 cm)	50.6 in. (128.6 cm)
c. Overall Width	32 in. (81 .28 cm)	32 in. (81 .28 cm)
d. Overall Height	37 in. (93.98 cm)	37 in. (93.98 cm)
e. Dry Weight (less Basic Issue Items List)	800 lb (362.8 kg)	825 lb (374.2 kg)
f. Wet Weight	868 lb (393.7 kg)	678 lb (398.2 kg)
2 Engine:		
a. Manufacturer	Onan	Onan
b. Model	DN2M	DN2M
c. Type	Two cylinder, four cycle, naturally aspirated diesel	Two cylinder, four cycle, naturally aspirated diesel
d. Displacement	57 cu in. (0.9 liters)	57 cu in. (0.9 liters)
e. Altitude Degradation, 4000 ft. (1220 m) to 8000 ft. (2440 m)	3.5% per 1000 ft (305 m)	3.5% per 1000 ft (305 m)
f. Firing Order	1,2	1, 2
g. Cold Weather Starting Aid System Use	40°F (4°C) to –25°F (–32°C)	40°F (4°C) to –25°F (–32°C)
h. Valve Tappet Clearance Adjustment:	None Required	None Required
3 Cooling System:		
a. Type	Pressurized radiator and pump	Pressurized radiator and pump
b. Capacity	6.2 qts (5.9 liters)	6.2 qts (5.9 liters)
c. Normal Operating Temperature	170-200°F (77–93°C)	170-200°F (77–93°C)
d. Temperature Indicating System Voltage Rating	24 VDC	24 VDC
4 Lubricating System:		
a. Type	Full flow, circulating pressure	Full flow, circulating pressure
b. Oil Pump Type	Positive displacement gear	Positive displacement gear
c. Normal Operating Pressure	25-60 psi (172-414 kPa)	25-60 psi (172-414 kPa)
d. Oil Filter Type	Full flow, spin-on replacement element	Full flow, spin-on replacement element
e. Capacity	3.2 qts (3.0 liters)	3.2 qts (3.0 liters)
f. Pressure Indicating System Voltage Rating	24 VDC	24 VDC

Table 1-1. Tabulated Data - Continued

	MEP-802A	MEP-812A
5 Fuel System:		
a. Type of Fuel	DF-1, DF-2, DF-A, JP4, JP5, JP8	DF-1, DF-2, DF-A, JP4, JP5, JP8
b. Fuel Tank Capacity	5 gal. (18.9 liters)	5 gal. (18.9 liters)
C. Fuel Consumption Rate	.55 gal. (2.1 liters) per hour	.61 gal. (2.3 liters) per hour
d. Auxiliary Fuel Pump:		
(1) Voltage Rating	24 VDC	24 VDC
(2) Delivery Pressure	5-6.5 psi (34.5-65.5 kPa) (max)	5-6.5 psi (34.5-65.5 kPa) (max)
e. Fuel Level Switch:		
(1) Type	Float	Float
(2) Current	0.6 amps (min) at 24 VDC	0.6 amps (min) at 24 VDC
6 Engine Starting System:		
a. Batteries	Two 12 volt, connected in series	Two 12 volt, connected in series
b. Starter:		
(1) Manufacturer	Onan	Onan
(2) Model	191-1550	191-1550
(3) Voltage Rating	24 VDC	24 VDC
(4) Drive Type	Gear reduction	Gear reduction
C. Battery Charging Alternator:		
(1) Manufacturer	Prestolite	Prestolite
(2) Model	8EM3005CA	8EM3005CA
(3) Rating	18 amps at 24 VDC	18 amps at 24 VDC
(4) Protective Fuse	30 amps	30 amps
7 AC Generator:		
a. Manufacturer	Onan	Onan
b. Type	Rotating field, synchronous	Rotating field, synchronous
C. Load Capacity	5 KW	5KW
d. Current Ratings:		
(1) 120/240 volt connection	26 amps	26 amps
(2) 120/208 volt connection	17 amps	17 amps
(3) 120 volt connection	52 amps	52 amps
e. Power Factor	0.8	0.8
f. Cooling	Fan Cooled	Fan Cooled
g. Drive Type	Direct Coupling	Direct Coupling
h. Duty Classification	Continuous	Continuous

Table 1-1. Tabulated Data - Continued

	MEP-802A	MEP-812A
8 Protection Devices:		
a. Low Oil Pressure Switch:		
(1) Trip Pressure	15 ± 3 psi (103.4 ± 20.7 kPa)	15 ± 3 psi (103.4 ± 20.7 kPa)
(2) Voltage Rating	24 VDC	24 VDC
(3) Current Rating	7 amps	7 amps
b. Coolant High Temperature Switch:		
(1) Trip Temperature	225 ± 5°F (107 ± 3°C)	225 ± 5°F (107 ± 3°C)
(2) Voltage Rating	24 VDC	24 VDC
(3) Current Rating	7 amps	7 amps
c. Overvoltage Relay:		
(1) Trip Point Condition	153 ± 3 VAC for no less than 200 milliseconds (120 VAC coil winding)	153 ± 3 VAC for no less than 200 milliseconds (120 VAC coil winding)
(2) Trip Point	No more than 1.25 seconds after trip conditions exist	No more than 1.25 seconds after trip conditions exist

1-10. DIFFERENCES BETWEEN MODELS.

1-10-1. The differences between models of the generator sets covered in this manual are as follows:

a. Model MEP-802A is equipped with a 60 Hz generator and 60 Hz frequency meter.

b. Model MEP-812A is equipped with 400 Hz generator and 400 Hz frequency meter.

1-10-2. Performance characteristics for the two models are shown in Table 1-2.

Table 1-2. Performance Characteristics

	MEP-802A	MEP-812A
1 Voltage:		
(a) Voltage waveform Deviation factor:		
Single phase	6% (max)	6% (max)
Three phase	5% (max)	5% (max)
Single voltage harmonics:		
Single phase	3% (max)	3% (max)
Three phase	2% (max)	2% (max)
(b) Voltage unbalance	5% of rated voltage (max)	5% of rated voltage (max)
(c) Phase balance voltage	1% of rated voltage (max)	1% of fated voltage (max)
(d) Voltage modulation	2.5% (max)	2.5% (max)
(e) Voltage regulation	3% (max)	3% (max)
(f) Short-term stability (30 seconds)	± 2% of rated voltage	± 2% of rated voltage
(g) Long-term stability (4 hours)	± 4% of rated voltage	± 4% of rated voltage

Table 1-2. Performance Characteristics - Continued

	MEP-802A	MEP-812A
(h) Voltage drift (60°F (16°C) in 8-hour period)	2% (max)	2% (max)
(i) Dip and rise for rated load	20% of rated voltage (max)	20% of rated voltage (max)
Recovery time	3 seconds	3 seconds
(j) Dip for low power factor load	35% of no-load voltage (max)	35% of no-load voltage (max)
Recovery time	5 seconds 95% of no–load voltage	5 seconds 95% of no-load voltage
(k) Adjustment range VAC 120V connection 120/240V connection 120/208V connection	60 Hz 114-126V 228-252V 205–220V	400 Hz 114-126V 228-252V 205–220V
2 Frequency:		
(a) Regulation	3% of rated frequency	3% of rated frequency
(b) Short-term steady-state stability (30 seconds)	2% of rated frequency	2% of rated frequency
(c) Long-term steady-state stability (4 hours)	3% of rated frequency	3% of rated frequency
(d) Frequency drift (60°F (16°C) in 8 hour period)	2% (max)	2% (max)
(e) Undershoot with application of load	3% of rated frequency (max)	3% of rated frequency (max)
Recovery time	3 seconds	3 seconds
(f) Overshoot with application of load	4% of rated frequency (max)	4% of rated frequency (max)
Recovery	3 seconds	3 seconds
(9) Adjustment range	± 3% for 60 Hz	± 3% for 400 Hz

Section III. PRINCIPLES OF OPERATION

1-11. INTRODUCTION.

This section contains functional descriptions of the generator set and explains how the controls and indicators interact with the systems, and the location and description of major components.

1-12. PRINCIPLES OF OPERATION.

1-12-1. Fault System

1-12-1-1. The Fault System (Figure 1–2) protects the generator set and any connected load against the potential faults described below and provides an indication of any incurred fault. The following summary of the Fault System will assist in understanding the operation of other generator set systems. Additional details relating to specific protection devices are provided in the descriptions of the respective systems.

1-12-1-2. The Fault System consists of the malfunction indicator, low fuel level float switch, fuel float switch module, fuel level relay, low oil pressure switch, oil pressure relay, coolant high temperature switch, overvoltage relay, overload/ short circuit relay, engine fault relay, and BATTLE SHORT switch. In addition to the fault indicator lamps, the malfunction indicator includes the PUSH TEST & RESET LAMPS switch which when depressed, illuminates all the lamps and resets any fault indication.

1-12-1-3. Activation of anyone of the following protection devices will cause three evants to occur. The AC circuit interrupter relay holding circuit will be deenergized causing the AC circuit interrupter relay to open; the generator set engine will be shutdown; and a fault indicator lamp will be illuminated to show which malfunction occurred.

1-12-1-3-1. Coolant High Temperature Switch. This device will activate when the engine coolant leaving the engine exceeds 225 ± 5°F (107 ± 3°C).

1-12-1-3-2. Low Oil Pressure Switch. This device activates when the engine lubrication oil pressure falls below 15± 3 psi (103.4 ± 20.7 kpa).

1-12-1-3-3. Low Fuel Level Float Switch. This device will activate when the fuel Ievel falls to a point at which the operating time of the set at rated Ioad is four minutes.

1-12-1-3-4. Overvoltage Relay. This device will activate when the 120-volt generator coil winding has risen to and remained at any value greater than 153 ± 3 volts.

1-12-1-4. Fuel Float Switch Module. This device prevents inadvertent engine shutdown by providing a one second delay after actuation of the low fuel level float switch.

1-12-1-5. Activation of any of the following electrical protection devices will cause two events to occur. The AC circuit interrupter relay will open and a fault indicator lamp will illuminate to indicate which fault occurred.

1-12-1-5-1. Short Circuit Relay. This device will activate when the set output current in any phase exceeds 425X 25 percent of the rated value.

1-12-1-5-2. Overload Relay. This device will operate when the load current in any phase exceeds 110 percent of rated value.

1-12-1-6. Although it is possible for more than one fault to occur at one time during operation, only the first fault to occur will be displayed by the malfunction indicator. The activated indicator lamp circuit remains illuminated until the malfunction indicator is reset. The lamp will be off with the MASTER SWITCH in the OFF position and will be re-illuminated when the MASTER SWITCH is turned to one of the RUN positions. Resetting a fault indication is done in two steps. First push the PUSH TEST & RESET LAMPS switch located on the malfunction indicator. Then move the MASTER SWITCH to the OFF position. The generator set cannot be cranked unless both actions are completed. The indicated fault must be corrected before any attempt is made to restart the generator set or dose the AC circuit interrupter relay.

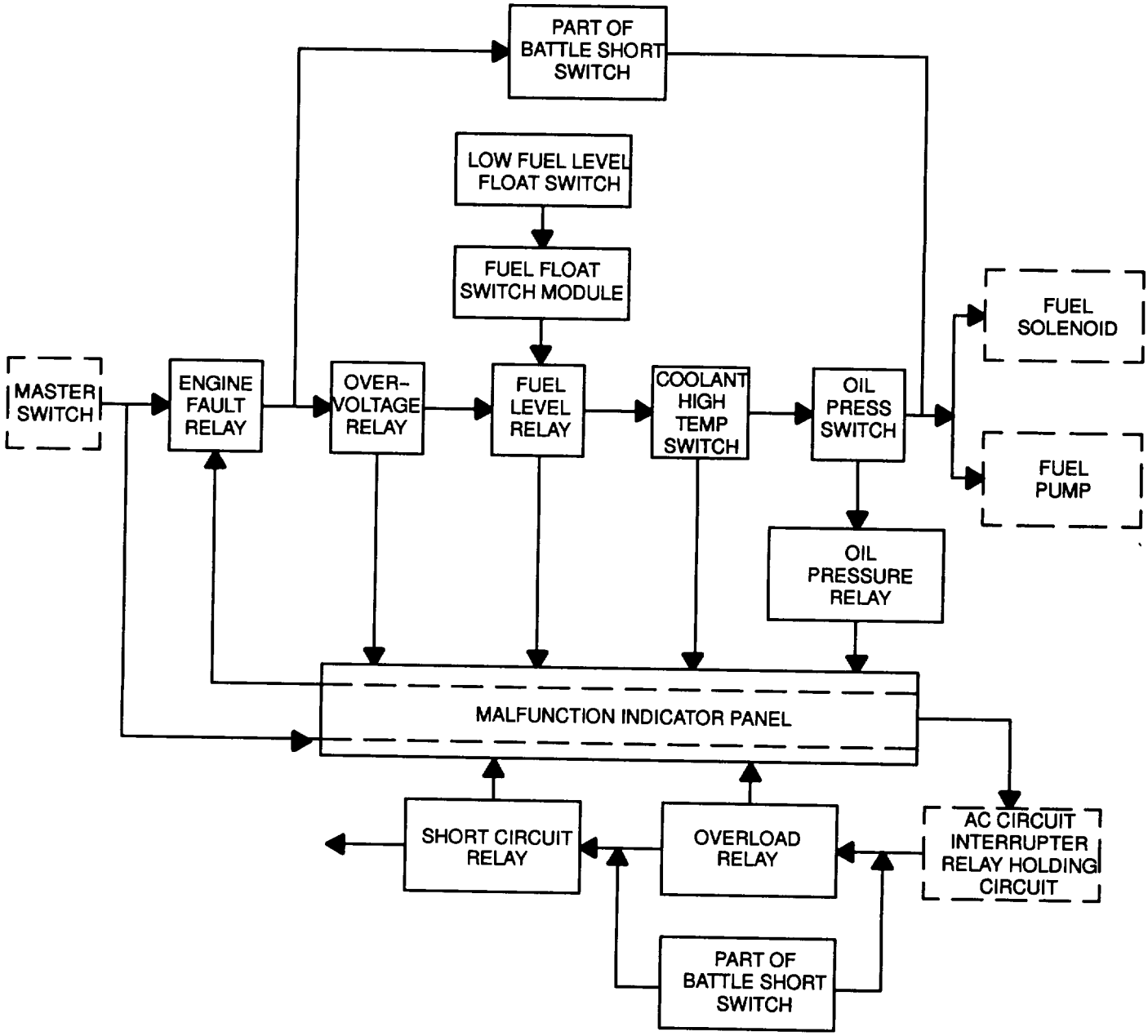

Figure 1-2. Fault System

1-12-1-7. After the generator set engine has been started, the BATTLE SHORT switch can be used to override all of the potential faults except short circuit.

1-12-2. Fuel System.

1-12-2-1. The Fuel System (Figure 1–3) includes a primary subsystem and an auxiliary subsystem.

1-12-2-2. The primary subsystem consists of fuel lines, fittings, fuel tank, low fuel level float switch, fuel float switch module, fuel level sender, FUEL LEVEL indicator, fuel transfer pump, fuel filter/water separator, two injection pumps, and two injectors.

1-12-2-3. Injection pump output is controlled by a mechanical engine governor. The governor also includes a fuel solenoid operated shutoff lever which stops operation of the injection pumps when the solenoid is deenergized. With the MASTER SWITCH in the START or either of the two RUN positions, both the fuel solenoid and the fuel transfer pump are energized. The fuel solenoid positions the shutoff lever to the open position, and the transfer pump starts drawing fuel from the fuel tank. After reaching the fuel transfer pump, fuel passes through a fuel filte/water separator where water and small impurities are removed. The fuel then goes to the injection pumps. With the engine cranking or running the fuel is metered, pressurized and pushed through the injectors by the injection pumps. Fuel is sprayed by the injectors into the engine combustion chamber where it is mixed with air and ignited. The fuel that is not burned by the engine is returned to the fuel tank by an excess fuel return line. Power is removed from the fuel solenoid and the transfer pump, stopping the engine whenever the MASTER SWITCH is turned to OFF position. The fuel solenoid and transfer pump are also de-energized by the fault system (refer to paragraph 1-12-1). The fuel level sender measures tank fuel level which is indicated by the FUEL LEVEL indicator from E (empty) to F (full).

1-12-2-4. The auxiliary subsystem consists of anauxiliary fuel supply, fuel lines, fittings, auxiliary fuel filter, auxiliary fuel pump, auxiliary fuel pump float switch located in the fuel tank, and a fuel float switch module.

1-12-2-5. When the MASTER SWITCH is set on PRIME & RUN AUX FUEL, it actuates the auxiliary fuel pump and transfers fuel from the auxiliary fuel supply to the fuel tank. The auxiliary fuel pump float switch shuts off the auxiliary fuel pump when the fuel tank is full and reactivates the pump as the level drops. The fuel float switch module allows the current used by the auxiliary fuel pump to bypass the float switch.

1-12-2-6. The 24 VDC control circuits provide control and power for operation of the fuel solenoid, indicators, fuel transfer pump, and auxiliary fuel pump.

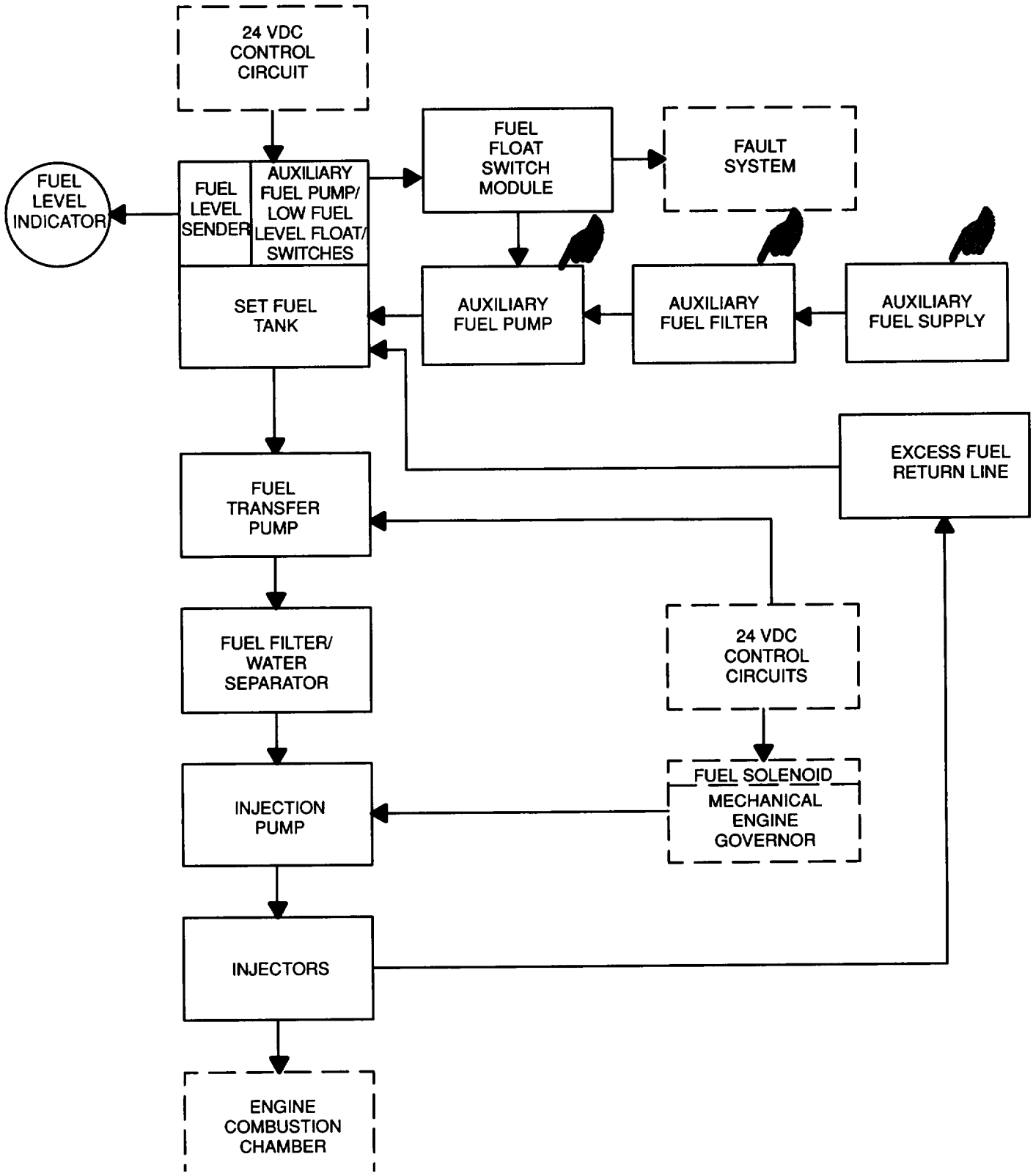

Figure 1-3. Generator Set Fuel System

1-12-3. Generator Set Cooling System.

1-12-3-1. The Generator Set Cooling System (Figure 1-4) includes air intake and exhaust grilles, baffles, and ducting within the generator set housing and the engine driven radiator cooling fan. The air intake grilles are located in panels on both sides of the generator set housing. The air exhaust grille is located in the housing top panel.

1-12-3-2. Air is drawn in through the air intake grilles and forced through the engine coolant radiator and outof the generator set through the exhaust grille by the radiator cooling fan. Some of the air drawn into the housing is used by the Engine Intake and Exhaust System (refer to paragraph 1-12-6). Most of the cooling airflows externally past the generator assembly and engine, Some cooling air is circulated internally through the AC generator assembly by a generator fan which is an integral part of the AC generator assembly. Baffles, ducting, and sound absorbing material are used to control the air flow through the generator set and to reduce sound transmission through the grilles

1-12-4. Engine Cooling System.

1-1241. The Engine Coding System (Figure 1-5) consists of a radiator, hoses, thermostat, temperature sender, coolant high temperature switch, COOLANT TEMP. indicator, water pump, a belt driven fan, and cooling jackets (part of engine).

1-1242. The water pump forces coolant through passages (cooling jackets) in the engine block and cylinder head where the coolant absorbs heat from the engine. When the engine reaches normal operating temperature, the thermostat opens and the heated coolant flows through the upper radiator hose assembly into the radiator. The cooling fan circulates air through the radiator where the coolant temperature is reduced.

1-12-4-3. A coolant high temperature switch in conjunction with the fault system provides automatic shutdown in the event that coolant temperature exceeds 225 ± 5°F (107 ± 3°F). The COOLANT TEMP. indicator indicates the engine coolant temperature, from 120°F to 240°F (48°C to 115°C).

1-12-5. Engine Lubrcation Svsterm.

1-12-5-1. The Engine Lubrication System (Figure l-6) consists of an oil sump, dipstick, pump, oil pressure sender, OIL PRESSURE indicator, low oil pressure switch, and filter.

1-12-5-2. The oil sump is a reservoir for engine lubricating oil. The dipstick indicates oil level in the sump. The oil level can only be checked when the engine is not running. The pump draws oil from the sump through a screen removing large impurities. The oil then passes through a spin-on type filter where small impurities are removed. From the filter, oil is distributed to the engine's internal moving parts and then retums to the oil sump. The oil pressure sender located in the engine crankcase senses oil pressure. The oil pressure is displayed on the OIL PRESSURE indicator. The Iow oil pressure switch, also located in the engine crankcase, functions with the generator set fault system. The engine is automatcally shut off if the oil pressure drops below 15 ± 3 psi (103.4 ± 20.7 kPa).

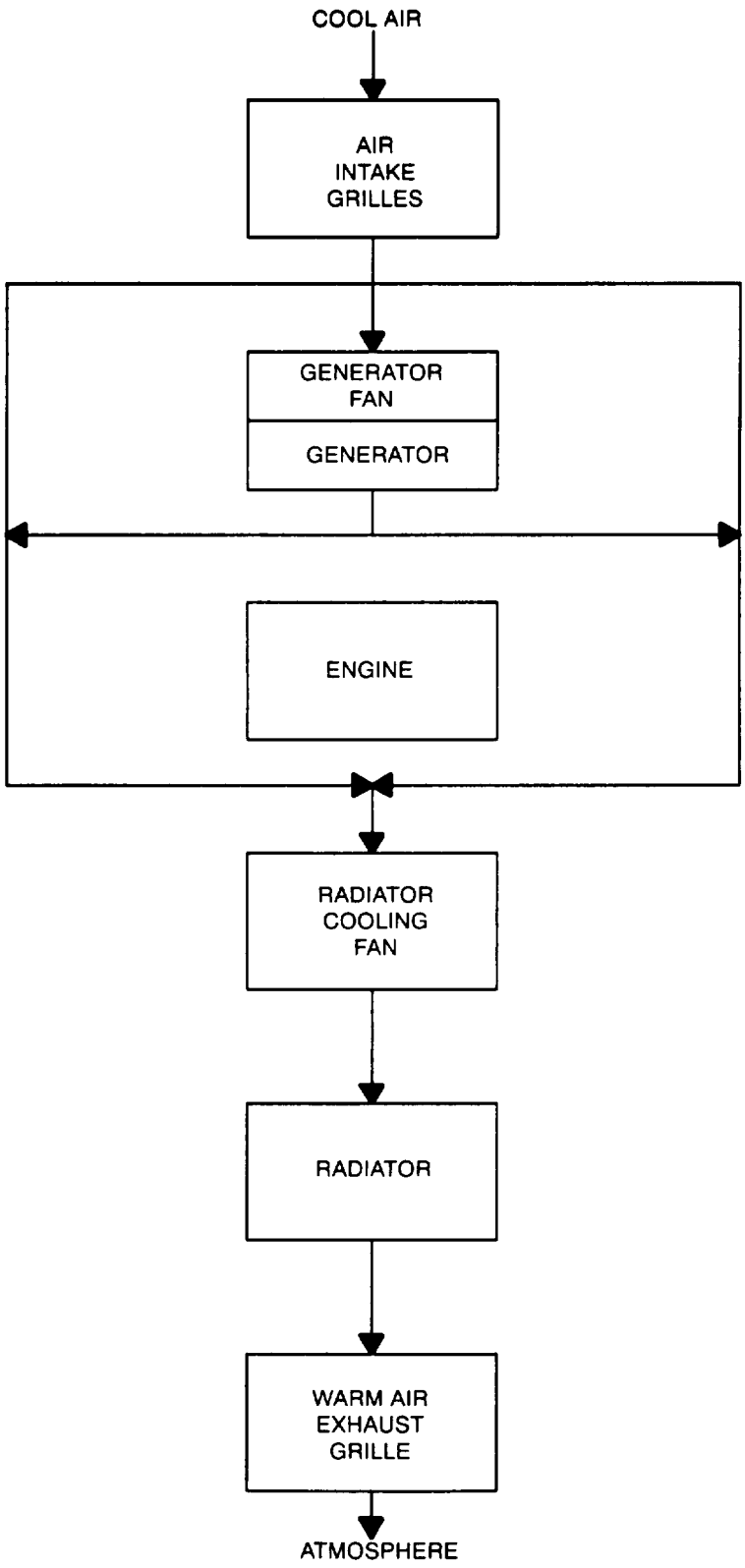

Figure 1-4. Generator Set Cooling System

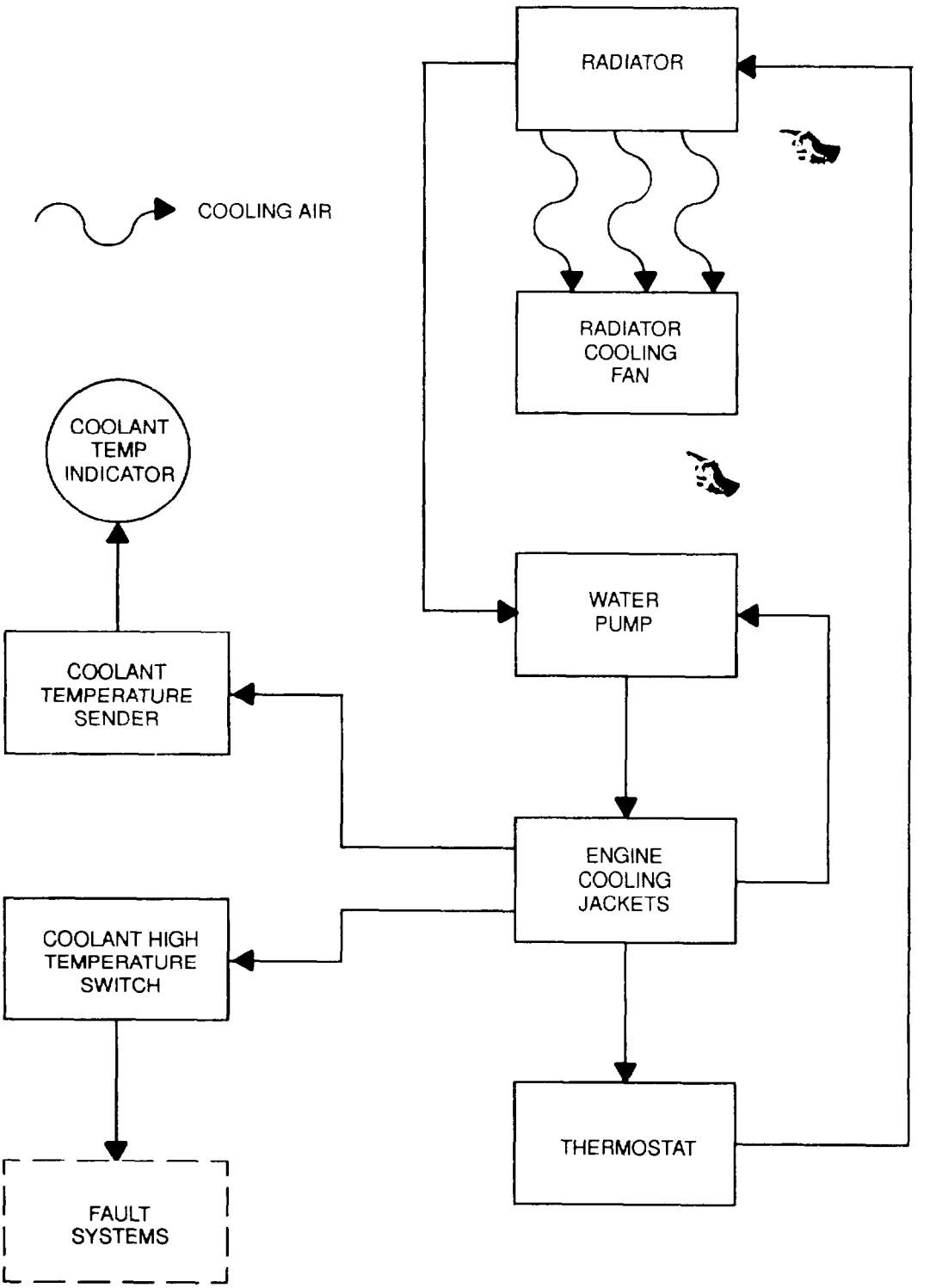

Figure 1-5. Engine Cooling System

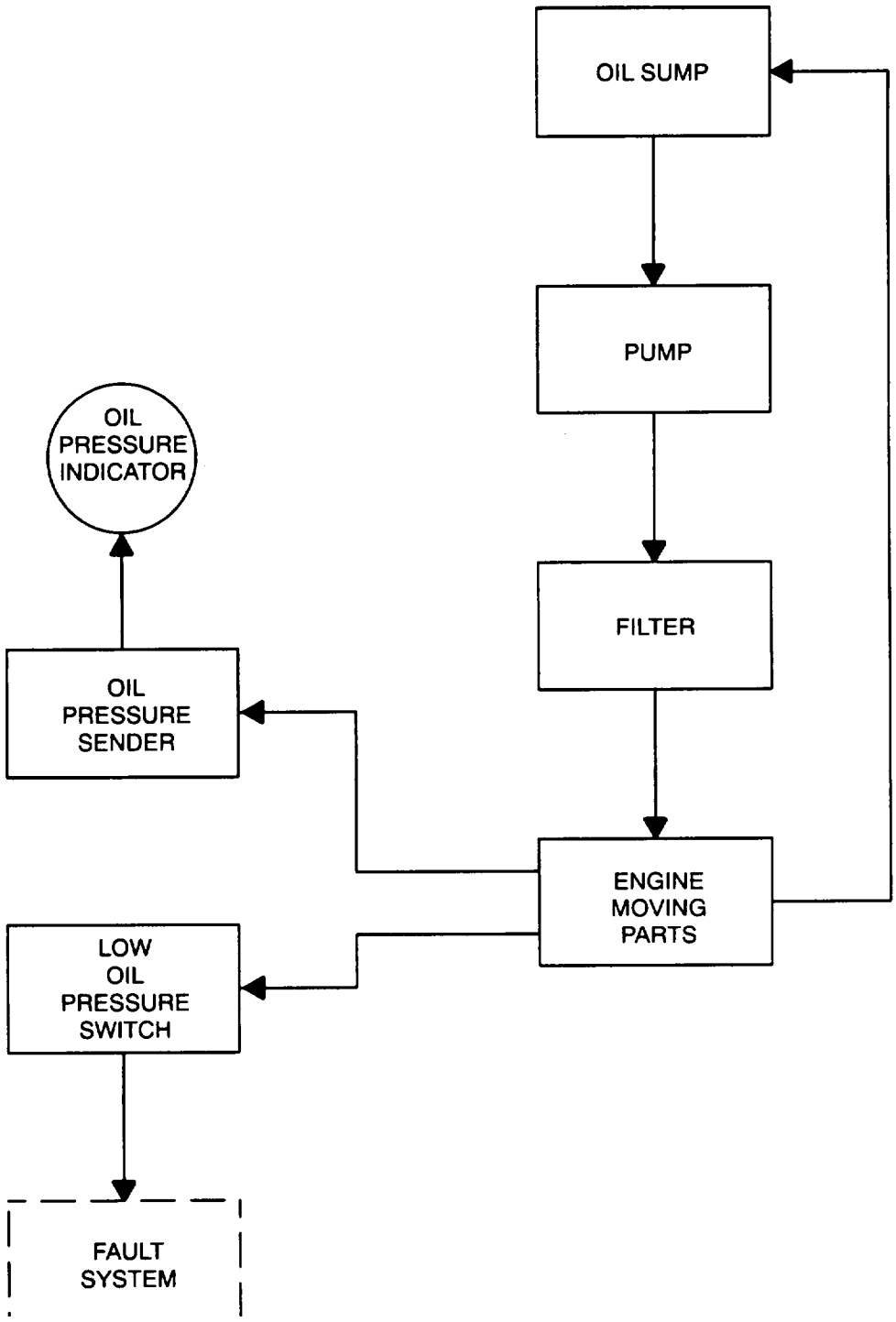

Figure 1-6. Engine Lubrication System

1-12-6. Engine Air Intake and Exhaust System.

1-12-6-1. The Engine Air Intake and Exhaust System (Figure 1-7) consists of an air cleaner assembly, intake manifold, two heater plugs, exhaust manifold, and muffler. The air cleaner assembly includes a dust collector, filter element, and restriction indicator.

1-12-6-2. Air is drawn into the dust collector and Passes through the filter element. Airborne dirt is removed and trapped in the dust collector and filter element. The restriction indicator indicates when the filter should be serviced. Filtered air is drawn out of the filter through air intake tubes to the intake manifold where it passes into the engine.

1-12-6-3. The engine exhaust gases are expelled into the exhaust manifold. The exhaust manifold channels the gases into the muffler that deadens the sound of the exhaust gases. The gases pass from the muffler through the muffler outlet and are vented upward from the generator set housing. A cover, which is held open by the pressure of the exhaust gases during operation, doses over the exhaust port to prevent rain, water, or other foreign matter from entering the exhaust port when the set is not in use. The cover is easily removed for connection of an exhaust pipe for indoor operation.

1-12-64. To improve engine starting when ambient temperature is below 40°F (4°C), two heater plugs are located in the intake manifold. The heater plugs are energized through the preheat relay when the MASTER SWITCH is held in the PREHEAT position.

1-12-6-5. The DC control circuit provides power to the preheat relay and heater plugs.

1-12-7. Output Supply System.

1-12-7-1. The Output Supply System (Figure 1-8) consists of the AC generator, AC voltage reconnection switch, GROUND FAULT CIRCUIT INTERRUPTER (GFCI), CONVENIENCE RECEPTACLE, current transformer, AC circuit interrupter relay, load terminals, AC CIRCUIT INTERRUPTER switch, AM-VM transfer switch, AC voltmeter (VOLTS AC), ammeter (PERCENT RATED POWER), frequency transducer, and FREQUENCY meter (HERTZ).

1-12-7-2. Power created by the AC generator is supplied through the current transformer, AC voltage reconnection switch, and AC circuit interrupter relay to the load terminals. The AC voltage reconnection switch allows configuration of the generator set for the following voltage connections: 120 volt, single phase, 2 wire; 120/240 volt, single phase, 3 wire; and 120/208 volt, 3-phase, 4 wire. The AC generator also provides 120 VAC to the CONVENIENCE RECEPTACLE through the GROUND FAULT CiRCUiT INTERRUPTER.

1-12-7-3. The AC CIRCUIT INTERRUPTER switch doses and opens the AC circuit interrupter relay. This enables or interrupts the power flow between the AC voltage reconnection switch and the load terminals. The voltage regulation system (refer to paragraph 1-12-10) senses generator output voltage and provides a control signal to the generator exciter to maintain the desired generator output voltage. Generator output frequency is controlled by the governor control system (refer to paragraph 1-12-9), sensed by the frequency transducer and is read on the FREQUENCY meter (HERTZ). The current transformer provides a reduced current signal to the ammeter (PERCENT RATED CURRENT) which indicates the percent of rated current being supplied to the load. The position of the AM-VM transfer switch selects the Ioad terminal from which current and voltage are measured. The AC circuit interrupter relay will open and disconnect the load whenever an overload or short circuit occurs.

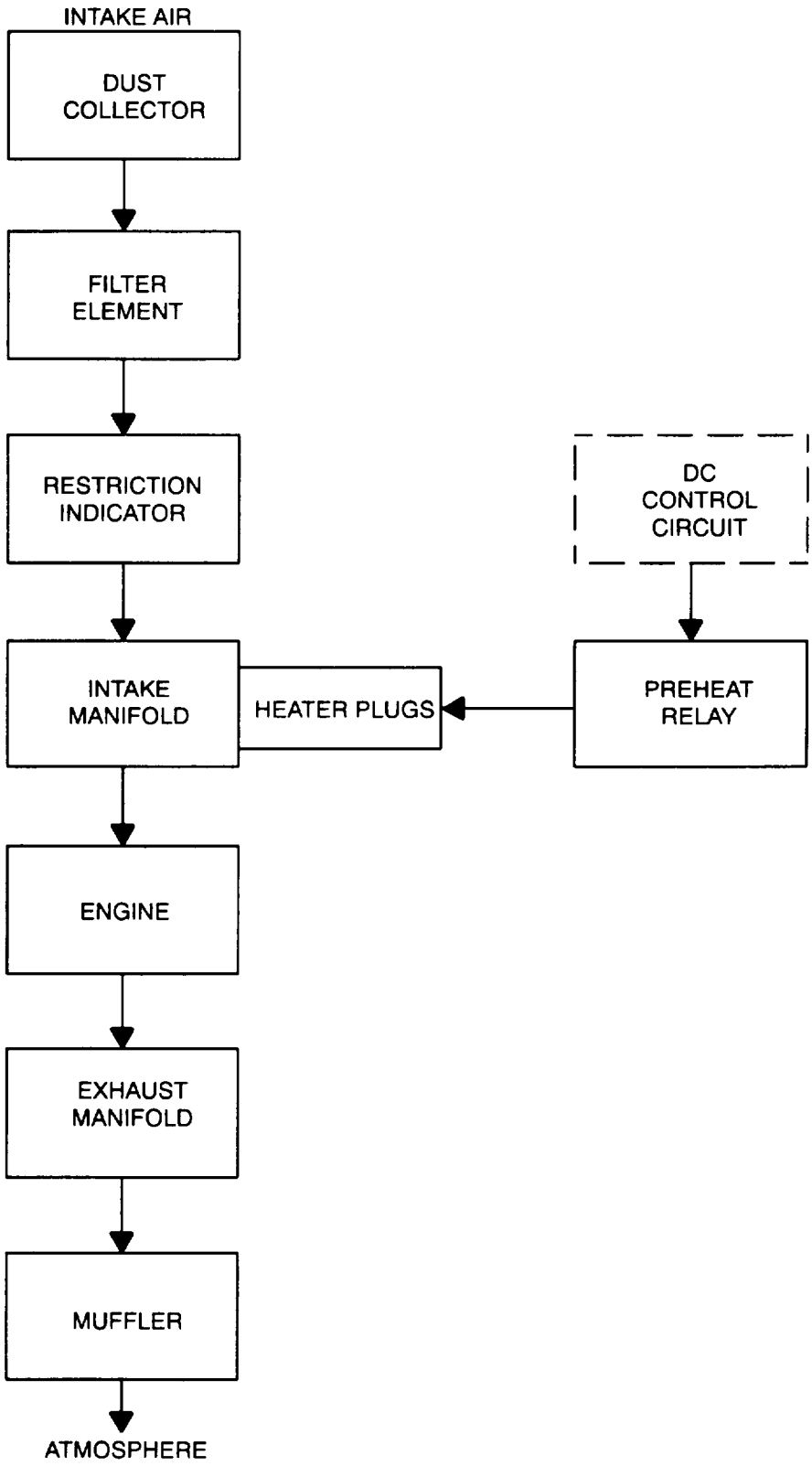

Figure 1-7. Engine Air Intake and Exhaust System

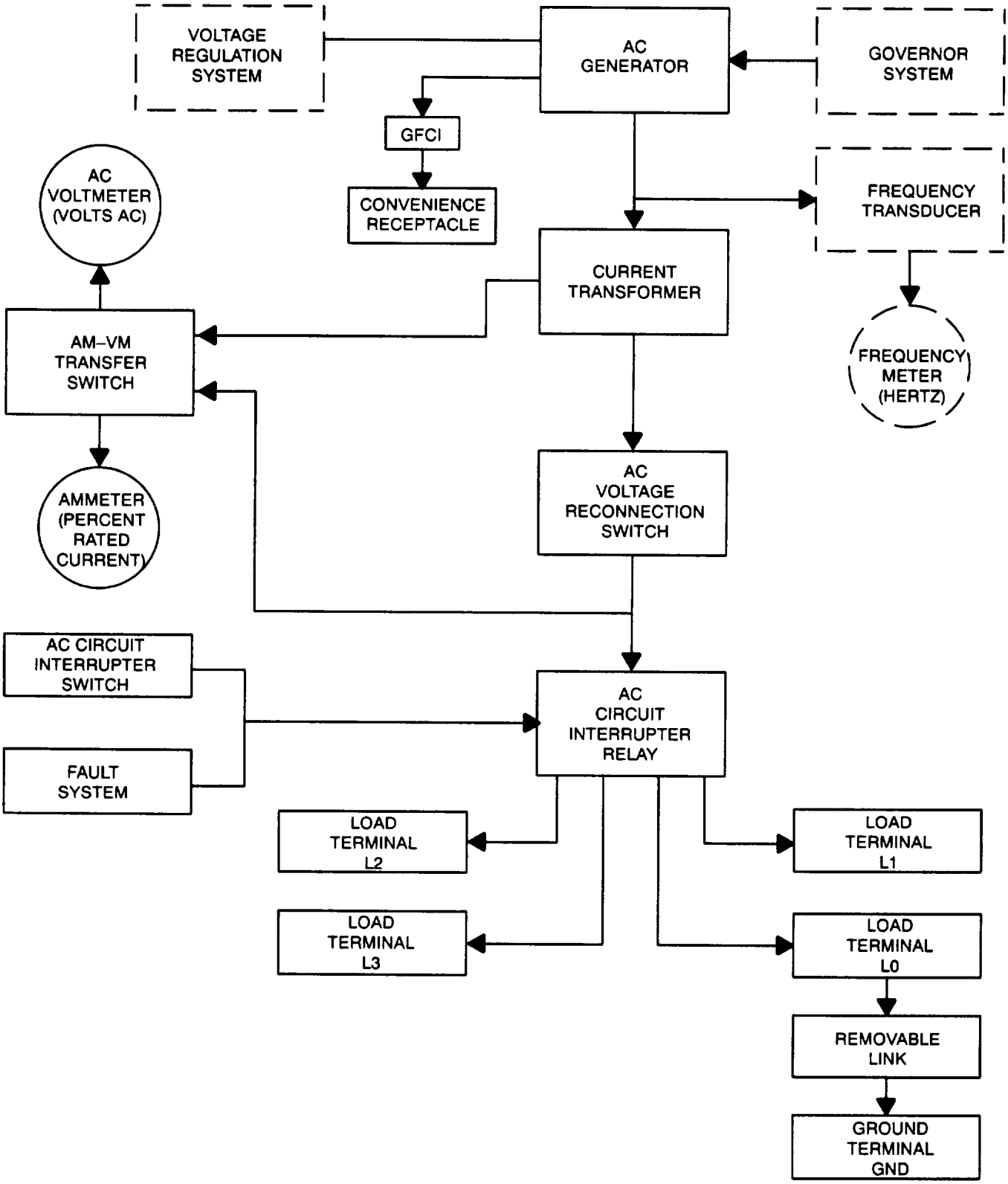

Figure 1-8. Output Supply System

1-12-7-4. The GND (ground terminal) is connected to the generator set skid base. This terminal is also connected to the ground rod for all generator set operation. The removable link provides a removable, low inductance connection between LO and GND terminals. This removable link must be in place for all generator set operation except when the load instructions specifically require its removal.

1-12-8. Generator Set Control%

1-12-8-1. Engine Starting System.

1-12-8-1-1. Engine starting (Figure 1-9) is accomplished primarily with two 12-volt batteries, connected in series to provide 24 VDC power, and a starter. The starter includes a cranking motor and solenoid. To permit engine starting, the DC CONTROL POWER circuit breaker must be pushed in, the DEAD CRANK switch must be in the NORMAL position and the BATTLE SHORT switch must be in the OFF position. In addition, any ENGINE SHUTDOWN fault previously registered on the malfunction indicator panel must have been corrected, and the malfunction indicator panel must have been reset. When the MASTER SWITCH is then placed in the START position, the starting circuits supply 24 VDC power to the starter. As the engine accelerates to approximately 900 rpm, the starting circuits disconnect power from the starter and energize the field flash relay. After the needle of the AC voltmeter (VOLTS AC) reaches rated voltage, indicating that the generator is producing power, the MASTER SWITCH can be moved to one of the two RUN positions for generator operation.

1-12-8-1-2. When the MASTER SWITCH is first moved to the START position, the various instrument and control circuits including two starting control circuits are energized. One starting control circuit supplies 24 VDC power directly to the control function of the crankdisconnect switch and also energizes the coil of the crank disconnect relay through closed contacts of BATTLE SHORT switch and crank disconnect switch. The other starting control circuit directly energizes the coil of the field flash relay and also energizes the cranking relay coil through closed contacts of the engine fault relay and crank disconnect relay. With the cranking relay energized, power passes from the batteries through closed contacts of the cranking relay to energize the solenoid and the pulling coil of the fuel solenoid. With the solenoid energized, power passes from the batteries through closed contacts of the solenoid to the cranking motor. The cranking motor then cranks the engine. As the engine accelerates to approximately 900 rpm, the magnetic pickup, which senses engine speed, causes the crank disconnect switch to break the circuit to the coil of the crank disconnect relay and dose the contacts of the field flash relay. When the MASTER SWITCH is moved to one of the RUN positions, both starting control circuits are de- energized while the instrument and other control circuits remain energized. The fuel solenoid holding coil remains energized.

1-12-6-1-3. The engine may be cranked without starting by use of the DEAD CRANK switch. With the DEAD CRANK switch in the CRANK position, the cranking relay coil is energized to initiate engine cranking without energizing any other starting or control function.

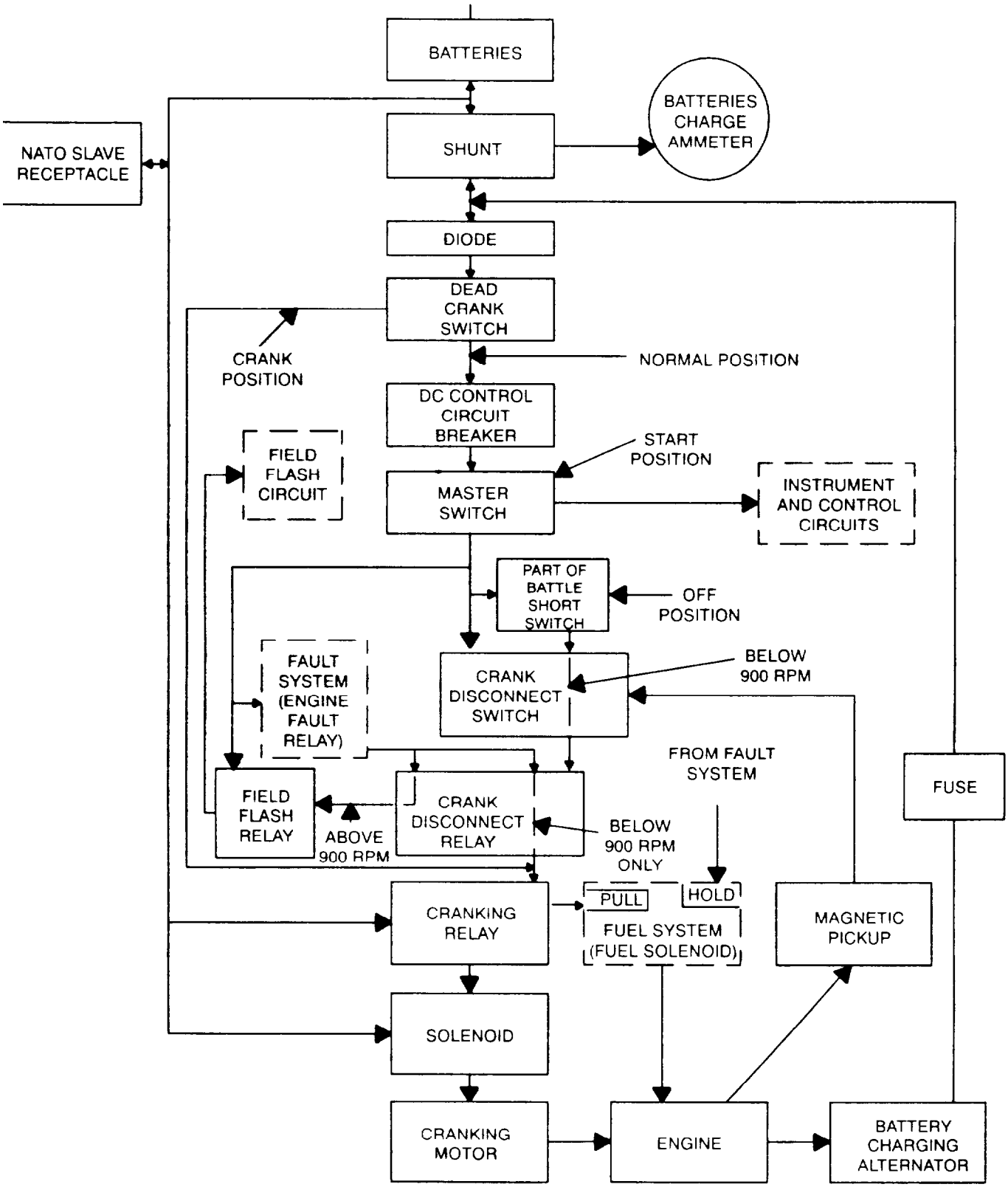

Figure 1-9. Engine Starting System

1-12-8-1-4. The generator set can be started without batteries by connecting an external 24 VDC power source to the NATO SLAVE RECEPTACLE. The generator set can also supply starting power to another set through the NATO SLAVE RECEPTACLE.

1-12-8-1-5. The batteries are charged by the battery charging alternator that is belt driven by the engine. Generator set control system power is also supplied by the battery charging alternator. The BATTERY CHARGE ammeter indicates the charge rate of the batteries, from -10 to +20 amps. The ammeter is connected to a shunt which provides a DC voltage signal, which is directly proportional to the battery current flow, to the BATTERY CHARGE ammeter. Normal operating indication depends on the state of charge in the batteries. A low charge which can exist immediately after engine starting, will cause a high reading (needle moves toward CHARGE area). When the charge in the batteries has been restored, the indicator moves near zero (0). The battery charging system is protected from a reverse polarity when connecting the batteries by a fuse and diode.

1-12-8-2. Field Flash. When the engine reaches sufficient speed (900 rpm), the magnetic pickup causes a setofmntacts in the crank disconnect switch to open and de-energize the crank disconnect relay. A set of contacts in the crank disconnect relay then doses and energizes the Field Flash circuit through dosed contacts of the field flash relay (refer to Figure 1-9). This provides current to the AC generator exciter field windings which sets up an electromagnetic field. The field current is necessary for the set to generate sufficient voltage for the voltage regulator (refer to Figure 1-11) to begin controlling the output voltage of the generator set. The Field Flash circuit is maintained until the MASTER SWITCH is released from the START position.

1-12-8-3. Operation. Placing the MASTER SWITCH in the PRIME & RUN or PRIME RUN AUX positions keeps the fuel solenoid energized, and fuel will be supplied to the engine as long as no fault condition exists. During operation, the operator should periodically check the set's instruments to ensure they are reading in the normal operating ranges. The VOLTAGE and FREQUENCY adjust controls are adjusted as required to maintain the desired frequency and voltage output.

1-12-8-4. Applying the Load. The load is applied by dosing the AC CIRCUIT INTERRUPTER switch (refer to Figure 1-8). This is a momentary contact switch that returns to the neutral, or center position. The AC circuit interrupter relay is energized by this momentary contact, and a holding circuit keeps it dosed, bringing the load on line.

1-12-8-5. Shutdown.

1-12-8-5-1. The AC circuit interrupter relay is disengaged by placing the AC CIRCUIT INTERRUPTER switch in the OPEN position. This is a momentary contact switch which will break the AC circuit interrupter relay holding circuit and then return to the neutral, or center position, disconnecting the load from the line.

1-12-8-5-2. When the MASTER SWITCH is placed in the OFF position, all power is removed from the control circuit and the engine will stop.

1-12-6-5-3. The EMERGENCY STOP switch will remove power from the control circuit by energizing the engine fault relay. This will cause the engine to shut down. The EMERGENCY STOP switch is not to be used as an alternative for routine shutdown procedures. When the generator set is stopped using the EMERGENCY STOP switch, some circuits remain energized causing a drain on the batteries until the MASTER SWITCH is placed in the OFF position.

1-12-9. Governor Control System.

1-12-9-1. The Governor Control System (FIGURE 1-10) includes the FREQUENCY ADJUST control, mechanical engine governor, engine fuel pump rack and fuel solenoid.

1-12-9-2. The mechanical engine governor is housed under the engine gear cover and moves the fuel pump rack, changing fuel delivery of the injection pumps in proportion to engine load. The governor is a flyweight type, with the weights mounted on the engine camshaft gear. The force of the flyweights is transferred through a thrust sleeve and collar to the governor lever, and balanced against the tension of the governor spring, which is stretched between the governor lever and the speed adjustment lever. Engine speed and generator output frequency are increased by increasing the tension on the main governor spring. Droop is adjusted by varying the location of the governor spring's mounting to the governor lever, effectively varying the strength of the spring.

1-12-9-3. The governor uses one lever for fuel shutoff and the other for speed adjustment. The shutoff lever is operated by the fuel solenoid in an energize-to-run configuration (fail safe). The speed adjustment lever is moved by a vernier control cable from the FREQUENCY ADJUST control of the set and provides an adjustment range of ± 3 percent of rated frequency.

1-12-10. Voltage Regulation System.

The Voltage Regulation System (Figure 1–11) consists of the voltage regulator and VOLTAGE adjust potentiometer. The voltage regulator senses and controls the generator output voltage which is operator adjustable within the design limits by use of the VOLTAGE adjust potentiometer. The output voltage to the load is indicated by the AC voltmeter (VOLTS AC) on the control panel assembly.

1-13. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

NOTE

All locations (Figure 1–12) referenced herein are given facing the control box side (rear) of the generator set.

1-13-1. Oil Filter (1). The oil filter is located in the engine compartment on the left side. The filter removes impurities from the engine lubricating oil.

1-13-2. Dipstick (2). The dipstick is located in the engine compartment on the left side. The dipstick shows the lubricating oil level in the engine crankcase.

1-13-3. Fuel Filter/Water Separator (3). The fuel filter/water separator is located to the rear of the engine compartment on the left side. The element removes impurities and water from the diesel fuel.

1-13-4. AC Generator (4). The AC generator is a single bearing, dripproof, synchronous, brushless, three phase, fan-cooled generator. The generator is coupled directly to the rear of the diesel engine.

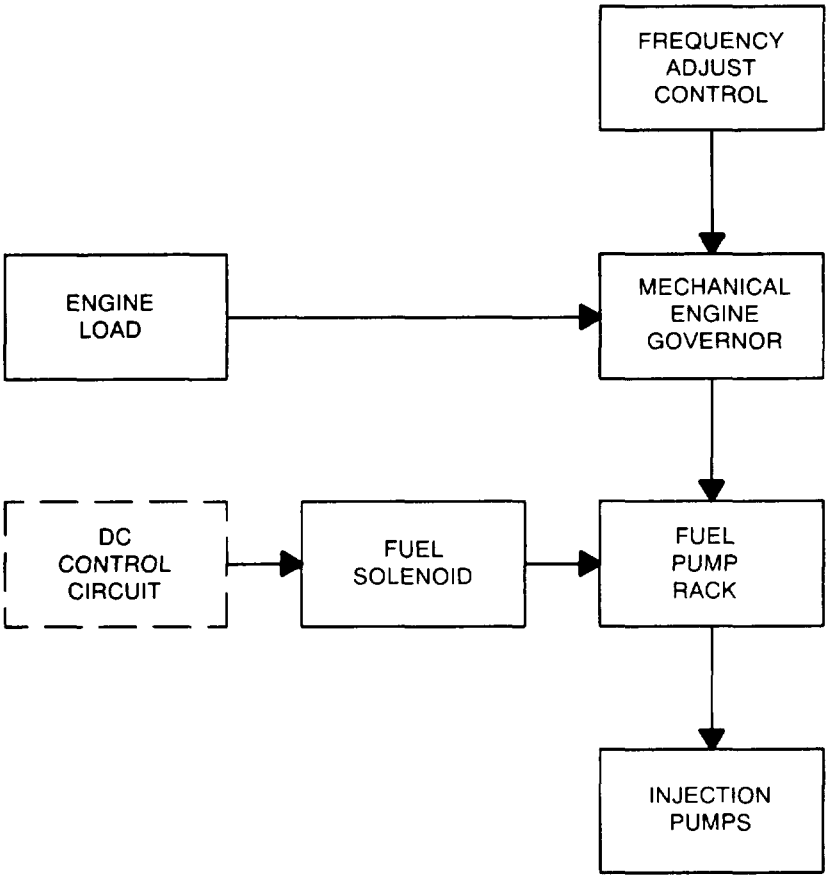

Figure 1-10. Governor Control System

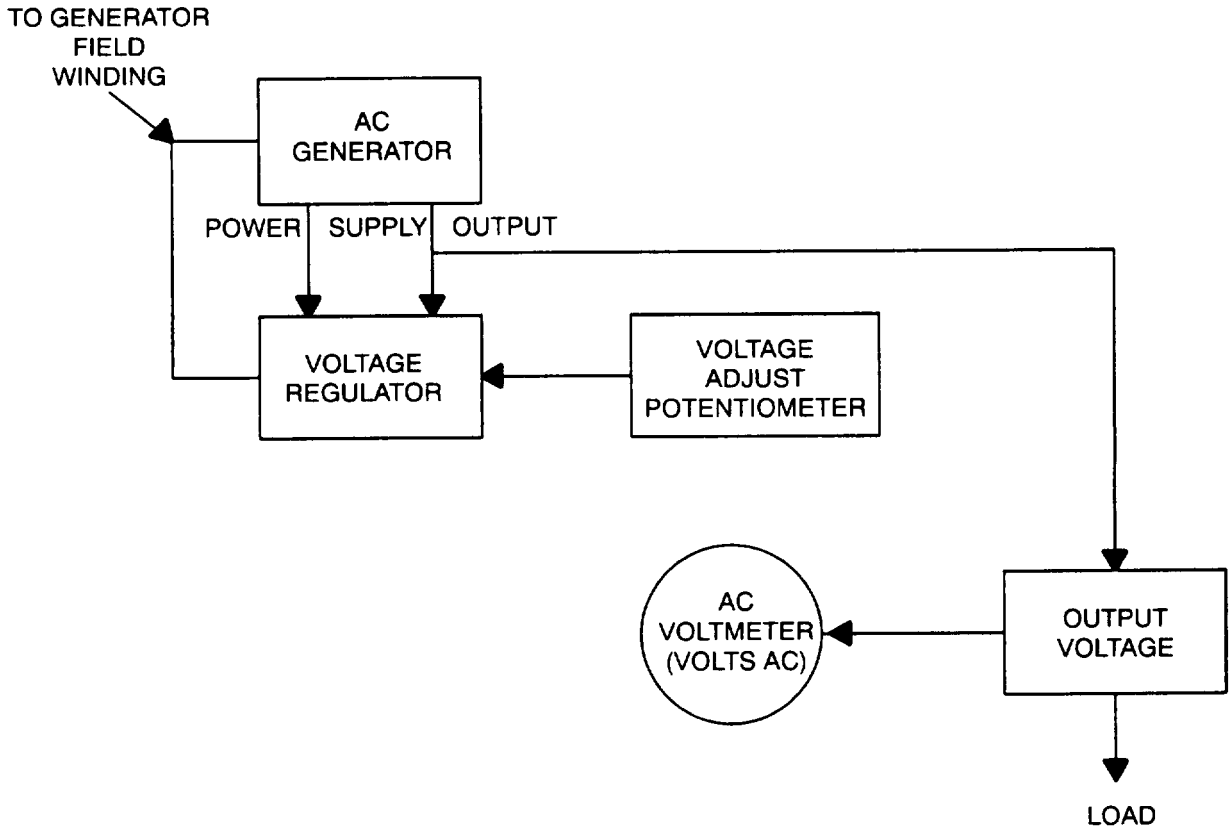

Figure 1-11. Voltage Regulation System

1-13-5. DEAD CRANK Switch (5) . The DEAD CRANK switch is located in the engine compartment on the left side. For maintenance purposes the switch allows the engine to be cranked without starting.

1-13-6. Engine (6). The generator is powered by a two cylinder, four cycle, fuel injected, naturally–aspirated, liquid–cooled diesel engine which occupies the front half of the generator set. The engine is also equipped with a fuel filter/water separator, oil filter, and an air cleaner assembly. Protection devices automatically stop the engine during conditions of high coolant temperature, low oil pressure, no fuel, and overvoltage.

1-13-7. Batteries (7). Two batteries are required, one on each side of the generator set. The batteries are electrolyte serviceable, lead acid, 12 volt type, connected in series. After starting, the generator set is capable of operating with batteries removed. A fuse and a diode, located behind the control panel assembly, protects the generator set if the batteries are incorrectly connected.

1-13-8. Water Pump (8). The water pump is located in the engine compartment on the front of the engine. The pump circulates the engine coolant through the engine block and the radiator.

1-13-9. Fuel Transfer Pump (9).The fuel transfer pump is located in the engine compartment on the front left side. The pump is electrically operated and transfers fuel from the fuel tank to the engine through the fuel filter/water separator.

1-13-10 Auxiliary Fuel Pump (10). The auxiliary fuel pump is located behind the front housing panel on the left side. The pump is electrically operated and transfers fuel from an auxiliary fuel source to the fuel tank.

1-1-10.1. Auxiliary Fuel Filter (10A). The auxiliary fuel filter is located behind the front housing panel on the left side. The filter removes impurities from the diesel fuel when using the auxiliary fuel supply.

1-13-11. Radiator (11). The radiator is located at the front of the generator set. It acts as a heat exchanger for the engine coolant.

1-13-12. Fuel Tank (12). The 5 gallon (18.9 liters) fuel tank is located in the front of the generator set below the engine and between the skid base side members. The fuel tank is a fuel reservoir and has sufficient capacity to enable the generator set to operate for at least 8 hours without refueling.

1-13-13. Air Cleaner Assembly (13). The air cleaner assembly is located on the right side behind the engine. It consists of a dry-type, disposable air filter element made of paper and a canister. The air cleaner assembly features a dust collector which traps large dust particles. The air cleaner assembly has a restriction indicator (visible by opening left engine access door) which will indicate red when the air filter element requires servicing.

1-13-14. Muffler (14). The muffler and exhaust tubing are connected to the exhaust manifold on the engine. The exhaust exits from the top of the generator set housing. Gases are exhausted upward.

1-13-15. Fan Belt (15). The fan belt is located in the engine compartment on the front of the engine. The belt drives the fan, water pump, and the battery charging alternator.

1-13-16. Battery Charging Alternator (16). The battery charging alternator is located on the right side of the engine. It is capable of maintaining the batteries in a state of full charge in addition to providing the required 24 VDC control power.

1-13-17. Starter (17). The starter is located on the right side of the engine. The electric starter mechanically engages the engine flywheel in order to start the diesel engine.

1-13-18. NATO SLAVE RECEPTACLE (18). The NATO SLAVE RECEPTACLE is located on the right side (rear) of the generator set. It is used for slave starting.

1-13-19. Skid Base (19). The skid base supports the generator set. It has fork lift access openings and cross members for short distance movement and lifting rings located at each corner of the skid base. The skid base has provisions in the bottom for installation of the generator set on a trailer.

1-13-20. Load Output Terminal Board (20). The load output terminal board is located on the bottom left side (rear) of the generator set. Four output terminals are located on the board. They are marked L1, L2, L3, and L0. A fifth terminal, marked GND, is located next to the output terminals and serves as equipment ground for the generator set. A removable, solid copper bar is connected between the L0 and GND terminals.

1-13-21. Load Output Terminal Board (21). The generator set control panel assembly is located at the rear of the generator set and contains controls and instruments for operating the engine and the generator.

1-13-22. FREQUENCY ADJUST Control (22). The FREQUENCY ADJUST control is located at the rear left side of generator set. It is used to adjust the generator frequency output.

1-13-23. Malfunction Indicator Panel (23). The malfunction indicator panel is located to the left of the control panel assembly. It indicates malfunctions of the generator set components.

1-13-24. CONVENIENCE RECEPTACLE (24). The CONVENIENCE RECEPTACLE is a 120 VAC receptacle used to operate small plug in type equipment.

1-13-25. Diagnostic Connector (25). The diagnostic connector is a multi-pin plug that is wired to specific points in the generator set electrical system to enable monitoring and troubleshooting of the generator set operation at a single location.

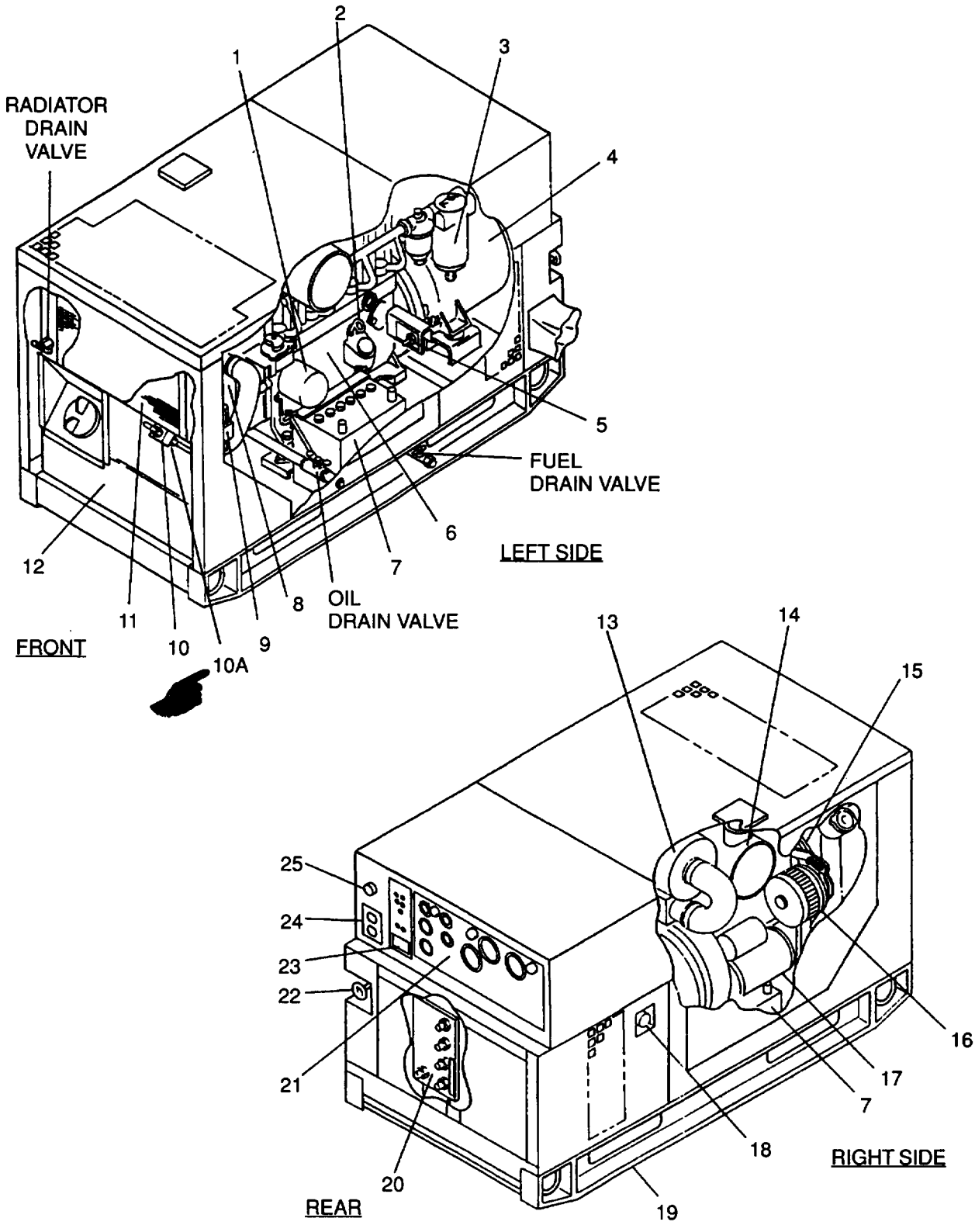

Figure 1-12. Generator Set Components

CHAPTER 2

UNIT MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. INSPECTING AND SERVICING THE EQUIPMENT.

This section provides information and guidance for inspecting, servicing, and installing the generator set under normal conditions.

2-1-1. Inspection.

a. Unpack and inventory all end item components for serviceability.

b. Check that all packing materials have been removed.

c. Check generator set identification plate for positive identification.

d. Inspect generator set for any internal or exterior shipping damage.

e. Open engine compartment access doors and inspect batteries for damage.

f. Check battery cables for damage.

g. Open control panel access door and check panel for damage.

h. Lower control panel and check electrical connections for damage or loose connections.

i. Check air cleaner assembly and exhaust opening for obstruction.

j. Check fan drive belt for proper adjustment, paragraph 2-75-4.

k. Inspect generator set for loose or missing mounting hardware or damaged or missing parts.

l. Check oil level. Ensure that oil level is at FULL mark on dipstick If required, add engine lube oil specified in Table 2-3.

m. Unpack grounding rod, and auxiliary fuel hose. Inspect each item for damage.

2-1-2. Service.

2-1-2-1. Batteries.

For Battery service refer to TM9-6140-200-14

2-1-2-2. Radiator.

Do not operate generator set while servicing radiator. Damage to equipment or personal injuries may result.

a. Remove radiator cap

b. Check that radiator drain valve (Figure 1-12) is closed.

Table 2-1. Coolant

AMBIENT TEMPERATURE	RADIATOR COOLANT	RATIO
+40°F TO +120°F (4°C TO 49°C)	WATER: MIL-A-53009 INHIBITOR, CORROSION	35:1
-25°F TO +120°F (-31°C TO 49°C)	WATER: MIL-A-46153 ANTIFREEZE	1:1
-25°F TO +120°F (-31°C TO 49°C)	MIL-A-11755 ANTIFREEZE	N/A

c. Fill radiator with proper coolant/antifreeze in accordance with Table 2-1. Fill radiator to a level two inches below filler neck opening. Cooling system capacity is 6.2 quarts (5.9 liters). Install radiator cap.

d. Remove overflow bottle cap.

e. Fill overflow bottle to COLD level and install overflow bottle cap.

f. Start generator set. After 30 minutes of operation, shutdown generator set and check coolant/antifreeze level at overflow bottle. Add coolant/antifreeze in accordance with Table 2-1, to HOT level in overflow bottle.

2-1-2-3. Fuel Tank.

Maintain metal-to-metal contact between fuel tank filler neck and fuel nozzle to prevent sparks from static electricity. Do not smoke or use open frame in area of fueling operation. Failure to follow this warning could result in explosion, severe personal injury or death.

Table 2-2. Diesel Fuel

AMBIENT TEMPERATURE	DIESEL FUEL
+20°F TO +120°F (-7°C TO 49°C)	VV-F-800 GRADE DF-2, JP4, JP5, OR JP8
0°F TO +20°F (-17°C TO -7°C)	VV-F-800 GRADE DF-1, JP4, JP5, OR JP8
-25°F TO 0°F (-31°C TO -17°C)	VV-F-800 GRADE DF-1
-25°F TO 0°F (-31°C TO -17°C)	VV-F-800 GRADE DF-A

WARNING

Hot refueling of generator set while operating presents a safety hazard and should not be attempted. Hot engine surfaces and sparks produced from the engine and generator circuitry are possible sources of ignition. Severe injury or death could result.

a. Check that fuel drain valve (Figure 1-12) is closed.

b. Remove fuel tank filler cap.

c. Fill generator set fuel tank with fuel type specified in TABLE 2-2. Fuel capacity is 7.3 gallons (18.9 liters).

d. Install fuel tank filler cap.

2-1-2-4. Lubricating Oil.

a. Place suitable container under oil drain plug and remove plug.

b. Open left side engine access door. Open oil drain valve (Figure 1-12) and drain oil.

c. Close oil drain valve and remove oil fill cap.

d. Fill engine with proper lube oil in accordance with Table 2-3 to FULL mark on dipstick. Lubrication system capacity is 3.2 quarts (3.0 liters).

Table 2-3. Lubricating Oil

AMBIENT TEMPERATURE	LUBRICATING OIL
+20°F TO +120°F (-7°C TO 49°C)	MIL-L-2104 OE HDO-30 or OE HDO-15/40
0°F TO +20°F (-17°C TO -7°C)	MIL-L-2104 OE HDO-10
-25°F TO 0°F (-31°C TO -17°C)	MIL-L-46167

e. Install oil fill cap.

f. Close left side engine access door.

2-2. Generator Set Installation.

2-2-1. General.

WARNING

Exhaust discharge contains deadly gases. Do not operate generator sets in enclosed areas unless exhaust discharge is properly vented outside. Severe personal injury or death due to carbon monoxide poisoning could result.

a. Ensure that installation site is as level as possible.

b. Provide adequate ventilation to prevent recirculation of hot air exhausted from generator set.

c. Place generator set within twenty-five feet (7.4 meters) of auxiliary fuel supply.

d. Refer to Figure 2–1 for minimum enclosure clearance measurement requirements and Figure 2–2 for base mounting measurements.

2-2-2. Outdoor Installation.

a. Make use of natural protective barriers.

b. Allow space on all sides for service and maintenance, refer to Figure 2–1.

c. Ensure that site soil is firm and well drained.

d. Use planks or other material for support in areas where soil will not support the generator set.

2-2-3. Indoor Installation.

Exhaust discharge contains deadly gases. Do not operate generator sets in enclosed areas unless exhaust discharge is properly vented outside. Severe personal injury or death due to carbon monoxide poisoning could result.

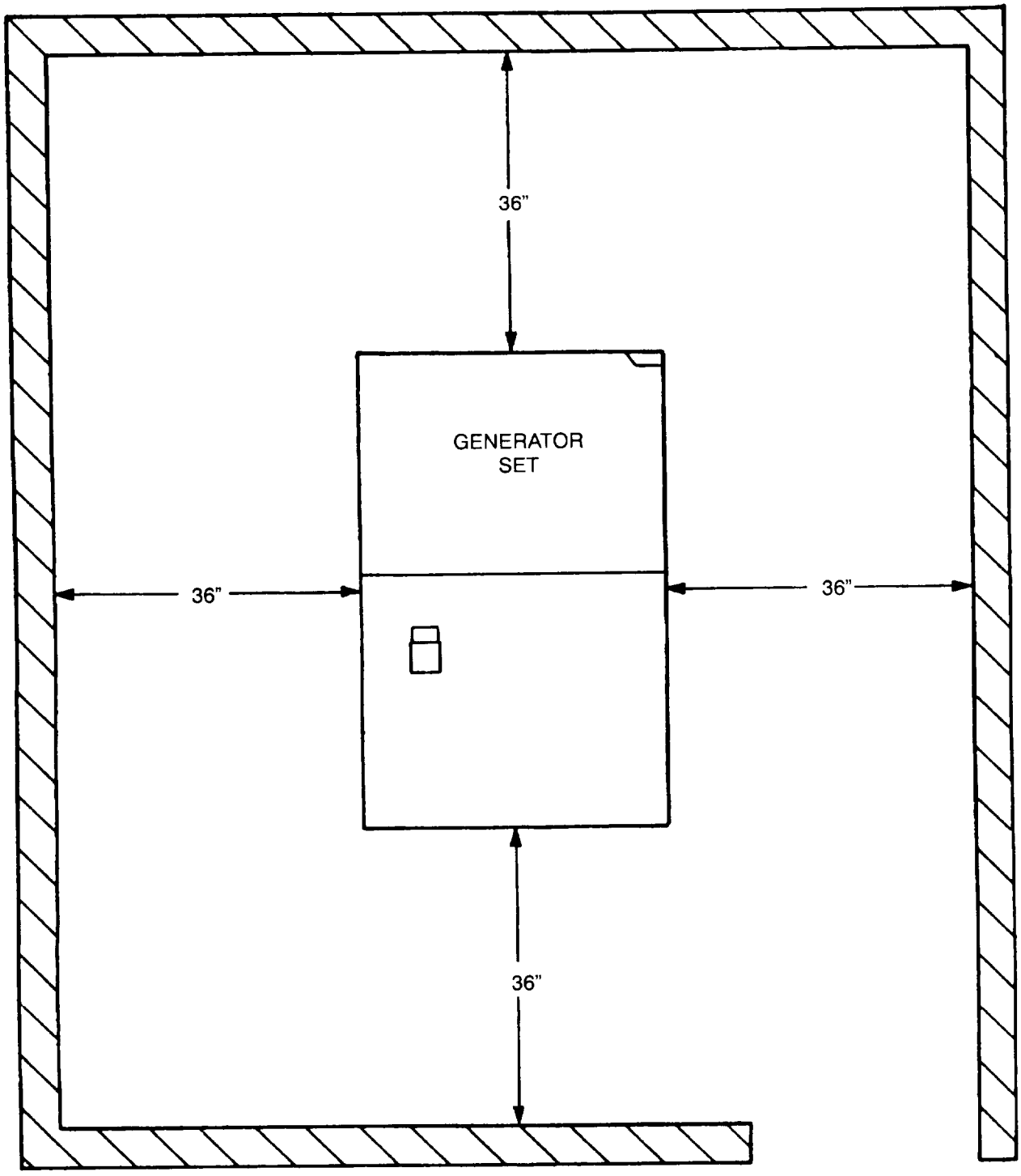

Figure 2-1. Minimum Enclosure Clearance Measurements

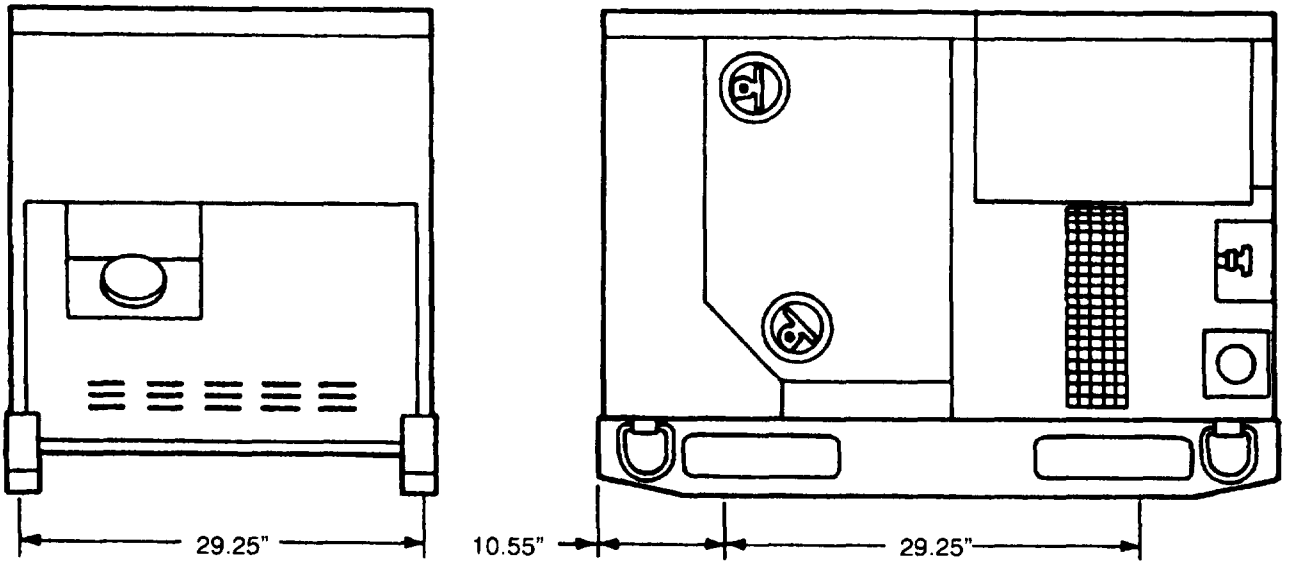

Figure 2-2. Base Mounting Measurements

CAUTION

Never position generator set with the air inlets near a wall or other object that interferes with cooling air circulation. Damage to equipment could result.

a. Provide ducts and vents to outside of building if good supply of cooling air is not available,

b. Make air intake and outlet openings in building same size or larger as those on the generator set.

c. Install a gas tight metal pipe from exhaust pipe of generator set to outside of building.

NOTE

Make exhaust pipe extension as short and straight as possible with only one 90 degree bend, if needed.

d. Ensure that inside diameter of exhaust pipe extension is as large or larger than generator set exhaust pipe.

WARNING

Hot exhaust gases can ignite flammable materials. Failure to observe this warning could result in severe personal injury or death.

e. Provide for harmless discharge of hot gases and sparks. Do not direct exhaust into area containing flammable materials.

WARNING

If not shielded, hot exhaust pipe can ignite flammable wall materials. Failure to observe this warning could result in severe personal injury or death.

f . Shield exhaust pipe with fireproof material at point where it passes through a flammable wall.

An unwrapped exhaust pipe can cause injury if touched.

g. Wrap exhaust pipe in protective material.

2-3. FABRICATION/ASSEMBLY OF PARTS.

Table 2-4 is a list of generator parts that require fabrication or assembly when replacing. See Appendix D for fabrication and assembly instructions.

Table 2-4. Fabricated/Assembled Parts

NAME	PART NUMBER
Cable Assembly, Battery	88–20312
Cable Assembly, Battery	88–20313
Cable Assembly, Battery	88–20314
Cable Assembly, Battery	88–20315
Cable Assembly, Battery	88-20316
Cord, Load Wrench	88–22460
Diode Assembly	88-22418-1
Holder, Control Panel	88–20134
Insulation, Skid	88–20296
Pump Assembly, Fuel	88–20479
Pump Assembly, Fuel	88–22546
Solenoid Assembly, Fuel	88-20482
Transducer Assembly	88–20480
Wire, Varistor (L0)	88–20305-1
Wire, Varistor (L1)	86-20305-2
Wire, Varistor (L2)	88–20305–3
Wire, Varistor (L3)	88-20305-4

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

2-4. REPAIR PARTS AND SPECIAL TOOLS LIST (R PSTL).

2-4-1. Tools and Equipment. There are no special tools or support equipment required to perform unit level maintenance on the generator set. A list of recommended tools and support equipment required to maintain the generator set is contained in Appendix B, Section III.

2-4-2. Maintenance Repair Parts. Repair parts and equipment are listed and illustrated in the repair parts and special tools list manual TM 9–6115–641–24P.

Section III. SPECIAL LUBRICATION INSTRUCTIONS

NOTE

There are no special lubrication instructions, refer to LO 9–6115–641–12 for generator set lubrication requirements.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-5. PMCS PROCEDURES.

2-5-1. General. To ensure that the generator set is ready for operation at all times, it must be inspected so that defects can be discovered and corrected before they result in serious damage or failure.

2-5-2. Purpose of PMCS TABLE.TABLE. Your Preventive Maintenance Checks and Services table lists the inspections and care of your equipment required to keep it in good operating condition.

2-5-3. Purpose of Service Intervals. The interval column of your PMCS table tells you when to do a certain check or service.

2-5-4. Procedures Column. The procedures column of your PMCS table tells you how to do the required checks and services. Carefully follow these instructions.

2-5–5. The “Equipment Is Not Ready/Available If”. This column tells you when and why the generator set cannot be used.

NOTE

The terms ready/available and mission capable refer to the same status: Generator set is on hand and is able to perform its combat missions (See DA PAM 738–750).

2-5-6. Reporting and Correcting Deficiencies. If your generator set does not perform as required, refer to Troubleshooting section for possible problems. (A) Report any malfunctions or failures on DA Form 2404, or refer to DA PAM 738-750. (F) report any malfunctions or failures in accordance with applicable directives.

Table 2-5. Unit Preventive Maintenance Checks and Services

M–Monthly Q–Quarterly S-Semi–annually A–Annually B-Bi-annually H–Hours

Item No.	Interval M	Q	S	A	B	H	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment is not Ready/Available If:
1			•			250	Engine Lube Oil	Drain engine lube oil. Add proper lube oil per LO 9–6115–641–12. NOTE: Oil filter should be changed with lube oil change. Refer to TM 9-281 5–252–24.	
2				•		250	Fuel Filter/ Water Separator Element	Change fuel filter/ water separator element, Refer to paragraph 2-87.	
3					•	1500	Cooling System	Drain coolant and flush cooling system. Add proper coolant. Refer to paragraph 2-69-2.	
4				•			Radiator Cap	Inspect radiator cap for corrosion, torn or deteriorated seal, and obvious damaged.	Radiator cap or seal is damaged.

Table 2-5. Unit Preventive Maintenance Checks and Services - Continued

M-Monthly Q-Quarterly S-Semi-annually A-Annually B-Bi-annually H-Hours

Item No.	Interval M	Q	S	A	B	H	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment is not Ready/Available If:
5				•			Batteries	Remove batteries. Refer to paragraph 2-12-2. Clean batteries, cable terminals, and battery posts. Test batteries for state of charge. Refer to paragraph 2-12-1.	Batteries will not hold charge.
6				•			Air Cleaner Assembly	Inspect air cleaner assembly and mounting bracket for cracks, dents, and other damage. Inspect element for dogs and damage. Clean or replace as necessary. Clean housing with cleaning cloth.	
7				•			Hardware and sound Insulation	Inspect for loose, damaged, or missing hardware and sound insulation. Tighten loose hardware. Reapir or replace damaged or missing hardware and insulation.	Loose, missing, or damaged hardware or insulation.
8				•			Radiator and Interior of Generator Set	Clean radiator exterior surfaces. Refer to paragraph 2-70-3. Clean engine compartment.	
9				•			Magnetic Pickup	Remove, inspect, and dean magnetic pickup. Refer to paragraphs NO TAG and NO TAG.	Magnetic pickup is damaged.

Table 2-5. Unit Preventive Maintenance Checks and Services - Continued

M-Monthly Q-Quarterly S-Semi-annually A–Annually B-Bi-annually H-Hours

Item No.	Interval M	Q	s	A	B	H	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment is not Ready/Available If:
10				•			Wiring Harnesses	Inspect wiring harnesses for breaks and loose connections. Repair and tighten wiring harnesses as necessary.	Wiring harnesses are damaged or connections are loose.
11				Ž			Muffler	Check muffler for leaks, restriction, and accumulation of carbon. Replace or clean as required.	Muffler leaks, is restricted, or has excessive carbon accumulation.
								NOTE If the auxiliary fuel system is used as the primary fuel source, then the auxiliary fuel filter must be replaced semi-annually.	
12				•		500	Auxiliary Fuel Filter	Check for proper operation using the auxiliary fuel system as primary source.	

Section V. TROUBLESHOOTING

2-6 UNIT TROUBLESHOOTING PROCEDURES

2-6-1. Purpose of Troubleshooting TABLE. This section contains troubleshooting information for locating and correcting operating troubles which may develop in the generator set. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine probable causes and corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed. This table 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 your supervisor.

NOTE

Before you use this table, be sure you have performed your PMCS.

NOTE

Ensure operator level troubleshooting has been performed prior to performing unit level troubleshooting.

NOTE

Refer to the Diagnostic Connector, Table 2-10 Electrical Schematic FO-1 and Wiring Diagram FO-2 as troubleshooting aids.

SYMPTOM INDEX
GENERATOR SET

	Troubleshooting Procedure Page
COOLING SYSTEM	
Engine overheating	2–18
Engine coolant temperature too low	2-19
ELECTRICAL SYSTEM	
BATTERY CHARGE ammeter	
Shows no charge when batteries are low or discharged	2-21
Shows excessive charging after prolonged operation	2-21
AC VOLTMETER (VOLTS AC)	
Does not indicate voltage	2–22
Generator set Fails to Generate Power	2–23
Indicates voltage, but frequency meter is off scale	2–23
Voltage fluctuates	2–23
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Frequency fluctuates	2–24
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Fails to crank,	2–12
Cranks but fails to start	2–14
Stops suddenly	2-15
Runs erratically or stalls frequently	2–15
Misfiring	2-16
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Vibrating	2–20
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Black or grey smoke in exhaust	2–17
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Low oil pressure	2–18
High oil pressure	2-18

Table 2-6. UNIT TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE FAILS TO CRANK.

Step 1. Test for defective DEAD CRANK switch, paragraph 2-96-3.

a. If DEAD CRANK switch is not defective, do Step 2.

b. If defective, replace DEAD CRANK switch, paragraph 2-96.

Step 2. Check for loose or corroded battery cable terminals or battery posts.

a. If terminals are tight and posts are clean, do Step 3.

b. If not clean and tight, clean and tighten battery cable terminals and posts, paragraph 2-12-4.

Step 3. Check that batteries are installed correctly, paragraph 2-12-5.

a. If batteries are installed correctly, do Step 4.

b. If not properly installed, install batteries correctly, paragraph 2-12-5.

Step 4. Test for low or no battery charge, paragraph 2-12-1.

a. If fully charged, do Step 5.

b. If not fully charged, replace batteries. paragraph 2-12.

Step 5. Test for defective DC CONTROL POWER circuit breaker, paragraph 2-26-2.

a. If DC CONTROL POWER circuit breaker is not defective, do Step 6.

b. If defective, replace DC CONTROL POWER circuit breaker, paragraph 2-26.

Step 6. Test for battery voltage at terminal 1 of starter solenoid, Refer to Electrical Schematic FO-1.

a. If battery voltage is present, do Step 7.

b. If battery voltage is not present, check for loose connections from solenoid to batteries.

Step 7. Test for battery voltage at + terminal of starter solenoid with MASTER SWITCH in START position. Refer to Electrical Schematic FO–1.

a. If battery voltage is present, replace starter solenoid. Refer to TM 9-2815–252-24.

b. If battery voltage is not present, do Step 8.

Step 8. Test for battery voltage at input of MASTER SWITCH, refer to Electrical Schematic FO-1.

a. If battery voltage is present at input terminal (6) and Grid, do Step 9.

b. If battery voltage is not present, do Step 10.

Step 9. Test MASTER SWITCH for output voltage in START position, refer to Electrical Schematic FO-1.

a. If battery voltage is present at MASTER SWITCH output terminal, do Step 13.

b. If battery voltage is not present at output terminal (7) and Grid, test MASTER SWITCH, paragraph 2-47-2.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 10. Test for defective battery charging ammeter shunt, paragraph 2-29-2.

a. If not defective, do Step 11.

b. If defective, replace battery charging ammeter shunt, paragraph 2-29.

Step 11. Test for defective Reverse Battery Diode (CR1), paragraph 2-34-2.

a. If not defective, do Step 12.

b. If defective, replace reverse battery diode, paragraph 2-34.

Step 12. Test for defective EMERGENCY STOP switch, paragraph 2-49-2.

a. If not defective, do Step 13.

b. If defective, replace EMERGENCY STOP switch, paragraph 2-49.

Step 13. Test for defective engine fault relay (K12), paragraph 2-33-2.

a. If engine fault relay is not defective, do Step 14.

b. If defective, replace engine fault relay, paragraph 2-33.

Step 14. Test for defective BATTLE SHORT switch, paragraph 2-50-2.

a. If BATTLE SHORT switch is not defective, do Step 15.

b. If defective, replace BATTLE SHORT switch (S7), paragraph 2-50.

Step 15. Test for defective crank disconnect switch (S14), paragraph 2-32-2.

a. If crank disconnect switch is not defective, do Step 16.

b. If defective, replace crank disconnect switch, paragraph 2-32.

Step 16. Test for defective crank disconnect relay (K16), paragraph 2-33-2.

a. If crank disconnect relay is not defective, do Step 17.

b. If defective, replace crank disconnect relay, paragraph 2-33.

Step 17. Check starting circuit for breaks or loose connections, refer to Schematic Diagram FO-1.

a. If starting circuit has no breaks and connections are tight, do Step 18.

b. If defective, repair or replace defective wires or connections.

Step 18. Test for defective cranking relay (K2), paragraph 2-62-3.

a. If cranking relay is not defective, do Step 19.

b. If defective, replace cranking relay, paragraph 2-62.

Step 19. Test for defective starter solenoid, refer to TM 9-2815-252-24.

a. If starter solenoid is not defective, do Step 20.

b. If defective, replace starter solenoid in accordance with TM 9-2815-252-24.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 20. Test for defective starting motor, refer to TM 9-2815-252-24.

If defective, replace starting motor in accordance with TM 9-2815-252-24.

2. ENGINE CRANKS BUT FAILS TO START.

Step 1. Test for low battery charge, paragraph 2-12-1.

a. If batteries are fully charged, do Step 2.

b. If not fully charged, replace batteries, paragraph 2-12.

Step 2. Check for clogged or defective fuel filter/water separator.

a. If fuel filter/water separator is not clogged or defective, do Step 3.

b. If clogged or defective, replace fuel filter/water separator, paragraph 2-87.

Step 3. Check for blocked fuel line(s) and components.

a. If fuel lines are not blocked, do Step 4.

b. If blocked, unblock or replace fuel line(s) and components, paragraph 2-80 and paragraph 2-84.

Step 4. Test for defective MASTER SWITCH (S1), paragraph 2-47-2.

a. If MASTER SWITCH is not defective, do Step 5.

b. If defective, replace MASTER SWITCH, paragraph 2-47.

Step 5. Test for defective fuel solenoid, paragraph 2-95-1.

a. If fuel solenoid is not defective, do Step 6.

b. If defective, replace fuel solenoid, paragraph 2–95.

Step 6. Test for defective fuel transfer pump, paragraph 2-85-2.

a. If fuel transfer pump is not defective, do Step 7.

b. If defective, replace fuel transfer pump, paragraph 2-85.

Step 7. Check for contaminated or incorrect grade of fuel.

a. If fuel is not contaminated and correct grade, do Step 8.

b. If contaminated or incorrect grade, drain fuel tank. Replace fuel filter/water separator element, paragraph 2-87. Service fuel tank with clean fuel of proper grade (Table 2-2). Prime engine fuel system in accordance with TM 9-2815-252-24.

Step 8. Check for air in fuel lines.

a. If air in fuel lines, bleed fuel lines in accordance with TM 9-2815-252-24.

b. If no air in fuel lines, notify next higher level of maintenance.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. ENGINE STOPS SUDDENLY.

Step 1. Check for tripped protective devices.

a. If no malfunction indicator lights are lit, do Step 2.

b. If lit, correct fault indicated.

Step 2. Check for air lock in fuel supply line.

a. If no air lock in fuel line, do Step 3.

b. If air in line, bleed fuel lines in accordance with TM 9-2815-252-24.

Step 3. Check for blocked fuel line(s) and components.

a. If fuel lines are not blocked, do Step 4.

b. If blocked, unblock or replace fuel line(s) and components, paragraph 2-80 and paragraph 2-84.

Step 4. Test for defective MASTER SWITCH, paragraph 2-47-2.

a. If MASTER SWITCH is not defective, do Step 5.

b. If defective, replace MASTER SWITCH, paragraph 2-47.

Step 5. Test for defective fuel solenoid, paragraph 2-95-1.

a. If fuel solenoid is not defective, do Step 6.

b. If defective, replace fuel solenoid, paragraph 2-95.

Step 6. Check for defective fuel transfer pump, paragraph 2-85-2.

a. If fuel transfer pump not defective, do Step 7.

b. If defective, replace transfer pump, paragraph 2-85.

Step 7. Test for defective engine fault relay, paragraph 2–33-2.

a. If defective, replace engine fault relay, paragraph 2-33.

b. If engine fault relay is not defective, notify higher level of maintenance.

4. ENGINE RUNS ERRATICALLY OR STALLS FREQUENTLY.

Step 1. Check for obstruction in fuel line(s).

a. If fuel lines are not obstructed, do Step 2.

b. If obstructed, unblock or replace fuel line(s), paragraph 2-80.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 2. Check for blocked exhaust pipe or muffler.

a. If exhaust pipe and muffler are not blocked, do Step 3.

b. If blocked, unblock or replace muffler, paragraph 2-65.

Step 3. Check for contaminated or incorrect grade of fuel.

a. If contaminated or incorrect grade, drain fuel tank. Replace fuel filter/water separator element, paragraph 2-87. Service fuel tank with clean fuel of a proper grade (Table 2-2). Prime engine fuel system in accordance with TM 9-2815-252-24.

b. If fuel is not contaminated or incorrect grade, notify next higher level of maintenance.

5. ENGINE MISFIRING.

Step 1. Check for contaminated or incorrect grade of fuel.

a. If fuel is not contaminated and correct grade, do Step 2.

b. If contaminated or incorrect grade, drain fuel tank. Replace fuel filter/water separator element, paragraph 2-87. Service generator set tank with dean fuel of a proper grade (Table 2-2). Prime engine fuel system in accordance with TM 9-2815-252-24.

Step 2. Check for air in fuel lines.

a. If air in lines, bleed fuel lines in accordance with TM 9-2815-252-24.

b. If no air in fuel lines, notify next higher level of maintenance.

6. ENGINE DOES NOT DEVELOP FULL POWER.

Step 1. Check for restricted fuel filter/water separator.

a. If fuel filter/water separator is not restricted, do Step 2.

b. If restricted, replace fuel filter/water separator element, paragraph 2-87.

Step 2. Check for contaminated or incorrect grade of fuel.

a. If fuel is not contaminated and correct grade, do Step 3.

b. If contaminated or incorrect grade, drain fuel tank. Replace fuel filter/water separator element, paragraph 2-87. Service tank with dean fuel of proper grade (Table 2-2). Prime engine fuel system in accordance with TM 9-2815-252-24.

Step 3. Check for blocked air intake system.

a. If air intake system is not blocked, do Step 4.

b. If blocked, unblock or replace air intake system components as required, paragraph 2-66.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 4. Check blocked exhaust pipe or muffler.

a. If blocked, unblock or replace muffler, paragraph 2–65.

b. If exhaust pipe and muffler are not blocked, notify next higher level of maintenance.

7. ENGINE KNOCKS.

Check for contaminated or incorrect grade of fuel.

a. If contaminated or incorrect grade, drain fuel tank. Replace fuel filter/water separator element, paragraph 2–87, Service fuel tank with clean fuel of a proper grade (Table 2–2). Prime engine fuel system in accordance with TM 9–281 5–252–24.

b. If fuel is not contaminated and correct grade, notify next higher level of maintenance.

8. BLACK OR GREY SMOKE IN EXHAUST.

Check for improper grade of fuel.

a. If improper grade of fuel, drain fuel tank. Service fuel tank with clean fuel of a proper grade (Table 2-2). Prime engine fuel system in accordance with TM 9-2815-252-24.

b. If proper grade of fuel, notify next higher level of maintenance.

9. BLUE OR WHITE EXHAUSTS SMOKE.

Step 1. Check for improper grade of fuel.

a. If proper grade of fuel, do Step 2.

b. If improper grade, drain fuel tank. Service fuel tank with clean fuel of a proper grade (Table 2-2). Prime engine fuel system in accordance with TM 9–2815–252–24.

Step 2. Check for defective thermostat, refer to TM 9-2815–252-24

a. If defective, replace thermostat in accordance with TM 9–2815–252–24.

b. If thermostat is not defective, and trouble persists, notify next higher level of maintenance.

10. HIGH OIL CONSUMPTION.

Step 1. Check for blocked air intake system.

a. If air intake system is not blocked, do Step 2.

b. If blocked, unblock or replace air intake system components as required, paragraph 2-66.

Step 2. Check for improper lubrication oil.

a. If improper, drain crankcase and refill with proper lubrication oil (Table 2–3). Replace oil filter in accordance with TM 9–2815–252–24.

b. If proper lubrication oil and trouble persists, notify next higher level of maintenance.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

11. LOW OIL PRESSURE.

Step 1. Check for improper lubrication oil.

a. If proper lubrication oil, do Step 2.

b. If improper, drain oil and refill with proper lubrication oil (Table 2–3), Replace oil filter in accordance with TM 9–2815–252–24.

Step 2. Test for defective OIL PRESSURE indicator, paragraph 2-41-2.

a. If OIL PRESSURE indicator is not defective, do Step 3.

b. If defective, replace OIL PRESSURE indicator, paragraph 2-41.

Step 3. Test for defective oil pressure sender, paragraph 2-91-1.

a. If defective, replace oil pressure sender, paragraph 2–91.

b. If oil pressure sender is not defective and trouble persists, notify next higher level of maintenance.

12. HIGH OIL PRESSURE.

Step 1. Check for improper lubrication oil.

a. If proper lubrication oil, do step 4.

b. If improper, drain oil and refill with proper lubrication oil (Table 2–3). Replace oil filter in accordance with TM 9-2815–252–24.

Step 2. Test for defective OIL PRESSURE indicator, paragraph 2-41-1.

a. If OIL PRESSURE indicator is not defective, do Step 3.

b. If defective, replace OIL PRESSURE indicator, paragraph 2-41.

Step 3. Test for defective oil pressure sender, paragraph 2-91-1.

a. If defective, replace oil pressure sender, paragraph 2-91.

b. If oil pressure sender is not defective, and trouble persists notify next higher level of maintenance.

13. ENGINE OVERHEATING.

Step 1. Check for broken or loose fan belt, paragraph 2-75-1.

a. If fan belt is not broken and tension is correct, do Step 2.

b. If worn or broken, replace fan belt, paragraph 2-75. If loose, adjust fan belt, paragraph 2-75-4.

Step 2. Check for clogged radiator.

a. If radiator is not clogged, do Step 3.

b. If clogged, service, paragraph 2-89-2.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 3. Test for defective radiator cap, paragraph 2-69-1.

a. If radiator cap is not defective, do Step 4.

b. If defective, replace radiator cap, paragraph 2-70.

Step 4. Test for defective thermostat, refer to TM 9-2815-252-24.

a. If thermostat is not defective, do Step 5.

b. If defective, replace thermostat in accordance with TM 9-2815-252-24.

Step 5. Check for defective coolant hose(s).

a. If coolant hoses are not leaking or collapsed, do Step 6.

b. If defective, replace coolant hose(s), paragraphs 2-71 and 2-72.

Step 6. Check for defective water pump, refer to TM 9-2815-252-24.

a. If defective, replace water pump in accordance with TM 9-2815- 252-24.

b. If water pump is not defective, and trouble persists notify next higher level of maintenance

14. ENGINE COOLANT TEMPERATURE TOO LOW.

Step 1. Check for defective thermostat, refer to TM 9-2815-252-24.

a. If thermostat is not defective, do Step 2.

b. If defective, replace thermostat in accordance with TM 9-2815-252-24.

Step 2. Test for defective temperature sender, paragraph 2-92-1.

a. If temperature sender is not defective, do Step 3.

b. If defective, replace temperature sender, paragraph 2-92.

Step 3. Test for defective COOLANT TEMP. indicator, paragraph 2-40-2.

a. If defective, replace COOLANT TEMP. indicator, paragraph 2-40.

b. If COOLANT TEMP. indicator is not defective, and trouble persists notify next higher level of maintenance.

15. EXCESSIVE FUEL CONSUMPTION.

Step 1. Check for blocked air intake system.

a. If air intake system is not blocked, do Step 2.

b. If blocked, unblock or replace air intake system components as required, paragraph 2-66 and 2-67.

Step 2. Check for leaks in fuel system.

a. If no leaks in fuel system, do Step 3.

b. If leaks found, repair fuel system as required.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 3. Check for contaminated oil.

a. If oil is contaminated, change oil, paragraph 2-88-2.

b. If oil is not contaminated notify next higher level of maintenance.

16. COOLANT IN CRANKCASE OR OIL IN COOLANT.

Check for coolant or oil contamination, If contaminated, notify next higher level of maintenance.

17. ENGINE VIBRATING.

Step 1. Check for bent or broken cooling fan blades, paragraph 2-74-1.

a. If fan blades are not damaged, do Step 2.

b. If damaged, replace cooling fan, paragraph 2-74.

Step 2. Check for contaminated or incorrect grade of fuel.

a. If fuel is not contaminated and is correct grade, do Step 3.

b. If contaminated or incorrect grade, drain fuel tank. Replace fuel filter/water separator element, paragraph 2-87. Service fuel tank with clean fuel of proper grade (Table 2-2). Prime engine fuel system in accordance with TM 9–2815–252–24.

Step 3. Check for loose or defective engine or engine mounts.

a. Tighten loose mounting bolts.

b. If bolts are tight or problem persists, notify next higher level of maintenance.

18. ENGINE FAILS TO START IN COLD WEATHER.

Step 1. Test for low or no battery charge, paragraph 2-12-1.

a. If batteries are fully charged, do Step 2.

b. If not fully charged, replace batteries, paragraph 2-12.

Step 2. Check for improper lubrication oil.

a. If proper lubrication oil, do Step 3.

b. If improper, drain crankcase and refill with proper lubrication oil (Table 2–3). Replace oil filter in accordance with TM 9-2815–252–24.

Step 3. Check for improper grade of fuel.

a. If proper grade of fuel, do Step 4.

b. If improper, drain fuel tank. Service fuel tank with clean fuel of a proper grade (Table 2-2). Prime engine fuel system in accordance with TM 9-2815-252-24.

Step 4. Check for defective inlet manifold heater plugs, refer to TM 9-2815-252-24.

a. If heater plugs are not defective, do Step 5.

b. If defective, replace heater plugs in accordance with TM 9-2815-252-24.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Step 5. Test for defective MASTER SWITCH, paragraph 2-47-2.

a. If MASTER SWITCH is not defective, do Step 6.

b. If defective, replace MASTER SWITCH, paragraph 2-47.

Step 6. TEST for defective PRE-HEAT RELAY (K18).

a. If PRE–HEAT RELAY is defective replace paragraph 2-63-3.

b. If PRE–HEAT RELAY is not defective and problem persists, go to MALFUNCTION 2.

19. BATTERY CHARGE AMMETER SHOWS NO CHARGE WHEN BATTERIES ARE LOW OR DISCHARGED.

Step 1. Check for broken or loose fan belt, paragraph 2-75-1.

a. If fan belt is not broken and tension is correct, do Step 2.

b. If worn or broken, replace fan belt, paragraph 2-75. If loose, adjust fan belt, paragraph 2-75-4.

Step 2. Check for defective BATTERY CHARGER FUSE (FU1), paragraph 2-25-2.

a. If BATTERY CHARGER FUSE is not blown, do Step 3.

b. If defective, replace BATTERY CHARGER FUSE (FU1), (MT4), paragraph 2-25.

Step 3. Test for defective battery charging ammeter shunt, paragraph 2-29-2.

a. If shunt is not defective, do Step 4.

b. If defective, replace battery charging ammeter shunt, paragraph 2-29.

Step 4. Test for defective battery charging alternator, paragraph 2-14-2.

a. If battery charging alternator is not defective, do Step 5.

b. If defective, replace battery charging alternator, paragraph 2-14

Step 5. Test for defective BATTERY CHARGE ammeter, paragraph 2-43-2.

a. If BATTERY CHARGE ammeter is not defective, do Step 6.

b. If defective, replace BATTERY CHARGE ammeter, paragraph 2-43-3.

Step 6. Check for breaks or loose connections in charging circuit, refer to Wiring Diagram FO–2.

If breaks or loose connections are found, repair charging circuit.

20. BATTERY CHARGE AMMETER SHOWS EXCESSIVE CHARGING AFTER PROLONGED OPERATION.

Step 1. Test for defective batteries, paragraph 2-12-1.

a. If batteries are not defective, do Step 2.

b. If defective, replace batteries, paragraph 2-12.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 2. Test for defective BATTERY CHARGE ammeter, paragraph 2-43-2.

a. If BATTERY CHARGE ammeter is not defective, do Step 3.

b. If defective, replace BATTERY CHARGE ammeter, paragraph 2-43.

Step 3. Test for defective battery charging alternator, paragraph 2-14-2.

a. If battery charging alternator is not defective, do Step 4.

b. If defective, replace battery charging alternator, paragraph 2-14.

Step 4. Check for short in charging circuit, refer to Wiring Diagram FO-2.

If shorted, repair charging circuit.

21. AC VOLTMETER (VOLTS AC) DOES NOT INDICATE VOLTAGE.

Step 1. Test defective AC Voltmeter (VOLTS AC), paragraph 2-46-2.

a. If AC Voltmeter (VOLTS AC) is not defective, do Step 2.

b. If defective, replace AC Voltmeter (VOLTS AC), paragraph 2-46.

Step 2. Test for defective AM-VM transfer switch, paragraph 2-52-2.

a. If AM–VM transfer switch is not defective, do Step 3.

b. If defective, replace AM–VM transfer switch, paragraph 2-52.

Step 3. Test for defective VOLTAGE adjust potentiometer, paragraph 2-48-2.

a. If VOLTAGE adjust potentiometer is not defective, do Step 4.

b. If defective, replace VOLTAGE adjust potentiometer, paragraph 2-48.

Step 4. Test for defective AC voltage regulator, paragraph 2-27-2.

a. If AC voltage regulator is not defective, do Step 5.

b. If defective, replace AC voltage regulator, paragraph 2-27.

Step 5. Test for defective voltage reconnection switch, paragraph 2-64-3.

a. If voltage reconnection switch is not defective, do Step 6.

b. If defective, replace voltage reconnection switch, paragraph 2-64.

Step 6. Check AC Voltmeter circuit for breaks or loose connections, refer to Wiring Diagram FO-1.

If breaks or loose connections are found, repair circuit.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

22. GENERATOR SET FAILS TO GENERATE POWER.

Step 1. Test AC Circuit interrupter relay, K1, refer to paragraph 2-61-3.

a. If the AC Circuit interrupter relay, K1 is not defective, do Step 2.

b. If defective, replace the AC circuit interrupter relay K1, refer to paragraph 2-61.

Step 2. Test Field Flash Relay. K15, paragraph 2-33-2.

a. If the field flash relay is defective replace per paragraph 2-33.

b. If relay is not defective refer to next higher level of maintenance.

23. AC VOLTMETER (VOLTS AC) INDICATES VOLTAGE. BUT FREQUENCY METER IS OFF SCALE.

Step 1. Check for defective frequency adjust control cable, paragraph 2-89-2.

a. If frequency adjust control cable is not defective, do Step 2.

b. If defective, replace or adjust frequency adjust control cable, paragraph 2-89.

Step 2. Test for defective FREQUENCY meter (HERTZ), paragraphs 2-44-2 or 2-44-3.

a. If FREQUENCY meter (HERTZ) is not defective, do Step 3.

b. If defective, replace FREQUENCY meter (HERTZ), paragraph 2-44.

Step 3. Test for defective frequency transducer, paragraphs 2-28-2 or 2-28-3.

a. If frequency transducer is not defective, do Step 4.

b. If defective, replace frequency transducer, paragraph 2-28.

Step 4. Check frequency meter circuit for breaks or loose connections, refer to Wiring Diagram FO-2.

If breaks or loose connections are found, repair circuit.

24. AC VOLTMETER (VOLTS AC) VOLTAGE FLUCTUATES.

Step 1. Check for loose electrical connections, refer to Wiring Diagram FO-2.

a. If no loose connections, do Step 2.

b. If loose, tighten electrical connections.

Step 2. Test for defective AC voltmeter (VOLTS AC), paragraph 2-46-2.

a. If AC voltmeter (VOLTS AC) is not defective, do Step 3.

b. If defective, replace AC voltmeter (VOLTS AC), paragraph 2-46.

Step 3. Test for defective VOLTAGE adjust potentiometer, paragraph 2-48-2.

a. If VOLTAGE adjust potentiometer is not defective, do Step 4.

b. If defective, replace VOLTAGE adjust potentiometer, paragraph 2-48.

Table 2-6. UNIT TROUBLESHOOTING - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 4. Test for defective AC voltage regulator, paragraph 2-27-2.

a. If AC voltage regulator is not defective, do Step 5.

b. If defective, replace AC voltage regulator, paragraph 2-27.

Step 5. Test for defective AM–VM transfer switch, paragraph 2-52-2.

a. If AM-VM transfer switch is not defective, do Step 6.

b. If defective, replace AM–VM transfer switch, paragraph 2-52.

Step 6. Check AC voltmeter circuit for breaks or loose connections, refer to Wiring Diagram FO-2.

a. If breaks or loose connections are found, repair circuit.

b. If engine is running erratically or stalls frequently, refer to MALFUNCTION 4.

25. FREQUENCY METER (HERTZ) FREQUENCY FLUCTUATES.

Step 1. Check for erratic engine operation.

a. If engine is operating properly, do Step 2.

b. If “Engine Runs Erratically or Stalls Frequently”. Refer to Malfunction 4.

Step 2. Test for defective FREQUENCY meter (HERTZ), paragraphs 2-44-2 or 2-44-3.

a. If FREQUENCY meter (HERTZ) is not defective, do Step 3.

b. If defective, replace FREQUENCY meter (HERTZ), paragraph 2-44.

Step 3. Test for defective frequency transducer, paragraphs 2-28-2 or 2-28-3.

a. If frequency transducer is not defective, do Step 4.

b. If defective, replace frequency transducer, paragraph 2-28.

Step 4. Check for defective frequency adjust control cable, paragraph 2-89-2.

a. If defective, replace or adjust frequency adjust control cable, paragraph 2-89.

b. If frequency adjust control cable is adjusted correctly and not defective, and trouble persists notify next higher level of maintenance.

Section VI. RADIO INTERFERENCE SUPPRESSION

2-7. GENERAL METHODS TO ATTAIN PROPER SUPPRESSION.

Suppression is attained by providing a low resistance path to ground for stray currents. The methods used include shielding the ignition and high–frequency wires, grounding the frame with bonding straps, and using filtering systems.

2–8. INTERFERENCE SUPPRESSION COMPONENTS.

2-8-1. Primary Suppression Components. The primary suppression components are those whose primary function is to suppress radio interference. The only primary suppression components on this generator set are the load output terminal board EMI filters. Refer paragraph 2-97 for inspection and replacement procedures.

2–8-2. Secondary Suppression Components. Secondary suppression components have radio interference suppression functions which are incidental or secondary to their primary function. The only secondary suppression component for this generator set is the housing Refer to Section IX for removal and installation procedures.

Section VII. SPECIAL INSTRUCTIONS

2-9. NUCLEAR, BIOLOGICAL, AND CHEMICAL CONTAMINATION.

The generator set is capable of being operated by personnel wearing nuclear, biological, or chemical (NBC) protective clothing without special tools or support equipment. Refer to FM 3-5, NBC Decontamination for information on decontamination procedures. Specific procedures for the generator set are the following:

2-9–1. Control panel indicators sealing gaskets, rubber sleeves and rope draw cords at output terminal access ports, control panel door gaskets, access door gaskets, rubber tubing and belts within the engine compartment, coverings for electrical conduits, external water drain tubing, and retaining cords for slave receptacle covers will absorb and retain chemical agents. Replacement of these items is the recommended method of decontamination.

2-9-2. Lubricants, fuel, coolant, or battery fluid may be present on the external surfaces of the generator set or components due to leaks or normal operation. These fluids will absorb NBC agents. The preferred method of decontamination is removal of these fluids using conventional decontamination methods in accordance with FM 3-5.

2–9–3. Continued decontamination of external generator set surfaces with supertropical bleach (STB) and decontaminating solution number 2 (DS2) will degrade clear plastic indicator coverings to a point where reading indicators will become impossible. This problem will become more evident for soldier swearing protective masks. The use of STB or DS2 decontaminants in these areas should be minimized. Indicators should be decontaminated with warm, soapy water.

2-9-4. External surfaces of the control panel assembly that are marked with painted or stamped lettering will not withstand repeated decontamination with STB or DS2 without degradation of this letterlng. The recommended method of decontamination for these areas is warm, soapy water.

2–9–5. Areas that will entrap contaminants, making efficient decontamination extremely difficult, include the following: space behind knobs and switches on the control panel, exposed heads of screws, areas adjacent to and behind exposed wiring conduits, hinged areas of access doors, spaces behind externally mounted equipment specification data plates, areas around external oil drain valve, retaining chains for external receptacle covers, areas behind external receptacle covers, access door locking mechanisms, recessed wells for access door handles, fuel caps, load output terminal board access door, slave receptacles, frequency adjustment controls, areas around tie–down/lifting rings, crevices around access doors, external screens covering ventilation areas, and areas adjacent to the external fuel drain valve. Replacement of these items, if available, is the preferred method of decontamination. Conventional decontamination methods should be used on these areas, while stressing the importance of thoroughness and the probability of some degree of continuing contact and vapor hazard.

2-9-6. In an NBC contaminated environment, the generator set should be operated with all access doors closed to reduce the effects of contamination.

2-9–7. The use of overhead shelters or chemical protective covers is recommended as an additional means of protection against contamination in accordance with FM 3-5. If using covers, care should be taken to provide adequate space for air flow and exhaust, refer to Figure 2-1.

2-9-8. (A) For additional NBC information refer to FM 3-3 and 3-4. All other services will use their applicable directives.

Section VIII. MAINTENANCE OF DC ELECTRICAL SYSTEM

2-10. INTRODUCTION.

This section contains unit maintenance procedures for the DC electrical system. Deficiencies noted during inspection/repair which are beyond the scope of unit maintenance shall be reported to the next higher maintenance level.

NOTE

Refer to TM 9-6115–641–10 for operating procedures.

NOTE

Once removed, replace all lockwashers.

2-11. BATTERY AND NATO SLAVE RECEPTACLE CABLES.

Batteries give off flammable gas. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in severe personal injury or death.

Remove metal jewelry when working on electrical system/components. Failure to observe this warning could result in severe personal injury or death by electrocution.

NOTE

This procedure is typical for the positive, negative, and interconnect battery cables, and the positive and negative NATO SLAVE RECEPTACLE cables.

2-11-1. Inspection.

a. Shut down generator set.

b. Open engine access doors.

c. Inspect battery/slave receptacle cables for security, cracked insulation, broken, burned or corroded terminals, missing parts, or other damage.

d. Close access doors.

2-11-2. Removal.

a. Shut down generator set.

b. Open battery access doors.

NOTE

Tag all cables before removal.

c. Disconnect negative battery cable terminal (1, Figure 2-3) from battery.

d. Disconnect and remove applicable cable assembly as shown in Figure 2-3 or Figure 2-4

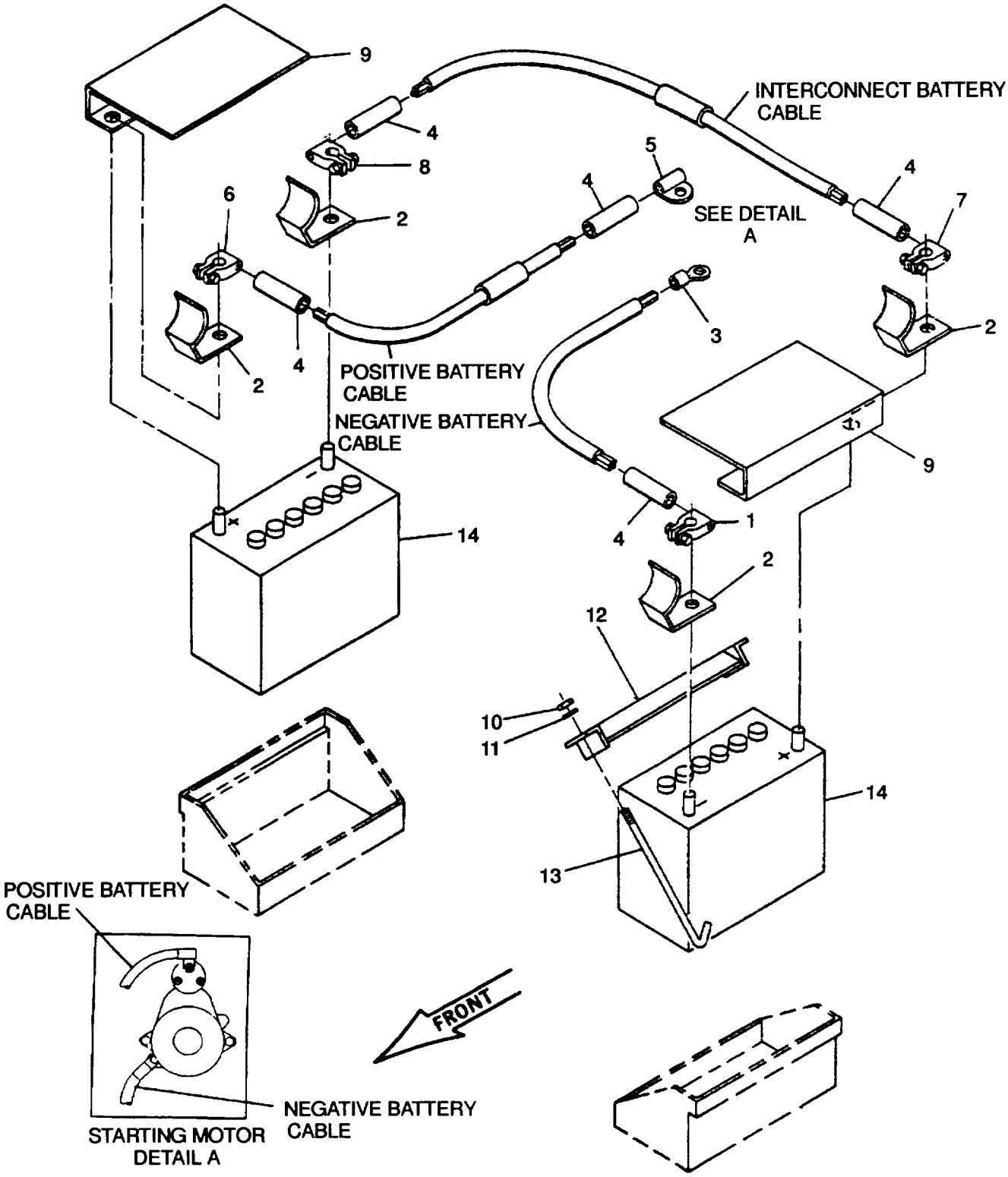


Figure 2-3. Batteries and Cables

2-11-3. Cleaning

a. Remove terminal cover(s) (2, Figure 2-3) from battery post(s), if applicable.

b. Clean battery post(s) and cable terminals with battery terminal cleaner.

c. Install terminal cover(s) (2), if removed.

2-11-4. Repair.

NOTE

If cable cannot be repaired, refer to Appendix D.

a. Remove applicable broken or damaged terminal as shown in Figure 2-3 or Figure 2-4.

b. Slide new shrinkable tubing (4, Figure 2-3 or Figure 2-4) over cable end.

c. Install applicable terminal to cable end as described in Appendix D.

d. Heat shrinkable tubing (4) with heat gun until secure.

2-11-5. Installation.

a. Install applicable cable assembly as shown in Figure 2-3 or Figure 2-4.

b. Connect negative battery cable terminal (1, Figure 2-3) to battery.

c. Close access doors.

2-12. Batteries.

2-12-1. Testing.

Batteries give off flammable gas. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in severe personal injury or death.

a. Shut down generator set.

b. Open engine access doors and disconnect negative battery cable terminal. (1, Figure 2-3).

c. Remove battery vent caps.

d. Test specific gravity of electrolyte in each battery cell with a hydrometer. Refer to Table 2-7 for state of charge with specific gravity corrected to 80°F (27°C). Refer to Table 2-8 for specific gravity temperature corrections.

e. Recharge or replace batteries as necessary. Retest batteries per above instructions.

f. Install battery vent caps.

g. Connect negative battery cable. Close engine access doors.

Table 2-7. STATE OF CHARGE WITH SPECIFIC GRAVITY CORRECTED TO 80°F (27°C)

Specific Gravity	Percent Charge
1.280	100
1.250	75
1.220	50
1.190	25
1.160	Little Useful
1.130	Capacity, Discharged

Table 2-8. SPECIFIC GRAVITY TEMPERATURE CORRECTIONS

Temperature °F	Correction Factor
+120	+0.016
+115	+0.014
+110	+0.012
+105	+0.010
+100	+0.008
+95	+0.006
+90	+0.004
+85	+0.002
+80	0
+75	-0.002
+70	-0.004
+65	-0.006
+60	-0.008
+55	-0.010
+50	-0.012
+45	-0.014
+40	-0.016
+35	-.018
+30	-0.020
+25	-0.022
+20	-0.024
+15	-0.026
+10	-0.028
+5	-0.030
0	-0.032
–5	-0.034
–10	-0.034
–15	-0.038
–20	-0.040

2-12-2. Removal.

a. Shut down generator set.

b. Open engine access doors.

c. Disconnect negative battery cable terminal (1, Figure 2-3).

d. Disconnect positive cable terminal (6).

e. Disconnect interconnect cable terminals (7) and (8) and remove interconnect battery cable.

f. Remove terminal covers (2) and battery covers (9).

g. Remove nuts (10), washers (11), retaining bars (12), and retaining clamps (13).

h. Remove batteries (14).

2-12-3. Inspection.

a. Shut down generator set.

b. Remove batteries, paragraph 2-12-2.

c. Inspect batteries for cracked cases, broken, burned or corroded posts, missing parts, and other damage.

d. Install batteries, paragraph 2-12-5.

2-12-4. Service.

a. Shut down generator set.

b. Disconnect battery cables, paragraph 2–12–2.

c. Remove terminal covers (2, Figure 2–3) and battery covers (9).

d. Clean cable terminals and battery posts with battery terminal cleaner.

e. Install terminal covers (2) and battery covers (9).

f. Connect battery cables, paragraph 2-12-5.

2-12-5. Installation.

a. Install batteries (14, Figure 2-3). Ensure that batteries are fully charged.

b. install battery covers (9) and terminal covers (2).

c. Apply grease (Item 8, Appendix C) to battery posts and cable terminals (1), (6), (7), and (8).

d. Install battery retaining bars (12), clamps (13), washers (11), and nuts (10) (both sides).

Connect negative battery terminal (1) last when installing battery cables. Failure to follow this procedure could result in sparks which can ignite volatile battery gases.

e. Position interconnect battery cable on battery and connect terminals (7) and (8).

f. Connect positive cable terminal (6) and negative cable terminal (1).

g. Close engine access doors.

2-13. NATO SLAVE RECEPTACLE.

2-13-1. Inspection.

a. Shut down generator set.

b. Open engine access doors and disconnect negative battery cable.

c. Inspect NATO SLAVE RECEPTACLE for security, corrosion, missing hardware, and other damage.

d. Connect negative battery cable and close engine access doors.

2-13-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Open right side engine access door, remove bolt (1, Figure 2-4), washer (2), and disconnect negative cable terminal (3) from slave receptacle (9).

d. Remove bolt (5), washer (6), and disconnect positive cable terminal (3) from slave receptacle (9).

e. Remove bolts (7), nuts (8), and slave receptacle (9) from generator set housing.

f. Remove bolt (10), nut (11), and cap (12) from housing.

2-13-3. Installation.

a. Insert slave receptacle (9, Figure 2-4) into generator set housing.

b. Secure slave receptacle (9) to generator set with bolts (7) and nuts (8).

c. Connect slave receptacle positive cable terminal (3) to slave receptacle (9) with bolt (5) and washer (6).

d. Connect negative cable terminal (3) to slave receptacle (9) with bolt (1) and washer (2).

e. Attach cap (12) to housing with bolt (10) and nut (11).

f. Slide cap (12) over slave receptacle (9).

g. Connect negative battery cable and close access doors.

2-14. BATTERY CHARGING ALTERNATOR.

2-14–1. Inspection.

a. Shut down generator set.

b. Inspect battery charging alternator (9, Figure 2-5) for loose mounting hardware, damaged or loose electrical connections, and other damage.

2-14-2. Testing.

a. Shut down generator set.

b. Inspect battery charging alternator (9, Figure 2-5) for loose connections.

c. Set multimeter for DC volts and connect between positive and negative terminals of alternator.

d. Start and operate generator set at rated frequency and voltage.

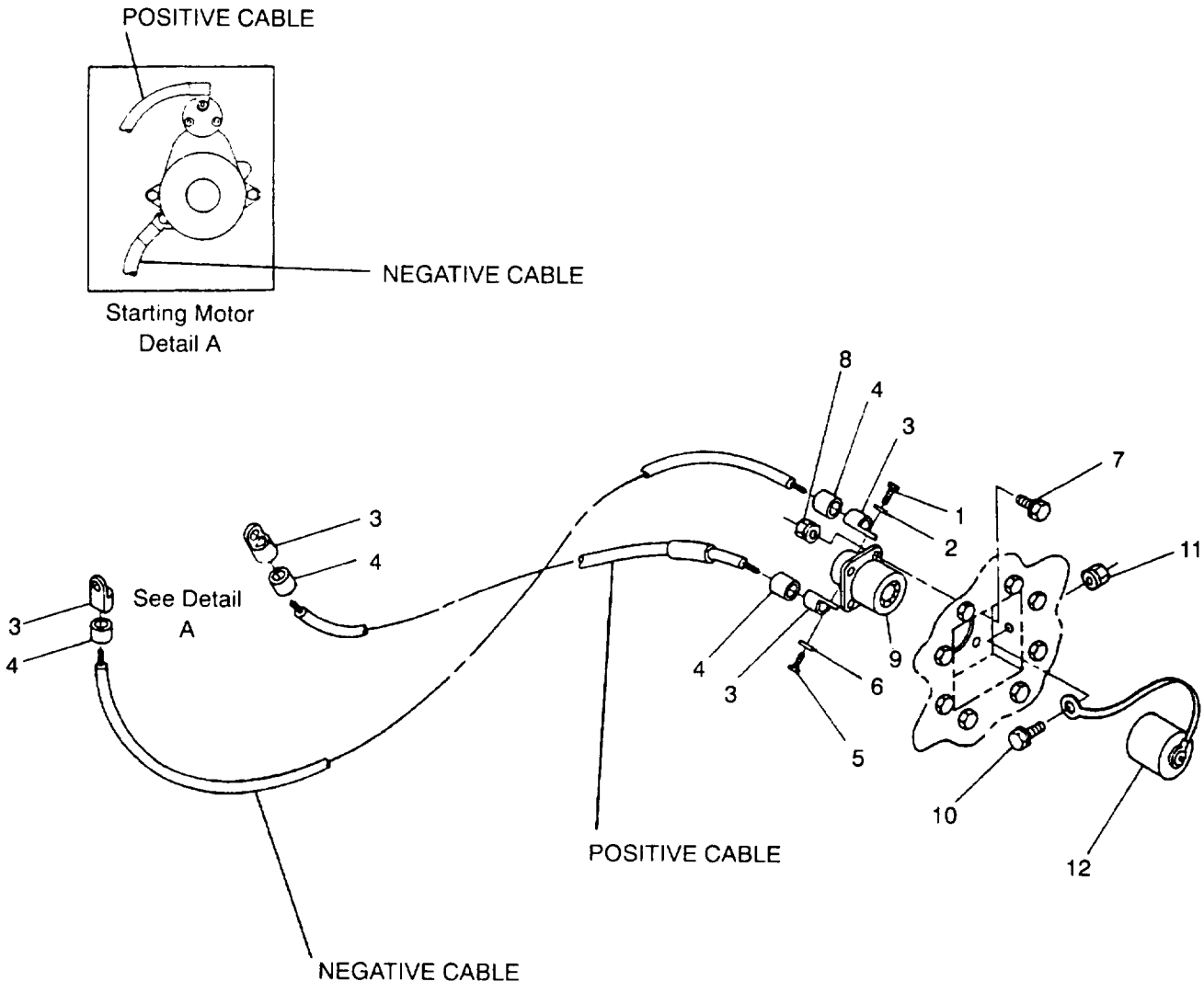


Figure 2-4. NATO Slave receptacle and Cables

2-14-2. Testing - Continued

e. Multimeter reading should be between 27.5 and 29.5 VDC.

f. Shut down generator set.

g. Battery charging alternator is defective and requires replacement, if reading is other than above

2-14-3. Removal.

a. Shut down generator set.

b. Open both engine access doors and disconnect negative battery cable.

c. Loosen bolts (26, Figure 2-20)) for overflow bottle mounting bracket (29) and move away from fan guard.

d. Remove bolts (2), washers (3), and right fan guard (4).

e. Loosen bolt (1, Figure 2-5) nut (4) and move battery charging alternator (9) so fan belt (33, Figure 2-20) can slip off battery charging alternator pulley and can be removed from crankshaft and water pump pulleys.

f. Tag and disconnect alternator (9, Figure 2-5) electrical leads.

g. Remove bolt (1) lockwasher (2), and washer (3).

h. Remove nut (4), lockwasher (5), washer (6), spacer (7). and bolt (8).

i. Remove battery charging alternator (9) from generator set.

j. If replacing alternator, remove and retain nut (10), lockwasher (11), and pulley (12) from alternator (9).

2-14-4. Installation.

a. If removed, install pulley (12, Figure 2-5) on battery charging alternator (9) with lockwasher (11) and nut (10). Torque nut (10) 40 to 50 ft-lbs (54 to 68 Nm).

b. Position battery charging alternator (9) in generator set.

c. Install bolt (8) spacer (7), washer (6), lockwasher (5), and nut (4).

d. Slip fan belt (33, Figure 2-20) onto battery charging alternator pulley.

e. Install bolt (1, Figure 2-5), lockwasher (2), and washer (3).

f. Install electrical leads and remove tags.

g. Adjust fan drive belt, paragraph 2-75-4.

h. Tighten bolts (26, Figure 2-20) for overflow mounting bracket (29).

i. Install right side fan guard (4, Figure 2-20) with bolts (2) and washers (3).

j. Connect negative battery cable and close access doors.

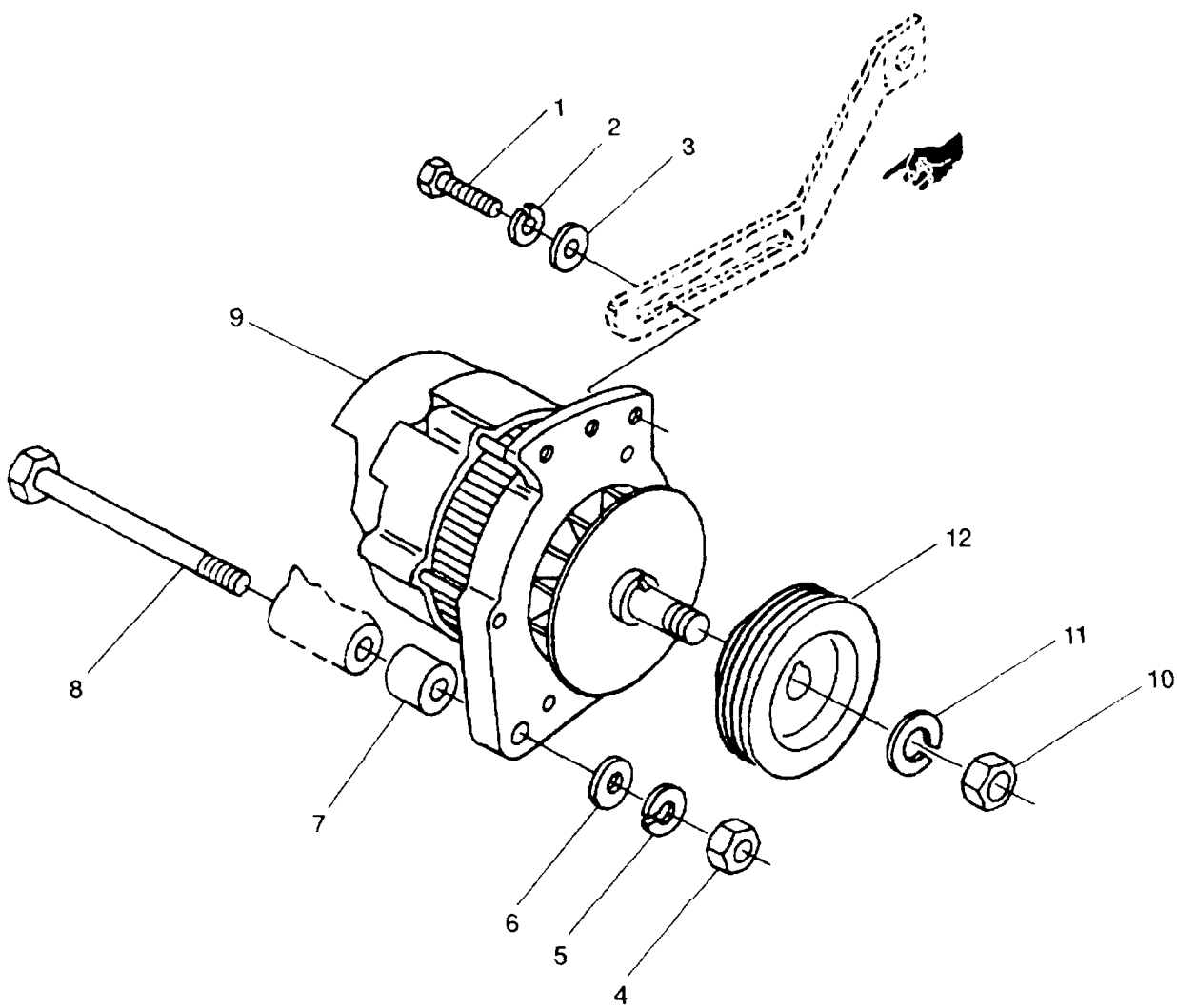


Figure 2-5. Battery Charging Alternation

Section IX. MAINTENANCE OF HOUSING

2-15. ACCESS DOORS.

2-15-1. Inspection.

a. Shut down generator set.

b. Inspect access doors, hinges, latches, door hold open mechanisms, and storage and document boxes for loose and missing hardware, cracks, dents, loose paint, and corrosion.

c. Inspect data plates for readability and loose or missing rivets.

2-15-2. Removal.

NOTE

This procedure is written for the right side engine access door, but is typical for all access doors, door hold open mechanisms, storage and document boxes, data plates, hinges, and latches.

a. Shut down generator set.

b. Remove bolts (1, Figure 2-6), nuts (2), and hold open mechanism (3) from right side engine access door (18) and generator set.

c. Remove nuts (4), washers (5), spacers (6) and (7), screws (8) and (9), door holding bracket (10), and door link support (11) from door link flange (12).

d. Remove bolts (13), washers (14), lockwashers (15), nuts (16), hinges (17), and right side engine access door (18) from generator set.

e. Remove bolts (19), nuts (20), and document box (21) from right side engine access door (18).

f. Remove screws (22), nuts (23), and latches (24) from right engine access door (18).

g. Drill rivets (25) and (27), and remove lifting and tiedown plate (26) and battery connection plate (28) from right side engine access door (18).

h. Drill out rivets (29), and remove schematic diagram (30) from document box (21).

2-15-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surfaces in accordance with TM 43–0139. (F) Refer to applicable directives.

d. Replace unreadable data plates.

e. Replace loose or missing rivets.

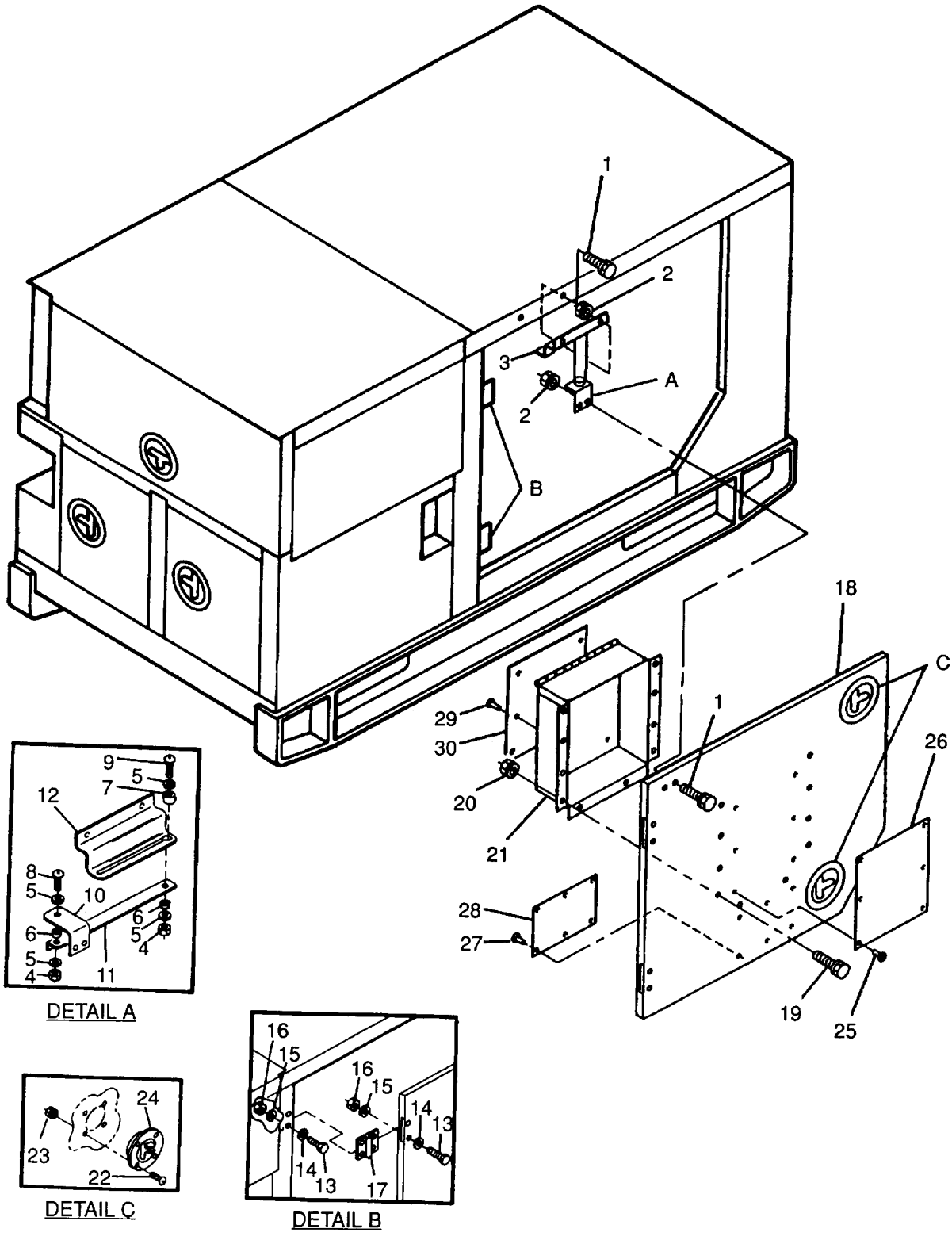


Figure 2-6. Generator Set Access Doors

2-15-4. Installation.

a. Install schematic diagram (30, Figure 2-6) on document box (21) with rivets (29).

b. Install lifting and tiedown plate (26) and battery connection plate (28) on right side engine access door (18) with rivets (25) and (27).

c. Install latches (24) on right side engine access door (18) with screws (22) and nuts (23).

d. Install document box (21) on right side engine access door (18) with bolts (19) and nuts (20).

e. Install hinges (17) and right side engine access door (18) on generator set with bolts (13), washers (14), lockwashers (15), and nuts (16).

f. Install door holding bracket (10) and door link support (11) on door link flange (12) with screws (8) and (9), spacers (6) and (7), washers (5), and nuts (4).

g. Install door hold open mechanism (3) on generator set and right side engine access door (18) with bolts (1) and nuts (2).

2-16. CONTROL BOX TOP PANEL.

2-16-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control panel access door, paragraph 2-15-2.

CAUTION

The control box top panel is attached to the generator set with a silicone sealant to prevent water from entering the control box, It will be necessary to pry the control box top panel to separate it from the generator set. Care must be taken not to bend, scratch, or otherwise damage the panel or the generator set.

d. Remove bolts (1, Figure 2-7), nuts (2), and top panel (3).

e. Remove old sealant from control box top panel (3) and control box assembly surfaces.

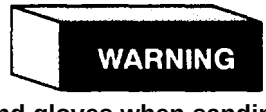
f. Remove bolts (4), nuts (5), bracket (6), and ring (7) from top panel (3).

2-16-2. Inspection.

a. Shut down generator set.

b. Inspect control box top panel for dents, cracks, loose paint, and corrosion.

2-16-3. Repair.



Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43–0139. (F) Refer to applicable directives.

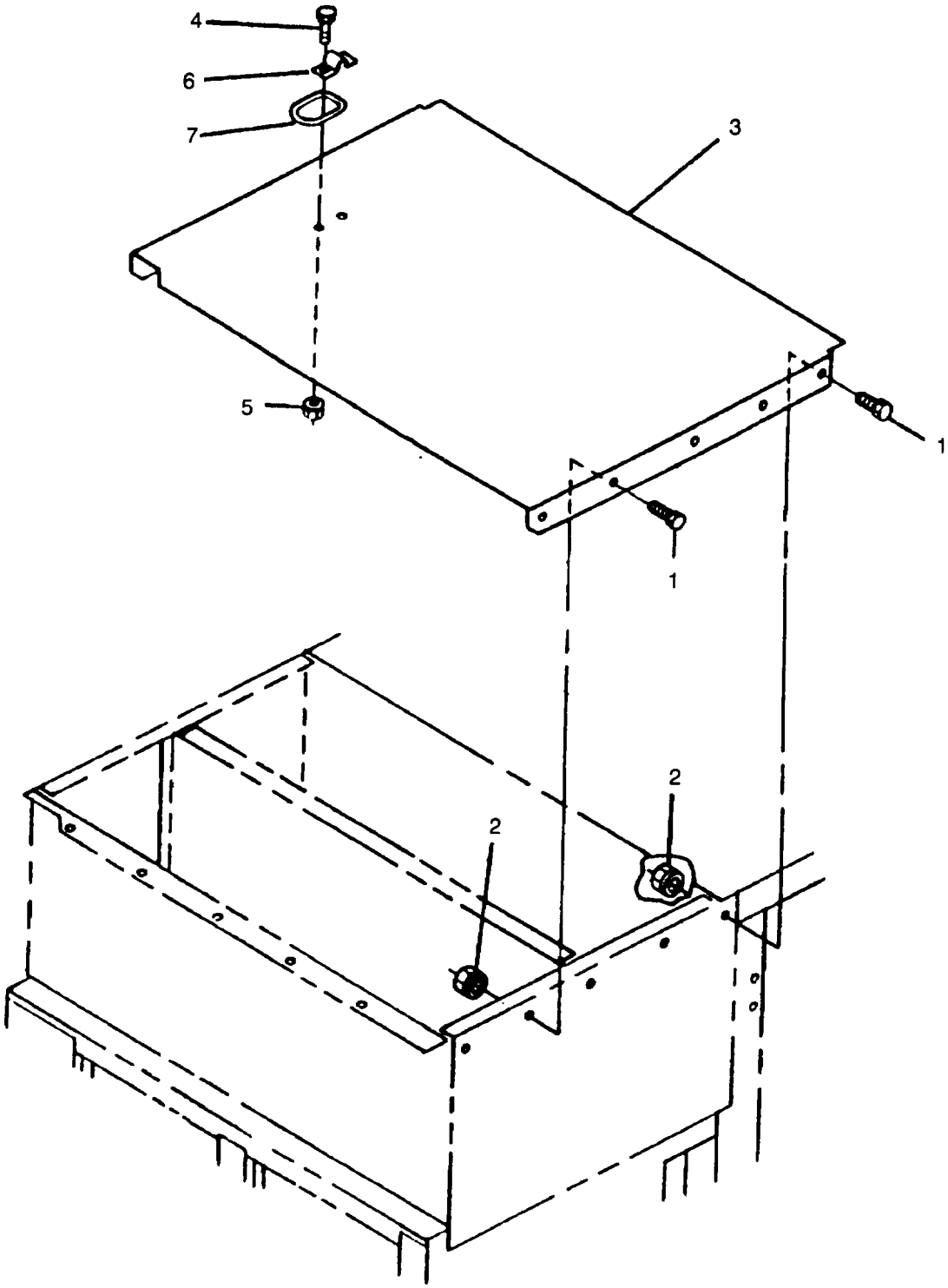


Figure 2-7. Control Box Top Panel

2-16-4. Installation.

a. Install ring (7, Figure 2-7) and bracket (6) on control box top panel (3) with bolts (4) and nuts (5)

b. Apply a bead of sealant (Item 16, Appendix C) to the top flanges of the control box assembly.

c. Immediately install top panel (3) with bolts (1) and nuts (2).

d. Install control panel access door, paragraph 2-15-4.

e. Connect negative battery cable and close access door.

2-17. TOP HOUSING PANEL.

2-17-1. Removal.

a. Shut down generator set.

Top housing panel can get very hot. Allow panel to cool down before performing maintenance. Failure to observe this warning could result in severe burns.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove bolts (1, Figure 2-8), bolts (2), nuts (3), and top housing panel (4).

d. Remove bolts (5), nuts (6), bracket (7), and exhaust door (8) from top housing panel (4).

2-17-2. Inspection.

a. Shut down generator set.

b. Inspect top housing panel (4, Figure 2-8), exhaust door (8), and bracket (7) for dents, cracks, loose paint, and corrosion.

2-17-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43–01 39. (F) Refer to applicable directives.

2-17-4. Installation.

a. Install exhaust door (8, Figure 2-8) and bracket (7) to top housing panel (4) with bolts (5) and nuts (6).

b. Install top housing panel (4) on generator set with bolts (1 and 2) and nuts (3).

c. Connect negative battery cable and close access door.

2-18. FRONT HOUSING PANEL.

2-18-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove bolts (9, Figure 2-8), bolts (10), lockwashers (11), and washers (12).

d. Remove bolts (13), washers (14), lockwashers (15), and nuts (16).

e. Remove front housing panel (17).

2-18-2. Inspection.

Inspect front housing panel (17, Figure 2-8) for dents, cracks, loose paint, and corrosion.

2-18-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43–0139. (F) Refer to applicable directives.

2-18-4. Installation.

a. Install front housing panel (17, Figure 2-8) on generator set with bolts (13), washers (14), lockwashers (15), and nuts (16).

b. Install bolts (9 and 10), lockwashers (11), and washers (12).

c. Connect negative battery cable and close access door.

2-19. FRONT HOUSING SECTION.

2-19-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove top housing panel, paragraph 2-17-1.

d. Remove bolts (18, Figure 2-8), lockwashers (19), and washers (20).

e. Remove bolts (21), nuts (22), and deflectors (23), (24), and (25).

f. Remove bolts (2, Figure 2-20), washers (3), and fan guards (4).

g. Remove front housing panel, paragraph 2-18-1.

h. Remove auxiliary fuel pump, paragraph 2-84-3.

i. Remove fuel tank filler neck, paragraph 2-81-1.

j. Remove fuel transfer pump, paragraph 2-85–3.

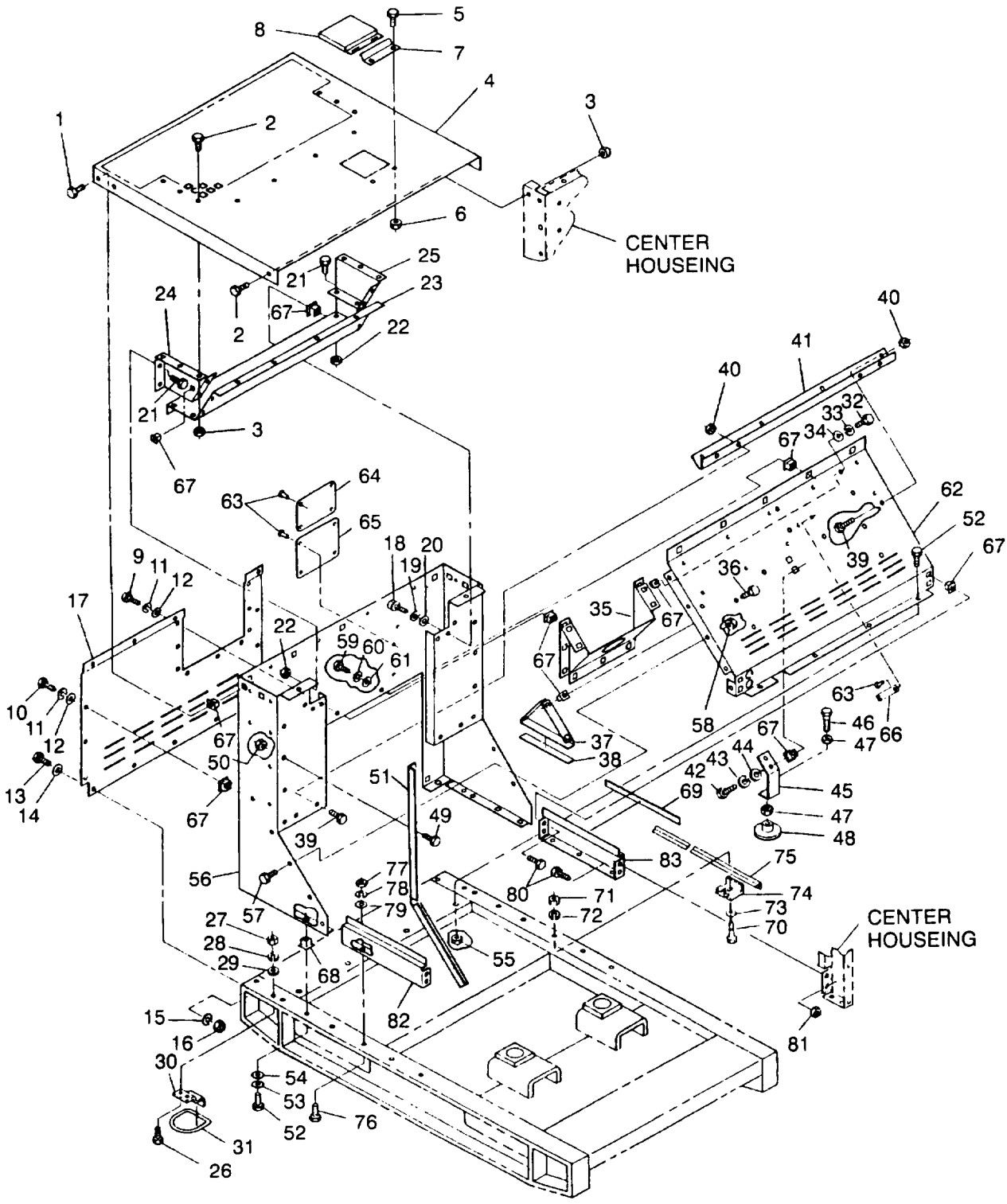


Figure 2-8. Generator Set front Housing Section

k. Remove radiator, paragraph 2-70-1.

l. Remove bolts (26, Figure 2–8), nuts (27), lockwashers (28), washers (29), front lifting ring brackets (30), and lifting rings (31) from generator set.

m. Remove screws (18, Figure 2-21), nuts (19), and float switch module (20).

n. Remove bolts (32, Figure 2-8), Iockwashers (33), washers (34), and filler neck panel (35) from air deflector (62).

o. Remove bolts (36) and fuel tank holddown brackets (37).

p. Remove bolts (39), nuts (40), and channel (41) from front housing (56) and air deflector (62).

q. Disconnect and cap fuel supply and fuel return lines at fuel tank fittings (16 and 34, Figure 2-21).

r. Remove bolts (42, Figure 2-8), Iockwashers (43), washers (44), and bracket assembly (45) from air deflector (62).

s. Remove bolt (46), nuts (47), and holddown plate (48) from bracket (45).

t. Tag and disconnect electrical leads at fuel level sender (4, Figure 2-21) and fuel float module (20).

u. Remove door sills, paragraph 2-19-5.

v. Remove bolts (49, Figure 2-8), nuts (50), and door stops (51) from front housing (56).

w. Remove bolts (52), Iockwashers (53), and washers (54), nuts (55) and front housing (56) with air deflector (62) from generator set.

x. Remove bolts (57) and nuts (58) from air deflector (62) and housing (56).

y. Remove bolt (59), Iockwasher (60), washer (61), and air deflector (62).

z. If necessary, drill out rivets (63), and remove identification plate (64), set rating plate (65), and external fuel supply plate (66).

2-19-2. Inspection.

a. Shut down generator set.

b. Inspect ail front housing parts for dents, cracks, loose paint, and corrosion.

c. Check for missing or damaged cage nuts (67, Figure 2-8) and (68).

d. Inspect door seals (69) for looseness or damage.

e. Inspect cotton webbing (38) for looseness or damage.

2-19-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43–0139. (F) Refer to applicable directives.

d. Replace all missing or damaged cage nuts (67, Figure 2-8) and (68).

e. Replace damaged door seals (69).

2-19-4. Installation.

a. If removed, install external fuel supply plate (66, Figure 2-8), set rating plate (65), and identification plate (64) with new rivets (63).

b. Install door stops (51) on front housing (56) with bolts (49) and nuts (50).

c. Install holddown plate (48) in bracket (45) with bolt (46) and nuts (47).

d. Install bracket assembly (45) on air deflector (62) with bolts (42), Iockwashers (43), and washers (44).

e. Install air deflector (62) on front housing (56) with bolts (57) and nuts (58).

f. Install bolt (59), Iockwasher (60) and washer (61).

g. Install channel (41) on front housing (56) and air deflector (62) with bolts (39) and nuts (40).

h. If replacing fuel tank holddown brackets (37), bond new cotton webbing strips (38) to brackets with adhesive (Item 1, Appendix C).

i. Install fuel tank holddown brackets (37) to air deflector (62) with bolts (36).

j. Install filler neck panel (35) on air deflector (62) with bolts (32), Iockwashers (33), and washers (34).

k. Install door sills, paragraph 2-19-6.

l. Install front housing (56) with air deflector (62) on generator set with bolts (52), Iockwashers (53), washers (54) and nuts (55).

m. Install front lifting rings (31) and brackets (30) on generator set with bolts (26), Iockwashers (28), washers (29), and nuts (27).

n. Adjust bolt (46) in bracket (45) so that holddown plate (48) contacts fuel tank, and tighten nuts (47).

o. Install fuel tank filler neck, paragraph 2-81-3.

p. Route electrical leads through air deflector (62) and connect leads, as tagged to fuel level sender and fuel float module. Remove tags.

q. Install auxiliary fuel pump, paragraph 2-84-4.

r. Install fuel transfer pump, paragraph 2-85-4.

s. Connect fuel supply and fuel return lines at fuel tank fittings (16 and 34, Figure 2-21).

t. Install radiator, paragraph 2-70-5.

u. Install front housing panel, paragraph 2-18-4.

v. Install deflectors (23), (24), and (25) with bolts (21) and nuts (22). Install bolts (18), lockwashers (19), and washers (20).

w. Install top housing panel, paragraph 2-17-4.

x. Connect negative battery cable and close access door.

2-1 9–5. Removal of Engine Access Door Sills.

a. Remove bolt (70, Figure 2-8), nut (71), Iockwasher (72), washer (73), front grounding rod bracket (74), and grounding rods (75) from generator set.

b. Remove bolts (9, Figure 2-23), washers (10), Iockwashers (11), nuts (12), and plate (13) from left side engine access door sill (81, Figure 2-8).

c. Remove bolts (76), nuts (77), Iockwashers (78), and washers (79).

d. Remove bolts (80), nuts (81), and engine access door sills (82) and (83).

2-19-6. Installation of Engine Access Door Sills.

a. Install bolts (80, Figure 2-8), nuts (81), and engine access door sills (82) and (83).

b. Install bolts (76), nuts (77), lockwashers (78), and washers (79) securing door sills (82) and (83).

c. Install bolt (70), nut (71), lockwasher (72), washer (73), front housing grounding rod bracket (74), and grounding rods (75) on generator set.

d. Install bolts (9, Figure 2-23), washers (10), lockwashers (11), nuts (12), and plate (13) to left side door sill (82, Figure 2-8).

2-20. REAR HOUSING SECTION.

2-20-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box assembly, paragraph 2-21-2.

d. Remove load terminal and storage box access doors, paragraph 2-15-2.

e. Remove top housing panel, paragraph 2-17-1.

f. Remove engine access doors, paragraph 2-15-2.

g. Remove DEAD CRANK switch, paragraph 2-96-2.

h. Remove oil pressure sender, paragraph 2-91-2 and oil line (3, Figure 2-25) at engine fitting (24).

i. Remove low oil pressure switch, paragraph 2-90-2.

j. Remove NATO SLAVE RECEPTACLE, paragraph 2-13-2.

k. Remove frequency adjust control cable assembly, paragraph 2-89-1.

l. Remove air cleaner assembly, paragraph 2-67-1.

m. Remove load terminal board upper mounting bracket, paragraph 2-97-1.

n. Remove bolts (1, Figure 2-9), nuts (2), and upper door sill (3).

o. Remove bolts (4), nuts (5), and center door post (6).

p. Remove bolts (7), nuts (8), lockwashers (9), washers (10), and lower door sill (11).

q. Remove bolts (12), nuts (13), lockwashers (14), washers (15), rear lifting rings brackets (16), and lifting rings (17).

r. Remove bolts (18) and nuts (19), four places each side.

s. Remove bolts (20), lockwashers (21), washers (22), and rear side panels (23) and (24).

t. Remove bolts (25), nuts (26), and slave receptacle box (27) from side panel (24).

u. Remove bolts (28), lockwashers (29), washers (30), and deflector (31) from side panel (24).

v. Remove bolts (32), nuts (33), lockwashers (34), washers (35), and stiffener (36) from side panel (24).

w. Remove bolts (37), nuts (38), and load entrance box assembly (39) from side panel (23).

x. Remove bolts (40), nuts (41), and frequency control cable box (42) from side panel (23).

y. Remove bolts (43), lockwashers (44), washers (45), and deflector (46) from side panel (23).

z. Remove bolts (47), nuts (48), lockwashers (49), washers (50), and stiffener (51) from side panel (23).

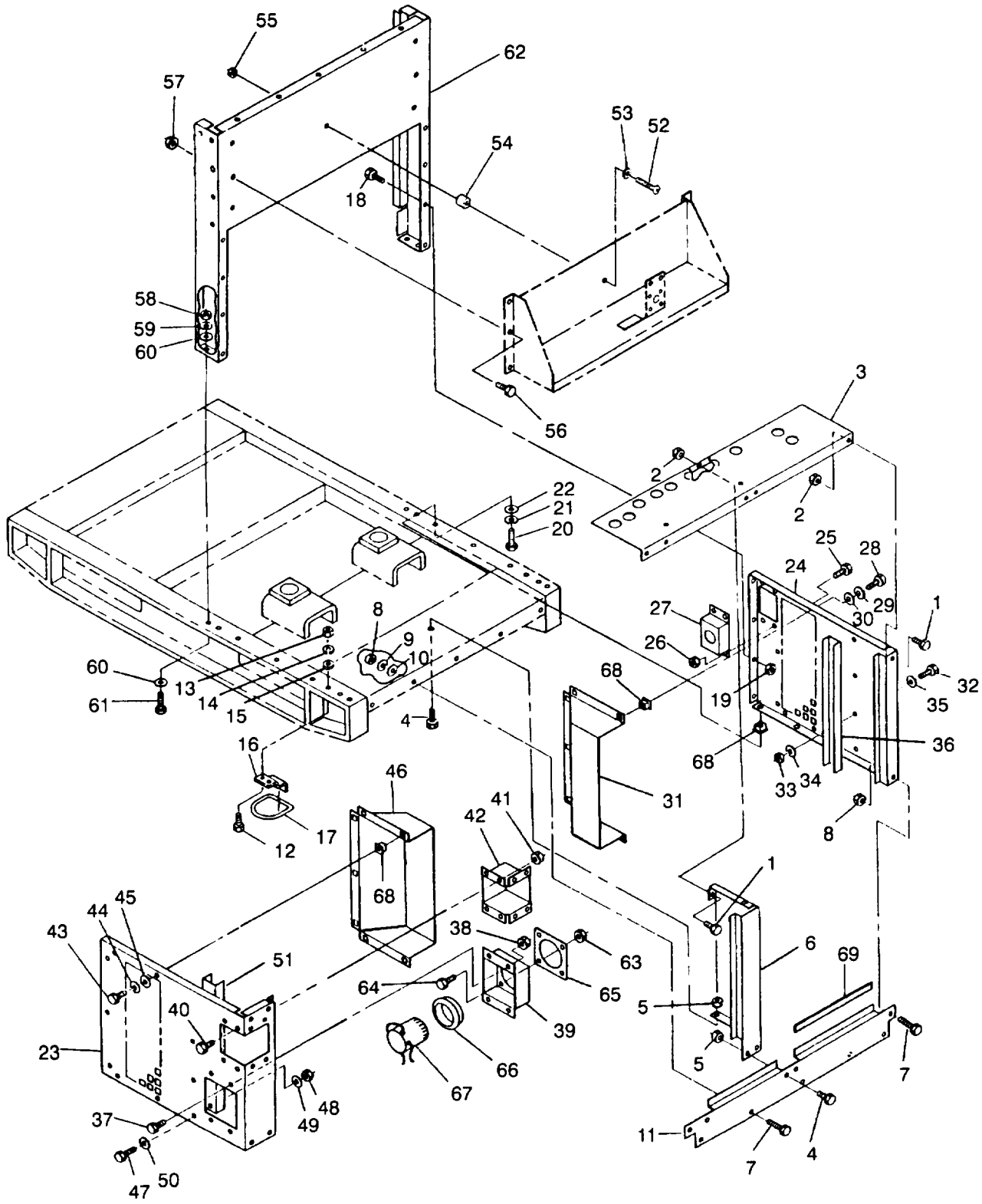


Figure 2-9. Generator set rear Housing Section

2-20-1 Removal - Continued.

aa. Remove bolts (52) and (56), nuts (55) and (57), washer (53), and spacer (54) securing output box assembly to center housing panel (62). Carefully lay output box assembly on generator.

ab. Remove nuts (58), Iockwashers (59), washers (60), bolts (61), and center housing panel (62) from generator set.

ac. If necessary, remove nuts (63) and bolts (64) and disassemble gasket (65), ring (66), and sleeve (67) from load entrance box (39).

2-20-2. Inspection.

a. Shut down generator set.

b. Inspect all rear housing parts for dents, cracks, loose paint, and corrosion.

c. Inspect for missing or damaged cage nuts (68, Figure 2-9).

d. Inspect door seals (69) for looseness and damage.

2-20-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43–0139. (F) Refer to applicable directives.

d. Replace all missing or damaged cage nuts (68).

e. Replace damaged door seals (69).

2-20-4. Installation.

a. Install center housing panel (62, Figure 2-9) on generator set with bolts (61), washers (60), Iockwashers (59), and nuts (58).

b. Secure output box assembly to center housing panel (62) with bolts (52) and (56), nuts (55) and (57), washer (53), and spacer (54).

c. Install stiffener (51) on side panel (23) with bolts (47), washers (50), Iockwashers (49), and nuts (48).

d. Install deflector (46) on side panel (23) with bolts (43), Iockwashers (44), and washers (45).

e. Install frequency control cable box (42) on side panel (23) with bolts (40) and nuts (41).

f. If removed, install sleeve (67), ring (66), gasket (65), nuts (63), and bolts (64) to load entrance box (39).

g. Install load entrance box assembly (39) on side panel (23) with bolts (37) and nuts (38).

h. Install stiffener (36) on side panel (24) with bolts (32), washers (35), Iockwashers (34), and nuts (33).

i. Install deflector (31) on side panel (24) with bolts (28), Iockwashers (29), and washers (30).

j. Install slave receptacle box (27) on side panel (24) with bolts (25) and nuts (26).

k. Install rear side panels (23) and (24) on generator set with bolts (20), Iockwashers (21), and washers (22).

l. Install bolts (18) and nuts (19), to secure rear side panels (23) and (24) to center housing panel (62).

m. Install rear lifting ring brackets (16) and lifting rings (17) on skid with bolts (12), washers (15), Iockwashers (14), and nuts (13).

n. Install lower door sill (11) with bolts (7), washers (10), lockwashers (9), and nuts (8).

o. Install center door post (6) with bolts (4) and nuts (5).

p. Install upper door sill (3) with bolts (1) and nuts (2).

q. Install load terminal board upper mounting bracket, paragraph 2-97-4.

r. Install air cleaner assembly, paragraph 2-67-4.

s. Install frequency adjust control cable assembly, paragraph 2-89–3.

t. Install NATO SLAVE RECEPTACLE, paragraph 2-13-3.

u. Install low oil pressure switch, paragraph 2-90-4.

v. Install oil pressure sender, paragraph 2-91-4 and oil line (3, Figure 2–25) at engine fitting.

w. Install DEAD CRANK switch, paragraph 2-96-4.

x. Install engine access doors, paragraph 2-15-4.

y. Install top housing panel, paragraph 2-17-4.

z. Install load terminal and storage box access doors, paragraph 2-15-4.

aa. Install control box assembly, paragraph 2-21-4.

ab. Connect negative battery cable and close all access doors.

Section X. MAINTENANCE OF CONTROL BOX ASSEMBLY

2–21. CONTROL BOX ASSEMBLY.

2-21-1. Inspection.

a. Shut down generator set.

b. Inspect control box for cracked and corroded panels, loose wires, or missing parts.

2-21-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Open storage box access door and uncouple three harness connectors on bottom of control box.

d. Remove control box top panel, paragraph 2-16-1.

e. Remove nuts (1, Figure 2-10), Iockwashers (2), washers (3), and voltage reconnection switch knob (4).

f. Remove bolts (5), nuts (6), and door striker (7).

g. Remove control box assembly (8).

2-21-3. Repair.

Repair control box by replacing terminals, screws, bolts, and components.

2-21-4. Installation.

a. Install control box assembly (8, Figure 2-10) and door striker (7) and secure with bolts (5), and nuts (6).

b. Install voltage reconnection switch knob (4), washers (3), Iockwashers (2), and nuts (1).

c. Install control box top panel, paragraph 2-16-4.

d. Connect three wiring harness connectors and close storage box access door.

e. Connect negative battery cable. Close engine access door.

2-22. CONVENIENCE RECEPTACLE.

NOTE

Applicable to MEP-802A only.

2-22-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect CONVENIENCE RECEPTACLE for cracks, breaks, corrosion, and other damage.

d. Raise and secure control panel.

2-22-2. Testing.

a. Shut down generator set.

b. Remove control box top panel, paragraph 2-16-1.

c. Tag and disconnect CONVENIENCE RECEPTACLE (5, Figure 2-11) electrical leads.

d. Set multimeter for ohms and check for continuity between upper and lower side terminals of each plug outlet.

e. Replace CONVENIENCE RECEPTACLE if continuity is indicated between terminals.

f. Connect electrical leads to receptacle (5) and remove tags.

g. Install control box top panel, paragraph 2-16-4.

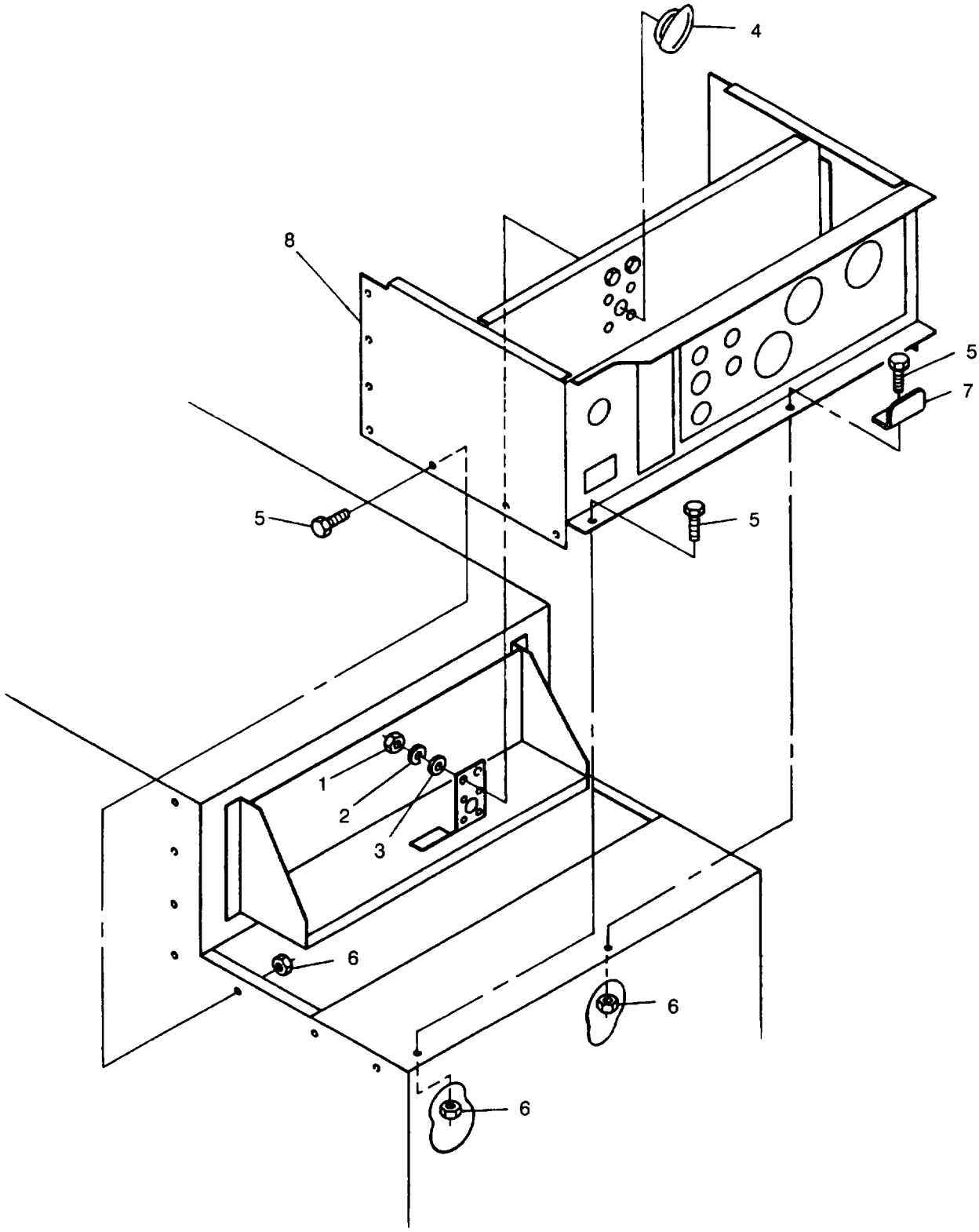


Figure 2-10. Control Box Assembly

2-22-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and disconnect CONVENIENCE RECEPTACLE (5, Figure 2-11) electrical leads.

e. Remove screws (1, Figure 2-11), nuts (2), and cover (3).

f. Remove machine screws (4) and CONVENIENCE RECEPTACLE (5) from control box.

2-22-4. Installation.

a. Install CONVENIENCE RECEPTACLE (5, Figure 2-11) and secure with machine screws (4).

b. Install CONVENIENCE RECEPTACLE cover (3) with screws (1) and nuts (2).

c. Connect electrical leads and remove tags.

d. Install control box top panel, paragraph 2-16-4.

e. Connect negative battery cable and close access door.

2-23. GROUND FAULT CIRCUIT INTERRUPTER.

NOTE

Applicable to MEP–802A only.

2-23-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect GROUND FAULT CIRCUIT INTERRUPTER for cracks, loose mounting, frayed wires, and other damage.

d. Raise and secure control panel.

2-23-2. Testing.

a. Start and operate generator set at rated voltage and frequency.

b. Press TEST button on GROUND FAULT CIRCUIT INTERRUPTER.

c. Set multimeter for AC voltage and check for zero voltage at CONVENIENCE RECEPTACLE.

d. Press RESET button on GROUND FAULT CIRCUIT INTERRUPTER and check for 120 VAC at CONVENIENCE RECEPTACLE.

e. If indications are other than above, replace GROUND FAULT CIRCUIT INTERRUPTER.

2-23-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and disconnect CIRCUIT INTERRUPTER (8, Figure 2-11) electrical leads.

e. Remove screws (6), nuts (7), and GROUND FAULT CIRCUIT INTERRUPTER (8) from malfunction indicator panel (12).

2-23-4. Installation.

a. Install GROUND FAULT CIRCUIT INTERRUPTER (8, Figure 2-11) in malfunction indicator panel (12) with screws (6) and nuts (7).

b. Connect electrical leads, remove tags.

c. Install control box top panel, paragraph 2-16-4.

d. Connect negative battery cable and close access door.

2-24. MALFUNCTION INDICATOR PANEL.

2-24-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect malfunction indicator panel for cracked housing, loose mounting, corrosion, and other damage.

d. Raise and secure control panel.

2-24-2. Testing.

a. Depress TEST/RESET button and check that all indicators are lit.

b. Replace malfunction indicator panel if one or more indicators do not light.

2-24-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Remove GROUND FAULT CIRCUIT INTERRUPTER, paragraph 2-23-3.

e. Disconnect multi-pin connector (13, Figure 2-11) at rear of malfunction indicator panel (12).

f. Remove screws (9), washers (10), nuts (11), and malfunction indicator panel (12) from control box.

2-24-4. Installation.

a. Install malfunction indicator panel (12, Figure 2-11) in control box assembly.

b. Install bolts (9), washers (10), and nuts (11).

c. Install multi–pin connector (13) at rear of panel.

d. Install GROUND FAULT CIRCUIT INTERRUPTER, paragraph 2-23-4.

e. Raise and secure control panel.

f. Connect negative battery cable and close access door.

2-25. BATTERY CHARGING FUSE ASSEMBLY.

2-25-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect for blown fuse.

d. Inspect fuse, fuse holder, and cap for cracks, corrosion, and obvious damage.

e. Replace defective parts.

f. Raise and secure control panel.

2-25-2. Testing.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Lower control panel and remove fuse (15, Figure 2-11).
d. Set multimeter for ohms and check for continuity across fuse.
e. If continuity exists, fuse is good. Otherwise fuse is bad and must be replaced.
f. Install fuse (15), raise and secure control panel.
g. Connect negative battery cable and close access door.

2-25-3. Removal.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Remove control box top panel, paragraph 2-16-1.
d. Remove cap (14, Figure 2-11) and fuse (15).
e. Tag and disconnect fuse holder (17) electrical leads.
f. Remove hex nut (16) and fuse holder (17).

2-25-4. Installation.

a. Install fuse holder (17, Figure 2-11) and secure with nut (16).
b. Connect electrical leads and remove tags.
c. Install fuse (15) and cap (14).
d. Install control box top panel, paragraph 2-16-4.
e. Connect negative battery cable and close access door.

2-26. DC CONTROL POWER CIRCUIT BREAKER.

2-26-1. Inspection.

a. Shut down generator set.
b. Release control panel by turning two fasteners and lower control panel slowly.
c. Inspect DC CONTROL POWER circuit breaker for cracks, loose mounting, corrosion, and other damage.
d. Raise and secure control panel.

2-26-2. Testing.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Tag and disconnect DC CONTROL POWER circuit breaker (19, Figure 2-11) electrical leads.
e. Place circuit breaker in OPEN position.
f. Set multimeter for ohms and connect across circuit breaker terminals. Multimeter should indicate open circuit.
g. Place circuit breaker in the CLOSED position. Multimeter should indicate continuity.
h. Replace circuit breaker if indications are not as above.
i. Connect electrical leads to circuit breaker (19) and remove tags.
j. Raise and secure control panel.

2-26-2. Testing - Continued

k. Connect negative battery cable and close access door

2-26-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable

C. Remove control box top panel, paragraph 2-16-1

d. Tag and disconnect DC CONTROL POWER circuit breaker (19, Figure 2-11) electrical leads

e. Remove nut (18) and remove DC CONTROL POWER circuit breaker (19) from control box

2-26-4. Installation

a. Insert DC CONTROL POWER circuit breaker (19, Figure 2-11) into control box with nut (18).

b. Connect electrical leads and remove tags.

C. Install control box top panel, paragraph 2-16-4.

d. Connect negative battery cable and close access door

2-27. AC VOLTAGE REGULATOR.

2-27-1. Inspection.

a. Shut down generator set.

b Release control panel by turning two fasteners and lower control panel slowly.

C. Inspect AC voltage regulator (21, Figure 2-11) for cracked case, broken wires, security, and other damage.

d. Raise and secure control panel.

2-27-2. Testing.

a. Shut down generator set.

b. Remove control box top panel. paragraph 2-16-1.

C. Note position of voltage reconnection switch.

d. Start generator set and turn VOLTAGE adjust potentiometer to verify adjustment ranges depending on position of voltage reconnection switch shown in Table 2-9.

Table 2-9. Voltage Adjustment Range

VOLTAGE RECONNECTION SWITCH POSITION	ADJUSTMENT RANGE
120/208	205-220 VOLTS
120	114–126 VOLTS
120/240	228–252 VOLTS

e. Shut down generator set

f. If no voltage or low voltage was Indicated, or voltage adjustment range could not be achieved, perform the following steps. Otherwise, AC voltage regulator is serviceable.

g. Disconnect wire 104C from terminal 6 of AC voltage regulator (21, Figure 2-11)

h. Set multimeter to DC volts and connect positive lead of multimeter, to wire 104C. Connect negative lead of multimeter to terminal 5 of AC voltage regulator, Start generator set and operate at rated frequency. Move and hold MASTER SWITCH in START position. Multimeter should indicate approximately 8 VDC.

i. Shut down generator set

2-27-2. Testing - Continued

j. Set multimeter for AC volts and connect multimeter, to terminals 7 and 8 of AC voltage regulator. Start generator set and operate at rated frequency Move and hold MASTER SWITCH in START position. Multimeter should Indicate 67.5 to 82.5 VAC.

k. Shut down generator set.

l Set multimeter for AC volts and connect multimeter, to terminals 3 and 4 of AC voltage regulator Start generator and operate at rated frequency Move and hold MASTER SWITCH in START position. Multimeter should indicate 108 to 132 VAC.

m. Shut down generator set.

n. Disconnect wire 156A from terminal 1 of AC voltage regulator Set multimeter for ohms and connect positive lead of multimeter, to wire 156A and negative lead to terminal 2 of AC voltage regulator. Move VOLTAGE adjust potentiometer counterclockwise to STOP position. Multimeter should indicate approximately O ohms. Move VOLTAGE adjust potentiometer clockwise slowly while observing multimeter. Multimeter should increase smoothly to approximately 5000 ohms

o. If steps h. j, I and n are as Indicated above, AC voltage regulator IS defective and must be replaced

p. Connect all wires previously disconnected

q. Install control box top panel. paragraph 2-16-1.

2-27-3. Removal.

a. Shut down generator set

b. Open left side engine access door and disconnect negative battery cable

C. Remove control box top cover, paragraph 2-16-1

d Tag and disconnect electrical leads to AC voltage regulator (21, Figure 2-11)

e. Remove screws (20) and AC voltage regulator (21)

2-274. Installation.

a. Install AC voltage regulator (21, Figure 2-11) with screws (20).

b. Connect all electrical leads and remove tags

C. Install control box top cover, paragraph 2-16-4.

d. Connect negative battery cable. Close access door.

2-28. FREQUENCY TRANSDUCER.

2-26-1. Inspection.

a. Shut down generator set

b. Release control panel by turning two fasteners and lower control panel slowly

C. Inspect frequency transducer for cracks, burned or broken terminals, corrosion, and other damage.

d. Raise and secure control panel.

2-28-2. Testing (MEP 802A).

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Release control panel by turning two fasteners and lower control panel slowly.

e. Disconnect wire 154A from positive (+) terminal of FREQUENCY meter (HERTZ).

Set multimeter for DC milliamperes (0 to 2 Ma range) and connect positive lead to disconnected wire 154A, and negative lead to vacant terminal of FREQUENCY meter (HERTZ).

g. Connect negative battery cable and close access door.

h. Start generator set and adjust frequency to 60 Hz.

Multimeter indictron should be 0.080 to 0.120 Ma.

Adjust frequency to 65 Hz and multimeter indication should be 0.180 to 0.220 Ma.

k. Shut down generator set.

Replace frequency transducer if readings are other than above.

m. If no repair is needed, remove multimeter and connect wire 154A to positive (t) terminal of FREQUENCY meter (HERTZ).

n. Raise and secure control panel.

0. Install control box top panel, paragraph 2-16-4.

2-28-3. Testing (MEP 812A).

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Release control panel by turning two fasteners and lower control panel slowly.

e. Disconnect wire 154A from positive terminal (+) of FREQUENCY meter (HERTZ).

Set multimeter for DC milliamperes (0 to 2 Ma range) and connect positive lead to free end of wire 154A and connect negative lead to positive terminal (+) of FREQUENCY meter (HERTZ).

g. Connect negative battery cable and close access door.

h. Start and operate generator set at rated voltage and adjust frequency to 400 Hz.

Multimeter indication should be 0.090 to 0.110 Ma.

Adjust frequency to 420 Hz. Multimeter indication should be 0.190 to 0.210 Ma.

k. Shut down generator set.

Replace frequency transducer if readings are other than above.

m If no repair is needed, remove multimeter and connect wire 154A to positive terminal (+) of FREQUENCY meter (HERTZ).

n. Raise and secure control panel.

o. Install control box top panel, paragraph 2-16-4.

2-29-4. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and remove frequency transducer (24, Figure 2-11) electrical leads.

e. Open load terminal board access door and remove screws (22), nuts (23), and frequency transducer (24)

2-28-5. Installation.

a. Install frequency transducer (24, Figure 2-11) with screws (22), and nuts (23).

b. Connect electrical leads and remove tags.

c. Install control box top panel, paragraph 2-16-4.

d. Connect negative battery cable. Close access doors.

2-29. SHUNT.

2-29-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect shunt for cracks, burned or broken terminals, corrosion, and other damage.

d. Raise and secure control panel.

2-29-2. Testing.

a. Shut down generator set.

b. Release control panel by turning two fasteners and slowly lower control panel.

c. Tag and disconnect shunt (27, Figure 2-11) electrical leads.

d. Set multimeter for ohms and connect to shunt terminals 1 and 4. Multimeter should indicate less than 0.5 ohms.

e. Replace shunt if multimeter indication is greater than above.

f. If no repair is needed, connect electrical leads to shunt (27) and remove tags.

g. Raise and secure control panel.

2-29-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect shunt (27, Figure 2-11) electrical leads.

e. Open storage box access door to gain access to remove screws (25), nuts (26), and shunt (27).

2-29-4. Installation.

a. Install shunt (27, Figure 2-11) with screws (25) and nuts (26).

b. Connect electrical leads and remove tags.

c. Raise and secure control panel.

d. Connect negative battery cable. Close access doors.

2-30. OVERVOLTAGE RELAY.

2-30-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect overvoltage relay for cracks, burned or broken terminals, corrosion, and other damage.

d. Raise and secure control panel.

2-30-2. Testing.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

CAUTION

The following procedure disables AC voltage regulator and allows generator to reach an overvoltage condition. Do not allow generator set to operate for an extended period of time in an extreme overvoltage condition.

d. Disconnect wire 006M from AC voltage regulator, terminal 3, and insulate wire end.

e. Connect negative battery cable and close access door.

f. Start generator set. As generator accelerates to rated speed, it should instantly shut down and the OVER VOLTAGE lamp on malfunction indicator panel should light, If this does not occur immediately, shut down generator set.

g. Replace overvoltage relay if generator set does not operate as above.

h. If no repair is needed, reconnect wire 006M to terminal 3 of AC voltage regulator.

i. Raise and secure control panel.

2-30-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and disconnect overvoltage relay (30, Figure 2-11) electrical leads.

e. Open load terminal board access door to gain access and remove screws (28), nuts (29), and overvoltage relay (30).

2-30-4. Installation.

a. Install overvoltage relay (30, Figure 2-11) with screws (28) and nuts (29).

b. Connect electrical leads and remove tags.

c. Install control panel top cover, paragraph 2-16-4.

d. Connect negative battery cable. Close access doors.

2-31. SHORT CIRCUIT/OVERLOAD RELAY.

2-31-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect relay for cracks, burned or broken connections, corrosion, and other damage.

d. Raise and secure control panel.

2-31-2. Testing.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag, disconnect, and insulate the following wires from short circuit/overload relay:

Wires 164C and 164B from terminal 1.

Wires 165C and 165B from terminal 2.

Wires 166C and 166B from terminal 3.

Wires 167G and 167D from terminal 4.

e. Tag and disconnect wire 104C from terminal 6 on AC voltage regulator.

NOTE

Disconnecting wire 104C at AC voltage regulator terminal 6, disables AC voltage regulator and allows generator to develop very low AC output voltage.

f. Connect a jumper wire from terminal 4 of short circuit/overload relay to terminal LO of load output terminal board.

g. Place voltage reconnection switch in 120/208 position.

h. Obtain low AC voltage with a jumper wire between L1 of load output terminal board and terminal 1 of short circuit/overload relay.

i. Connect negative battery cable and dose access door.

j. Start generator set and operate at rated frequency.

k. Close AC CIRCUIT INTERRUPTER switch. After approximately one minute, AC circuit interrupter relay should open and OVERLOAD lamp should illuminate on malfunction indicator panel.

l. Shut down generator set.

m. Disconnect jumper wire from terminal 1 of short circuit/overload relay and connect it to terminal 2.

n. Repeat steps j and k.

o. Shut down generator set.

p. Disconnect jumper wire from terminal 2 of short circuit/overload relay and connect it to terminal 3.

q. Repeat steps j and k

r. Shut down generator set.

s. Move jumper wire from terminal LO of load output terminal board and connect it to L2 Apply low AC voltage obtained with jumper wire between L1 of load output terminal board and terminal 3 of short circuit/overload relay.

t. Start generator set and operate at rated frequency.

u. Close AC CIRCUIT INTERRUPTER switch. AC circuit interrupter relay should open immediately and SHORT CIRCUIT lamp should illuminate on the malfunction indicator panel.

v. Shut down generator set.

w. Disconnect jumper wire from terminal 3 of short circuit/overload relay and connect it to terminal 2.

x. Repeat steps t and u.

y. Shut down generator set.

z. Disconnect jumper wire from terminal 2 of short circuit/overload relay and connect it to terminal 1.

aa. Repeat steps t and u.

ab. Shut down generator set.

ac. Replace short circuit/overload relay if any test is not as above.

ad. If no repair is needed, remove jumper wires and connect generator set wires to short circuit/overload relay, over/under voltage relay and AC voltage regulator as tagged. Remove tags.

ae. Raise and secure control panel.

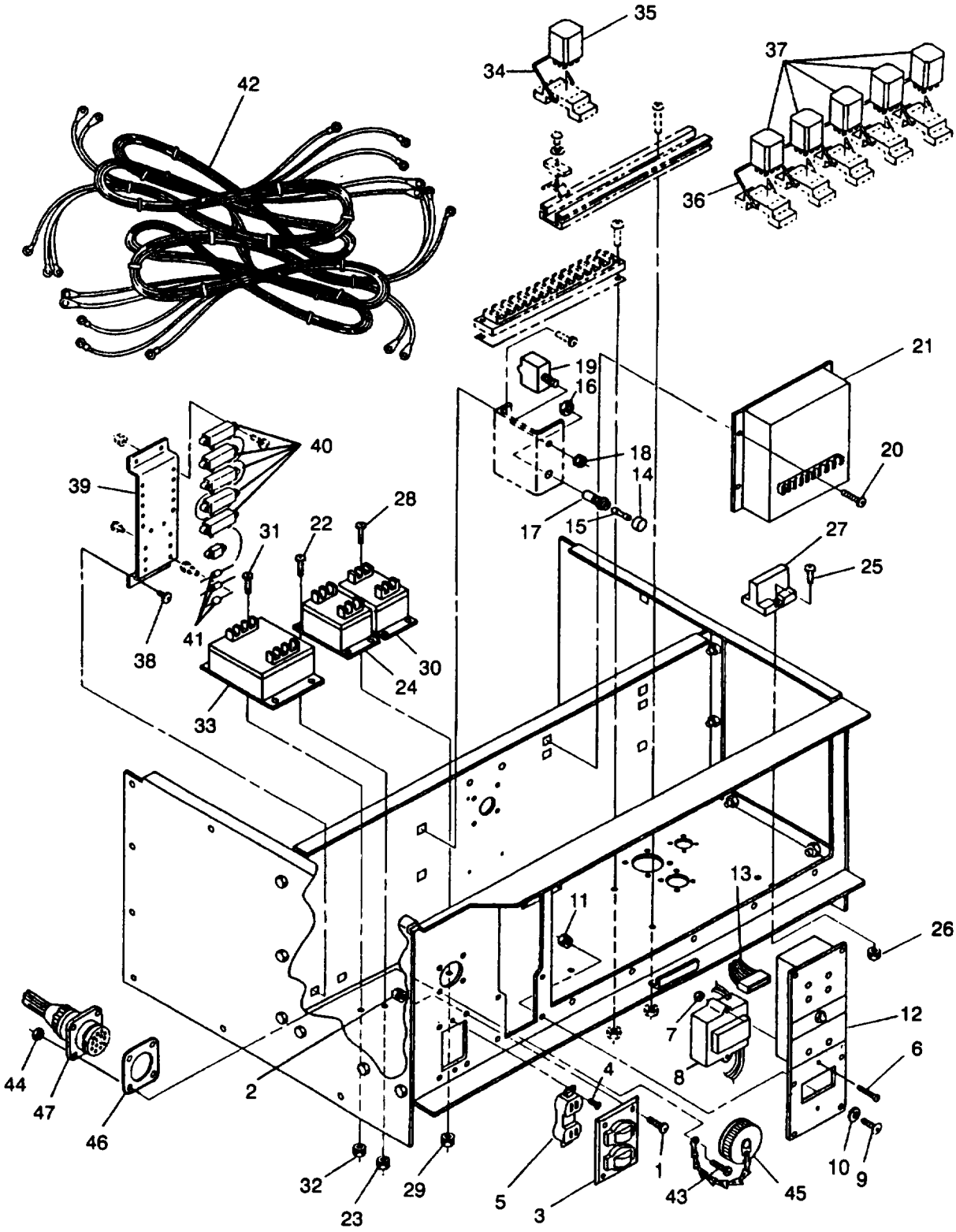


Figure 2-11. Control Box Components

2-31-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and disconnect short circuit/overload relay (33, Figure 2-11) electrical leads.

e. Open load terminal access door to gain access to nuts (32) and remove screws (31), nuts (32), and short circuit/ overload relay (33).

2-31-4. Installation.

a. Install short circuit/overload relay (33, Figure 2-11) with screws (31) and nuts (32).

b. Connect electrical leads and remove tags.

c. Install control box top cover, paragraph 2-16-4.

d. Connect negative battery cable. Close access doors.

2-32. CRANK DISCONNECT SWITCH.

2-32-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect crank disconnect switch (35, Figure 2-11) for cracks. Ensure that switch is seated properly.

d. Raise and secure control panel.

2-32-2. Testing.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Set multimeter for DC volts and connect positive lead of multimeter to terminal 1 of crank disconnect switch. connect negative lead of multimeter to any generator set ground.

d. Move MASTER SWITCH to either RUN position. Multimeter should indicate nearly O volts.

e. Start generator set and operate at rated frequency. Multimeter should indicate 23 to 28 VDC.

f. Replace crank disconnect switch if indications are other than above.

g. Raise and secure control panel.

2-32-3. Removal.

a. Shut down generator set.

b. Open left engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Release wire clip (34, Figure 2–11) and remove crank disconnect switch (35) by gently pulling straight up from socket.

2-32-4. Installion.

a. Install crank disconnect switch (35, Figure 2-11) and snap wire clip (34) over switch.

b. Raise and secure control panel.

c. Connect negative battery cable and close access door.

2-33. RELAYS.

2-33-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect relays for cracks, loose mounting, and other damage.

d. Raise and secure control panel.

2-33-2. Testing.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Remove applicable relay, paragraph 2-33-3.

d. Set multimeter for ohms and check for open circuits between terminals 7 and 4, 8 and 5, and 9 and 6. Check for closed circuits between terminals 7 and 1, 8 and 2, and 9 and 3.

e. Connect 24 VDC source to terminals A and B, and listen for audible actuation of relay. Set multimeter for ohms and check for open circuits between terminals 7 and 1, 8 and 2, and 9 and 3. Check for closed circuits between terminals 7 and 4, 8 and 5, and 9 and 6.

f. If indications are other than above, relay is defective and must be replaced.

g. Install relay, paragraph 2-33-4.

h. Raise and secure control panel.

2-33-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Locate suspected defective relay (37, Figure 2-11). Release wire clip (36) and remove relay (37) by gently pulling up on relay.

2-33-4 Installation.

a. Install relay (37, Figure 2-11) and secure with wire clip (36).

b. Raise and secure control panel.

c. Connect negative battery cable and close access door.

2-34. RESISTOR - DIODE ASSEMBLY.

2-34-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect resistor-diode assembly for cracks, breaks, corrosion, bent terminals, and other damage.

d. Raise and secure control panel.

2-34-2. Testing.

a. Shut down generator set.

b. Open battery access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Set multirneter for ohms and measure resistance across resistors R10, R11, R12, and R13. Multimeter indication should be 7.0 to 7.8 ohms for each resistor.

e. Using multimeter, measure resistance across resistor R14. Multimeter indication should be 19 to 21 ohms.

f. Using multimeter, measure resistance across resistor R15. Multimeter indication should be 1235 to 1365 ohms.

g. Connect positive lead of multimeter to cathode side and negative lead to anode side of each diode CR1 and CR2. Note ohms indication on multimeter for each diode. Refer to Figure 2–12.

h. Reverse multimeter leads so positive lead is on anode side and negative lead is on cathode side of each diode CR1 and CR2. Note ohms indication on multimeter for each diode.

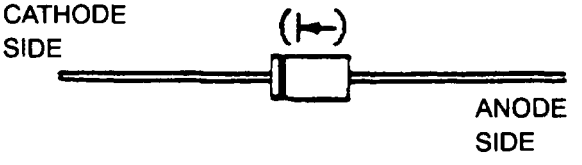


Figure 2-12. Diode Identification

i. Multimeter indications should be 1:10 ratio or greater.

j. If any indication is other than above, replace defective component.

k. Raise and secure control panel.

l. Connect negative battery cable and close access door.

2-34-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and disconnect all resistor-diode assembly (39, Figure 2-11) electrical leads.

e. Remove screws (38) and resistor-diode assembly (39).

2-34-4. Repair.

Repair resistor-diode assembly (39, Figure 2-11) by replacing resistors (40) and diodes (41).

2-34-5. Installation.

a. Install resistor-diode assembly (39, Figure 2-11) with screws (38).

b. Connect all electrical leads and remove tags.

c. Install control box top panel, paragraph 2-16-4.

d. Connect negative battery cable and close access door.

2-35. CONTROL BOX HARNESS.

2-35-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect control box harness (42, Figure 2-11) wiring for breaks, damaged insulation, and loose or damaged terminals.

d. Inspect harness connectors, sockets, and terminal board for cracks, corrosion, stripped threads, broken pins, and other visible damage.

e. Raise and secure control panel.

2-35-2. Testing

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control box panel by turning two fasteners and lower control panel slowly.

d. Set multimeter for ohms, and using Wiring Diagram FO-2 as a guide, check wires for continuity.

e. If no repair is needed, connect negative battey cable and close access door.

f. Raise and secure control panel.

2-35-3. Repair.

a. Replace damaged terminals on single wires.

b. Replace wires not indicating continuity.

2-36. DIAGNOSTiC CONNECTOR.

NOTE

The diagnostic connector can be used as an aid in troubleshooting. Refer to Figure 2–13 and Table 2-10.

2-36-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Inspect diagnostic connector for cracks, breaks, corrosion, bent terminals, burns, or other indications of damage.

d. Inspect cap for cracks, corrosion, or broken chain.

e. Replace any defective part.

f. If no repair is needed, connect negative battery cable and close access door.

NOTE

Diagnostic connector is a component of control box harness assembly, but maybe removed separately as follows.

2-36-2. Removal

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel paragraph 2-16-1.

d. Loosen rear outer ring and plastic insert from diagnostic connector (47, Figure 2-11).

e. Tag and disconnect electrical leads from diagnostic connector (47) by inserting removal tool into pins of connector.

f. Remove screws (43) and nuts (44).

g. Remove diagnostic connector (47) gasket (46) and cap (45).

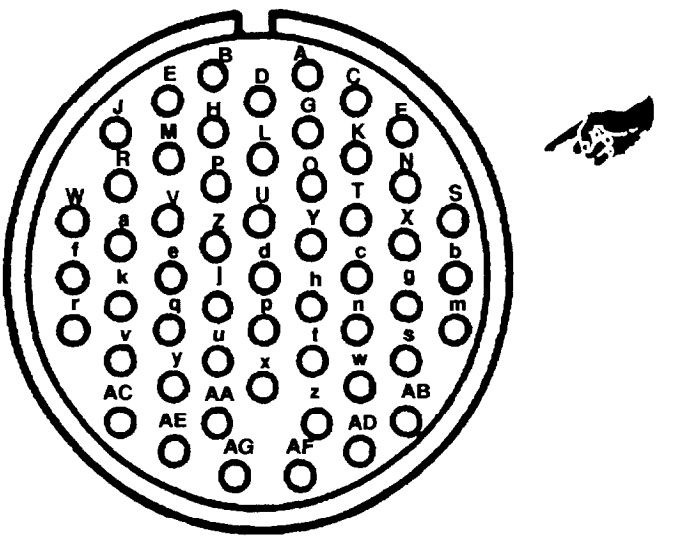


Figure 2-13. Diagnostic Connector Pin Positions (Front View)

2-36-3. Installation

a. Install diagnostic connector (47, Figure 2-11) gasket (46) and cap (45) with screws (43) and nuts (44).

b. Connect electrical leads and remove tags.

C. Install control box top panel, paragraph 2-16-4.

d. Connect negative battery cable and dose access door.

Table 2-10. Diagnostic Connector Connection Points

NOTE

The Diagnostic Connector can be a useful troubleshooting tool. Refer to Figure 2-13 for pin positions.

PIN	DESCRIPTION	EXPECTED OUTPUT*
B	AC chassis ground (GND)	Continuity 0 Volts (*)
D	DC ground	Continuity 0 Volts (')
F	DC exciter field voltage (positive)	0-45 VDC (4)
J	DC exciter field voltage (negative)	0-45 VDC (5)
K	DC voltage across engine fuel solenoid coil	24 VDC (1)
N	DC starter motor solenoid coil	24 VDC (2) or (6)
0	DC voltage across auxiliary fuel pump	24 VDC (3)
P	DC voltage S1 Terminal 7	24 VDC (6)
R	DC voltage S1 Terminal 3	24 VDC (1), (3), (6)
T	DC voltage across starter crank relay coil	24 VDC (2)
U	DC voltage (output to DC circuit breaker)	24 VDC
V	DC voltage across output circuit interrupter coil	24 VDC
X	DC starter motor (motor side of solenoid contacts)	24 VDC (2)
Z	DC voltage across fuel level contacts	24 VDC (1)
a	DC voltage across low oil pressure switch	O VDC
b	DC voltage across low oil pressure switch	O VDC
d	DC battery charging voltage (input to DC circuit breaker)	0-27.6 VDC

* With Generator Set Operating (Refers to all not numbered)

(1) Place MASTER SWITCH in PRIME/RUN position.

(2) Place DEAD CRANK switch in CRANK position.

(3) Place MASTER SWITCH in PRIME/RUN AUX. FUEL position.

(4) Read between Pin F and J.

(5) Read between Pin J and F.

(6) During engine starting.

(7) Auxiliary fuel pump in operation (note fuel level must be low), master switch in PRIME&RUN position.

2-37. CONTROL PANEL LIGHTS.

2-37-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect control panel lights for cracks, stripped threads, corrosion, and other damage

d. Raise and secure control panel.

2-37-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect panel light (3, Figure 2-14) electrical leads.

e. Remove nut (1) and washer (2).

f. Remove panel light (3) from control panel.

2-37-3. Disasssembly.

a. Remove panel light directional cap (4, Figure 2-14) from panel light housing (3).

b. Remove panel light bulb (5).

2-374. Assembly.

a. Install panel light bulb (5, Figure 2-14) into panel light housing (3).

b. Install panel light directional cap (4).

2-37-5. Installation.

a. Insert panel light (3, Figure 2-14) into control panel.

b. Install washer (2) and nut (1).

c. Connect panel light electrical leads and remove tags.

d. Raise and secure control panel.

e. Connect negative battery cable and close access door.

2-38. PRESS TO TEST INDICATOR LIGHTS.

2-38-1. Inspection.

a. Inspect indicator lights for cracks, corrosion, evidence of shorting, and other damage.

b. Replace or repair indicator lights or components as necessary.

2-38-2. Testing.

a. Place MASTER SWITCH in either PRIME & RUN position.

b. Press in lamp holder (6, Figure 2-14) and check that lamp is lit.

c. If lamp (7) fails to light, set multimeter for DC volts and check for battery voltage at receptacle (10) terminals 1 and 3.

d. If voltage is present, replace press to test light assembly.

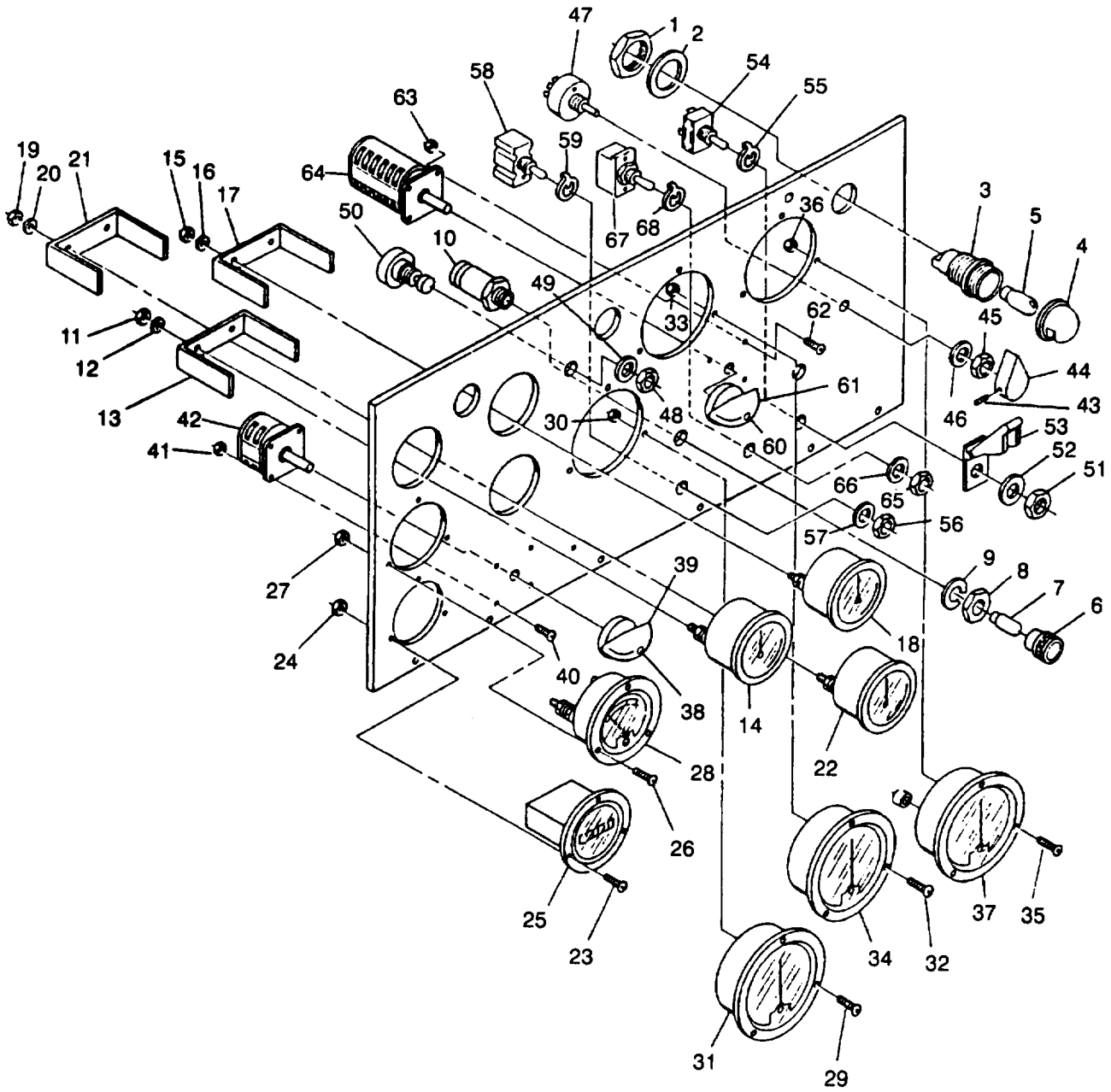


Figure 2-14. Control Panel Indicators and Switches

2-38-3. Removal.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Tag and disconnect electrical leads to light receptacle (10, Figure 2-14).
e. Remove lamp holder (6), nut (8), lockwasher (9), and receptacle (10) from control panel.
f. If necessary, remove lamp (7) from lamp holder (6).

2-38-4. Installation.

a. Install indicator light receptacle (10, Figure 2-14) in control panel with lockwasher (9) and nut (8).
b. If removed, install lamp (7) in lamp holder (6).
c. Install lamp holder (6) on receptacle (10).
d. Connect electrical leads and remove tags.
e. Raise and secure control panel.
f. Connect negative battery cable and close access door.

2-39. FUEL LEVEL INDICATOR.

2-39-1. Inspection.

a. Shut down generator set.
b. Release control panel by turning two fasteners and lower control panel slowly.
c. Inspect FUEL LEVEL indicator for cracked lens, loose mounting, corrosion, and other damage.
d. Raise and secure control panel.

2-39-2. Testing.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Isolate generator set VOLTAGE adjust potentiometer by disconnecting wire 156A at terminal 1 and wire 157B at terminal 2 of AC voltage regulator.
e. Set multimeter for ohms and connect between terminals L and R of generator set VOLTAGE adjust potentiometer.
f. Adjust potentiometer until multimeter indicates 216 to 264 ohms resistance.
g. Remove multimeter, but do not disturb potentiometer adjustment.
h. Disconnect and isolate electrical lead from terminal S of FUEL LEVEL indicator.
i. Connect jumper wire between disconnected wire 156A and terminal S of FUEL LEVEL indicator.
j. Connect jumper wire between disconnected wire 157B and terminal G of FUEL LEVEL indicator.
k. Connect negative battery cable and move generator set MASTER SWITCH to PRIME & RUN position.
l. FUEL LEVEL indicator should indicate EMPTY (±1/8 inch).
m. Move MASTER SWITCH to OFF position and disconnect negative battery cable.
n. Repeat steps e thru g, setting potentiometer between 29.7 and 36.3 ohms.
o. Connect negative battery cable and move MASTER SWITCH to PRIME & RUN position.

2-39-2. Testing - Continued.

p. FUEL LEVEL indicator should indicate FULL (±1/8 inch).

q. Move MASTER SWITCH to OFF position and disconnect negative battery cable.

r. Replace FUEL LEVEL indicator if it fails to function properly.

s. Remove jumper wires and connect electrical leads to AC voltage regulator and FUEL LEVEL indicator.

t. Raise and secure control panel.

u. Connect negative battery cable and close access door.

2-39-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect fuel level indicator (14, Figure 2-14) electrical leads.

e. Remove nuts (11, Figure 2-14), washers (12), and clamp (13).

f. Remove FUEL LEVEL indicator (14) from control panel.

2-39-4. Installation.

a. Insert FUEL LEVEL indicator (14, Figure 2-14) into control panel.

b. Install clamp (13), washers (12), and nuts (11).

c. Connect electrical leads and remove tags.

d. Raise and secure control panel.

e. Connect negative battery cable and close access door.

2-40. COOLANT TEMP. INDICATOR.

240-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect COOLANT TEMP. indicator for cracked lens, loose mounting, corrosion, and other damage.

d. Raise and secure control panel.

2-40-2. Testing

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Isolate generator set VOLTAGE potentiometer by disconnecting wire 156A at terminal 1 and wire 157B at terminal 2 of AC voltage regulator.

e. Set multimeter for ohms and connect between terminals L and R of generator set VOLTAGE adjust potentiometer.

f. Adjust potentiometer until multimeter indicates 117 to 143 ohms resistance.

g. Disconnect multimeter but do not disturb potentiometer setting.

h. Disconnect and isolate electrical lead from terminal S of COOLANT TEMP. indicator.

i. Connect jumper wire between disconnected wire 156A and terminal S of COOLANT TEMP. indicator.

2-40-2. Testing Continued.

j. Connect jumper wire between disconnected wire 157B and terminal G of COOLANT TEMP. indicator.

k. Connect negative battery cable and move generator set MASTER SWITCH to PRIME & RUN position.

l. COOLANT TEMP. indicator should Indicate 116 to 164°F.

m. Move MASTER SWITCH to OFF position and disconnect negative battery cable.

n. Repeat steps e thru g, setting potentiometer between 58.5 and 71.5 ohms

o. Connect negative battery cable and move MASTER SWITCH to PRIME & RUN positron.

p. COOLANT TEMP. indicator should indicate 156 to 204°F.

q. Move MASTER SWITCH to OFF position and disconnect negative battery cable.

r. Replace COOLANT TEMP. indicator if Indications are other than above.

s. Remove jumper wires and connect electrical leads to AC voltage regulator and COOLANT TEMP. indicator.

t. Raise and secure control panel.

u. Connect negative battery cable and close left side engine access door.

2-40-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect COOLANT TEMP. indicator (18, Figure 2-14) electrical leads.

e. Remove nuts (15), washers (16), and clamp (17).

f. Remove COOLANT TEMP. indicator (18) from control panel.

2-40-4. Installation.

a. Install COOLANT TEMP. indicator (18, Figure 2-14) in control panel.

b. Install washers (16), nuts (15), and clamp (17).

c. Connect electrical leads and remove tags.

d. Raise and secure control panel.

e. Connect negative battery cable and close access door.

2-41. OIL PRESSURE INDICATOR.

2-41-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect OIL PRESSURE indicator for cracked lens, loose mounting, corrosion. and other damage

d. Raise and secure control panel.

2-41-2. Testing,

a. Shut down generator set

b. Open left side engine access door and disconnect negative battery cable

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Isolate generator set VOLTAGE adjust potentiometer by disconnecting wire 156A at terminal 1 and wire 157B at terminal 2 of AC voltage regulator.

e. Set multimeter for ohms and connect between terminals Land R of generator set VOLTAGE adjust potentiometer.

f. Adjust potentiometer until multimeter Indicates 92.7 to 113.3 ohms resistance.

g. Disconnect multimeter, but do not disturb potentiometer adjustment.

h. Disconnect and Isolate electrical lead from terminal S of OIL PRESSURE indicator.

Connect jumper wire between disconnected wire 156A and terminal S of OIL PRESSURE indicator.

j. Connect jumper wire between disconnected wire 157B and terminal G of OIL PRESSURE indicator.

k. Connect negative battery cable and move MASTER SWITCH to PRIME & RUN position.

OIL PRESSURE indicator should indicate 32 to 48 PSI.

m. Move MASTER SWITCH to OFF position and disconnect negative battery cable.

n. Repeat steps e thru g, setting potentiometer between 30.1 and 36.8 ohms.

o. Connect negative battery cable and move MASTER SWITCH to PRIME & RUN position.

p. COOLANT TEMP. indicator should indicate 72 to 88 PSI.

q. Move MASTER SWITCH to OFF position and disconnect negative battery cable.

r. Replace OIL PRESSURE indicator if it does not function properly.

s. Remove jumper wires and connect electrical leads to AC voltage regulator and OIL PRESSURE indicator.

t. Raise and secure control panel.

u. Connect negative battery cable and close left side engine access door.

2-41-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect OIL PRESSURE Indicator (22, Figure 2-14) electrical leads.

e. Remove nuts (19), washers (20), and clamp (21).

f. Remove OIL PRESSURE indicator (22) from control panel.

2-41-1. Installation.

a Insert OIL PRESSURE indicator (22, Figure 2-14) into control panel.

b Install clamp (21). washers (20). and nuts (19).

c. Connect electrical leads and remove tags.

d. Raise and secure control panel.

e. Connect negative battery cable and close access door,

2-42. TIME METER (TOTAL HOURS)

2-42-1. Inspection.

a. Shut down generator set.
b. Release control panel by turning two fasteners and lower control panel slowly.
c. Inspect time meter (TOTAL HOURS) for cracked lens, loose mounting, corrosion, and other damage.
d. Raise and secure control panel.

2-42-2. Testing

a. Release control panel by turning fasteners and lower control panel slowly.
b. Turn MASTER SWITCH to PRIME & RUN position.
c. Crank engine momentarily to energize time meter relay.
d. Set multimeter for DC volts and connect across terminals 1 and 2 of time meter (TOTAL HOURS).
e. If 24 VDC is present, wait approximately 6 minutes. Time meter (TOTAL HOURS) should move 1/10 of an hour.
f. If time meter (TOTAL HOURS) does not operate properly, meter is defective and must be replaced.
g. Disconnect multimeter, raise and secure control panel.

2-42-3. Removal.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Tag and disconnect time meter (TOTAL HOURS) (25, Figure 2-14) electrical leads.
e. Remove screws (23) and nuts (24).
f. Remove time meter (TOTAL HOURS) (25) from control panel.

2-42-4. Installation.

a. Insert time meter (TOTAL HOURS) (25, Figure 2-14) into control panel.
b. Install screws (23) and nuts (24).
c. Connect electrical leads and remove tags.
d. Raise and secure control panel.
e. Connect negative battery cable and close access door.

2-43. BATTERY CHARGE AMMETER

2-43-1. Inspection.

a. Shut down generator set.
b. Release control panel by turning two fasteners and lower control panel slowly.
c. Inspect BATTERY CHARGE ammeter for cracked lens, loose mounting, corrosion, and other damage.
d. Raise and secure control panel.

2-43-2. Testing

a, Start and operate generator set at rated voltage and frequency.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Set multimeter for DC volts and connect across BATTERY CHARGE ammeter terminals. Connect positive lead to positive terminal and negative lead to negative terminal if you observe or think battery is charging. Multimeter should indicate up to 50 mv (for example, 25 mv is equal to a +10 amps reading on BATTERY CHARGE ammeter).

d. Reverse multimeter leads if you obsere or think battery is discharging. Multimeter should indicate up to 25 mv (for example, 25 mv is equal to a –10 amps reading on BATTERY CHARGE ammeter).

e. If multimeter indicated millivolt reading and BATTERY CHARGE ammeter is not within =10% of equivalent ampere reading, or is not indicating, replace BATTERY CHARGE ammeter.

f. Raise and secure control panel.

2-43-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect BATTERY CHARGE ammeter (28, Figure 2-14) electrical leads.

e. Remove screws (26) and nuts (27).

f. Remove BATTERY CHARGE ammeter (28).

2-43-4. Installation.

a. Insert BATTERY CHARGE ammeter (28, Figure 2-14) into control panel.

b. Install screws (26) and nuts (27).

c. Connect electrical leads and remove tags.

d. Raise and secure control panel.

e. Connect negative battery cable and close access door.

2-44. FREQUENCY METER (HERTZ)

2-44-1. Inspection,

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect FREQUENCY meter (HERTZ) for cracked lens, loose mounting, corrosion, and other damage.

d. Raise and secure control panel.

2-44-2. Testing (60 Hz).

NOTE

Test frequency transducer in accordance with paragraph 2-28-2 or 2-28-3 prior to testing FREQUENCY meter (HERTZ).

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Disconnect wire 154A from positive (+) terminal of FREQUENCY meter (HERTZ).
e. Set multimeter for DC milliamps and connect positive lead to positive (+) terminal of FREQUENCY meter (HERTZ) and negative lead to wire 154A.
f. Connect negative battery cable, start and operate generator set at rated voltage and adjust frequency to 60 Hz.
g. Multimeter indication should be 0.096 to 0.104 DC milliamps.
h. Replace FREQUENCY meter (HERTZ) if multimeter reading is not as stated above.
i. Raise and secure control panel.

2-44-3. Testing (400 Hz).

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Disconnect wire 154A from positive (+) terminal of FREQUENCY meter (HERTZ).
e. Set multimeter for DC milliamps and connect positive lead to positive (+) terminal of FREQUENCY meter (HERTZ) and negative lead to wire 154A.
f. Connect negative battery cable, start and operate generator set at rated voltage and adjust frequency to 400 Hz,
g. Multimeter indication should be 0.096 + 0.104 DC milliamps.
h. Replace FREQUENCY meter (HERTZ) if multimeter reading is not as stated above.
i. Raise and secure control panel.

2-44-4. Removal.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Tag and disconnect FREQUENCY meter (HERTZ) (31, FIGURE 2-14) electrical leads.
e. Remove screws (29) and nuts (30).
f. Remove FREQUENCY meter (HERTZ) (31) from control panel.

2-44-5. Installation.

a. Insert FREQUENCY meter (HERTZ) (31, Figure 2-14) into control panel.

b. Install screws (29) and nuts (30).

c. Connect electrical leads and remove tags.

d. Raise and secure control panel.

2-45-4. Installation.

a. Insert ammeter (PERCENT RATED CURRENT) meter (34, Figure 2-14) into control panel.

b. Install screws (32) and nuts (33).

c. Connect electrical leads and remove tags.

d. Raise and secure control panel.

e. Connect negative battery cable and close access door.

2-46. AC VOLTMETER (VOLTS AC).

2-46-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

2-47. MASTER SWITCH.

2-47-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect MASTER SWITCH for loose connections and mounting, corrosion, and other damage.

d. Raise and secure control panel.

2-47-2. Testing.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect MASTER SWITCH (42, Figure 2-14) electrical leads.

e. Check switch for continuity using multimeter. Refer to Electrical Schematic FO-1 (S-1 Circuit Schedule) to determine circuits made to corresponding switch positions.

f. Check continuity until all five positions have been checked.

g. If open circuit is noted in any switch position, switch is unserviceable and must be replaced.

h. Connect electrical leads to MASTER SWITCH (42) and remove tags.

i. Raise and secure control panel.

j. Connect negative battery cable and close access door.

2-47-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect MASTER SWITCH (42, Figure 2-14) electrical leads.

e. Loosen setscrew (38) and remove knob (39).

f. Remove screws (40) and nuts (41).

g Remove MASTER SWITCH (42) from control panel.

2-47-4. Installation.

a. Insert MASTER SWITCH (42, Figure 2-14) into control panel.

b. Install screws (40) and nuts (41).

c. Install knob (39) and tighten setscrew (38).

d. Connect electrical leads and remove tags.

e. Raise and secure control panel.

f. Connect negative battery cable and close access door.

2-48. VOLTAGE ADJUST POTENTIOMETER.

2-48-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect VOLTAGE adjust potentiometer for loose connections and mounting, corrosion, and other damage.

d. Raise and secure control panel.

2-48-2. Testing.

a. Remove VOLTAGE adjust potentiometer, paragraph 2-48-3.

b. Set multimeter for ohms and connect across two outer terminals of VOLTAGE adjust potentiometer. Indication shall be 4500 to 5500 ohms.

c. Rotate potentiometer shaft counterclockwise as far as it will go.

d. Connect multimeter between center terminal and either outer terminal.

e. Slowly, at an even rate, rotate potentiometer shaft clockwise as far as it will go while observing multimeter.

f. Multimeter indication shall increase, at an even rate, from 0 to 5000 ohms.

g. If multimeter indication changes erratically or is not 4500 to 5500 ohms when rotation is complete, VOLTAGE adjust potentiometer is defective and must be replaced.

h. If not defective, install VOLTAGE adjust potentiometer, paragraph 2-48-4.

2-48-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect VOLTAGE adjust potentiometer (47, Figure 2-14) electrical leads using solder gun. Remove shrinkable tubing.

e. Remove setscrews (43) and knob (44).

f. Remove nut (45) and washer (46).

g. Remove VOLTAGE adjust potentiometer (47) from control panel.

2-48-4. Installation.

a. Insert VOLTAGE adjust potentiometer (47, Figure 2-14) into control panel.

b. Install washer (46) and nut (45).

c. Install washer (44) and setscrews (43).

d. Connect electrical leads and remove tags.

e. Raise and secure control panel.

f. Connect negative battery cable and close access door.

2-49. EMERGENCY STOP SWICTH.

2-49-1. Inspection.

a. Shut down generator set.
b. Release control panel by turning two fasteners and lower control panel slowly.
c. Inspect EMERGENCY STOP switch for cracks, loose mounting, corrosion, and other damage.
d. Raise and secure control panel.

2-49-2. Testing.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. With switch in normal (out) position, set multimeter for ohms and check circuit between switch terminals. If no continuity is indicated, EMERGENCY STOP switch is defective.
e. Push in EMERGENCY STOP switch.
f. Check for continuity between switch terminals. Replace switch if continuity is indicated.
g. Raise and secure control panel.
h. Connect negative battery cable and close access door.

2-49-3. Removal.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Tag and disconnect EMERGENCY STOP switch (50, Figure 2-14) electrical leads.
e. Remove nut (48) and washer (49).
f. Remove EMERGENCY STOP switch (50) from control panel.

2-49-4. Installation.

a. Insert EMERGENCY STOP switch (50, Figure 2-14) into control panel.
b. Install washer (49) and nut (48).
c. Connect electrical leads and remove tags.
d. Raise and secure control panel.
e. Connect negative battery cable and close access door.

2-50. BATTLE SHORT SWICTH.

2-50-1. Inspection.

a. Shut down generator set.
b. Release control panel by turning two fasteners and lower control panel slowly.
c. Inspect BATTLE SHORT switch for cracks, loose or damaged connections, corrosion, and other damage.
d. Raise and secure control panel.

2-50-2. Testing.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Place BATTLE SHORT switch in ON position.

NOTE

Refer to Wiring Diagram FO–2 for terminal positions and isolate switch from circuit.

e. Using multimeter, check for continuity between terminals: 2 and 3; 5 and 6; 8 and 9; and 11 and 12.

f. Place switch in OFF position.

g. Check for continuity between terminals: 1 and 2; 4 and 5; 7 and 8; and 10 and 11.

h. Replace switch if any open circuit is indicated.

i. Raise and secure control panel.

j. Connect negative battery cable. Close access door.

2-50-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect BATTLE SHORT switch (54, Figure 2-14) electrical leads.

e. Remove nut (51), washer (52), and protective cover (53).

f. Remove BATTLE SHORT switch (54) from control panel.

g. Remove tab washer (55) from switch stem.

2-50-4. Installation.

a. Install tab washer (55, Figure 2-14) on BATTLE SHORT switch (54).

b. Insert BATTLE SHORT switch (54) into control panel.

c. Install protective cover (53), washer (52), and nut (51).

d. Connect electrical leads and remove tags.

e. Raise and secure control panel.

f. Connect negative battery cable and close access door.

2-51. CIRCUIT INTERRUPTER SWITCH.

2-51-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect AC CIRCUIT INTERRUPTER switch for cracks, loose or damaged connections, corrosion, and other damage.

d. Raise and secure control panel.

2-51-2. Testing

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

NOTE

Refer to Wiring Diagram FO-2 for terminal positions.

d. Set multimeter for ohms and check for continuity between terminals 5 and 4, and terminals 2 and 3 of AC CIRCUIT INTERRUPTER switch.

e. Check for open circuits between terminals 5 and 6, and terminals 1 and 2.

f. Place and hold AC CIRCUIT INTERRUPTER switch in CLOSED position.

g. Check for continuity between terminals 5 and 6, and terminals 2 and 3.

h. Check for open circuits between terminals 5 and 4, and terminals 2 and 1.

i. Place and hold AC CIRCUIT INTERRUPTER switch in OPEN position.

j. Check for continuity between terminals 5 and 4, and terminals 1 and 2.

k. Check for open circuits between terminals 5 and 6, and terminals 3 and 1.

l. Replace switch if any continuity check is other than indicated above.

m. Raise and secure control panel.

n. Connect negative battery cable and close access door.

2-51-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect AC CIRCUIT INTERRUPTER switch (58, Figure 2-14) electrical leads.

e. Remove nut (56) and washer (57).

f. Remove AC CIRCUIT INTERRUPTER switch (58) from control panel.

g. Remove tab washer (59) from switch stem.

2-51-4. Installation.

a. Install tab washer (59, Figure 2-14) on AC CIRCUIT INTERRUPTER switch (58).

b. Insert AC CIRCUIT INTERRUPTER switch (58) into control panel.

c. Install washer (57) and nut (56).

d. Connect electrical leads and remove tags.

e. Raise and secure control panel.

f. Connect negative battery cable and close access door.

2-52. AM - VM TRANSFER SWITCH.

2-52-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect AM–VM transfer switch for cracks, loose or damaged connections, corrosion, and other damage.

d. Raise and secure control panel.

2-52-2. Testing.

a. Shut down generator set.

b. Remove AM–VM transfer switch, paragraph 2-52-3.

c. Set multimeter for ohms and check switch for continuity. Refer to Electrical Schematic FO-1 (S-6 Circuit Schedule) to determine circuits made to corresponding switch position.

d. Check continuity in all six switch positions.

e. If open circuit is noted in any switch position, AM–VM transfer switch is unserviceable and must be replaced.

f. Install AM–VM transfer switch, paragraph 2-52-4.

2-52-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect AM–VM transfer switch (64, Figure 2-14) electrical leads.

e. Loosen setscrew (60) and remove knob (61).

f. Remove screws (62) and nuts (63).

g. Remove AM–VM transfer switch (64) from control panel.

2-52-4. Installation.

a. Connect electrical leads to AM-VM transfer switch (64, Figure 2-14) and remove tags.

b. Insert AM–VM transfer switch (64) into control panel.

c. Install screws (62) and nuts (63).

d. Install knob (61) and tighten setscrew (60).

e. Raise and secure control panel.

f. Connect negative battery cable and close access door.

2-53. PANEL LIGHTS SWITCH.

2-53-1. Inspection.

a. Shut down generator set.

b. Release control panel by turning two fasteners and lower control panel slowly.

c. Inspect PANEL LIGHTS switch for cracks, loose or damaged connections, corrosion, and other damage.

d. Raise and secure control panel.

2-53-2. Testing.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Set multimeter for ohms and connect between PANEL LIGHTS switch terminals.
e. Place switch in OFF position. Multimeter should indicate open circuit.
f. Place switch in ON position. Multimeter should indicate continuity.
g. Replace PANEL LIGHTS switch if indications are other than above.
h. Raise and secure control panel.
i. Connect negative battery cable and close access door.

2-53-3. Removal.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Release control panel by turning two fasteners and lower control panel slowly.
d. Tag and disconnect PANEL LIGHTS switch (67, Figure 2-14) electrical leads.
e. Remove nut (65) and washer (66).
f. Remove PANEL LIGHTS switch (67) from control panel.
g. Remove tab washer (68) from switch stem.

2-53-4. Installation.

a. Install tab washer (68, Figure 2-14) on PANEL LIGHTS switch (67).
b. Insert PANEL LIGHTS switch (67) into control panel.
c. Install washer (66) and nut (65).
d. Connect electrical leads and remove tags.
e. Raise and secure control panel.
f. Connect negative battery cable and close access door.

2-54. CONTROL PANEL.

2-54-1. Inspection.

a. Shut down generator set.
b. Release control panel by turning two fasteners and lower control panel slowly.
c. Inspect control panel and hinge for cracks, dents, loose paint, corrosion, and other damage.
d. Raise and secure control panel.

2-54-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable

c. Release control panel by turning two fasteners and lower control panel slowly.

d. Tag and disconnect all electrical leads to control panel indicators and switches.

e. Remove screw (1, Figure 2-15), nut (2), and strap (3).

f. Remove bolts (4), nuts (5), hinge (6), and control panel (7) from control box.

2-54-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43–0139. (F) Refer to applicable directives.

2-54-4. Installation.

a. Install hinge (6, Figure 2-15) on control panel (7) with bolts (4) and nuts (5).

b. Install control panel (7), with hinge (6) attached, on control box with bolts (4) and nuts (5).

c. Install strap (3) with screw (1) and nut (2).

d. Connect electrical leads to all indicators and switches and remove tags.

e. Raise and secure control panel.

f. Connect negative battery cable and close access door.

2-55. CONTROL PANEL FRAME.

2-55-1. Removal.

a. Shut down generator set.

b. Open left engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Remove control panel, paragraph 2-54-2.

NOTE

It is not necessary to disconnect electrical leads for components removed in steps e thru g.

e. Remove diagnostic connector, paragraph 2-36-2.

f. Remove convenience receptacle, paragraph 2-22-3.

g. Remove ground fault circuit interrupter, paragraph 2-23-3.

h. Remove malfunction indicator panel, paragraph 2-24-3.

i. Remove bolts (8 and 10, Figure 2-15), nuts (9) and (11), and control panel frame (12).

2-55-2. Inspection.

Inspect control panel frame (12, Figure 2-15) for dents, cracks, loose paint, and corrosion.

2-55-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43–0139. (F) Refer to applicable directives.

2-55-4. Installation.

a. Install control panel frame (12. Figure 2-15) on control box assembly with bolts (8) and (10), and nuts (9) and (11).

b. Install malfunction indicator panel, paragraph 2-24-4.

c. Install ground fault circuit interrupter, paragraph 2-23-4.

d. Install convenience receptacle, paragraph 2-22-4, and diagnostic connector, paragraph 2-36-3.

e. Install control panel, paragraph 2-54-4 and control box top panel, paragraph 2-16-4.

f. Connect negative battery cable and close access door.

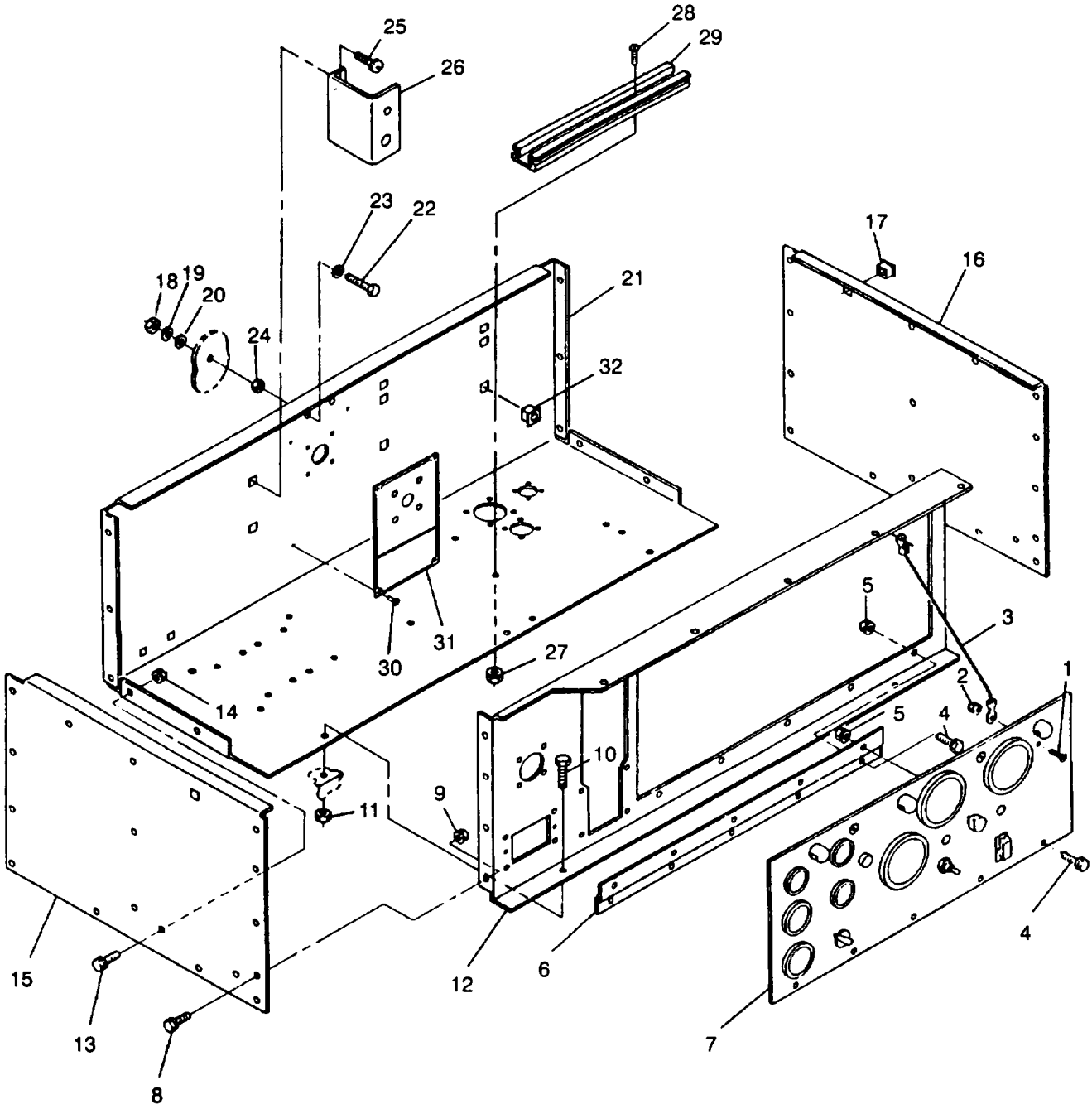


Figure 2-15. Control Box Housing and Control Panel

2-56. CONTROL BOX SIDE PANELS.

2-56-1. Inspection.

a. Inspect control box side panels (15 and 16, Figure 2-15) for dents, cracks, loose paint, and corrosion.

b. Inspect for missing and damaged cage nuts (17).

2-56-2. Removal.

a. Shut down generator set.

b. Open left engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Remove bolts (8 and 13, E 2-15) and nuts (9) and (14).

e. Remove control box side panels (15) and (16).

2-56-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning Is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43-0139. (F) Refer to applicable directives.

d. Replace damaged and missing cage nuts (17).

2-56-4. Installation.

a. Install control box side panels (15 and 16, Figure 2-15) with bolts (8) and (13), and nuts (9) and (14).

b. Install control box top panel, paragraph 2-16-4.

c. Connect negative battery cable and close access door.

2-57. CONTROL BOX TRAY.

2-57-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Remove control panel, paragraph 2-54-2.

e. Remove control panel frame, paragraph 2–55-1.

f. Remove control box side panels, paragraph 2-56-2.

g. Remove DC CONTROL POWER circuit breaker, paragraph 2-26-3; BATTERY CHARGER FUSE assembly, paragraph 2-25-3; AC voltage regulator, paragraph 2-27-3; frequency transducer, paragraph 2-28-4; shunt, paragraph 2-29-3; overvoltage relay, paragraph 2-30-3; short circuit/overload relay, paragraph 2-31-3; crank disconnect switch, paragraph 2-32-3; relays, paragraph 2-33-3; and resistor-diode assembly, paragraph 2-34-3.

h. Contact next higher maintenance level to remove control box harness.

i. Remove nuts (18, Figure 2-15), lockwashers (19), washers (20), and control box tray (21) from generator set.

2-57-1. Removal. - Continued.

j. Remove bolts (22), washers (23), and nuts (24) from tray (21).

k. Remove screws (25) and controls bracket (26).

l. Remove screws (28), nuts (27), and tracks (29). Drill out rivets (30) and remove voltage reconnection switch plate (31).

2-57-2. Inspection.

a. Inspect control box tray (21, Figure 2-15) for dents, cracks, loose paint, and corrosion.

b. Inspect for damaged and missing cage nuts (32).

2-57-3. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine grit abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43-0139. (F) Refer to applicable directives.

d. Replace all missing or damaged cage nuts (32, Figure 2-15).

2-57-4. Installation.

a. Install voltage reconnection switch plate (31, Figure 2-15) with new pop rivets (30).

b. Install bolts (22), washers (23), and nuts (24) in control box tray (21).

c. Install tracks (29) and secure with screws (28) and nuts (27).

d. Install controls bracket (26) with screws (25).

e. Position control box tray (21) in generator set and install washers (20), lockwashers (19), and nuts (18).

f. Contact next higher maintenance level to install control box harness.

g. Install resistor-diode assembly, paragraph 2-34-5; relays, paragraph 2-33-4; crank disconnect switch, paragraph 2-32-4; short circuit/overload relay, paragraph 2-31-4; overvoltage relay, paragraph 2-30-4; shunt, paragraph 2-29-4; frequency transducer, paragraph 2-28-5; AC voltage regulator, paragraph 2-27-4; BATTERY CHARGER FUSE assembly, paragraph 2-25-4; and DC CONTROL POWER circuit breaker, paragraph 2-26-4.

h. Install control box side panels, paragraph 2-56-4; control panel frame, paragraph 2-55-4; control panel, paragraph 2-54-4; and control box top panel, paragraph 2-16-4.

i. Connect negative battery cable and close access door.

Section XI. MAINTENANCE OF OUTPUT BOX ASSEMBLY

2-58. OUTPUT BOX ASSEMBLY.

2-56-1. Inspection.

a. Shut down generator set.

b. Remove control box top panel, paragraph 2-16-1.

c. Inspect output box panels and tray for cracks, dents, loose paint, and corrosion.

d. Install control box top panel, paragraph 2-16-4.

2-56-2. Repair.

Wear a protective mask and gloves when sanding CARC painted surfaces. CARC paint dust is a health hazard and could cause personal injury if warning is not followed.

a. Repair all dents and cracks, and remove all loose paint.

b. Remove light corrosion with fine abrasive paper (Item 15, Appendix C).

c. Repaint surface in accordance with TM 43-0139. (F) Refer to applicable directives.

2-59. OUTPUT BOX/ENGINE HARNESS.

2-59-1. Inspection.

a. Shut down generator set.

b. Remove control box top panel, paragraph 2-16-1.

c. Open engine access doors.

d. Inspect wiring harness (1, Figure 2-16) for burned, bent, corroded, and broken terminals.

e. Inspect connectors for cracks, corrosion, stripped threads, bent or broken pins, and obvious damage.

f. Inspect wire insulation for burns, deterioration, and chafing.

g. Install control box top panel, paragraph 2-16-4.

h. Close engine access doors.

2-59-2. Repair.

a. Replace damaged or broken terminals.

b. Replace damaged or broken connector pins.

2-60. CURRENT TRANSFORMER.

2-60-1. Inspection.

a. Shut down generator set.

b. Remove control box top panel, paragraph 2-16-1.

c. Inspect current transformer (2, Figure 2-16) for cracks, loose or stripped threads, and evidence of overheating.

d. Install control box top panel, paragraph 2-16-4.

2-60-2. Testing.

a. Shut down generator set.

b. Remove control box top panel, paragraph 2-16-1.

c. Tag and disconnect current transformer (2, Figure 2-16) electrical leads from secondary terminals.

d. Set multimeter for ohms and check for continuity between secondary terminals A1 and A2, B1 and B2, and C1 and C2.

e. If continuity is not present, current transformer is defective and must be replaced. Contact next higher level of maintenance.

f. If continuity is present, connect electrical leads to secondary terminals and remove tags.

g. Install control box top panel, paragraph 2-16-4.

2-61. AC CIRCUIT INTERRUPTER RELAY.

2-61-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Inspect AC circuit interrupter relay (4, Figure 2-16) for dents, cracks, and loose or stripped studs.

e. Install control box top panel, paragraph 2-16-4.

f. Connect negative battery cable and close left side engine access door.

2-61-2. Removal.

a. Shut down generator set.

b. Open left engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and disconnect electrical leads to AC circuit interrupter relay (4, Figure 2-16).

e. Remove screws (3) and AC circuit interrupter relay (4) from output box.

2-61-3. Testing.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove central box top panel, paragraph 2-16-1.

d. Set multimeter for ohms and check for open circuits between terminals A1 and A2, B1 and B2, C1 and C2, 11 and 12.

e. Connect jumper wire from cranking relay terminal A1 to AC circuit interrupter relay terminal X.

f. Connect negative battery cable.

g. Check for closed circuits (continuity) between terminals A1 and A2, B1 and B2, C1 and C2, 11 and 12.

h. Disconnect negative battery cable.

i. Replace AC circuit interrupter relay if indications are other than above.

j. If replacement is not needed, remove jumper wire.

k. Install control box top panel, paragraph 2-16-4.

l. Connect negative battery cable and close left side engine access door.

2-61-4. Installation.

a. Install AC circuit interrupter relay (4, Figure 2-16) with screws (3) in output box assembly.

b. Connect electrical leads to AC circuit interrupter relay as tagged and remove tags.

c. Install control box top panel, paragraph 2-16-4.

d. Connect negative battery cable and close access door.

2-62. CRANKING RELAY.

2-62-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Inspect cranking relay (6, Figure 2-16) for dents, cracks, and loose or stripped studs.

e. Install control box top panel, paragraph 2-16-4.

f. Connect negative battery cable and close left side engine access door.

2-62-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Disconnect and tag electrical leads to cranking relay (6, Figure 2-16).

e. Remove screws (5) and cranking relay (6) from output box assembly.

2-62-3. Testing.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and disconnect wires from terminals X1, X2, and A2 of cranking relay (6, Figure 2-16).

e. Connect a jumper wire between terminals A1 and X1 of cranking relay.

f. Connect negative battery cable.

g. Connect X2 wire disconnected in step d to cranking relay and listen for audible actuation.

h. Set multimeter for ohms and check for continuity between terminals A1 and A2 of cranking relay. If no continuity is indicated, cranking relay is defective and must be replaced.

i. Disconnect negative battery cable.

j. If replacement is not needed, remove jumper wire and connect remaining wires to cranking relay as tagged.

k. Install control box top panel, paragraph 2-16-4.

l. Connect negative battery cable and close left side engine access door.

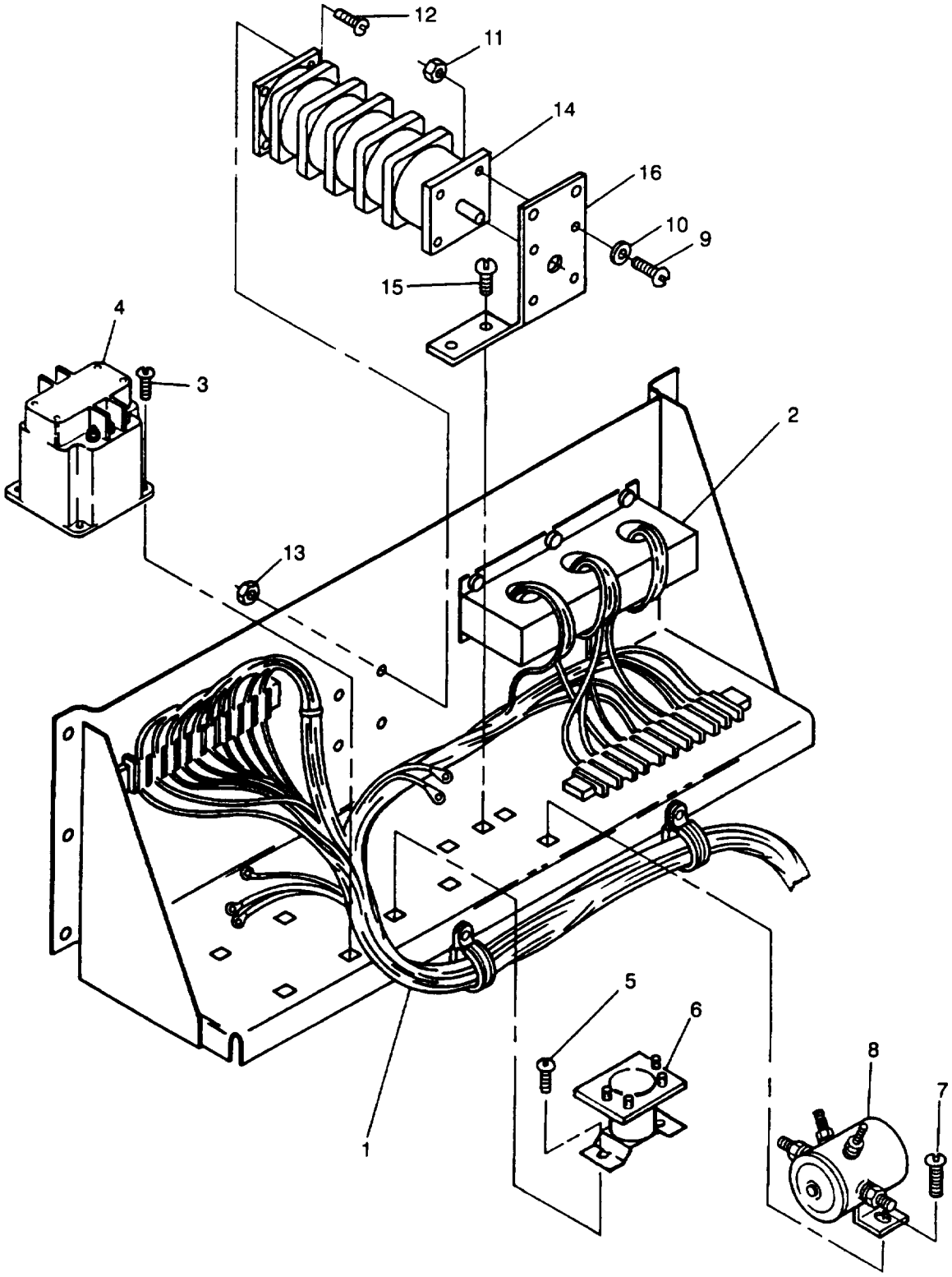


Figure 2-16. Output Box Assembly

2-62-4. Installation.

a. Install cranking relay (6, Figure 2-16) with screws (5) in output box assembly.

b. Connect electrical leads to cranking relay as tagged and remove tags.

c. Install control box top panel, paragraph 2-16-4.

d. Connect negative battery cable and close access door.

2-63. PRE-HEAT RELAY.

2-63-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Inspect pre-heat relay (8, Figure 2-16) for dents, cracks, stripped studs, and missing parts.

e. Install control box top panel, paragraph 2-16-4.

f. Connect negative battery cable and close access door.

2-63-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Tag and disconnect electrical leads from preheat relay (8, Figure 2-16).

e. Remove screws (7) and relay (8) from output box.

2-63-3. Testing.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

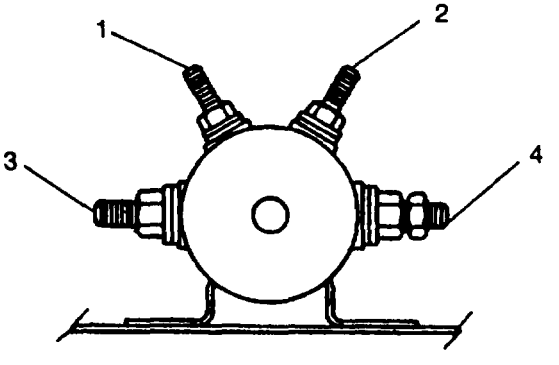


Figure 2-17. Pre-Heat Relay Terminals

d. Tag and disconnect wires from pre-heat relay (8, Figure 2-16) terminals 1, 2 and 3. See Figure 2-17 for terminal positions.

e. Connect a jumper wire between terminals 1 and 4.

f. Connect negative battery cable.

2-63-3. Testing. – Continued.

g. Connect wire to terminal 2 disconnected in step d and listen for audible actuation.

h. Set multimeter for ohms and check for continuity between terminals 3 and 4. If no continuity is indicated pre-heat relay is defective and must be replaced.

i. Disconnect negative battery cable.

j. If replacement is not required, remove jumper wire and connect remaining wires to preheat relay as tagged.

k. Install control box top panel, paragraph 2-16-4.

l. Connect negative battery cable and close access door.

2-63-4. Installation.

a. Install pre-heat relay (8, Figure 2-16) in output box with screws (7).

b. Connect electrical leads and remove tags.

c. Install control box top panel, paragraph 2-16-4.

d. Connect negative battery cable and close access door.

2-64. VOLTAGE RECONNECTION SWITCH.

2-64-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Inspect voltage reconnection switch (14, Figure 2-16) for cracks, missing parts, and loose hardware.

e. Install control box top panel, paragraph 2-16-4.

f. Connect negative battery cable and close access door.

2-64-2. Removal.

a. Shut down generator set.

b. Open left engine access door and disconnect negative battery cable.

c. Remove control box assembly, paragraph 2-21-2.

d. Tag and disconnect electrical leads to voltage reconnection switch (14, Figure 2-16).

CAUTION

When removing the voltage reconnection switch, use extreme care not to drop the attaching hardware down on the generator unit. Serious damage to the equipment could result.

e. Remove screws (9) and (12), washers (10), nuts (11) and (13), and voltage reconnection switch (14) from output box assembly.

f. Remove screws (15) and mounting bracket (16) from output box assembly.

2-64-3. Testing.

a. Remove voltage reconnection switch, paragraph 2-64-2.

b. Set multimeter for ohms and check voltage reconnection switch for continuity. Refer to Electrical Schematic FO-1 (S-8 Circuit Schedule) to determine switch circuits made to corresponding switch positions.

c. Check continuity of switch circuits in all three switch positions.

d. If open circuit is indicated in any switch position, voltage reconnection switch is defective and must be replaced.

e. If replacement is not required, install voltage reconnection switch, paragraph 2-64-4.

2-64-4. Installation.

a. Install mounting bracket (16, Figure 2-16) with screws (15) in output box assembly.

CAUTION

When installing the voltage reconnection switch, use extreme care not to drop the attaching hardware down on the generator unit. Serious damage to the equipment could result.

b. Install voltage reconnection switch (14) in output box assembly and secure with screws (9) and (12), washers (10), and nuts (11) and (13).

c. Connect electrical leads to voltage reconnection switch as tagged and remove tags.

d. Install control box assembly, paragraph 2-16-4.

e. Connect negative battery cable and close access door.

Section XII. MAINTENANCE OF AIR INTAKE AND EXHAUST SYSTEM

2-65. MUFFLER.

2-65-1. Removal.

a. Shut down generator set.

b. Open both engine access doors and disconnect negative battery cable.

The exhaust system can get very hot. Allow system to cool before performing maintenance. Failure to follow these instructions could result in severe burns and injuries.

c. Remove bolts (1, Figure 2-18) and Iockwashers (2) at intake manifold.

d. Remove bolts (3), lockwashers (4), muffler (5), exhaust seal (6), retaining plate (7), and exhaust seal spring (8) from generator set.

e. Remove gasket (9) from exhaust manifold.

f. Unlace safety wire (10) and remove wrap (11) from muffler (5).

2-65-2. Cleaning and Inspection.

a. Remove muffler, paragraph 2-65-1.

Dry cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation Is normally adequate.

b. Clean muffler with stiff bristle brush and dry cleaning solvent (Item 18, Appendix C).

c. Inspect muffler for dents, cracks, excessive corrosion, clogging, and other damage.

d. Inspect wrap for tears, broken or missing capstands, and other damage.

e. Replace damaged parts.

f. Install muffler, paragraph 2-65-3.

2-65-3. Installation.

a. Install muffler wrap (11, Figure 2-18) on muffler (5) with safety wire (10) in a criss-crossing pattern.

b. Install gasket (9), exhaust seal (6), retaining plate (7), exhaust seal spring (8), and muffler (5) at exhaust manifold with Iockwashers (4) and bolts (3).

c. Secure other end of muffler (5) with Iockwashers (2) and bolts (1).

d. Connect negative battery cable.

e. Start generator set and check for exhaust leaks.

f. Shut down generator set and close engine access doors.

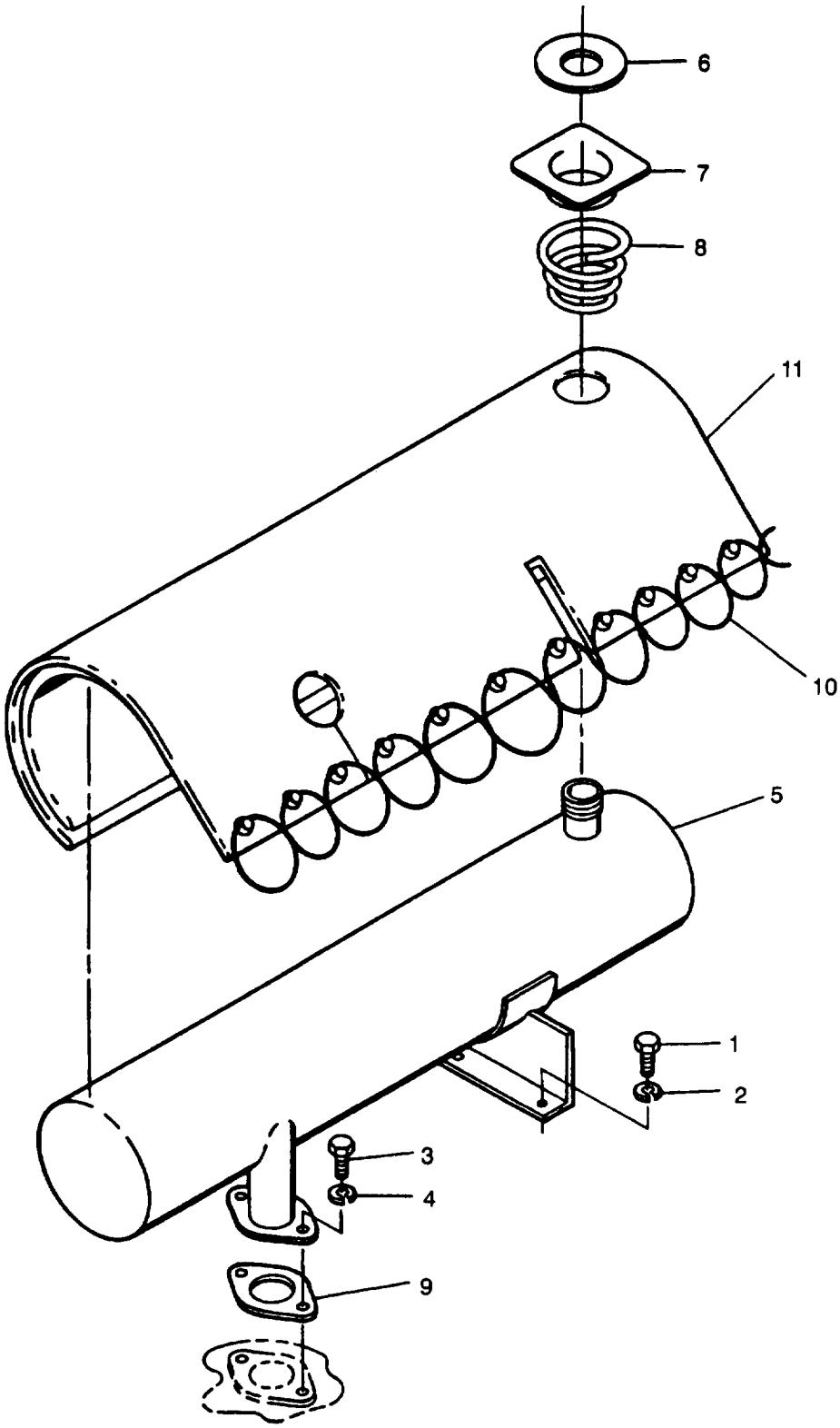


Figure 2-18. Muffler

2-66. AIR RESTRICTION INDICATOR.

2-66-1. Inspection.

a. Shut down generator set.

b. Open right side engine access door.

c. Inspect air restriction indicator (1, Figure 2-19) for cracks, stripped threads, or other obvious damage.

2-66-4. Removal.

a. Shut down generator set.

b. Open right side engine access door.

c. Unscrew and remove air restriction indicator (1, Figure 2-19) from air cleaner housing (7).

2-66-3. Installation.

a. Install air restriction indicator (1, Figure 2-19) on air cleaner housing (7).

b. Close access door.

2-67. AIR CLEANER ASSEMBLY.

2-67-1. Removal.

a. Shut down generator set.

b. Open both engine access doors and disconnect negative battery cable.

c. Loosen clamps (2, Figure 2-19) and remove hose (3) from air cleaner housing (7) and engine intake.

d. Loosen clamp (4) and remove hose (5) from air cleaner housing (7).

e. Open clamps (6) and remove air cleaner assembly from generator set.

f. Remove air cleaner element, paragraph 2-68-1.

CAUTION

Do not permit nuts or bolts on lamps to drop into generator set.

g. Remove control box top panel, paragraph 2-16-1 to remove bolts (8), washers (9), lockwashers (10), nuts (11), and clamps (6) from generator set.

2-67-2. Inspection and Service.

a. Shut down generator set.

b Open left side engine access door and disconnect negative battery cable.

c. Remove top housing panel, paragraph 2-17-1.

d. Inspect air cleaner housing and mounting clamps for dents, cracks, corrosion, and other damage.

e. Service by replacing air cleaner element.

f. Install top housing panel, paragraph 2-17-4.

2-67-3. Repair.

Repair by replacing damaged hoses and clamps.

2-67-4. Installation.

a. Install clamps (6, Figure 2-19) on generator set with bolts (8), washers (9), Iockwashers (10), and nuts (11).
b. Install air cleaner element, paragraph 2-68-3.
c. Place air cleaner assembly in clamps (6).
d. Position hose (3) on air cleaner housing (7) and intake manifold.
e. Position hose (5) on air cleaner housing (7).
f. Tighten clamps (6) securing air cleaner assembly.
g. Reposition hoses (3) and (5), and tighten clamps (2) and (4).
h. Install control box top panel, paragraph 2-16-4.
i. Connect negative battery cable and close access doors.

2-68. AIR CLEANER ELEMENT.

2-68-1. Removal.

a. Shut down generator set.
b. Open left side engine access door.
c. Loosen clamp (12, Figure 2-19) and remove cap (13).
d. Remove wing nut (14), baffle (15), and air cleaner element (16).

2-68-2. Cleaning and Inspection.

a. Remove air cleaner element, paragraph 2-68-1.
b. Wipe inside of air cleaner housing (7, Figure 2-19) with cleaning cloth (Item 6, Appendix C).
c. Inspect element (16) for clogs and damage, and replace as necessary.
d. Install air cleaner element, paragraph 2-68-3.

2-68-3. Installation.

a. Install air cleaner element (16, Figure 2-19), baffle (15), and wing nut (14).
b. Install cap (13) and tighten clamp (12).
c. Close engine access door.

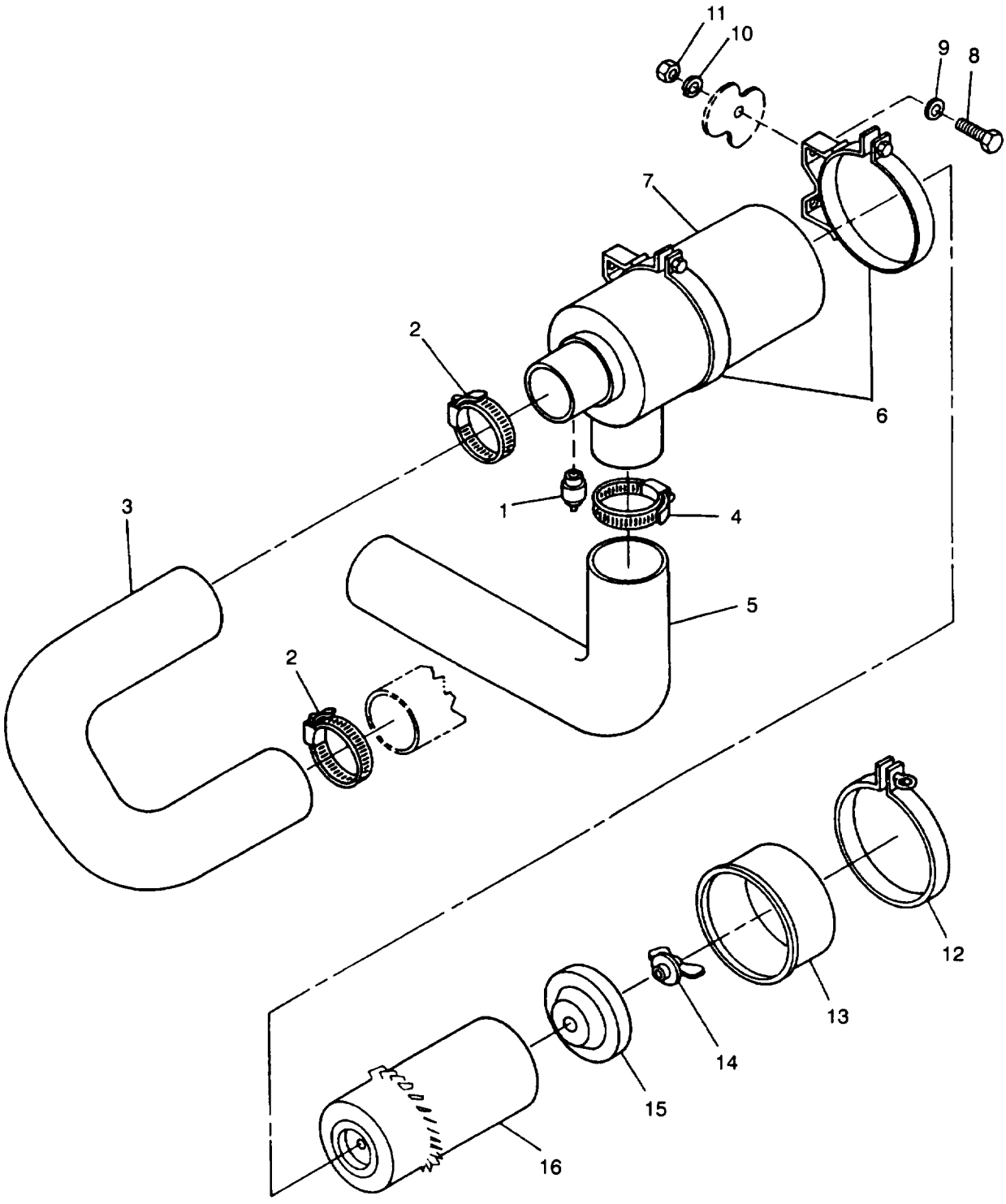


Figure 2-19. Air Cleaner Assembly

Section XIII. MAINTENANCE OF COOLING SYSTEM

2-69. COOLANT SYSTEM.

The coolant system operates at high temperatures. Personal injury or death from burns or scaldlng could result from high pressure steam.

2-69-1. Testing.

a. Shut down generator set.

b. Install coolant pressure tester in radiator neck.

c. Pump pressure tester to indicate 7 psi, check for leaks and ensure radiator cap releases.

d. Release pressure on coolant pressure tester and remove from radiator neck.

2-69-2. Service.

a. Shut down generator set.

b. Open right side engine access door.

c. Flush or drain coolant system in accordance with Preventative Cleaning procedures contained in TM 750-254.

d. Close right side engine access door.

2-70. RADIATOR.

2-70-1. Removal.

a. Shut down generator set.

b. Open engine access doors.

c. Remove top housing panel, paragraph 2-17-1.

d. Remove front housing air deflectors, paragraph 2-19-1, steps d and e.

Coolant can get very hot. Allow system to cool down before performing malnte-nance. Failure to follow these instructions could result In severe burns and injuries.

Always remove radiator cap slowly to permit pressure to escape. Failure to observe this warning could result in severe personal injury.

e. Remove radiator cap (1, Figure 2-20).

f. Remove bolts (2), washers (3), and fan guards (4).

g. Remove bolts (5), washers (6), nuts (7), and caution plate (8).

h. Open radiator drain valve (9) and drain coolant into suitable container.

i. Disconnect drain hose (10) and overflow hose (11) at radiator (12).

j. Loosen hose clamps (19) and remove upper coolant hose (20).

2-70-1. Removal. - Continued.

k. Loosen hose clamps (21) and remove lower coolant hose (22).

l. Remove bolts (13), nuts (14), and shroud halves (15).

m. Remove bolts (16), lockwashers (17), washers (18), and radiator (12) from generator set.

n. Remove drain valve (9) from radiator (12).

2-70-2. Inspection.

a. Remove radiator, paragraph 2-70-1.

b. Inspect radiator (12, Figure 2-20) for excessive corrosion, cracks, or bent cooling fins.

c. Check inside of radiator for corrosion and scale.

d. Inspect seals (34) for looseness and deterioration.

e. Install radiator, paragraph 2-70-5.

2-70-3. Cleaning.

Use clean, low pressure air, 30 psi maximum. Wear protective glasses when using compressed air. Failure to follow these instructions could result in eye injury.

a. Clean dirt particles from radiator core air passages using filtered, compressed air.

Dry cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normalil adequate.

b. Clean exterior surface of radiator with dry cleaning solvent (item 18, Appendix C).

2-70-4. Repair.

a. Replace defective radiator cap (1, Figure 2-20).

b. Solder minor leaks.

c. Replace damaged seals (34).

2-70-5. Installation.

a. Install drain valve (9, Figure 2-20) in radiator (12).

b. Install radiator (12) in generator set with bolts (16), lockwashers (17), and washers (18).

c. Install shroud halves (15) with bolts (13) and nuts (14).

d. Install clamps (21) and lower coolant hose (22).

e. Install clamps (19) and upper coolant hose (20).

f. Attach drain hose (10) and overflow hose (11) to radiator (12) and drain valve (9).

g. Install caution plate (8) on right side fan guard (4) with bolts (5), washers (6), and nuts (7).

h. Install fan guards (4) with bolts (2) and washers (3).

i. Install front housing air deflectors, paragraph 2-19-4, step v.

j. Install top housing panel, paragraph 2-17-4.

2-70-5. Installation. - Ccntinued.

k. Ensure drain valve (9) is dosed.

l. Add coolant to proper level, paragraph 2-1-2-2.

m. Install radiator fill cap (1) and start generator set. Run until operating temperature is reached and check for leaks.

n. Add coolant as required to overflow bottle (25).

o. Close access doors.

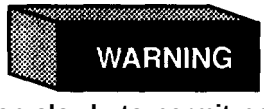
2-71. UPPER COOLANT HOSE.

2-71-1. Removal.

a. Shut down generator set.

b. Open both engine access doors.

Coolant can get very hot. Allow system to cool down before performing maintenance. Failure to follow these instructions could result in severe bums and injuries.



Always remove radiator cap slowly to permit pressure to escape. Failure to observe this warning could result in severe personal injury.

c. Remove radiator cap (1, Figure 2-20).

d. Remove bolts (2), washers (3), and left side fan guard (4).

e. Loosen damps (19) and remove upper coolant hose (20).

2-71-2. Inspection.

a. Shut down generator set.

b. Inspect hose for cracks, holes, chafing, or other damage.

c. Inspect damps for cracks, stripped threads, or other damage.

d. Replace damaged parts.

2-71-3. Installation.

a. Push upper coolant hose (20, Figure 2-20) onto thermostat housing opening and radiator inlet. Tighten clamps (19).

b. Install left side fan guard (4) with bolts (2) and washers (3).

c. Install radiator cap (1).

d. Start generator set, allow unit to reach operating temperature and check for coolant leaks.

e. Add coolant as required to overflow bottle (25). See Table 2-1 for recommended coolant.

f. Close access doors.

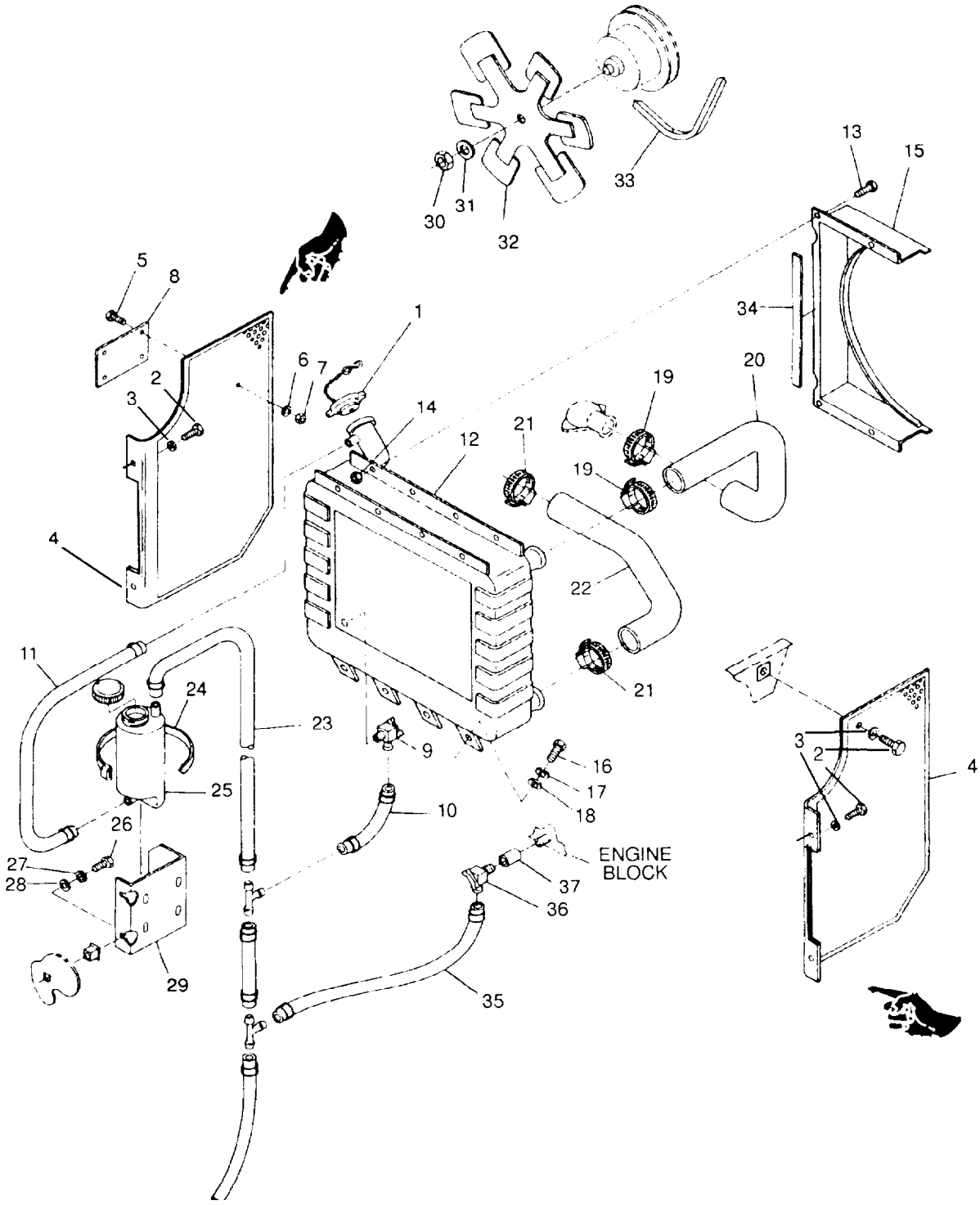


Figure 2-20. Radiator Assembly and Cooling System

2-72. LOWER COOLANT HOSE.

2-72-1. Removal.

a. Shut down generator set.

b. Open both engine access doors.

Coolant can get very hot. Allow system to cool down before performing maintenance. Failure to follow these instructions could result in severe burns and injuries.

Always remove radiator cap slowly to permit pressure to escape. Failure to follow this warning could result in severe personal injury.

c. Remove radiator cap (1, Figure 2-20).

d. Remove bolts (2), washers (3), and fan guards (4).

e. Open radiator drain valve (9) and drain coolant into suitable container.

f. Loosen damps (21) and remove lower coolant hose (22).

2-72-2. Inspection.

a. Shut down generator set.

b. Inspect hose for crack, holes chafing, or other damage.

c. Inspect damps for cracks, stripped threads, or other damage.

d. Replace damaged parts.

2-72-3. Installation.

a. Push lower coolant hose (22, Figure 2-20) onto radiator outlet opening and water pump opening and tighten damps (21).

b. Close radiator drain valve (9) and add coolant to proper level, paragraph 2-1-2-2.

c. Install fan guards (4) with bolts (2) and washers (3).

d. Install radiator cap (1).

e. Start generator set, allow unit to reach operating temperature and check for coolant leaks.

f. Add coolant as required to overflow bottle (25).

g. Close access doors.

2-73. COOLANT RECOVERY SYSTEM.

2-73-1. Inspection.

a. Shut down generator set.
b. Open right side engine access door.
c. Inspect coolant overflow bottle for cracks, holes, or other damage.
d. Inspect overflow bottle mount for cracks, corrosion, or other damage.
e. Replace damaged coolant recovery system components as necessary.
f. Close right side engine access door.

2-73-2. Removal.

a. Shut down generator set.
b. Open right side engine access door.
c. Remove radiator overflow hose (11, Figure 2-20) at overflow bottle (25) and drain coolant into suitable container.
d. Remove bottle overflow hose (23) at overflow bottle (25).
e. Cut tiedown straps (24) and remove overflow bottle (25) from mount (29).
f. Remove bolts (26). washers (28), Iockwashers (27), and mount (29) from generator set.

2-73-3. Installation.

a. Install mount (29, Figure 2-20) in generator set with bolts (26), Iockwashers (27), and washers (28).
b. Position coolant overflow bottle (25) in mount (29) and secure with new tiedown straps (24).
c. Install bottle overflow hose (23) on overflow bottle (25).
d. Install radiator overflow hose (11) on overflow bottle (25).
e. Fill overflow bottle with coolant to COLD mark. See Table 2-1 for recommended coolant.
f. Start generator set and run until normal operating temperature is reached.
g. Add coolant as required to overflow bottle (25).
h. Close access door.

2-74. COOLING FAN.

2-74-1. Inspection.

a. Shut down generator set.
b. Open engine access doors and disconnect negative battery cable.
c. Inspect cooling fan (32, Figure 2-20) blades for dents, cracks, and damage.
d. Connect negative battery cable and close engine access doors.

2-74-2. Removal.

a. Shut down generator set.
b. Open both engine access doors and disconnect negative battery cable.
c. Remove bolts (2, Figure 2-20), nuts (3), and fan guards (4).
d. Remove bolts (13), nuts (14), and shroud halves (15).
e. Remove 1-1/2 in. hex nut (30), washer (31), and fan (32).

2-74-3. Installation.

CAUTION

When installing engine cooling fan use the following procedures to ensure that the fan is not Installed backward. Failure to follow these directions could result in the engine overheating and damage to the generator set.

a. Stand facing front of engine and rotate fan clockwise. Leading edges of fan blades must be facing rearward. Install fan (32, Figure 2-20) with washer (31) and 1-1/2 in. hex nut (30). Torque hex nut (30) to 22 ft-lbs (30 Nm).

b. Install shroud halves (15) with bolts (13) and nuts (14).

c. Install fan guards (4) with bolts (2) and washers (3).

d. Connect negative battery cable and close access doors.

2-75. FAN BELT.

2-75-1. Inspection.

a. Shut down generator set.

b. Open engine access doors and disconnect negative battery cable.

c. Inspect for loose, frayed or torn fan belt (33, Figure 2-20).

d. Connect negative battery cable and close engine access doors.

2-75-2. Removal.

a. Shut down generator set.

b. Open both engine access doors and disconnect negative battery cable.

c. Remove bolts (2, Figure 2-20), washers (3), and right side fan guard (4).

d. Remove bolts (13), nuts (14), and shroud halves (15).

e. Loosen alternator mounting hardware, (1 and 4, Figure 2-5), to relieve tension from fan belt (33, Figure 2-20).

f. Move alternator until fan belt (33) can slip over alternator pulley.

g. Remove fan belt (33) from crankshaft pulley and water pump pulley.

WARNING

Fan is not sharp, but can still cause personal injury.

h. Slip fan belt (33) between cooling fan (32) and radiator (12).

2-75-3. Installation.

a. Slip fan belt (33, Figure 2-20) between cooling fan (32) and radiator (12).

b. Install fan belt (33) onto water pump pulley, crankshaft pulley, and alternator pulley.

c. Adjust fan belt (33), paragraph 2-75-4, steps e and f.

d. Install right side fan guard (4) with bolts (2) and nuts (3).

e. Install shroud halves (15) with bolts (13) and nuts (14).

f. Connect negative battery cable and close access doors.

2-75-4. Adjustment.

a. Shut down generator set.

b. Open both engine access doors and disconnect negative battery cable.

c. Remove bolts (2, Figure 2-20), washers (3), and right side fan guard (4).

d. Secure alternator and loosen alternator mounting hardware, (1 and 4, Figure 2-5) to relieve tension on fan belt (33, Figure 2-20).

NOTE

Fan belt must not be hot when checking or adjusting tension. Belt tension specified is for a warm belt.

e. Adjust fan belt tension by moving alternator until there is 3/4 in. (1.68 cm) deflection with 20 lb (89 N) force halfway between pulleys.

f. Tighten alternator mounting hardware, (4 and 1, Figure 2-5) while maintaining tension.

g. Install right side fan guard (4, Figure 2-20) with bolts (2) and nuts (3).

h. Connect negative battery cable and close access doors.

Section XIV. MAINTENANCE OF FUEL SYSTEM

2-76. FUEL LEVEL SENDER.

2-76-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove front housing panel, paragraph 2-18-1.

d. Inspect fuel level sender (4, Figure 2-21) for loose connections and mounting.

e. Install front housing panel, paragraph 2-18-4.

f. Connect negative battery cable and dose access door.

2-76-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove front housing panel, paragraph 2-18-1.

d. Tag and disconnect fuel level sender (4, Figure 2-21) electrical leads.

e. Remove screws (1), lockwashers (2), washers (3), fuel level sender (4), and gasket (5) from fuel tank. Note position of float when removing sender. Float must be in same position when installing to ensure clearance with fuel tank.

f. Cover fuel tank opening.

2-76-3. Testing

a. Remove fuel level sender, paragraph 2-76-2.

b. Position fuel level sender in vertical position, similar to position as installed in fuel tank.

c. Set multimeter for ohms and connect positive lead to fuel level sender terminal, and negative lead to sender ground.

d. With fuel level sender arm resting freely in what would be an empty position, multimeter should indicate 216 to 264 ohms.

e. Move fuel level sender arm up to what would be a full position and multimeter should indicate 29.7 to 36.3 ohms.

f. Replace fuel level sender if indications are not as above.

g. Install fuel level sender, paragraph 2-76-4.

2-76-4. Installation.

a. Remove cover in fuel tank opening; clean, make flat, and smooth mating surfaces to gasket (5, Figure 2-21), ensuring no foreign material enters fuel tank. Apply sealant (Item 19, Appendix C) to both sides of gasket (5).

b. Position fuel level sender (4) and gasket (5) to fuel tank. Ensure sender (4) is seated evenly in fuel tank and is in the same position as removed.

c. Install screws (1), lockwashers (2), and washers (3).

d. Connect electrical leads and remove tags.

e. Install front housing panel, paragraph 2-18-4.

f. Connect negative battery cable and close access door.

2-77. LOW FUEL LEVEL/AUXILIARY FUEL PUMP FLOAT SWITCH.

2-77-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove front housing panel, paragraph 2-18-1.

d. Inspect low fuel level/auxiliary fuel pump float switch (9, Figure 2-21) for loose connections and mounting.

e. Install front housing panel, paragraph 2-18-4.

f. Connect negative battery cable and close access door.

2-77-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove front housing panel, paragraph 2-18-1.

d. Tag and disconnect low fuel level/auxiliary fuel pump float switch (9, Figure 2-21) electrical connector.

e. Remove screws (6), lockwashers (7), washers (8), float switch (9), and gasket (10) from fuel tank. Note position of float switch when removing. Float switch must be in same position when installing to ensure clearance with fuel tank.

f. Cover fuel tank opening.

2-77-3. Testing.

a. Remove low fuel level/auxiliary fuel pump float switch, paragraph 2-77-2.

b. Position float switch in vertical position, similar to position as installed in fuel tank.

c. Set multimeter for ohms and connect positive lead to pin 2 and negative lead to pin 1 of electrical connector.

d. With upper float moving toward the down position, multimeter should indicate continuity 1/4 inch before float reaches the down position.

e. Move upper float to the full up position, multimeter should indicate open circuit.

f. Disconnect multimeter leads from pins 1 and 2 and connect positive lead to pin 3 and negative lead to pin 4 of electrical connector.

g. Repeat steps d and e, except with lower float.

h. Replace low fuel level/auxiliary fuel pump float switch if indications are other than above.

i. Install low fuel level/auxiliary fuel pump float switch, paragraph 2-77-4.

2-77-4. Installation.

a. Loosen float switch plate adjusting nut.

b. Remove cover in fuel tank opening; clean, make flat, and smooth mating surfaces to gasket (10, Figure 2-21), ensuring no foreign material enters fuel tank. Apply sealant (Item 19, Appendix C) to both sides of gasket (10).

c. Position gasket (10) and low fuel level/auxiliary fuel pump float switch (9) onto fuel tank. Ensure float switch (9) is in same position as removed.

d. Install screws (6), lockwashers (7), and washers (8).

e. Set float switch stem 1/16 inch from bottom of fuel tank. Tighten float switch plate adjusting nut.

f. Connect electrical connector and remove tag.

g. Install front housing panel, paragraph 2-18-4.

h. Connect negative battery cable and close access door.

2-78. FUEL PICKUP.

2-78-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove front housing panel, paragraph 2-18-1.

d. Disconnect fuel line (17, Figure 2-21) from fitting (16) and cap line.

e. Remove screws (11), lockwashers (12), washers (13), fuel pickup (14), and gasket (15) from fuel tank. Cover fuel tank opening.

f. Remove fitting (16) from fuel pickup (14).

2-78-2. Inspection.

a. Remove fuel pickup, paragraph 2-78-1.

b. Inspect fuel pickup and fittings for clogs, stripped threads, and other damage.

c. Replace damaged parts.

d. Install fuel pickup, paragraph 2-78-3.

2-78-3. Installation.

a. Remove cover in fuel tank opening; clean, make flat, and smooth mating surfaces to gasket (10, Figure 2-21), ensuring no foreign material enters fuel tank. Apply sealant (Item 19, Appendix C) to both sides of gasket (10).

b. Install gasket (15) and fuel pickup (14) in fuel tank with screws (11), lockwashers (12), and washers (13).

c. Install fitting (16) in fuel pickup (14).
d. Connect fuel line (17) to fitting (16).
e. Install front housing panel, paragraph 2-18-4.
f. Connect negative battery cable and close access door.

2-79. FUEL FLOAT MODULE.

2-79-1. Testing.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Remove front housing panel, paragraph 2-18-1.
d. Tag and disconnect fuel float module (20, Figure 2-21) electrical connector (J12) from fuel float switch electrical connector (P12).
e. Connect pins 1 and 2 of fuel float module electrical connector (J12) together with a jumper wire.
f. Connect negative battery cable, move MASTER SWITCH to PRIME & RUN AUX FUEL position and auxiliary fuel pump should start operating. Remove jumper wire and auxiliary fuel pump should stop operating.
g. Start and operate generator set at rated voltage and frequency.
h. Using jumper wire, make connection between pins 3 and 4 of fuel float module electrical connector (J12). Generator set should shut down after approximately 2 seconds and NO FUEL lamp on malfunction indicator panel should light.
i. Replace fuel float module if operation is other than above. Otherwise remove jumper wire, connect J12 and remove tag.
j. Install front housing panel, paragraph 2-18-4.
k. Close left side engine access door.

2-79-2. Removal.

a. Shut down generator set.
b. Open left side engine access door and disconnect negative battery cable.
c. Remove front housing panel, paragraph 2-18-1.
d. Tag and disconnect electrical connector from fuel float module (20, Figure 2-21).
e. Remove bolts (18), nuts (19), and fuel float module (20) from generator set.

2-79-3. Installation.

a. Install fuel float module (20, Figure 2-21) in generator set with bolts (18) and nuts (19).
b. Connect electrical connector and remove tag.
c. Install front housing panel, paragraph 2-18-4.
d. Connect negative battery cable and close access door.

2-80. LOW PRESSURE FUEL LINES.

2-80-1. Inspection.

a. Shut down generator set.
b. Remove front housing panel, paragraph 2-18-1.
c. Inspect fuel lines for deterioration, cracks, and leaks.
d. Install front housing panel, paragraph 2-18-4.

2-80-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Identify fuel line to be removed as shown in Figure 2-21 or Figure 2-22.

d. Disconnect fittings at both ends of fuel line and remove any clamps. Cap openings.

e. Remove fuel line from generator set.

2-80-3. Installation.

a. Remove any caps and position fuel line in generator set.

b. Install any clamps as removed and connect fittings at both ends of fuel line.

c. Connect negative battery cable.

d. Turn MASTER SWITCH to PRIME& RUN or PRIME & RUN AUX FUEL position as applicable, and check for fuel leaks.

e. Close all access doors.

2-81. FUEL TANK FILLER NECK.

2-81-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove front panel, paragraph 2-18-1.

d. Remove filler cap (21, Figure 2-21). Rotate tube (22) one quarter turn counterclockwise, and remove from filler neck (27).

e. Remove bolts (23) and nuts (24).

f. Remove clamps (25), rubber collar (26), and filler neck (27) from fuel tank opening.

g. Cover fuel tank opening.

2-81-2. Inspection.

a. Shut down generator set.

b. Remove front housing panel, paragraph 2-18-1.

c. Inspect rubber collar (26, Figure 2-21) for cracks, wear, or other damage.

d. Inspect filler neck (27), clamps (25), tube (22), and cap (21) for corrosion, cracks, or other damage.

e. Install front housing panel, paragraph 2-18-4.

2-81-3. Installation.

a. Position filler neck (27, Figure 2-21) onto fuel tank opening.

b. Install rubber collar (26) and clamps (25) onto filler neck (27) and fuel tank opening.

c. Install bolts (23) and nuts (24).

d. Install filler cap (21) and tube (22).

e. Install front panel, paragraph 2-18-4.

f. Connect negative battery cable and close access door.

2-82. FUEL TANK DRAIN VALVE.

2-82-1. Removal.

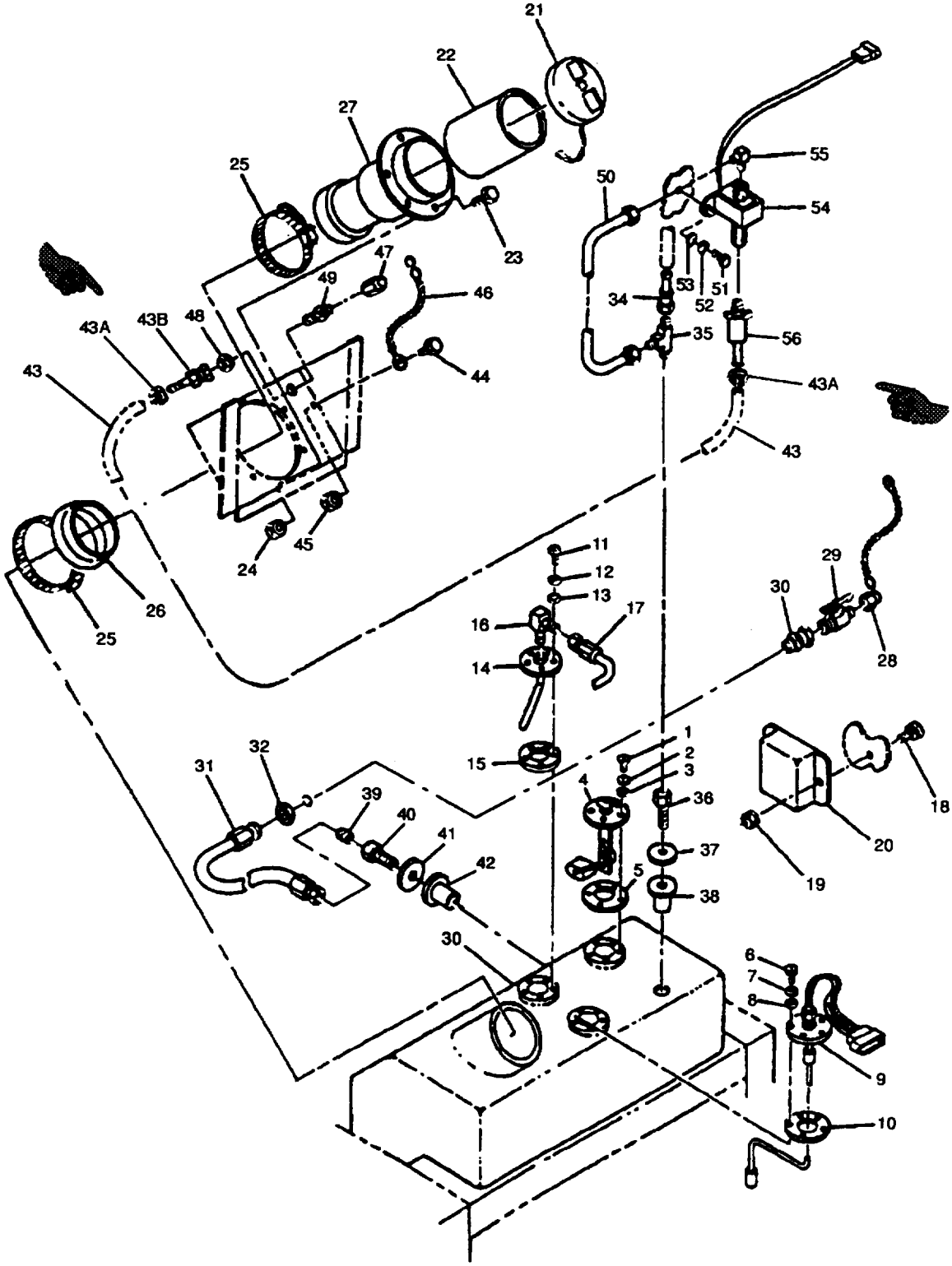


Figure 2-21. Fuel Tank, Switches, and Auxiliary Fuel Pump

2-82-1. Removal. - Continued.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

Diesel fuel is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

c. Remove cap (28, Figure 2-21), open fuel drain valve (29) and drain all fuel into suitable container.

d. Remove fuel drain valve (29) from fitting (30) at left side skid.

e. Remove fuel drain line (31) from adapter (40) and fitting (30).

f. Remove nut (32) and fitting (30) from left side skid.

2-82-2. Installation.

a. Install fitting (30, Figure 2-21) in left side skid with nut (32).

b. Install fuel drain line (31) to fitting (30) and adapter (39).

c. Install fuel drain valve (29) in fitting (30) at left side skid.

d. Install cap (28) on valve (29). Ensure fuel drain valve (29) is closed.

e. Fill fuel tank with fuel. See Table 2-2 for recommended fuel. Check for fuel leaks.

f. Connect negative battery cable and close access door.

2-83. FUEL TANK.

2-83-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

Diesel fuel is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

c. Drain fuel into a suitable tank container.

d. Remove front housing section, paragraph 2-19-1.

e. Remove fuel tank drain valve, paragraph 2-82-1.

f. Remove fuel tank (33, Figure 2-21) from generator set.

g. Remove fittings (34) and (35) from fuel tank fitting (36).

h. Remove adapter (39) from fuel tank fitting (40).

i. Remove fittings (36) and (40), washers (37) and (41), and bushings (38) and (42) from fuel tank (33).

j. Remove fuel float switch, paragraph 2-77-2, fuel level sender, paragraph 2-76-2, and fuel pickup, paragraph 2-78-1 from fuel tank (33).

2-83-2. Inspection

a. Shut down generator set.
b. Remove fuel tank, paragraph 2-83-1.
c. Inspect fuel tank for leaks and cracks.
d. Install fuel tank, paragraph 2-63-3.

2-83-3. Installation.

a. Install fuel level sender, paragraph 2-76-4, fuel float switch, paragraph 2-77-4, and fuel pickup paragraph 2-78-3 in fuel tank (33, Figure 2-21).
b. Install bushings (38) and (42), washers (37) and (41), and fittings (36) and (40) in fuel tank (33).
c. Install adapter (39) in fuel tank fitting (40).
d. Install fittings (35) and (34) in fuel tank fitting (36).
e. Install fuel tank (33) in generator set.
f. Install fuel tank drain valve, paragraph 2-82-2.
g. Install front housing section (except front housing panel), paragraph 2-19-4.
h. Service fuel tank with diesel fuel. Refer to Table 2-2 for recommended fuel.
i. Connect negative battery cable.
j. Start generator set and check for leaks and proper operation.
k. Shut down generator set and install front housing panel, paragraph 2-18-4.

2-84. AUXILIARY FUEL PUMP.

2-84-1. Inspection

a. Shut down generator set.
b. Remove front housing panel, paragraph 2-16-1.
c. Check auxiliary fuel pump (54, Figure 2-21) for leaks, cracks, missing hardware, and loose connections.
d. Install front housing panel, paragraph 2-18-4.

2-84-2. Testing.

a. Remove front housing panel, paragraph 2-16-1.
b. Connect generator set to auxiliary fuel supply at fitting (49, Figure 2-21).

NOTE

Ensure auxiliary fuel supply is level with or above auxiliary fuel pump inlet.

c. Disconnect auxiliary fuel pump outlet tube (50) at fuel tank fitting (35) and place end in measuring container.
d. Connect negative battery cable.
e. Move generator set MASTER SWITCH to PRIME & RUN AUX FUEL position for 1 minute and return MASTER SWITCH to OFF position.
f. Measuring container should have collected at least 32 oz (0.95 liter) of fuel.
g. Replace auxiliary fuel pump if delivery amount is other than above.
h. Connect auxiliary fuel pump outlet tube (50) at fuel tank fitting (35).
i. Disconnect generator set from auxiliary fuel supply.
j. Disconnect negative battery cable.

2-84-2. Testing - Continued.

k. Install front housing panel, paragraph 2-18-4.

2-84-3. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove front housing panel, paragraph 2-18-1.

d. Tag and disconnect auxiliary fuel pump electrical connector.

e. Loosen clamps (43a). Disconnect filter (56) and remove adapter fitting (43b) from filter neck panel fitting (49). Remove adapter fitting (43b) from fuel inlet hose (43). Remove filter (56) from auxiliary fuel pump (54). Cap fuel inlet hose (43).

f. Remove bolt (44), nut (45), chain (46), cap (47), nut (48), and fitting (49) from fuel filler panel.

g. Remove auxiliary fuel outlet tube (50) from auxiliary fuel pump (54), and fitting (35). Cap fuel outlet tube openings.

h. Remove bolts (51), Iockwashers (52), washers (53), and auxiliary fuel pump (54) from generator set.

i. Remove fitting (55) from auxiliary fuel pump (54).

2-84-4. Installation.

a. Install auxiliary fuel pump (54, Figure 2-21) with bolts (51), Iockwashers (52), and washers (53).

b. Install fitting (49), nut (48), cap (47), chain (46), bolt (44), and nut (45) to fuel filler panel.

c. Remove caps and install fitting (55) and auxiliary fuel outlet tube (50) to auxiliary fuel pump (54) and fitting (35).

d. Remove caps from fuel inlet hose (43). lnstall filter (56) on auxiliary fuel pump (54). Install adapter fitting (43b) on fuel inlet hose (43) and connect adapter fitting (43b) to filler neck panel fitting (49). Connect other end of fuel inlet hose to filter (56). Tighten clamps (43a).

e. Connect auxiliary fuel pump electrical connector and remove tag.

f. Install front panel, paragraph 2-18-4.

g. Connect negative battery cable and close access door.

2-85. FUEL TRANSFER PUMP.

2-85-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Inspect fuel transfer pump (6, Figure 2-22) for leaks, cracks, missing hardware, and loose connections.

d. Connect negative battery cable and close left side engine access door.

2-85-2. Testing.

a. Shut down generator set.

b. Open left side engine access door and disconnect fuel transfer pump outlet line (9, Figure 2-22) at secondary fuel filter. Place line in measuring container.

c. Move generator set MASTER SWITCH to PRIME & RUN position for one minute and return MASTER SWITCH to OFF position.

d. Measuring container should have collected at least 25 oz (0.845 liter) of fuel.

e. Replace fuel transfer pump if delivery amount is other than above.

f. Connect fuel line (9) to secondary fuel filter.

g. Close access door.

2-85-3. Removal.

a. Shutdown generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove bolts (2, Figure 2-20), washers (3), and left side fan guard (4).

d. Tag and disconnect fuel transfer pump electrical connector.

e. Disconnect inlet fuel hose (1, Figure 2-22) from fuel transfer pump (6). Cap hose.

f. Disconnect outlet fuel tube (2) from fuel transfer pump (6). Cap tube.

g. Remove bolts (3), Iockwashers (4), washers (5), and fuel transfer pump(6) from generator set.

h. Remove fittings (7) and (8) from fuel transfer pump (6).

2-85-4. Installation

a. Install fittings (7 and 8, Figure 2-22) in fuel transfer pump (6).

b. Install fuel transfer pump (6) with bolts (3), Iockwashers (4), and washers (5).

c. Remove caps and connect fuel hose (1) and fuel tube (2) at fuel transfer pump (6).

d. Connect electrical connector and remove tag.

e. Install left side fan guard (4, Figure 2-20) with bolts (2) and washers (3).

f. Connect negative battety cable and dose access door.

2-88. FUEL FILTER/WATER SEPARATOR ASSEMBLY.

2-86-1. Inspection.

a. Shutdown generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Inspect fuel filter/water separator assembly for fuel leaks and loose connections.

d. Connect negative battery cable and dose left side engine access door.

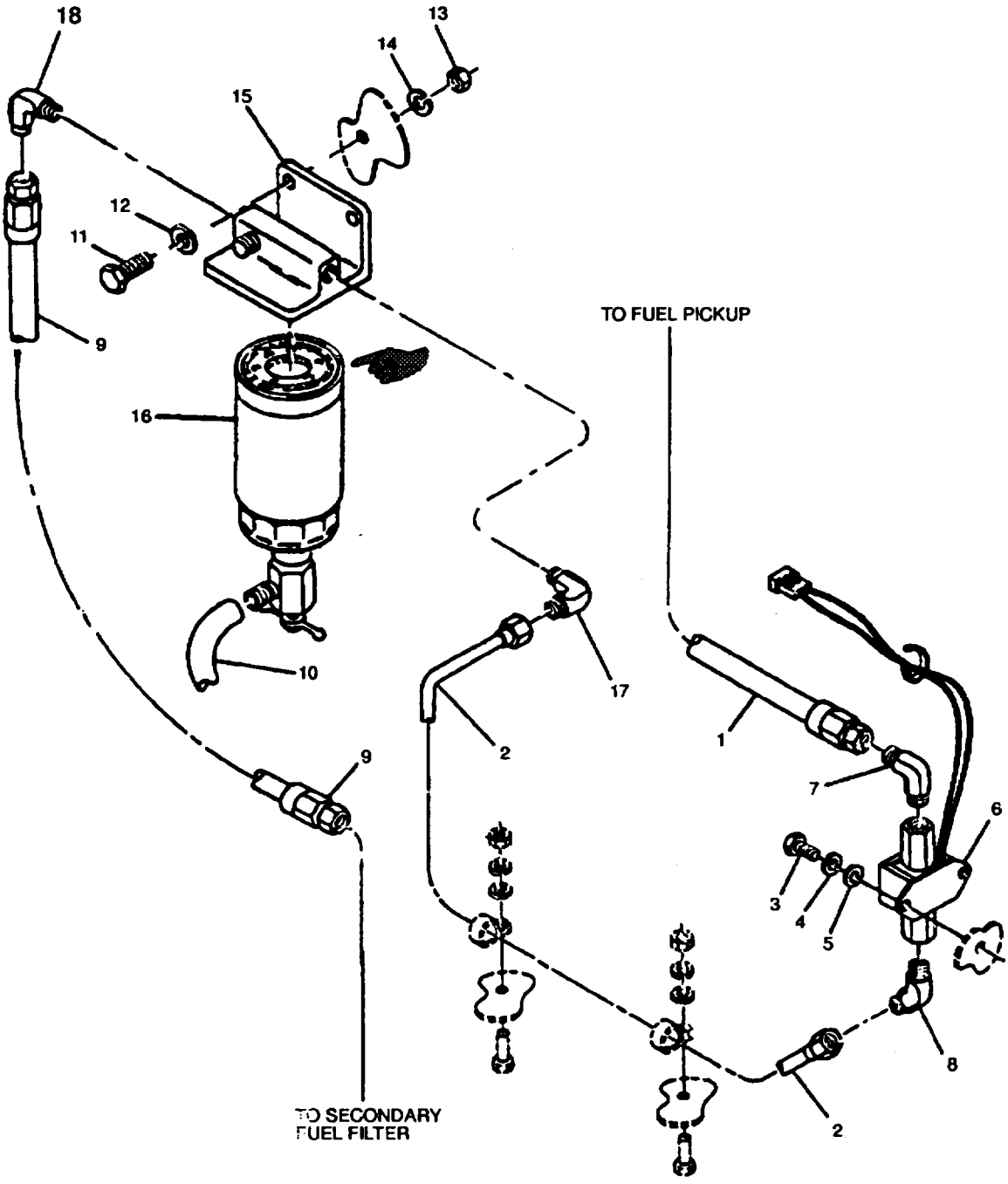


Figure 2-22. Fuel Filter/Water Separator and Transfer Pump

2-86-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box assembly, paragraph 2-21-2.

d. Loosen output box mounting hardware to allow access to fuel filter/water separator fuel lines.

e. Disconnect fuel outlet line (9, Figure 2-22), inlet line (2), and water drain line (10) from fuel filted/water separator assembly. Cap all lines.

f. Remove bolts (11), washers (12), nuts (13), lockwashers (14), and fuel filter/water separator assembly from generator set.

g. Remove fuel filter/water separator element, paragraph 2-87-1.

h. Remove fittings (17) and (18) from base (15).

2-86-3. Repair.

Repair assembly by replacing fuel filter/water separator element.

2-86-4. Installation.

a. Install fittings (17 and 18, Figure 2-22) in base (15).

b. Install fuel filter/water separator element, paragraph 2-87-3.

c. Install fuel filter/water assembly in generator set with bolts (11), washers (12), Iockwashers (14), and nuts (13).

d. Remove caps and connect water drain line (10), fuel outlet line (9), and fuel inlet line (2) to fuel filter/water separator assembly.

e. Tighten output box mounting hardware.

f. Install control box assembly, paragraph 2-21-4.

g. Connect negative battery cable and close access door.

2-87. FUEL FILTER/WATER SEPARATOR ELEMENT.

2-87-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Disconnect water drain line (10, Figure 2-22) from element (16).

d. Unscrew and remove fuel filter/water separator element (16) from base (15).

2-87-2. Inspection.

a. Remove fuel filter/water separator element, paragraph 2-87-1.

b. Inspect element for clogging, tears, and other damage.

c. Install fuel filter/water separator element, paragraph 2-87-3.

2-87-3. Installation.

a. Open petcock valve on fuel filter/water separator.

b. Apply a film of engine oil (11, Appendix C) to the sealing surface of fuel filter/water separator.

c. Install fuel filter/water separator element (16, Figure 2-22) on base (15). Hand-tighten only.

d. Connect water drain line (10) to element (16).

e. Close petcock valve on fuel filter/water separator. Hand-tighten only.

f. Connect negative battery cable and close access door.

Section XV. MAINTENANCE OF LUBRICATION SYSTEM

2-88. ENGINE OIL DRAIN LINE.

2-88-1. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Inspect oil drain line for leaks, loose fittings, and other damage.

d. Connect negative battery cable and close left side engine access door.

2-88-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove plug (1, Figure 2-23), open drain valve (2), and drain engine oil into suitable container.

d. Remove clamps (3) and drain hose (4).

e. Remove drain valve (2), fitting (5), and pipe (6) from plate (13).

f. Remove fitting (5) and pipe (6) from drain valve (2).

g. Remove elbow (7) and fitting (8) from engine.

h. Remove fitting (8) from elbow (7).

i. Remove bolts (9), washers (10), lockwashers (11), nuts 12), and plate (13) from left side engine door sill.

2-88-3. Repair.

Repair oil drain line by replacing clamps, hoses, and fittings.

2-88-4. Installation.

a. Install plate assembly (13, Figure 2-23) in left side engine door sill with bolts (9), washers (10), lockwashers (11), and nuts (12).

b. Install fitting (8) in elbow (7).

c. Install elbow (7) and fitting (8) assembly into engine.

d. Install pipe (6) and fitting (5) in drain valve (2).

e. Install drain valve (2), fitting (5), and pipe (6) into plate (13).

f. Install drain hose (4) with clamps (3).

g. Close drain valve (2), install plug (1) and add engine oil to proper level. See Table 2-3 for proper lube oil, Check for leaks.

h. Connect negative battery cable and close access door.

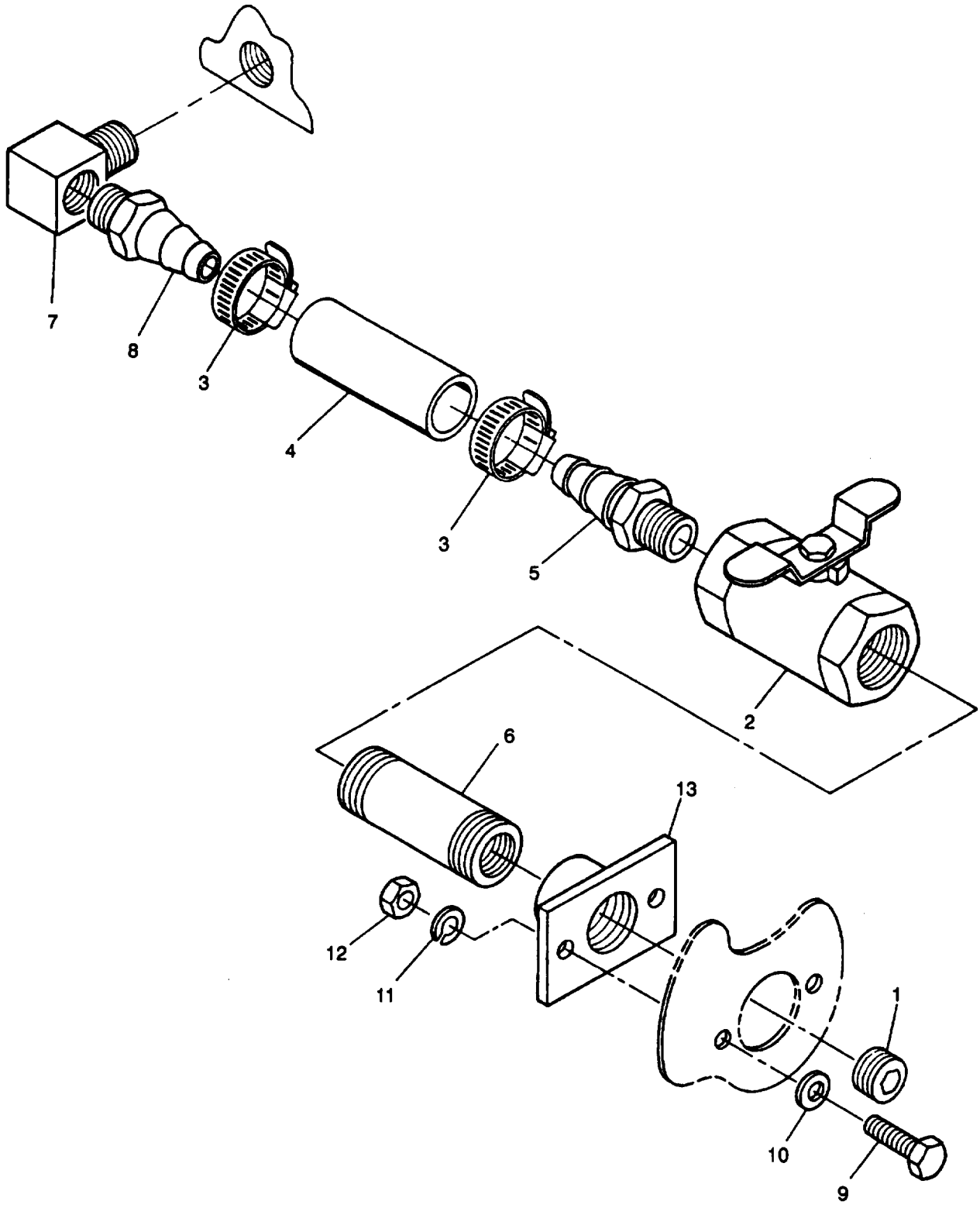


Figure 2-23. Engine Oil Drain Line

Section XVI. MAINTENANCE OF ENGINE ACCESSORIES

2-69. FREQUENCY ADJUST CONTROL CABLE ASSEMBLY.

2-89-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove bolts (2, Figure 2-20), washers (3), and left fan guard (4).

d. Spread keeper (1, Figure 2-24) and remove control cable wedge (2) at governor speed lever (3).

e. Open load terminal board access door and loosen nut (4). Slide nut (4) and washer (5) off cable assembly (6).

f. Remove frequency adjust control cable assembly (6) from rear of generator set.

2-89-2. Inspection.

a. Shut down generator set.

b. Inspect frequency adjust control cable assembly for broken or frayed cable, stripped threads, corrosion, and damaged knobs.

c. Replace damaged parts or cable assembly, as necessary.

2-89-3. Installation.

a. Insert frequency adjust control cable assembly (6, Figure 2-24) at rear of generator set.

b. Install washer (5) and nut (4), and close load terminal board access door.

c. Install control cable wedge (2) at governor speed lever (3).

d. Install frequency control cable (6) in keeper (1). Close keeper (1).

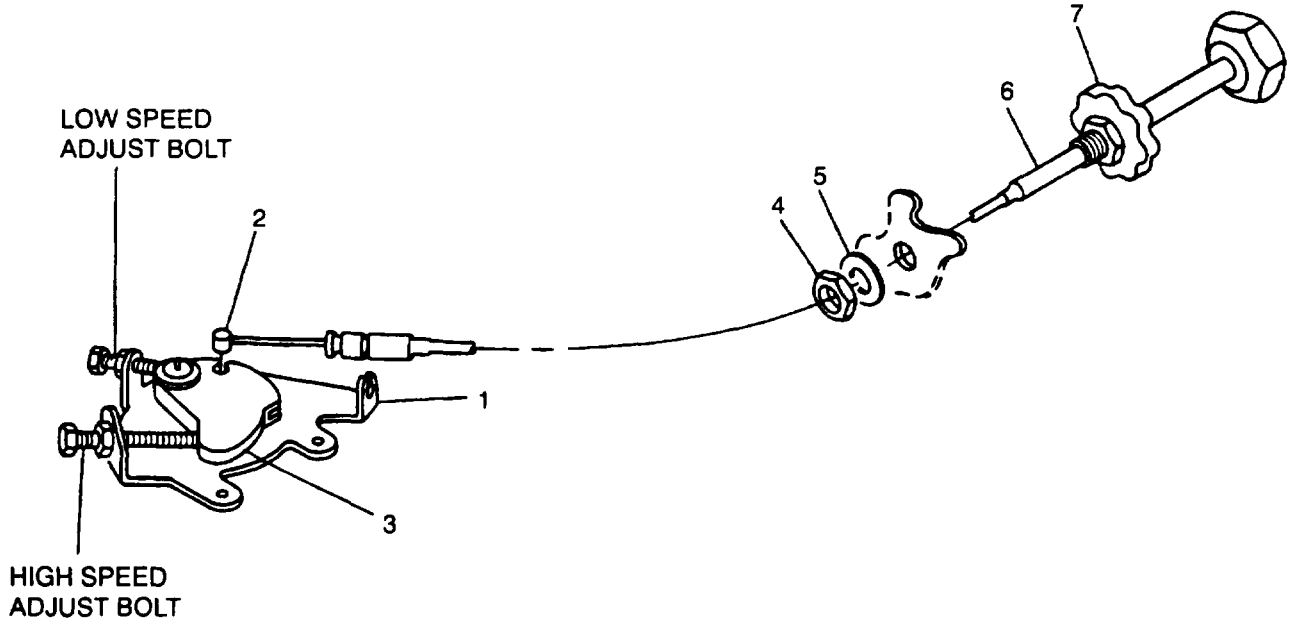


Figure 2-24. Frequency Adjust Control Cable Assembly

e. Connect negative battey cable.

f. Start generator set. Using frequency adjust control, ensure the following adjustment range:

MEP-802A = 58– 65 Hz.
MEP-812A = 388-420 Hz.

If frequency adjustment range is not correct, adjust frequency, paragraph 2-89-4.

g. If adjustment is correct, shut down generator set.

h. Install left fan guard (4, Figure 2-20) with bolts (2) and washers (3).

i. Shut left side engine access door.

2-89-4. Adjustment

a. Shut down generator set.

b. Open left side engine access door and remove control cable wedge (2, Figure 2-24) from governor speed lever (3).

c. Loosen jam nuts on both speed adjust bolts on governor control and turn bolts counterclockwise until they do not touch speed lever (3).

d. Adjust frequency control adjust cable (6) with nuts (4) and (7) and connect cable to speed lever (3) so that lever is positioned approximately mid-range.

e. Start generator set. Using frequency adjust control, adjust frequency to 65 Hz (420 Hz for MEP-812A).

f. Turn high speed adjust bolt on governor control until it contacts speed lever (3) and tighten jam nut

g. Using frequency adjust control, adjust frequency to 58 Hz (388 Hz for MEP-812A)

h. Turn low speed adjust bolt on governor control until it contacts speed lever (3) and tighten jam nut

i. Using frequency adjust control, cycle generator set frequency from minimum to maximum and back to minimum to verify settings.

j. Readjust high or low speed adjust bolts on governor control as needed to obtain required frequency adjustment range.

k. Shut down generator set and close left side engine access door

2-90. LOW OIL PRESSURE SWITCH.

NOTE

Prior to performing this test, refer to TM9-2815-252-24 and verify engine has good oil pressure.

2-90-1. Testing.

a. Shut down generator set.

b. Open left side engine access door.

c. Tag and disconnect electrical leads from low oil pressure switch (1, Figure 2-25)

d. Set multimeter for ohms and connect across switch connector pins C and NO. Multimeter shall indicate open circuit.

e. Connect multimeter across switch connector pins C and NC. Multimeter shall indicate continuity.

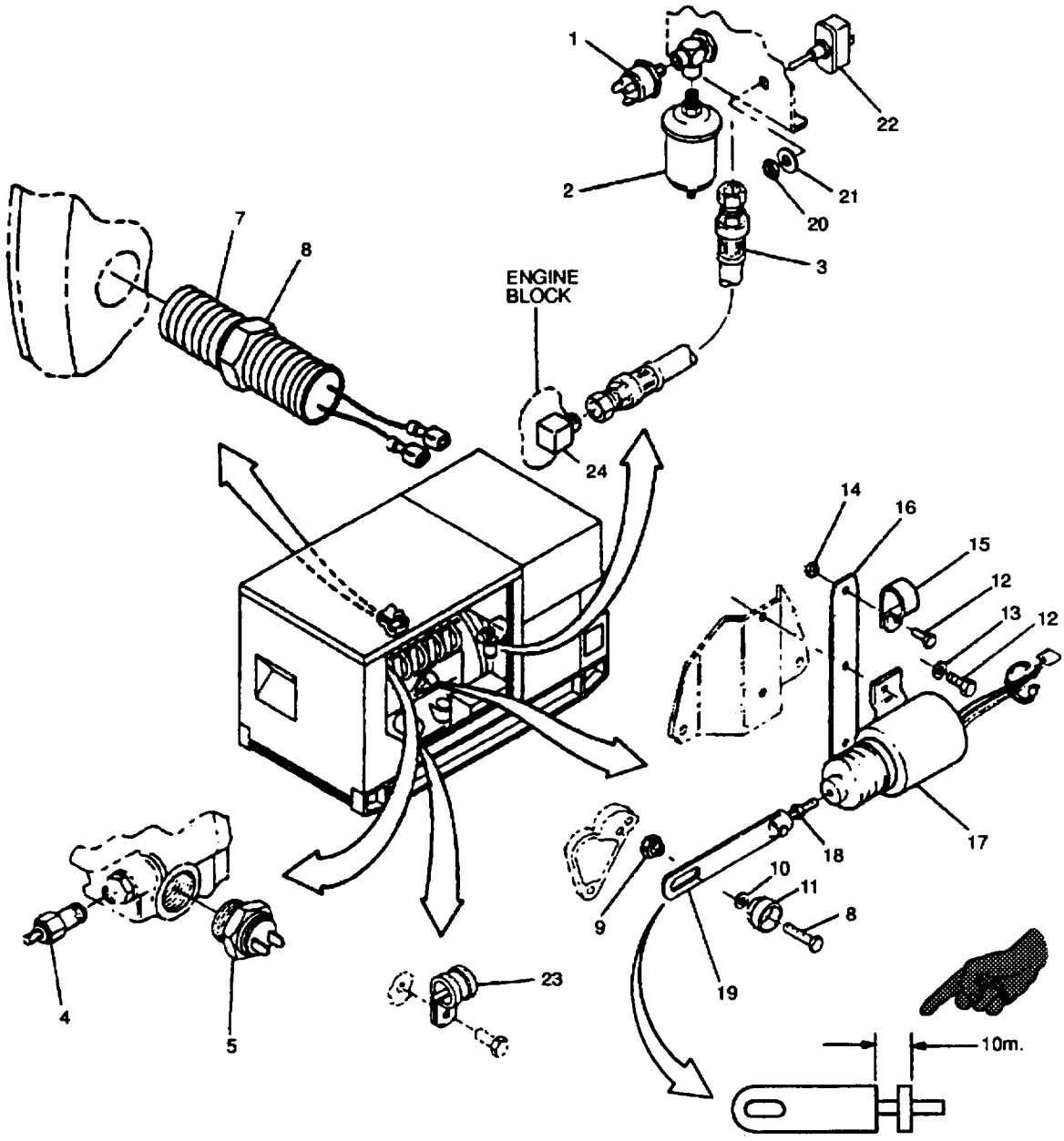


Figure 2-25. Engine Related Switches and Senders

2–90-1. Testing - Continued.

f. Start generator set. Place BATTLE SHORT switch in ON position before releasing MASTER SWITCH from START position.

g. Connect multimeter across switch connector pins C and NO. Multimeter shall indicate continuity.

h. Shut down generator set. Return BATTLE SHORT switch to OFF position.

i. If switch fails to meet continuity requirements, replace low oil pressure switch.

J Connect electrical leads, remove tags, and close left side engine access door.

2-90-2. Removal.

a. Shut down generator set.

b, Open left side engine access door and disconnect negative battery cable.

c. Tag and disconnect low oil pressure switch (1, Figure 2-25) electrical leads.

d. Unscrew low oil pressure switch (1) from fitting on left side rear engine wall.

2–90-3. Cleaning and Inspection.

a. Remove low oil pressure switch, paragraph 2-90-2.

Use clean, low pressure air, 30 psi maximum. Wear protectlve glasses when using compressed air. Failure to follow these instructions could result in eye injury.

Dry cleaning solvent Is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

b. Clean low oil pressure switch with dry, filtered compressed air and electrician's brush or wipe with cleaning cloth (Item 6, Appendix C) lightly moistened with approved solvent (Item 18, Appendix C).

c. Inspect low oil pressure switch for cracked casing, stripped or damaged threads, corrosion, or other damage.

d. Install low oil pressure switch, paragraph 2-90-4.

2-90-4. Installation.

a. Install low oil pressure switch (1, Figure 2-25) into fitting on left side rear engine wall.

b. Connect electrical leads and remove tags.

c. Install negative battery cable and close access door.

2-91. OIL PRESSURE SENDER.

2-91-1. Testing.

a. Shut down generator set.

b. Open left side engine access door.

c. Disconnect electrical lead from oil pressure sender (2, Figure 2-25).

d. Set multimeter for ohms and connect to oil pressure sender terminal and casing. Multimeter should indicate 216 to 264 ohms.

e. Start generator set and observe multimeter. As the engine cranks and accelerates to rated speed, the multimeter indication should decrease to a value between 100 ohms and 33 ohms.

f. Shut down generator set.

9. Replace oil pressure sender if above resistance requirements are not met.

h. Connect electrical lead and close left side engine access door.

2-91-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Tag and disconnect oil pressure sender (2, Figure 2-25) electrical lead.

d. Unscrew oil pressure sender (2) from fitting on left side rear engine wall.

2-91-3. Cleaning and Inspection.

a. Remove oil pressure sender, paragraph 2-91-2.

Use clean, low pressure air, 30 psi maximum. Wear protective glasses when using compressed air. Failure to follow these instructions could result In eye injury.

Dry cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

b. Clean oil pressure sender with dry, filtered compressed air and wipe with cleaning cloth (Item 6, Appendix C) lightly moistened with approved solvent (Item 18, Appendix C).

c. Inspect oil pressure sender for cracked casing, stripped or damaged threads, corrosion, or other visible damage.

d. Inspect oil line (3, Figure 2-25) for deterioration and damage.

e. Install oil pressure sender, paragraph 2-91-4.

2-91-4. Installation.

a. Screw oil pressure sender (2, Figure 2-25) into fitting on left side rear engine wall.

b. Install electrical lead and remove tag.

c. Install negative battery cable and close access door.

2-92. COOLANT TEMPERATURE SENDER.

2-92-1. Testing.

a. Shut down generator set.

b. Open left side engine access door.

c. Disconnect and tag electrical lead from coolant temperature sender (4, Figure 2-25).

d. Set multimeter for ohms and connect to coolant temperature sender terminal and casing. Muitimeter indication should be greater than 300 ohms.

e. Start generator set and observe multimeter.

f. As engine operates and coolant temperature rises, multimeter indication should decrease.

g. Shut down generator set.

h. Replace coolant temperature sender if indications are other than above.

i. Connect electrical lead, remove tag, and close left side engine access door.

2-92-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Tag and disconnect coolant temperature sender (4, Figure 2-25) lead.

d. Unscrew coolant temperature sender (4) from thermostat housing.

2-92-3. Cleaning and Inspection.

a. Remove coolant temperature sender, paragraph 2-92-2.

Use clean, low pressure air, 30 psi maximum. Wear protective glasses when using compressed air. Failure to follow these instructions could result In eye injury.

Dry cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

b. Clean coolant temperature sender with filtered compressed air and cleaning cloth (Item 6, Appendix C) lightly moistened with approved solvent (Item 18, Appendix C).

c. Inspect coolant temperature sender for cracked casing, corrosion, and damaged threads and connector.

d. Install coolant temperature sender, paragraph 2-92-4.

2-92-4. Installation.

a. Install coolant temperature sender (4, Figure 2-25) into thermostat housing.

b. Connect electrical lead and remove tag.

c. Connect negative battery cable and close access door.

2-93. COOLANT HIGH TEMPERATURE SWITCH.

2-93-1. Removal.

a. Shut down generator set.

WARNING

Allow coolant system to cool down before performing maintenance. Hot fluids or steam can cause bums to skin. Failure to observe this warning could result in severe personal injury.

b. Open left side engine access door and disconnect negative battery cable.

c. Tag and disconnect coolant high temperature switch (5, Figure 2-25) electrical leads.

d. Unscrew coolant high temperature switch (5) from thermostat housing.

2-93-2. Cleaning and Inspection.

a. Remove coolant high temperature switch, paragraph 2-93-1.

WARNING

Use clean, low pressure air, 30 psi maximum. Wear protective glasses when using compressed air. Failure to follow these instructions could result in eye injury.

WARNING

Dry cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

b. Clean coolant high temperature switch with filtered compressed air and cleaning cloth (Item 6, Appendix C) lightly moistened with dry cleaning solvent (Item 18, Appendix C).

c. Inspect coolant high temperature switch for cracked casing, corrosion, stripped or damaged threads, and bent or broken connector pins.

d. Install coolant high temperature switch, paragraph 2-93-4.

2-93-3. Testing.

a. Remove coolant high temperature switch, paragraph 2-93-1.

b. Suspend coolant high temperature switch in container of clean 50/50 mixture of antifreeze and water so that sensing element is completely immersed but not touching sides or bottom of container.

c. Suspend reliable thermometer in container. Do not allow end of thermometer to rest on container bottom.

d. Set multimeter for ohms and connect between high temperature switch terminals. Multimeter should indicate open circuit.

e. Gradually heat antifreeze/water mixture so that heat will be evenly distributed and observe thermometer and multimeter.

f. At 220 to 230°F (105 to 110°C), multimeter should indicate continuity.

g. Replace coolant high temperature switch if it fails to operate as above.

h. Install coolant high temperature switch, paragraph 2-93-4.

2-93-4. Installation.

a. Install coolant high temperature switch (5, Figure 2-25) Into thermostat housing.

b. Install electrical leads and remove tags.

c. Connect negative battery cable and close access door.

2-94. MAGNETIC PICKUP.

2-94-1. Removal.

a. Shut down generator set.

b. Open both engine access doors and disconnect negative battery cable.

NOTE

Magnetic pickup is located on right side of flywheel housing.

c. Tag and disconnect electrical leads to magnetic pickup (7, Figure 2-25).

d. Loosen nut (6) and unscrew magnetic pickup (7) from flywheel housing.

2-94-2. Cleaning and Inspection.

a. Remove magnetic pickup, paragraph 2-94-1.

Use clean, low pressure air, 30 psl maximum. Wear protective glasses when using compressed air. Failure to follow these instructions could result in eye injury.

Dry cleaning solvent Is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation Is normally adequate.

b. Cleaning magnetic pickup with filtered compressed air and cleaning cloth (Item 6, Appendix C) lightly moistened with dry cleaning solvent (Item 18, Appendix C).

c. Inspect magnetic pickup for cracked casing, corrosion, stripped or damaged threads, and bent or broken connector pins.

d. Install magnetic pickup, paragraph 2-94-3.

2-94-3. Installation.

a. Screw magnetic pickup (7, Figure 2-25) into flywheel housing until pickup bottoms out on flywheel.

b. Back magnetic pickup out 1-1/2 turns and finger tighten nut (6).

c. Connect electrical connectors and remove tags.

d. Adjust magnetic pickup (7) in accordance with paragraph 2-94-4.

2-94-4. Adjustment.

a. Set multimeter for AC volts and connect to terminals 3 and 6 on crank disconnect switch (35, Figure 2-11).

b. Connect negative battey cable and dead crank engine with DEAD CRANK switch.

CAUTION

Do not adjust magnetic pickup more than 1/8 of a turn at a time. Failure to observe this caution could result in damage to magnetic pickup.

c. Multimeter should read 2 to 3 VAC. Adjust magnetic pickup in or out, no more than 1/8 of a turn at a time, to obtain proper reading.

d. Tighten nut (6) and close access doors.

2-95. FUEL SOLENOID.

2-95-1. Testing.

a. Open left side engine access door and disconnect negative battery cable.

b. Measure from fuel solenoid housing (17, Figure 2-25) to nut (18) and note measurement.

c. Tag, disconnect, and insulate wire 113B from starter solenoid and connect negative battery cable.

d. Move generator set MASTER SWITCH to START position and observe that fuel solenoid linkage retracts.

e. Release MASTER SWITCH to RUN position, ensure fuel solenoid linkage remains retracted, and measure from solenoid housing (17) to nut (18) again. Difference in measurement from step b should be 1 in. (2.54 cm).

f. Position MASTER SWITCH to OFF.

g. Repeat test several times to ensure proper performance of solenoid.

h. If fuel solenoid does not travel its full 1 in. (2.54 cm), the solenoid is defective and must be replaced.

i. Disconnect negative battey cable and connect wire 113B to starter solenoid.

j. Connect negative battery cable and close access door.

2-95-2. Inspection.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Inspect fuel solenoid assembly for damage and loose connections.

d. Connect negative battery cable and close left side engine access door.

2-95-3. Removal

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battey cable.

c. Disconnect and tag electrical connector to fuel solenoid (17, Figure 2-25).

d. Disconnect linkage (19) from engine governor cam by removing bolt (8), threaded bushing (9), washer (10), and spacer (11).

e. Remove bolts (12), washers (13), nut (14), clamp (15), strap (16), and fuel solenoid (17).

f. Loosen jam nut (18) and remove linkage (19) from solenoid (17).

2-95-4. Repair.

Repair fuel solenoid assembly by replacing electrical contacts, solenoid, and damaged linkage.

2-95-5. Installation.

a. Install linkage (19, Figure 2-25) in fuel solenoid (17) and apply sealant (item 20, Appendix C) on threads. Tighten jam nut (18) next to rubber bellows to a distance of 0.4 inches between the back side of the linkage (19) and the far side of the jam nut (18). (See Figure 2-25, exploded view.)

b. Install fuel solenoid (17), clamp (15), and strap (16) to engine mount plate with bolts (12), washers (13), and nut (14).

c. Connect linkage (19) to engine governor cam with bolt (8), spacer (11), washer (10), and threaded bushing (9). Insert bolt (8) through spacer (11) and washer (). Apply sealant (item 20, Appendix C) on threads of threaded bushing (9). Insert threaded part of bolt (8) which extends beyond the spacer (11) and washer (10) through the linkage slot. Secure in place by tightening the threaded bushing (9) to the bolt (11). Thread the knob assembly into the stop lever located on the engine. Torque threaded bushing (9) to 40-45 in-lbs.

d. Connect electrical connector and remove tag.

e. Disconnect wire 113B from starter solenoid and connect negative battery cable.

f. Move generator set MASTER SWITCH to START position and ensure engine governor linkage contacts lower set screw stop.

g. Move MASTER SWITCH to OFF position and ensure governor linkage contacts upper set screw stop.

h. Adjust solenoid linkage (19) as necessary to ensure contact with both stops.

i. Disconnect negative battery cable, connect wire 113B at starter solenoid and reconnect negative battery cable.

j. Close left side engine access door.

2-96. DEAD CRANK SWITCH.

2-96-1. Inspection

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Inspect DEAD CRANK switch (22, Figure 2-25) for damage and loose connections.

d. Connect negative battery cable and close left side engine access door.

2-96-2. Removal.

a. Shut down generator set.

b. Open left engine access door and disconnect negative battery cable.

c. Remove nut (20, Figure 2-25) and washer (21).

d. Remove DEAD CRANK switch (22) from mounting bracket on left rear engine wall.

e. Tag and disconnect DEAD CRANK switch electrical leads.

2-96-3. Testing.

a. Remove DEAD CRANK switch, paragraph 2-96-2.

b. Set multimeter for ohms, and with DEAD CRANK switch in NORMAL position, check for continuity between contacts 2 and 3.

c. Position switch to CRANK and check for continuity between contacts 1 and 2.

d. If switch fails continuity check, replace switch.

e. Install DEAD CRANK switch, paragraph 2-96-4.

2-96-4. Installation.

a. Connect electrical leads to DEAD CRANK switch (22, Figure 2-25) and remove tags.

b. Install DEAD CRANK switch (22) in mounting bracket with washer (21) and nut (20).

c. Connect negative battery cable and close access door.

Section XVII. MAINTENANCE OF LOAD OUTPUT TERMINAL BOARD ASSEMBLY

2-97. LOAD OUTPUT TERMINAL BOARD ASSEMBLY.

2-97-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Open load terminal board access door and disconnect load cables.

d. Remove nuts (1, Figure 2-26), Iockwashers (2), washers (3), and bolts (4) securing ground plane bracket (5) to generator set.

e. Remove nuts (6) and bolts (7) securing load terminal board assembly mounting bracket (8) to generator set.

f. Remove nuts (9) and copper washers (10). Tag and disconnect main power leads and varistor leads (11) from load terminals (12).

g. Remove ground plane bracket (5) and terminal board (13) from generator set as an assembly.

h. Remove load terminals (12) from terminal board (13), paragraph 2–98-1.

i. Remove EMI filter (14) positioned between LO and GND terminals (12).

j. Remove nut (15), washer (16), and bus bar (17) from standoff (18).

k. Remove nuts (19) and (21), washers (20) and (22), ground bar (23), and standoffs (18) and (24) from terminal board (13).

l. Disconnect varistor leads (11) from varistors (25) and remove leads from assembly.

m. Remove varistors (25) from load terminal board assembly, paragraph 2-99-1.

n. Remove EMI filters (26) positioned between load terminals (12) and varistors (25).

o. Remove nuts (27) and bolts (28) and separate ground plane bracket (5) and terminal board (13).

p. Remove nuts (29), Iockwashers (30), bolts (31), washers (32), and mounting bracket (8) from terminal board (13).

q. Remove nuts (33), bolts (34), bracket (35), and wrench (36) from generator set. Untie cord (37) and remove from wrench (36).

2-97-2. Inspection.

a. Remove load output terminal board assembly, paragraph 2-97-1, steps a thru g.

b. Inspect terminal output board components for cracks, corrosion, and obvious damage.

c. Inspect threaded components for stripped threads.

d. Inspect varistor electrical leads for damaged insulation and loose terminals.

e. Replace damaged and defective parts.

f. Install load output terminal board assembly, paragraph 2-97-4, steps k thru o.

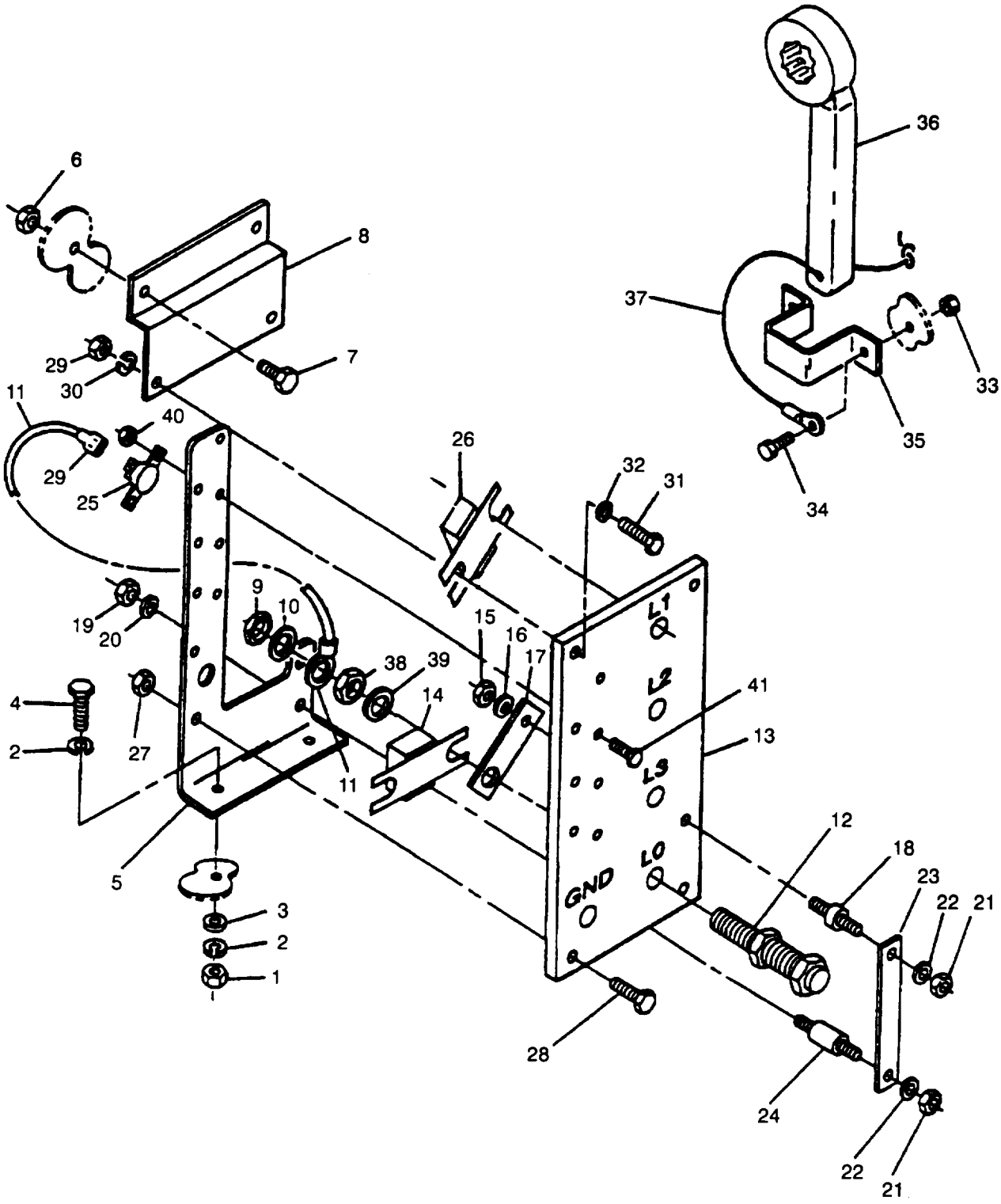


Figure 2-26. Load Output Terminal Board Assembly

2-97-3. Repair.

Repair load output terminal board assembly by replacing wires, load terminals, EMI filters, and varistors.

2-97-4. Installation.

a. Tie cord (37, Figure 2-26) to wrench (36). Install wrench (36) and bracket (35) in generator set with bolts (34) and nuts (33).

b. Align terminal board (13) with ground plane bracket (5) and install bolts (28) and nuts (27).

c. Position EMI filters (26) between varistors (25) and L1, L2, and L3 load terminals (12) mounting holes.

d. Install varistors (25), paragraph 2-99-3.

e. Install standoffs (24) and (18) and ground bar (23) to terminal board assembly with washers (20) and (22) and nuts (19) and (21).

f. Install bus bar (17) on standoff (18) with washer (16) and nut (15).

g. Position EMI filter (14) between LO and GND load terminals (12) mounting holes.

h. Install load terminals (12), paragraph 2-98-3.

i. Install mounting bracket (8) on terminal board assembly with bolts (31), washers (32), lockwashers (30), and nuts (29).

j. Connect varistor electrical leads (11) to varistors (25).

k. Position load output terminal board assembly in generator set and connect varistor leads (11) and main electrical leads to load terminals (12) with copper washers (10) and nuts (9). Remove tags.

l. Secure terminal board assembly mounting bracket (8) to generator set with bolts (7) and nuts (6).

m. Secure terminal board assembly to generator set skid with bolts (4), lockwashers (2), washers (3), and nuts (1).

n. Connect load cables and close access door.

o. Connect negative battery cable and close access door.

2-98. LOAD OUTPUT TERMINALS.

2-98-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable,

c. Open load terminal board access door and disconnect load cables.

d. Remove load output terminal board assembly from generator set, paragraph 2-97-1, steps c thru g.

e. Remove nuts (38, Figure 2-26), copper washers (39), and load terminals (12) from load output terminal board assembly.

2-98-2. Inspection.

a. Remove load output terminals, paragraph 2-98-1.

b. Inspect load terminals for stripped threads or other obvious damage.

c. Replace damaged load terminals as necessary.

d. Install load output terminals, paragraph 2-98-3.

2-98-3. Installation.

a. Install load output terminals (12, Figure 2-26) on load output terminal board assembly with copper washers (39) and nuts (38).

NOTE

Ensure GND load terminal passes through ground plane bracket (5) and LO load terminal passes through bus bar (17).

b. Install load output terminal board assembly in generator set, paragraph 2-97-4, steps k thru m.

c. Connect load cables and close load terminal board access door.

d. Connect negative battery cable and close left side engine access door.

2-99. VARISTORS.

2-99-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove load output terminal board assembly from generator set, paragraph 2-97-1, steps c thru g.

d. Tag and disconnect varistor leads, (11, Figure 2-26) from varistors (25).

e. Remove nuts (40), bolts (41), and varistors (25) from load output terminal board assembly.

2-99-2. Inspection.

a. Remove varistors, paragraph 2-99-1.

b. Inspect varistors for obvious external damage.

c. Set multimeter for ohms and test each varistor by connecting multimeter to varistor terminals 1 and 2. Note multimeter indication.

d. Reverse multimeter leads and note multimeter indication.

e. Multimeter indications should be infinite ohms in both direction.

f. Varistors are defective and must be replaced if indications are other than above.

g. Install varistors, paragraph 2-99-3.

2-99-3. Installation.

a. Install varistors (25, Figure 2-26), on load output terminal board assembly with bolts (41) and nuts (40).

b. Connect varistor leads (11) to varistors (25) and remove tags.

c. Install load output terminal board assembly in generator set, paragraph 2-97-4, steps k thru m.

d. Connect negative battery cable and close left side engine access door.

Section XVIII. PREPARATION FOR SHIPMENT AND STORAGE

2-100. PRESERVATION.

a. Preserve generator sets in accordance with levels A, B, or C of MIL–G-28554.

b. Preserve generator set cooling systems in accordance with method II of MIL–G–28554 or the antifreeze and water procedure of Ml L–E–10062.

2-101. PACKING.

Pack generator sets in accordance with levels A, B or C of MIL-G-28554.

2-102. MARKING.

Mark for shipment or storage in accordance with MIL–STD–129.

2-103. USE OF CORROSION- PREVENTIVE COMPOUNDS, MOISTURE BARRIERS, and DESICCANT MATERIALS.

(A) Refer to MIL-HDBK-729 for corrosion and corrosion prevention/metal.

2-104. STORAGE.

(A) Refer to TB 740-97-2 for storage information. (F) Refer to TO 38-1-5.

CHAPTER 3

GENERAL MAINTENANCE INSTRUCTIONS

Section 1. REPAiR PARTS; TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SPECIAL SUPPORT EQUIPMENT

3-1. MAINTENANCE REPAIR PARTS.

Repair parts are listed and illustrated in the repair parts and special tools list manual TM 9-6115-641-24P.

3-2. TOOLS AND EQUIPMENT.

There are no special tools or support equipment required to perform any level of maintenance on the generator set. A list of recommended tools and support equipment required to maintain the generator set is contained in Appendix B, Section Ill.

3-3. FABRIC OF TOOLS AND EQUIPMENT.

There is no requirement for fabrication of tools and equipment for the maintenance of the generator set.

Section II. TROUBLESHOOTING

3-4. DIRECT SUPPORT TROUBLESHOOTING PROCEDURES.

3-4-1. Purpose of Troubleshooting Table. This section contains troubleshooting information for locating and correcting operating troubles which may develop in the generator set. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine probable causes and corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

This table cannot list all malfunctions that can occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or cannot be corrected by listed corrective actions. notify your supervisor.

NOTE

Before you use this table, be sure you have performed your PMCS.

NOTE

Refer Diagnostic Connector Table 2–10 to the Electrical Schematic FO–1 and Wiring Diagram FO–2 as troubleshooting aids.

SYMPTOM INDEX
GENERATOR SET

	Troubleshooting Procedure Page
ENGINE	
Cranks but fails to start	3-3
Runs erratically or stalls frequently	3-3
Misfiring	3-4
Does not develop full power	3-4
Coolant in crankcase or oil in Coolant	3-5
Abnormal noise	3-6
EXHAUST SYSTEM	
Black or grey exhaust smoke	3-5
Blue or white exhaust smoke	3-5
GENERATOR SET	
Fails to generate power	3-6
Fails to generate sufficient voltage	3-7
Output fluctuates	3-7
Noisy when running	3-7

Table 3-1. DIRECT SUPPORT TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. ENGINE CRANKS BUT FAILS TO START.

Step 1. Test for defective fuel injection nozzle(s), refer to TM 9-2815-252-24.

a. If fuel injection nozzle(s) is not defective, do Step 2.

b. If defective, repair or replace fuel injection nozzle(s), refer to TM 9-2815-252-24.

Step 2. Check for incorrect timing on fuel injection pump(s), refer to TM 9-2815-252-24.

a. If fuel injection pump(s) timing is correct, do Step 3.

b. If not timed correctly, time fuel injection pump(s), refer to TM 9-2815-252-24.

Step 3. Test for defective fuel injection pump(s), refer to TM 9-2815-252-24.

If defective, repair or replace fuel injection pump(s), refer to TM 9-2815-252-24.

2. ENGINE RUNS ERRATICALLY OR STALLS FREQUENTLY.

Step 1. Test for defective fuel injection nozzle(s), refer to TM 9-2815-252-24.

a. If fuel injection nozzle(s) is not defective, do Step 2.

b. If defective, repair or replace defective fuel injection nozzle(s), refer to TM 9-2815-252-24.

Step 2. Check for incorrect timing on fuel injection pump(s), refer to TM 9-2815-252-24.

a. If fuel injection pump(s) timing is correct, do Step 3.

b. If not timed correctly, time fuel injection pump(s), refer to TM 9-2815-252-24.

Step 3. Test for defective fuel injection pump(s), refer to TM 9–2815-252-24.

a. If fuel injection pump(s) is not defective, do Step 4.

b. If defective, repair or replace fuel injection pump(s), refer to TM 9-2815-252-24.

Step 4. Check for defective cylinder head gasket, refer to TM 9-2815-252-24.

a. If cylinder head gasket is not defective, do Step 5.

b. If defective, replace cylinder head gasket, refer to TM 9-2815-252-24.

Step 5. Check for valves stuck or burnt, refer to TM 9-2815-252-24.

a. If valves not stuck or burnt, do Step 6.

b. If defective, replace valves, refer to TM 9-2815-252-24.

Step 6. Check for low engine vacuum, refer to TM 9-2815-252-24.

If engine vacuum is too low, repair or replace engine, refer to TM 9-2815-252-24.

Table 3-1. DIRECT SUPPORT TROUBLESHOOTING - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. ENGINE MISFIRING.

Step 1. Test for defective fuel injection nozzle(s), refer to TM 9-2815-252-24.

a. If fuel injection nozzle(s) is not defective, do Step 2.

b. If defective, repair or replace fuel injection nozzle(s), refer to TM 9-2815-252-24.

Step 2. Check for incorrect timing on fuel injection pump(s), refer to TM 9-2815-252-24.

a. If fuel injection pump(s) timing is correct, do Step 3.

b. If not timed correctly, time fuel injection pump(s), refer to TM 9-2815-252-24.

Step 3. Check for defective fuel injection pump(s), refer to TM 9-2815-252-24.

a. If fuel injection pump(s) is not defective, do Step 4.

b. If defective, repair or replace fuel injection pump(s), refer to TM 9-2815-252-24.

Step 4. Check for weak valve springs, refer to TM 9-2815-252-24.

a. If valve springs are serviceable, do Step 5.

b. If defective, replace valve springs, refer to TM 9-2815-252-24.

Step 5. Check for valves stuck or burnt, refer to TM 9-2815-252-24.

a If valves not struck or burnt, do Step 6.

b. If defective, replace valves, refer to TM 9-2815-252-24.

Step 6. Check for low engine vacuum, refer to TM 9-2815-252-24.

If engine vacuum is too low, repair or replace engine, refer to TM 9-2815-252-24.

4. ENGINE DOES NOT DEVELOP FULL POWER.

Step 1. Test for defective fuel injection nozzle(s), refer to TM 9-2815-252-24.

a. If fuel injection nozzle(s) is not defective, do Step 2.

b. If defective, repair or replace fuel injection nozzle(s), refer to TM 9-2815-252-24.

Step 2. Check for incorrect timing on fuel injection pump(s), refer to TM 9-2815-252-24.

a. If fuel injection pump(s) timing is correct, do Step 3.

b. If not timed correctly, time fuel injection pump(s), refer to TM 9-2815-252-24.

Step 3. Check for weak valve springs, refer to TM 9-2815-252-24.

a. If valve springs are serviceable, do Step 4.

b. If defective, replace valve springs, refer to TM 9-2815-252-24.

Table 3-1. DIRECT SUPPORT TROUBLESHOOTING - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 4. Check for valves stuck or burnt, refer to TM 9-2815-252-24.

a. If valves not stuck or burnt, do Step 5.

b. If defective, replace valves, refer to TM 9-2815-252-24.

Step 5. Check for defective cylinder head gasket, refer to TM 9-2815-252-24.

a. If cylinder head gasket is not defective, do Step 6.

b. If defective, replace cylinder head gasket, refer to TM 9-2815-252-24.

Step 6. Check for low engine vacuum, refer to TM 9-2815-252-24.

If engine vacuum is too low, repair or replace engine, refer to TM 9-2815-252-24.

5. BLACK OR GREY SMOKE IN EXHAUST.

Step 1. Test for defective fuel injection nozzle(s), refer to TM 9-2815-252-24.

a. If fuel injection nozzle(s) is not defective, do Step 2.

b. If defective, repair or replace fuel injection nozzle(s), refer to TM 9-2815-252-24.

Step 2. Check for incorrect timing on fuel injection pump(s), refer to TM 9-2815-252-24.

If fuel injection pump(s) timing is incorrect, time fuel injection pump(s), refer to TM 9-2815-252-24.

6. BLUE OR WHITE EXHAUST SMOKE.

Step 1. Test for defective fuel injection nozzle(s), refer to TM 9-2815-252-24.

a. If fuel injection nozzle(s) is not defective, do Step 2.

b. If defective, repair or replace fuel injection nozzle(s), refer to TM 9-2815-252-24.

Step 2. Check for incorrect timing on fuel injection pump(s), refer to TM 9-2815-252-24.

If fuel injection pump(s) timing is incorrect, time fuel injection pump(s), refer to TM 9-2815-252-24.

7. COOLANT IN CRANKCASE OR OIL IN COOLANT.

Step 1. Check for cracked cylinder head, refer to TM 9-2815-252-24.

a. If cylinder head is not cracked, do Step 2.

b. If cracked, replace cylinder head, refer to TM 9-2815-252-24.

Step 2. Check for defective cylinder head gasket, refer to TM 9-2815-252-24.

a. If defective, replace cylinder head gasket, refer to TM 9-2815-252-24.

b. If not defective and problem persists, replace engine, refer to TM 9-2815-252-24.

Table 3-1. DIRECT SUPPORT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

8. ABNORMAL ENGINE NOISE

Step 1. Check for worn rocker arm shaft, refer to TM 9-2815-252-24.

a. If rocker arm shaft is not worn, do Step 2.

b. If worn, replace rocker arm shaft, refer to TM 9-2815-252-24.

Step 2. Check for bent push rods.

a. If push rods are not bent, do Step 3.

b. If bent, replace push rods, refer to TM 9-2815-252-24.

Step 3. Check for worn timing gears.

a. If timing gears are not worn, do Step 4.

b. If worn, replace timing gears, refer to TM 9-2815-252-24.

Step 4. Check for foreign material in combustion chamber, refer to TM 9-2815-252-24.

a. If foreign material found, clean combustion chamber, refer to TM 9-2815-252-24.

b. If no foreign material is found replace engine, refer to TM 9-2815-252-24.

9. GENERATOR SET FAILS TO GENERATE POWER.

Step 1. Test for open circuit in generator exciter field, refer to paragraph 4-10-4.

a. If exciter stator, is not open, do Step 2.

b. If open, replace exciter stator, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

Step 2. Test for defective generator stator windings, refer to paragraph 4-10-7.

a. If generator stator is not defective, so Step 3.

b. If defective, replace generator stator, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

Step 3. Test for defective generator rotating rectifiers, refer to paragraph 4-10-3.

a. If rectifiers are not defective, do Step 4.

b. If defective, replace generator rotating rectifiers, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

Step 4. Check for open circuit in generator rotor, refer to paragraph 4-10-6.

a. If generator rotor is not open, do Step 5.

b. If open, replace generator rotor, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

Step 5. Check for shorted generator exciter armature, refer to paragraph 4-10-5.

If generator exciter rotor is shorted, replace exciter rotor, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

Table 3-1. DIRECT SUPPORT TROUBLESHOOTING - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

10. GENERATOR SET FAILS TO GENERATE SUFFICIENT VOLTAGE.

Step 1. Check for low engine speed, refer to TM 9-2815-252-24.

a. If engine is operating correctly, do Step 2.

b. If defective, repair engine, refer to TM 9-2815-252-24.

Step 2. Test for shorted generator stator, paragraph 4-10-7.

If generator stator is shorted, replace generator stator, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

11. GENERATOR SET OUTPUT FLUCTUATES.

Step 1. Check for irregular engine speed, refer to TM 9-2815-252-24.

a. If engine is operating properly, do Step 2.

b. If defective, repair engine, refer to TM 9-2815-252-24.

Step 2. Check for short in generator exciter stator, refer to paragraph 4-10-4.

If exciter stator is shorted, replace exciter stator, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

12. GENERATOR NOISY WHEN RUNNING.

Step 1. Check for defective generator main bearing, refer to paragraph 4-11 (MEP-802A) or 4-12 (MEP-812A).

a. If generator main bearing is not defective, do Step 2.

b. If defective, replace main bearing, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

Step 2. Check for heat causing loose laminations.

a. If generator laminations are not loose, do Step 3.

b. If defective, replace part(s), paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

Step 3. Inspect for loose engine/generator coupling.

a. If there are no loose or missing engine/generator coupling bolts, do Step 4.

b. If loose, tighten or install engine/generator coupling bolts, paragraph 4-11-4 (MEP-802A) or paragraph 4-12-6 (MEP-812A).

Step 4. Check for defective generator.

If defective, replace generator, paragraph 4-11 (MEP-802A) or paragraph 4-12 (MEP-812A).

Section III. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS.

3-5. GENERAL.

The engine and generator are bolted together at the engine flywheel housing. The engine-generator assembly is mounted on the skid base at four points. The engine-generator should be removed as an assembly, However, when removing the generator only, the engine can remain attached to the skid base with adequate blocking of the flywheel housing to support the rear of the engine.

3-6. ENGINE AND GENERATOR ASSEMBLY.

3-6-1. Removal.

a. Shut down generator set.

b. Remove batteries, paragraph 2-12-2.

c. Remove screws (2, Figure 2-20), washers (3), and fan guards (4) from both sides of generator set.

NOTE

If removing the generator only, proceed to step f.

d. Drain engine oil into suitable container.

If engine has been operating and coolant is hot, allow the engine to cool before you slowly loosen radiator filler cap and relieve pressure from the cooling system. Failure to observe this warning could result in severe personal injury.

e. Drain coolant into a suitable container.

f. Remove control box top panel, paragraph 2-16-1, para's d–f.

g. Remove top housing panel, paragraph 2-17-1, step c.

h. Tag and disconnect wires at terminal board TB3 (16, Figure 4-11) leading from generator.

i. Remove nuts (1, Figure 2-26), Iockwashers (2), washers (3), and bolts (4) securing load output terminal board assembly (13) to skid base.

j. Remove nut (5, Figure 2-9) and bolt (4) securing center door post (6) to skid base.

k. Remove bolts (7), nuts (8), Iockwashers (9), and washers (10) securing lower door sill (11) to skid base.

NOTE

If removing the generator only, proceed to step n.

l. Remove bolts (18, Figure 2-8), Iockwashers (19), washers (20), bolts (21), and nuts (22) securing air deflector panels (23), (24), and (25) to front housing (56).

NOTE

Fan shroud is in two pieces.

m. Remove bolts (13, Figure 2-20) and nuts (14) securing fan shroud (15).

n. Loosen two clamps (2, Figure 2-19) and remove hose (3) from air cleaner (7) and air intake manifold.

NOTE

If removing the generator only, proceed to step p.

o. Remove muffler, paragraph 2-65-1.

p. From right side of generator set, perform following removal procedures:

3-6-1. Removal. - Continued.

NOTE

Only the four pin connector-J5 should be disconnected.

(1) Disconnect four pin connector-J5 from under control box,

(2) Tag and disconnect electrical connections to magnetic pickup (7, Figure 2-25).

(3) Remove starter, refer to TM 9-2815-252-24.

(4) Tag and disconnect electrical connections to alternator (9, Figure 2-5).

(5) Tag and disconnect electrical connections to heater plugs, refer to TM 9-2815-252-24.

(6) If removing engine and generator, disconnect coolant drain hose (35, Figure 2-20) at engine block drain valve.

(7) Remove bolt (70, Figure 2-8), nut (71), lockwasher (72), washer (73), mounting plate (74), and grounding rods (75).

q. Remove bolts (80, Figure 2-6) and nuts (81) securing door sills (82) and (83) to center housing panel (62, Figure 2-9).

r. Remove bolts (20, Figure 2-9), lockwashers (21), and washers (22) securing rear side housing panels (23) and (24) to skid base.

s. Remove nuts (58), lockwashers (59), washers (60), and bolts (61) securing center housing panel (62) to skid base.

t. Remove bolts (12), nuts (13), lockwashers (14), and washers (15) securing lifting ring brackets (16) and lifting rings (17) to skid base (both sides).

u. From left side of generator set, perform following removal procedures:

(1) Tag and disconnect electrical leads to fuel shutoff solenoid (17, Figure 2-25).

(2) Tag and disconnect electrical leads from coolant temperature sender (4) and coolant high temperature switch (5).

(3) Remove nut (14), bolt (12), and clamp (15) from fuel shutoff solenoid bracket (16).

NOTE.

If removing the generator only, proceed to sub-step (6).

NOTE.

Tag radiator hoses to indicate what each end is connected to and which end is connected to the radiator. This will be an aid during installation.

(4) Loosen clamps (19, Figure 2-20) and (21). Tag and remove upper radiator hose (20) and lower radiator hose (22).

(5) Loosen clamp (3, Figure 2-23) and disconnect oil drain hose (4) from fitting (8).

(6) Disconnect frequency control cable (6, Figure 2-24) from mechanical governor.

(7) Remove fuel supply line (2, Figure 2-22). Cap open ends.

(8) Remove fuel supply hose (9) at fuel filter/water separator fitting (18) and cap end.

(9) Disconnect fuel filter/water separator drain hose (10) from fuel filter/water separator drain valve.

(10) Disconnect oil pressure line (3, Figure 2-25) from engine block fitting (24).

(11) Tag and disconnect electrical connections from low oil pressure switch (1) and oil pressure sender (2).

3-6-1. Removal. - Continued.

CAUTION

Wires running the length of the generator set on the left side have not been disconnected. Use care when lifting the rear generator set housing to avoid cutting or pulling these wires.

v. Using a suitable lifting device or an assistant, lift and rotate rear generator set housing assembly towards left side and front, clearing skid base.

NOTE

If removing the generator only, proceed to step x.

w. Disconnect and cap fuel return line at Number 2 injector, refer to TM 9-2815-252-24.

Rated capacity of overhead lifting device should be at least 1500 lbs (681 kg). Damage to the equipment and/or severe personal injury or death can occur if a lifting device with less capacity is used.

NOTE

If removing generator only, attach overhead lifting device to generator lifting point only.

x. Attach suitable overhead lifting device to lifting points engine and generator. Take up slack.

NOTE

If removing generator only, proceed to step z.

y Remove nuts (1, Figure 3-1), washers (2) and (4), and mounting bolts (3) from engine mounting points.

z. Remove nuts (5), washers (6) and (8) and mounting bolts (7) from generator mounting points.

NOTE

If engine and generator are to be removed as an assembly, perform steps aa and ab.

If removing only the generator, perform steps ac through af.

aa. Lift engine and generator assembly from skid base and move to appropriate maintenance area.

ab. Remove generator from engine; MEP-802A, refer to paragraph 4-11-1; MEP-812A, refer to paragraph 4-12-1 .

ac. Loosen nuts (1) at engine mounting points.

ad. Raise generator approximately 1 in. (2.54 cm) from generator mounting points.

ae. Support rear of engine with wooden shims.

af. Remove generator from engine; MEP-802A, refer to paragraph 4-11-1; MEP-812A, refer to paragraph 4-12-1.

ag. Remove generator snubbing washers (9, Figure 3-1) and shock mounts (10).

ah. Remove snubbing washers (11), nuts (12), lockwashers (13), washers (14) and (16), bolts (15), and engine shock mounts (17).

3-6-2. Installation.

a. Install engine shock mounts (17, Figure 3-1) with snubbing washers (11), nuts (12), Iockwashers (13), washers (14) and (16), and bolts (15).

b. Install generator shock mounts (10) and snubbing washers (9).

Rated capacity of overhead lifting device should be at least 1500 lbs (681 kg). Damage to the equipment and/or severe personal injury or death can occur if a lifting device with less capacity is used.

c. Install generator to engine; MEP–802A, refer to paragraph 4-11-4; MEP-812A, refer to paragraph 4-12-6.

NOTE

If only the generator was removed, attach overhead lifting device to generator lift points only.

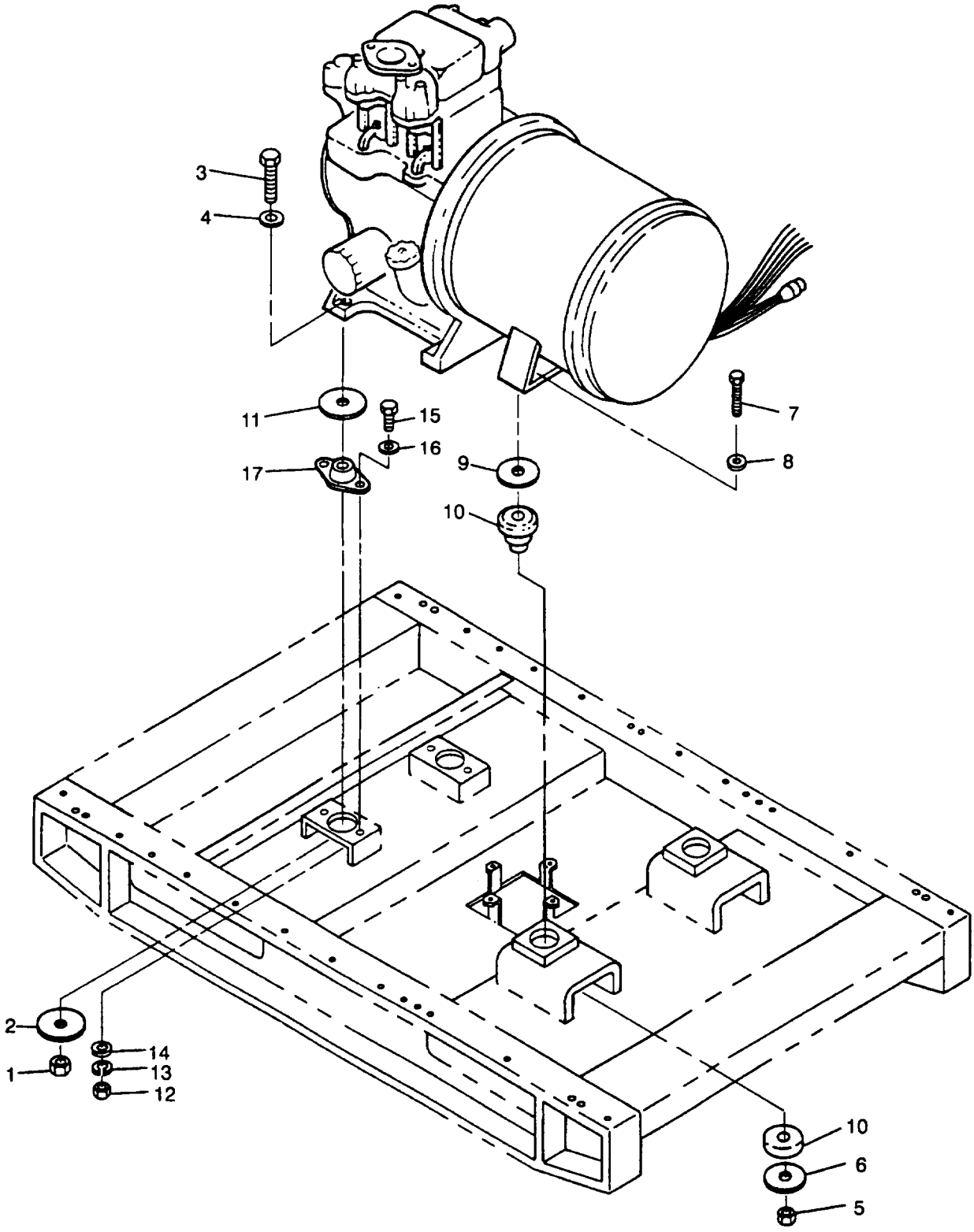


Figure 3-1. Engine and Generator Assembly Removal

3-6-2. Installation - Continued.

d. Attach a suitable lifting device to lifting points on engine and generator.

NOTE

If only the generator was removed, proceed to step g.

e. Lift engine and generator assembly, move and position assembly on skid base mating engine and generator mounting brackets with mounts on skid base.

f. Install nuts (1, Figure 3-1), washers (2) and (4), and mounting bolts (3) at engine mounts. Torque nuts (1) to 31 ft-lbs (42 Nm). Proceed to step i.

g. Lift generator and remove wooden shims used to support rear of engine.

h. Tighten nuts (1, Figure 3-1) at engine mounting points to 31 ft-lbs (42 Nm).

i. Install nuts (5), washers (6) and (8), and mounting bolts (7) at generator mounting points. Torque nuts (5) to 45 ft-lbs (61 Nm).

NOTE

If only the generator was removed, proceed to step k.

j. Remove cap and connect fuel return line at Number 2 injector, refer to TM 9-2815-252-24.

CAUTION

Wires running the length of the generator set on the left side have not been disconnected. Use care when lowering the rear generator set housing onto the skid base, to avoid cutting or pinching these wires.

k. Using a suitable lifting device or an assistant, lift and rotate rear generator set housing assembly to right and lower onto skid base.

l. From left side of generator set, perform following installation procedures:

(1) Connect electrical connections to low oil pressure switch (1, Figure 2-25) and oil pressure sender (2). Remove tags.

(2) Connect oil pressure line (3) to fitting (24) on engine block.

(3) Connect fuel filter/water separator drain hose (10, Figure 2-22) to fuel filter/water separator drain valve.

(4) Remove cap and install fuel supply hose (9) at fuel filter/water separator fitting (18).

(5) Remove caps and install fuel supply line (2).

(6) Connect frequency control cable (6, Figure 2-24) to mechanical governor.

NOTE

If only the generator was removed, proceed to sub-step (9).

(7) Connect oil drain hose (4, Figure 2-23) to fitting (8) and tighten clamp (3).

(8) Install upper radiator hose (20, Figure 2-20) and lower radiator hose (22) with clamps (19) and (21) as tagged during removal. Remove tags.

(9) Install nut (14, Figure 2-25), bolt (12), and clamp (15) to fuel shutoff solenoid bracket (16).

(10) Connect electrical leads to coolant temperature sender (4) and coolant high temperature switch (5). Remove tags.

(11) Connect electrical leads to fuel shutoff solenoid (17). Remove tags.

m. Install bolts (12, Figure 2-9), nuts (13), lockwashers (14), and washers (15) securing lifting ring brackets (16) and lifting rings (17) to skid base (both sides).

n. Install nuts (58), lockwashers (59), washers (60), and bolts (61) securing center housing panel (62) to skid base.

o. Install bolts (20), lockwashers (21), and washers (22) securing rear side housing panels (23) and (24) to skid base.

3-6-2. Installation - Continued.

p. Install bolts (80, Figure 2-8) and nuts (81) securing door sills (82) and (83) to center housing panel (62, Figure 2-9).

q. From right side of generator set, perform following installation procedures:

(1) Install bolt (70, Figure 2-8), nut (71), Iockwasher (72), washer (73), mounting plate (74), and grounding rods (75).

(2) Connect coolant drain hose (35, Figure 2-20) at engine block drain valve.

(3) Connect electrical connections to heater plugs, refer to TM 9-2815-252-24. Remove tags.

(4) Connect electrical connections to alternator (9, Figure 2-5). Remove tags.

(5) Install starter, refer to TM 9-2815-252-24.

(6) Connect electrical connections to magnetic pickup (7, Figure 2-25). Remove tags.

(7) Connect four pin connector-J5 under control box.

NOTE

If only the generator was removed, proceed to step s.

r. Install muffler, paragraph 2-65-3.

s. Install hose (3, Figure 2-19) between air cleaner (7) and air intake manifold. Tighten two damps (2).

NOTE

If only the generator was removed, proceed to step v.

NOTE

Fan shroud is in two pieces.

t. Install bolts (13, Figure 2-20), nuts (14), and fan shroud (15).

u. Install bolts (18, Figure 2-8), Iockwashers (19), washers (20), bolts (21), nuts (22), and air deflector panels (23), (24), and (25) to front housing (56).

v. Install bolts (7, Figure 2-9), nuts (8), Iockwashers (9), and washers (10) securing lower door sill (11) to skid base.

w. Install nut (5) and bolt (4) securing center door post (6) to skid base.

x. Install nuts (1, Figure 2-26), Iockwasher (2), washers (3), and bolts (4) securing load output terminal board assembly (13) to skid base.

y. Connect wires at terminal board TB3 (16, Figure 4-11) leading from generator. Remove tags.

z. Install top housing panel, paragraph 2-17-4.

aa. Install control box top panel, paragraph 2-16-4.

NOTE

If only the generator was removed, proceed to step ad.

ab. Service coolant system, paragraph 2-1-2-2.

ac. Service engine lubrication system, paragraph 2-1-2-4.

ad. Install screws (2, Figure 2-20), washers (3), and fan guards (4).

ae. Install batteries, paragraph 2-12-5.

NOTE

If only the generator was removed, proceed to step ag.

af. Prime and bleed engine fuel system, refer to TM 9-2815-252-24.

3-6-2. Installation - Continued.

ag. Start generator set and check for proper operation of all components.

3-7. ENGINE REPLACEMENT.

a. Remove engine and generator assembly from generator set, paragraph 3-6-1.

b. Remove generator from engine; MEP-802A, paragraph 4-11-1; MEP–812A, paragraph 4-12-1.

c. Drill existing lower alternator mounting hole on new engine to 0.510 in. (12.9 mm)

d. Drill a 0.21 in. (5.33 mm) hole in top web of oil filler cap of new engine.

e. Remove the following from the old engine and install on new engine:

(1) Fan belt, paragraph 2-75.

(2) Cooling fan, paragraph 2-74.

(3) Battery charging alternator, paragraph 2-1 4. Use hardware and supporl bracket from old engine.

(4) Fuel solenoid with oil cap chain, paragraph 2-95. Use hardware from old engine.

(5) Magnetic pickup, paragraph 2-94.

(6) Oil drain hose elbow (7, Figure 2-23) and fitting (8).

(7) Coolant high temperature switch, paragraph 2-93.

(8) Coolant temperature sender, paragraph 2-92.

(9) Engine block coolant drain valve (36, Figure 2-20) and bushing (37).

(10) Engine oil pressure line elbow (24, Figure 2-25).

(11) Starter mounting bolts.

f. Connect chain from fuel solenoid bracket to oil filler cap at hole drilled in step d.

g. Install generator on engine; MEP–802A, paragraph 4-11-4; MEP–812A, paragraph 4-12-6.

h. Install engine and generator assembly in generator set, paragraph 3-6-2.

i. Check and adjust fan belt as necessary, paragraph 2-75-4.

j. Check and adjust magnetic pickup as necessary, paragraph 2-94-4.

k. Check and adjust frequency droop as necessary, paragraph 4-7.

l. Start generator set, check for leaks, and proper operation.

CHAPTER 4

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section 1. MAINTENANCE OF DC ELECTRICAL SYSTEM

4-1. BATTERY CHARGING ALTERNATOR.

4-1-1. Disassembly.

a. Remove terminal nuts (1, Figure 4-7), washers (2), bolts (3), back cover (4), and gasket (5) from rear housing (19).

b. Remove nuts (6), strap (7), and brush assembly (8) from voltage regulator (10).

c. Remove bolts (9), insulating washers (11), and voltage regulator (10) from rear housing (19).

d. Remove nut (12) and straighten strap (13).

e. Remove bolts (14), tag and remove stator (21) leads from diode-trio (16).

f. Remove bolts (15), died-trio (16), and rectifier bridge (17) from rear housing (19).

g. Match mark front and rear housings, and remove thru-bolts (18).

CAUTION

Do not insert screwdriver blades deeper than 1/16 in. (1 .587 mm) to avoid damaging stator winding.

h. Insert two flat tip screw drivers in opposite openings between stator (21) and rear housing (19) and pry units apart, refer to Figure 4-1.

i. Remove rear housing (19, Figure 4-7) and stator (21) from front housing (29).

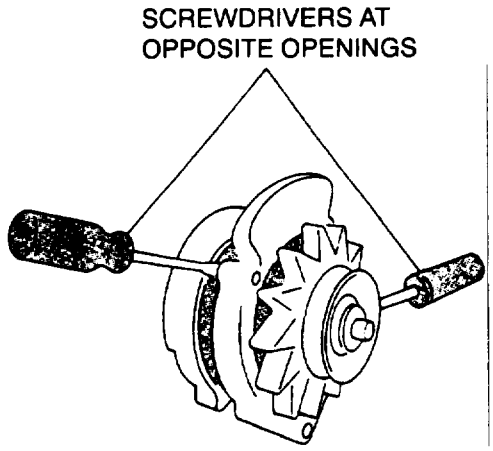


Figure 4-1. Housing Separation

j. Remove nut (22), lockwasher (23), pulley (24), fan (25), spacer (26), and woodruff key (27) from rotor assembly (28) shaft.

k. Using arbor press, remove rotor assembly (28) from front housing (29).

l. Remove bearing retaining screws (30) and press bearing (31) from front housing (29).

4-1-2. Inspection.

a. Inspect brushes for cracks, grooves on sides, being oil soaked, and that they are at least 3/16 in. (4.76 mm) long.

b. Inspect rear housing for cracked or broken casting, stripped threads, and severe wear of rear bearing bore.

c. Inspect fan for cracked or broken fins and for worn mounting hole.

d. Inspect front housing for cracked or broken casting, stripped threads, and bore in mounting foot for elongation.

e. Inspect other components for damage such as broken terminals or insulation, discoloration, stripped threads, and other obvious damage.

f. Replace damaged components as necessary.

4-1-3. Testing.

a. Set multimeter for ohms and check brush assembly (Figure 4-2) for continuity between mount A and brush B, and mount C and brush D. Check for open circuits between mount A and mount C, mount A and brush D, mount C and brush B, and brush B and brush D. Replace brush assembly if indications are other than stated.

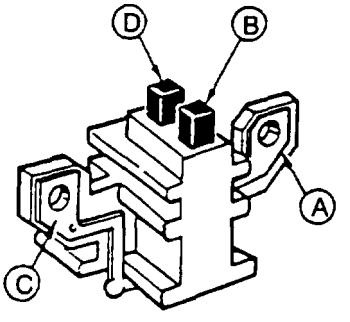


Figure 4-2. Brush Test

b. Set multimeter for ohms and check diode-trio assembly (Figure 4-3) by noting multimeter indications between D+ stud and each of stator terminals. Reverse multimeter leads, repeat checks and note indications. If readings are the same in both directions for any diode, replace entire diode-trio assembly. A good diode will show a high indication in one direction and a low indication in the other.

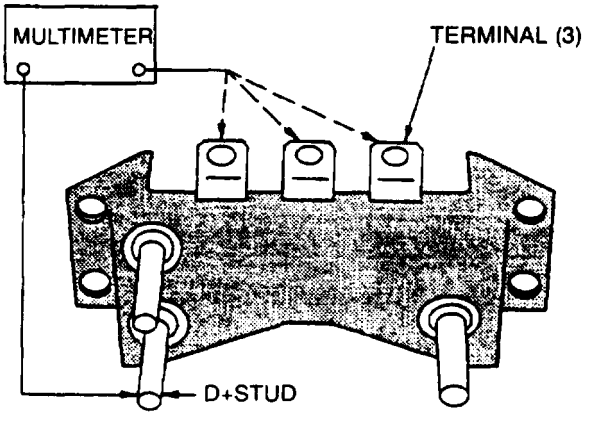


Figure 4-3. Diode-Trio Test

c. Set multimeter for ohms and check rectifier bridge assembly (Figure 4-4) by noting multimeter indications between point A and each point C, and between point B and each point C. Reverse leads, repeat checks and note indications. If readings are the same in both directions for any diode, replace entire rectifier bridge assembly. A good diode will have a high indication in one direction and a low indication in the other.

4-1-3. Testing - Continued.

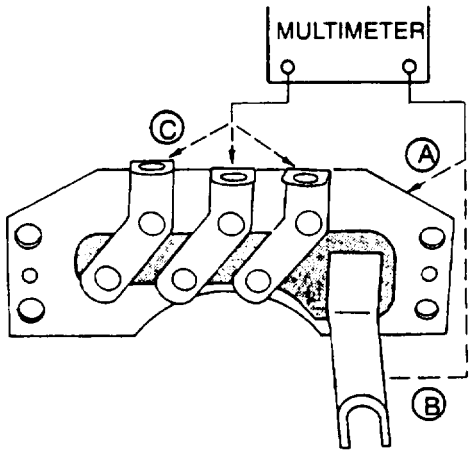


Figure 4-4. Rectifier Bridge Test

d. Set multimeter for ohms and check stator (Figure 4-5) for open circuits between point D (laminations) and each terminal A, B, and C. If continuity is noted between laminations and any terminal, stator is defective and must be replaced.

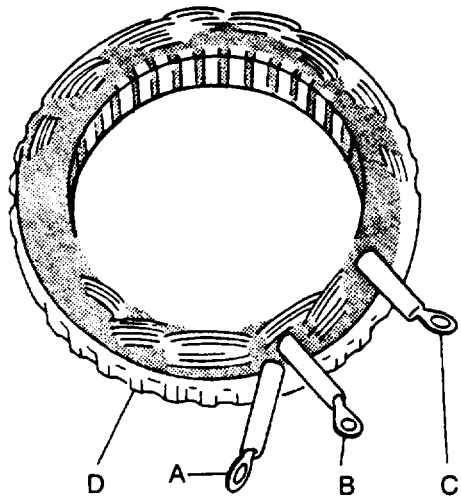


Figure 4-5. Stator Winding Test

NOTE

Place test leads on edges of slip rings to avoid creating arcs on brush contact surfaces.

e. Set multimeter for ohms and check rotor assembly (Figure 4-6) for 40.5 – 43.8 ohms indication between slip rings. Also check that open circuits are indicated between rotor body and each slip ring. Replace entire rotor assembly if indications are other than stated.

4-1-3. Testing - Continued.

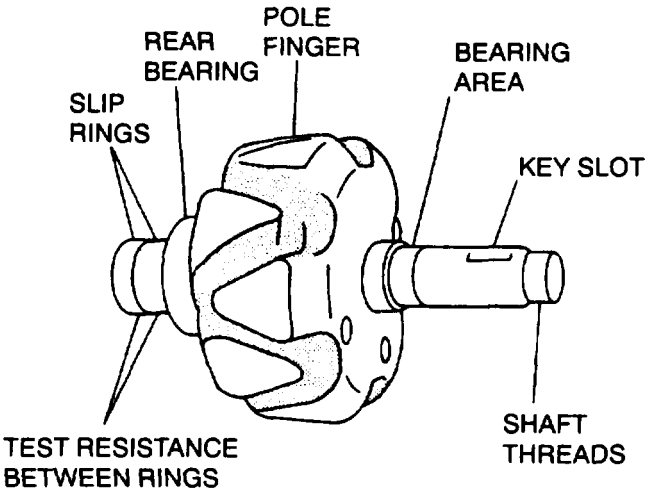


Figure 4-6. Rotor Test

4-1-4. Assembly.

a. Using press, install front bearing (31, Figure 4-7) in front housing (29).

b. Install front bearing retaining screws (30). Torque screws 25 to 35 in-lbs (2.8 to 3.9 Nm).

4-1-4. Assembly. - Continued.

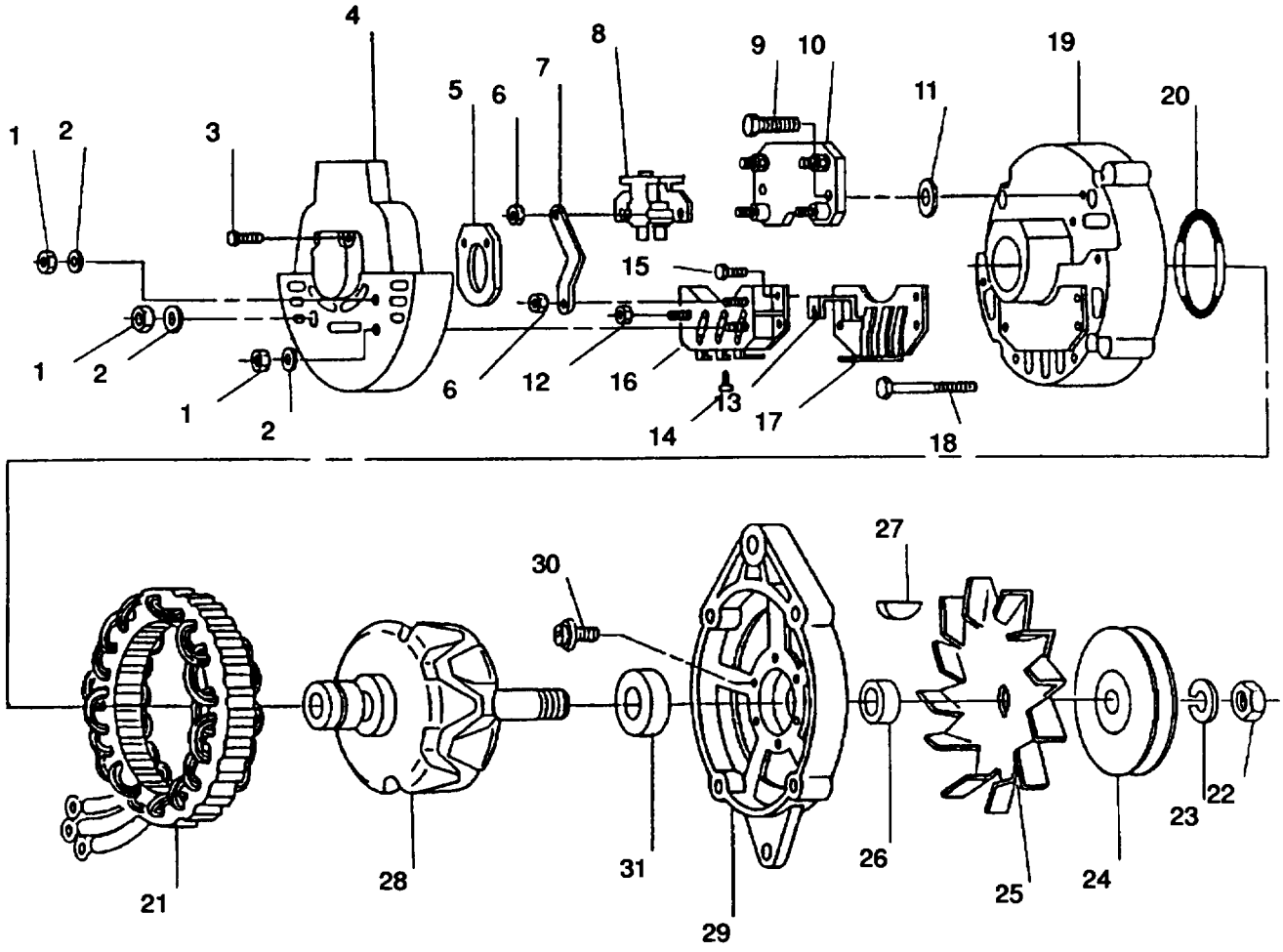


Figure 4-7. Alternator Assembly

4-1-4. Assembly. - Continued.

c. Using arbor press, press front housing (29) over rotor assembly (28) until inner bearing race contacts shoulder on shaft, refer to Figure 4-8.

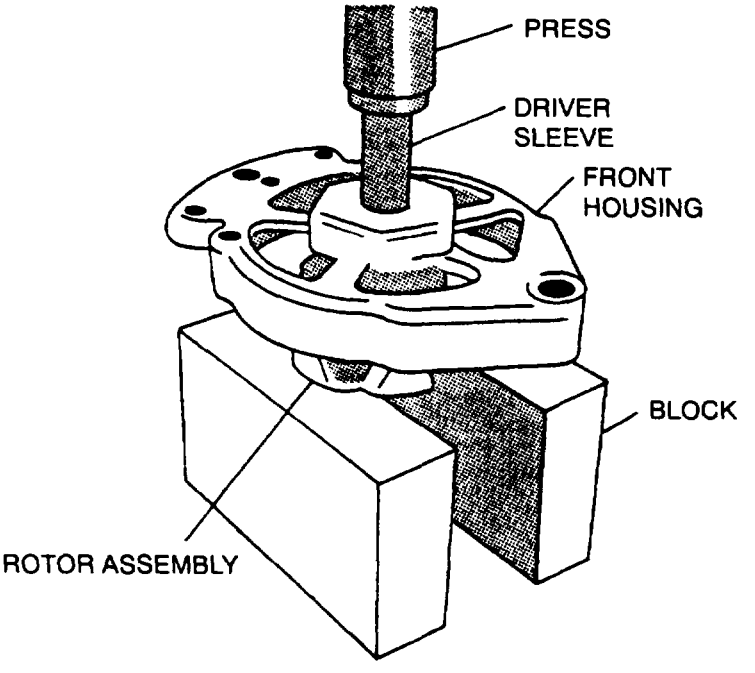


Figure 4-8. Assembling Front Housing to Rotor

d. Position pulley spacer (26, Figure 4-7), woodruff key (27), fan (25), and pulley (24) on rotor assembly (28) shaft.

e. Install lockwasher (23) and nut (22) on rotor assembly (28) shaft. Torque nut 35 to 50 ft-lbs (47 to 68 Nm).

f. Position stator (21) in front housing (29) with stator leads at top and notches in lamination aligned with bolt holes.

g. If removed, install retainer (20) in rear housing (19).

h. Position rear housing (19) over slip rings of rotor assembly (28) with front and rear housing bolt holes aligned, and stator leads extending through openings at top of rear housing (19).

i. Install thru–bolts (18) and tighten evenly. Torque bolts 50 to 60 in–lbs (5.6 to 6.8 Nm).

j. If necessary, remove thru-bolts (18) and rotate rear housing (19) and stator (21) to align housings as match marked on disassembly. Reinstall bolts and torque evenly 50 to 60 in–lbs (5.6 to 6.8 Nm).

k. Insert strap (13) of rectifier bridge (17) through slot in diode–trio (16) body. Bend strap (13) over B+ terminal and secure with cone nut (12).

l. Apply thin film of heat sink compound (Item 7, Appendix C) to back of rectifier bridge (17) and mating area of rear housing (19).

m. Install diode-trio (16) and rectifier bridge (17) on rear housing (19) with bolts (15) and connect stator leads with bolts (14). Remove tags.

n. Install voltage regulator (10) to rear housing (19) with insulating washers (11) and bolts (9).

o. Install brush assembly (8) and strap (7) with nuts (6).

p. Position felt gasket (5) in back cover (4) and install back cover on rear housing (19) with bolts (3).

4-1-4. Assembly. - Continued.

q. Install terminal washers (2) and terminal nuts (1).

r. Perform alternator performance test as follows:

(1) Mount alternator on test fixture capable of providing 5,000 alternator rpm.

CAUTION

Make sure connections are tight to avoid possible damage to instruments, alternator, or wiring due to short circuits.

(2) Set up test circuit as shown in Figure 4-9.

NOTE

Carbon pile and ammeter must be capable of handling the alternator rated output.

(3) Starting with carbon pile off, slowly increase load while observing ammeter and maintaining 5000 rpm. Increase load until an output voltage of 27.0 - 29.0 volts is achieved. Record the output current at this point. Acceptable minimum current is 16.2 amperes at 70° to 80°F (21 to 27°C).

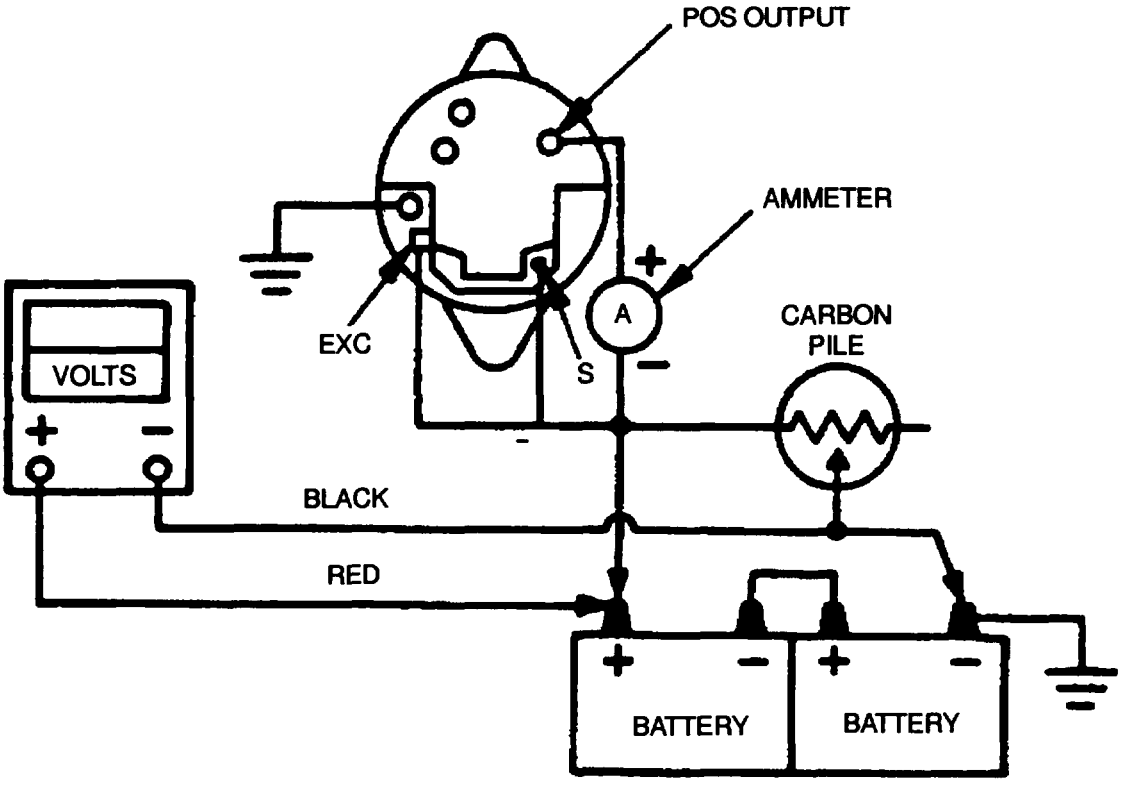


Figure 4-9. Performance Test Circuit

Section II. MAINTENANCE OF CONTROL BOX ASSEMBLY

4-2. CONTROL BOX HARNESS

4-2-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-16-1.

d. Open storage box access door and disconnect three electrical connectors at bottom of control box.

e. Remove crank disconnect switch, paragraph 2-32-3.

f. Remove relays, paragraph 2-33-3.

g. Remove screws (1, Figure 4-10), washers (2), insulators (3), clips (4), and sockets (5) from track (20).

h. Remove screws (6) and nuts (7) to free terminal board (8).

i. Remove screws (9), nuts (10), and cap (11) to free diagnostic connector (12).

j. Tag and disconnect electrical leads at AC voltage regulator (21, Figure 2-11), shunt (27), BATTERY CHARGER FUSE assembly (17), DC CONTROL POWER circuit breaker (19), overvoltage relay (30), frequency transducer (24), short circuit/overload relay (33), resistor-diode assembly (39), CONVENIENCE RECEPTACLE (5) and GROUND FAULT CIRCUIT INTERRUPTER (8).

k. Disconnect electrical connector (13, Figure 4-10) to malfunction indicator (12, Figure 2-11) panel.

l. Tag and disconnect electrical leads to all indicators, switches, and lights on control panel.

m. Remove screws (14, Figure 4-10) and nuts (15) to free harness connectors (16), (17), and (18).

n. Remove harness assembly (19) from control box.

4-2-2. Inspection.

a. Inspect control box harness wiring for breaks, damaged insulation, and loose or damaged terminals.

b. Inspect harness connectors, sockets, and terminal board for cracks, corrosion, stripped threads, broken pins, and other visible damage.

4-2-3. Testing. Using Wiring Diagram FO–2 as a guide, check all wires for continuity with multimeter.

4-2-4. Repair.

a. Replace damaged cable assemblies, terminals, connectors, sockets, or terminal board.

b. Replace or ensure proper connection of all wires not indicating continuity.

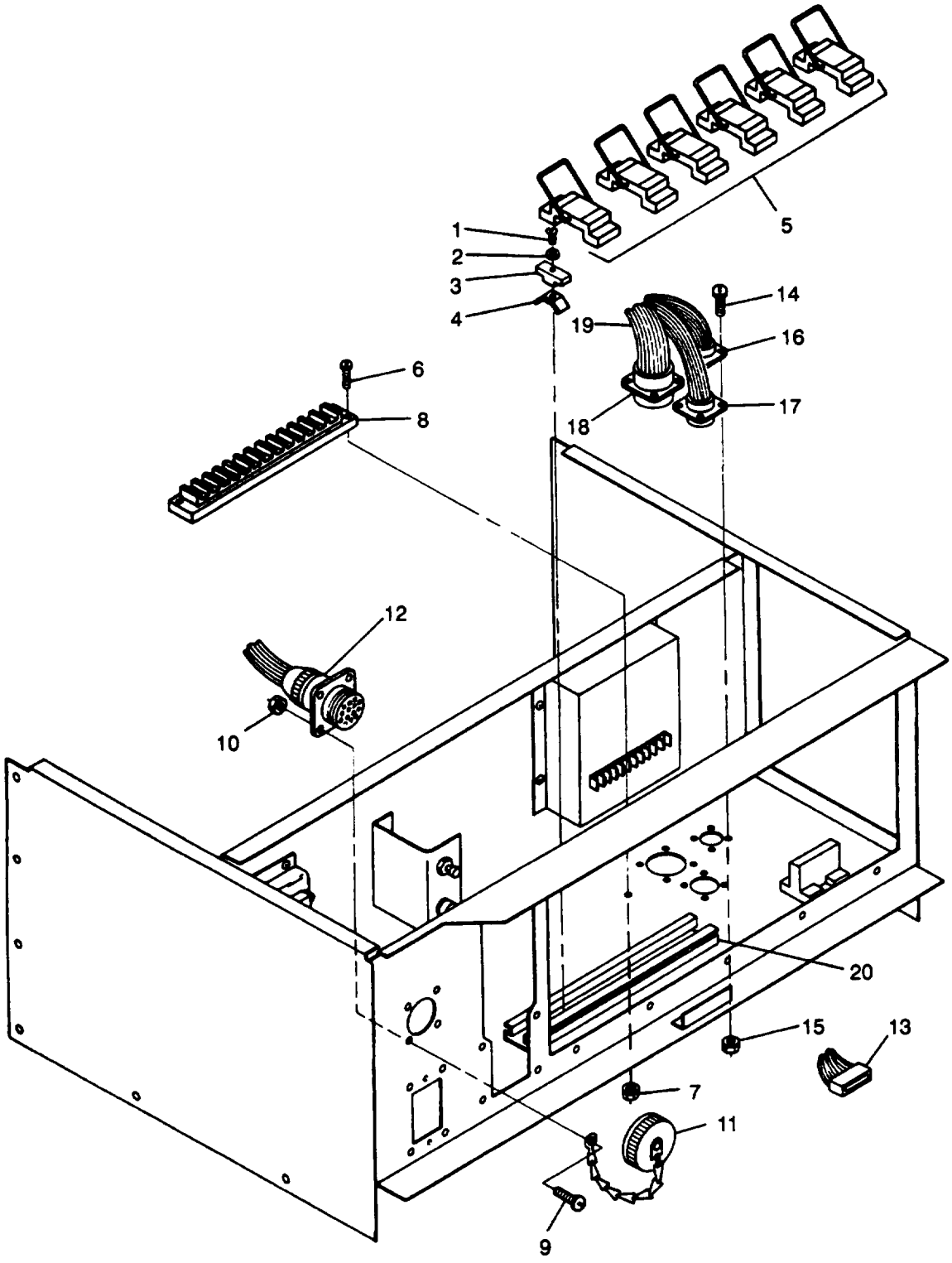


Figure 4-10. Control Box Harness

4-2-5. Installation.

a. Position control box wiring harness assembly (19, Figure 4-10) in control box.

b. Secure harness connectors (16), (17), and (18) to control box with screws (14) and nuts (15).

c. Connect all electrical leads to control panel indicators, switches, and lights as tagged on removal, Remove tags.

d. Connect electrical connector (13) to malfunction indicator panel (12, Figure 2–11).

e. Install diagnostic connector (12, Figure 4-10) and cap (11) with screws (9) and nuts (10).

f. Connect electrical leads, as tagged on removal, to GROUND FAULT CIRCUIT INTERRUPTER (8, Figure 2-11), CONVENIENCE RECEPTACLE (5), resistor-diode assembly (39), short circuit/overload relay (33), frequency transducer (24), over-voltage relay (30), DC CONTROL POWER circuit breaker (19), BATTERY CHARGER FUSE assembly (17), shunt (27), and AC voltage regulator (21). Remove tags.

g. Secure terminal board (8, Figure 4-10) to control box with screws (6) and nuts (7).

h. Position sockets (5) on track (20) as tagged on removal.

i. Secure sockets (5) with clips (4), insulators (3), washers (2), screws (1), and remove tags.

j. Install relays, paragraph 2-33-4.

k. Install crank disconnect switch, paragraph 2-32-4.

l. Connect three electrical connectors at bottom of control box and close access door.

m. Install control box top panel, paragraph 2–16-4.

n. Connect negative battery cable and close access door.

Section III. MAINTENANCE OF OUTPUT BOX ASSEMBLY

4-3. OUTPUT BOX ASSEMBLY.

4-3-1. Removal.

a. Open left side engine access door and disconnect negative battery cable.

b. Remove control box assembly, paragraph 2–21–2.

c. Remove front housing panel, paragraph 2–18–1.

d. Tag and disconnect electrical leads from fuel float module (20, Figure 2–21), fuel level sender (4), and auxiliary fuel pump (54).

e. Open right side engine access door, tag and disconnect electrical leads from heater plugs, refer to TM 9-2815-252-24.

f. Remove clamps (6, Figure 2–19), clamp (2), and air cleaner assembly.

g. Tag and disconnect electrical leads from starter (including ground wires at mounting bolt), starter solenoid, battery charging alternator (9, Figure 2–5), and magnetic pickup (7, Figure 2–25).

h. Remove left fan guard, paragraph 2–70–1.

NOTE

Remove DEAD CRANK switch from mounting bracket to disconnect electrical leads.

i. On left side of engine, tag and disconnect electrical leads from fuel transfer pump (6, Figure 2–22), coolant high temperature switch (5, Figure 2–25), coolant temperature sender (4), fuel solenoid (17), low oil pressure switch (1), oil pressure sender (2), and DEAD CRANK switch (22),

j. Remove bolt (12, Figure 2-25), nut (14), and clamps (15) and (23).

k. Tag and disconnect electrical leads from terminals A2, B2, and C2 of AC circuit interrupter relay (4, Figure 2–16).

4-3-1. Removal. - Continued.

l. Tag and disconnect electrical lead from terminal LO of voltage reconnection switch (14).

m. Tag and disconnect ground wire 100E from terminal GND of load output terminal board (13, Figure 2–26).

n. Remove fuel filter/water separator, paragraph 2-86-2.

0. Tag and disconnect main generator leads from terminal board (16, Figure 4–11).

p. Remove bolts (1) and (3), nuts (2) and (6), washer (4), spacer (5), and output box assembly from generator set. The assembly includes the output box tray (11), and side panels (9) and (10).

q. Remove bolts (7), nuts (8), and side panels (9) and (10) from output box tray.

4-3-2. Installation.

a. Install side panels (9 and 10, Figure 4–11) on output box tray (11) with bolts (7) and nuts (8).

b. Install output box assembly on generator set with bolts (1) and (3), washer (4), spacer (5), and nuts (2) and (6).

c. Connect main generator electrical leads to terminal board (16) as tagged and remove tags.

d. Connect electrical leads as tagged to terminals A2, B2, and C2 of AC circuit interrupter relay (4, Figure 2-16) and remove tags.

e. Connect electrical lead to terminal LO of voltage reconnection switch (14) and remove tag.

f. Connect output/engine harness wire 10OE to terminal GND of load output terminal board (13, Figure 2–26) and remove tag.

g. On left side of engine, connect electrical leads as tagged to DEAD CRANK switch (22, Figure 2–25), oil pressure sender (2), low oil pressure switch (1), coolant temperature sender (4), fuel solenoid (17), coolant high temperature switch (5), and fuel transfer pump (6, Figure 2–22). Remove tags.

h. Install clamps (15 and 23, Figure 2-25), bolt (12), and nut (14).

i. Route electrical leads through front air deflector panel (62, Figure 2–8) and connect electrical leads as tagged to auxiliary fuel pump (54, Figure 2–21), fuel level sender (4), and fuel float module (20). Remove tags.

j. Install left fan guard, paragraph 2-70–5.

k. On right side of engine, connect electrical leads as tagged to magnetic pickup (7, Figure 2–25), battery charging alternator (9, Figure 2–5), starter solenoid, starter motor, and engine heater plugs, refer to TM 9–281 5–252–24. Remove tags.

l. Install front housing panel, paragraph 2–18–4.

m Install fuel filter/water separator assembly, paragraph 2–86-4.

n. Install air cleaner assembly with clamps (6, Figure 2-19) and clamp (2).

o. Install control box assembly, paragraph 2–21–4.

p. Connect negative battery cable and close all access doors.

4-4. OUTPUT BOX/ENGINE HARNESS.

4-4-1. Testing. Set multimeter for ohms and test individual wires for continuity. Refer to Wiring Diagram FO-2 for wire identification.

4-4-2. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box assembly, paragraph 2-21–2.

d. Remove front housing panel, paragraph 2-18-1, tag and disconnect electrical leads to fuel float module (20, Figure 2-21), fuel level sender (4), and auxiliary fuel pump (54).

e. Open right side engine access door, tag and disconnect electrical leads from engine heater plugs, refer to TM 9–281 5–252–24, starter motor (including ground wires at mounting bolt), starter solenoid, battery charging alternator (9, Figure 2–5), and magnetic pickup (7, Figure 2–25).

f. Remove left fan guard, paragraph 2–70–1.

g. On left side of engine, tag and disconnect electrical leads from fuel transfer pump (6, Figure 2–22), coolant high temperature switch (5, Figure 2–25), fuel solenoid (17), coolant temperature sender (4), low oil pressure switch (1), oil pressure sender (2), and DEAD CRANK switch (22).

h. Remove bolt (12, Figure 2–25), nut (14), and clamps (15) and (23).

i. Tag and disconnect electrical leads to AC circuit interrupter relay (4, Figure 2–16).

j. Tag and disconnect electrical leads to voltage reconnection switch (14).

k. Tag and disconnect electrical leads to pre-heat relay (8).

l. Tag and disconnect electrical leads to cranking relay (6).

m. Open load terminal access door, tag and disconnect wire 100E from terminal GND of load output terminal board (13, Figure 2-26).

n. Tag and disconnect main generator leads from rear side of terminal board (16, Figure 4–11).

CAUTION

When removing assembly, use extreme care not to drop attaching hardware down onto generator unit. Serious damage to equipment could result.

o. Remove screws (12) and nuts (13) securing terminal board (14) to output box assembly.

p. Remove screws (15) securing terminal board (16) to output box assembly.

q. Remove screws (17), washers (18), nuts (19), current transformer (20), and output box/engine harness (21) from output box assembly and generator set.

4-4-3. Inspection.

a. Inspect wiring harness for burned, bent, corroded, and broken terminals.

b. Inspect connectors for cracks, corrosion, stripped threads, bent or broken pins, and obvious damage.

c. Inspect wire insulation for burns, deterioration, and chafing.

4-4-4. Repair.

a. Replace damaged terminals and connectors.

b. Replace wires with damaged insulation and those that do not indicate continuity.

4-4-5. Installation.

a. Position output box/engine harness (21, Figure 4–11) in output box assembly and generator set.

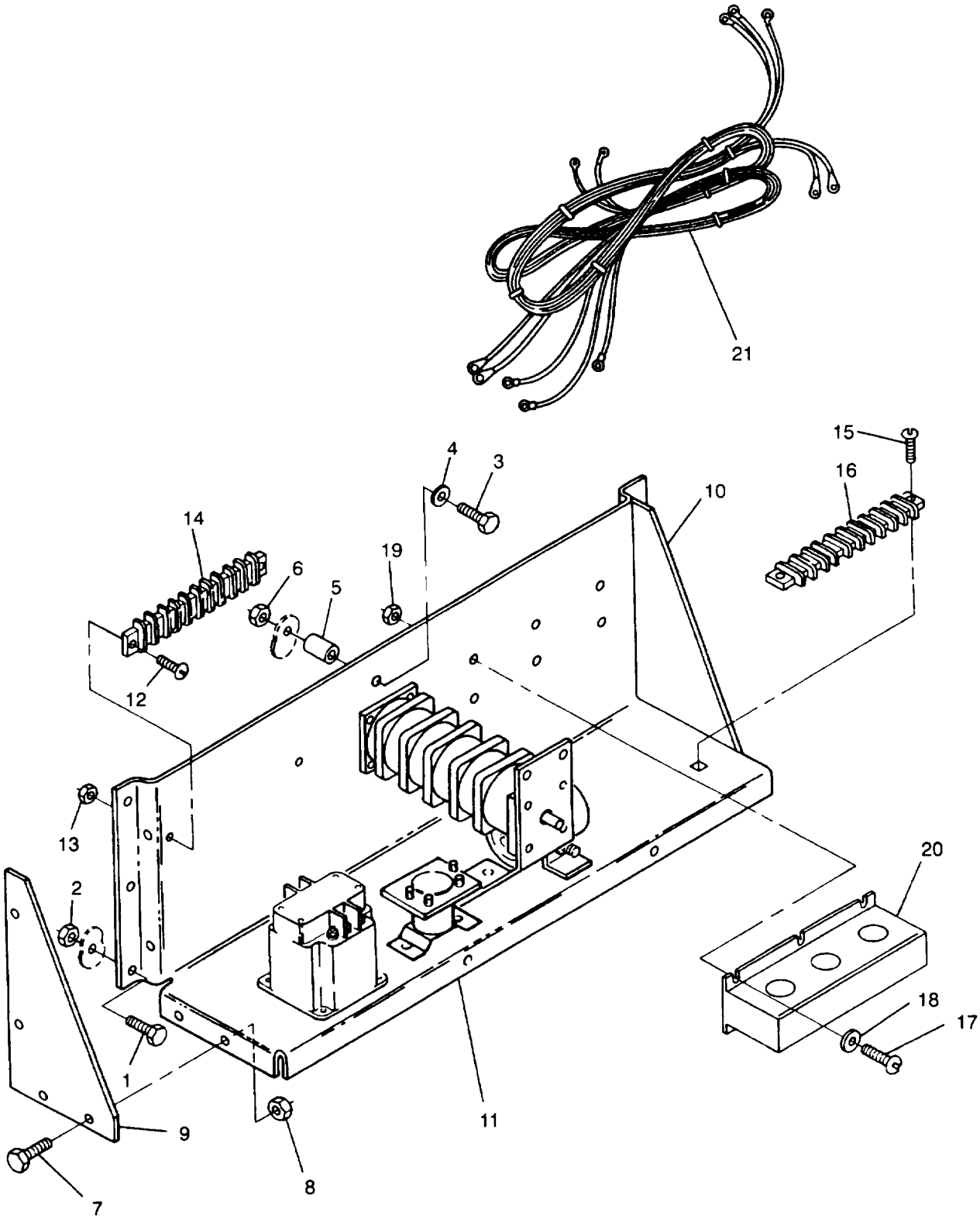


Figure 4-11. Output Box Assembly

b. Install current transformer (20) with screws (17), washers (18), and nuts (19).

c. Install terminal board (16) with screws (15).

CAUTION

When installing assembly, use extreme care not to drop attaching hardware down onto generator unit. Serious damage to equipment could result.

d. Install terminal board (14) with screws (12) and nuts (13).

e. Connect main generator leads to rear side of terminal board (16) as tagged and remove tags.

f. Connect electrical leads as tagged to pre–heat relay (8, Figure 2–16), cranking relay (6), voltage reconnection switch (14), and AC circuit interrupter relay (4). Remove tags.

g. Connect wire 100E to GND terminal of load output terminal board (13, Figure 2–26) and remove tag.

h. On left side of engine, connect electrical leads as tagged to DEAD CRANK switch (22, Figure 2–25), oil pressure sender (2), low oil pressure switch (1), coolant temperature sender (4), fuel solenoid (17), coolant high temperature switch (5), and fuel transfer pump (6, Figure 2–22). Remove tags.

i. Route electrical leads through front air deflector panel (62, Figure 2-8) and connect electrical leads as tagged to auxiliary fuel pump (54, Figure 2–21), fuel level sender (4), and fuel float module (20). Remove tags.

j. Install clamps (15 and 23, Figure 2-25), bolt (12), and nut (14).

k. Install left fan guard, paragraph 2–70–5.

l. On right side of engine, connect electrical leads as tagged to magnetic pickup (7, Figure 2–25), battery charging alternator (9, Figure 2–5), starter solenoid, starter motor, and engine heater plugs, refer to TM 9-2815–252-24. Remove tags.

m. Install front housing panel, paragraph 2-1 8–4.

n. Install control box assembly, paragraph 2–21–4.

o. Connect negative battery cable and close all access doors.

4-5. CURRENT TRANSFORMER.

NOTE

Current transformer is a component of output box/engine harness assembly, but can be removed and tested separately as follows.

4-5-1. Removal.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box assembly, paragraph 2-21–2.

d. Tag and disconnect current transformer (20, Figure 4–11) electrical leads form secondary terminals.

e. Tag and disconnect main power cables from front side of terminal board (16).

CAUTION

When removing current transformer, use extreme care not to drop attaching hardware onto generator unit. Serious damage to equipment could result.

NOTE

Tag, count, and note number of wraps and location of main power cables on current transformer.

f. Unwrap main power cables from current transformer (20).

g. Remove screws (17), washers (18), nuts (19), and current transformer (20).

4-5-2. Testing.

a. Remove current transformer, paragraph 4-5-1.

b. Set multimeter for ohms and check for continuity between secondary terminals A1 and A2, B1 and B2, and C1 and C2.

c. If continuity is present, continue with test. If continuity is not present, current transformer is defective and must be replaced.

d. Set up a test circuit using 10 gauge wire as shown in Figure 4-12. Make ten passes with wire through phase A window.

e. Turn on power source and load bank. Adjust load bank until 18.4 amps is indicated on ammeter.

f. Set multimeter for amperes, and connect to secondary terminals A1 and A2. Multimeter indication must be 0.9 to 1.1 amps.

g. Repeat steps d, e, and f using phase window B and secondary terminals B1 and B2.

h. Repeat steps d, e, and f using phase C window and secondary terminals C1 and C2.

i. Replace current transformer if multimeter indication in any phase is other than stated in step f.

j. Install current transformer, paragraph 4–5–3.

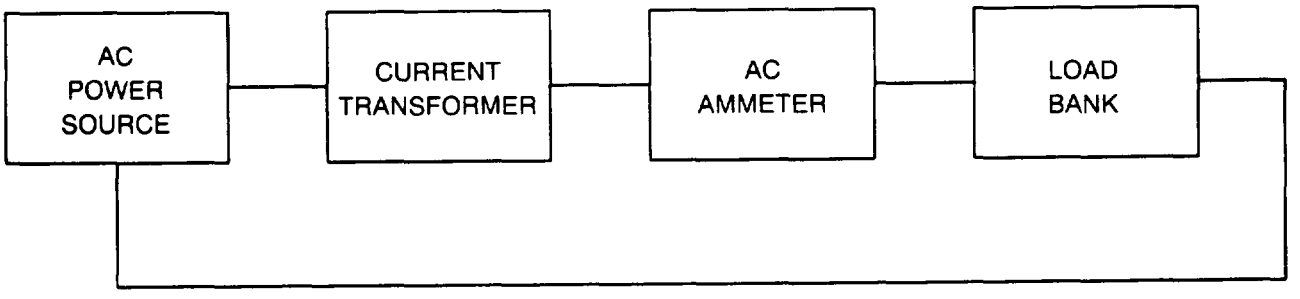


Figure 4-12. Testing Current Transformer

CAUTION

When installing current transformer use extreme care not to drop attaching hardware onto generator unit. Serious damage to equipment could result.

4-5-3. Installation.

a. Install current transformer (20, Figure 4–11) with screws (17), washers (18), and nuts (19).

b. Wrap main power cables around current transformer (20) as noted on removal.

c. Connect *main* power cables to front side of terminal board (16) and remove tags.

d. Connect electrical leads to current transformer (20) secondary terminals and remove tags.

e. Install control box assembly, paragraph 2-21–4.

f. Connect negative battery cable. Close left side engine access door.

Section IV. MAINTENANCE OF COOLANT SYSTEM

4-6. RADIATOR REPAIR.

Repair radiator in accordance with TM 750-254.

Section V. MAINTENANCE OF ENGINE ACCESSORIES

4-7. ADJUSTING FREQUENCY DROOP AT ENGINE GOVERNOR.

NOTE

Frequency droop should be checked whenever maintenance has been performed on the engine governor, or the engine assembly has been replaced. Adjust frequency droop as follows if droop does not meet the performance characteristics listed in Table 1-2.

a. Shut down generator set.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove left side fan guard, paragraph 2–70–1.

d. Remove plug (1, Figure 4-13) from engine governor housing (3).

NOTE

Do not turn adjustment screw more than one turn at a time.

e. Using a 5 mm hex key, at least 5 in. long, adjust screw (2) clockwise to decrease the amount of droop.

f. Install plug (1), connect negative battery cable and close left side engine access door.

g. Start generator set and check frequency droop.

h. Shut down generator set.

i. Repeat procedures until frequency droop meets performance characteristics listed in Table 1–2.

j. Open left side engine access door, install left fan guard, paragraph 2–70–5, and close left side engine access door.

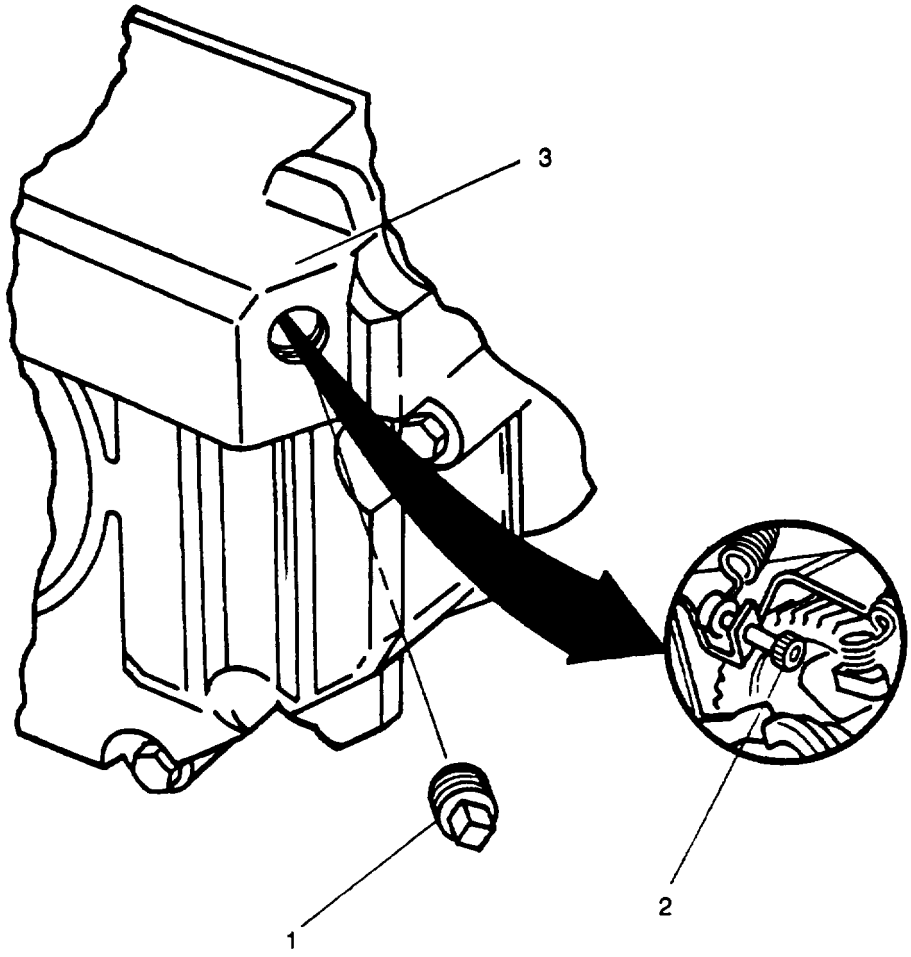


Figure 4-13. Frequency Droop Adjustment

Section VI. MAINTENANCE OF SKID BASE

4-8. SKID BASE

4-8-1. Removal.

a. Remove batteries, paragraph 2–21–2.

b. Remove generator set front housing section, paragraph 2-19-1.

c. Remove generator set rear housing section, paragraph 2–20–1.

d. Remove fuel tank, paragraph 2-83-1.

e. Remove engine and generator, paragraph 3-6-1.

f. Remove clip halves (1, Figure 4–14) and insulation (2) from plate (5).

g. Remove nuts (3), bolts (4), and plate (5) from skid base (6).

4-8-2. Inspection. Inspect skid base for cracks, broken welds, corrosion, or other obvious damage.

4-8-3. Repair. Repair of skid base is limited to corrosion control and spot welding minor cracks. More serious requires replacement of skid base.

4-8-4. Installation.

a. Install insulation (2, Figure 4-14) on plate (5) with clip halves (1).

b. Install plate (5) to skid base (6) with bolts (4) and nuts (3).

c. Install engine and generator, paragraph 3–6–2.

d. Install fuel tank, paragraph 2-83-3.

e. Install generator set rear housing section, paragraph 2–20-4.

f. Install generator set front housing section, paragraph 2-19-4.

g. Install batteries, paragraph 2-12–5.

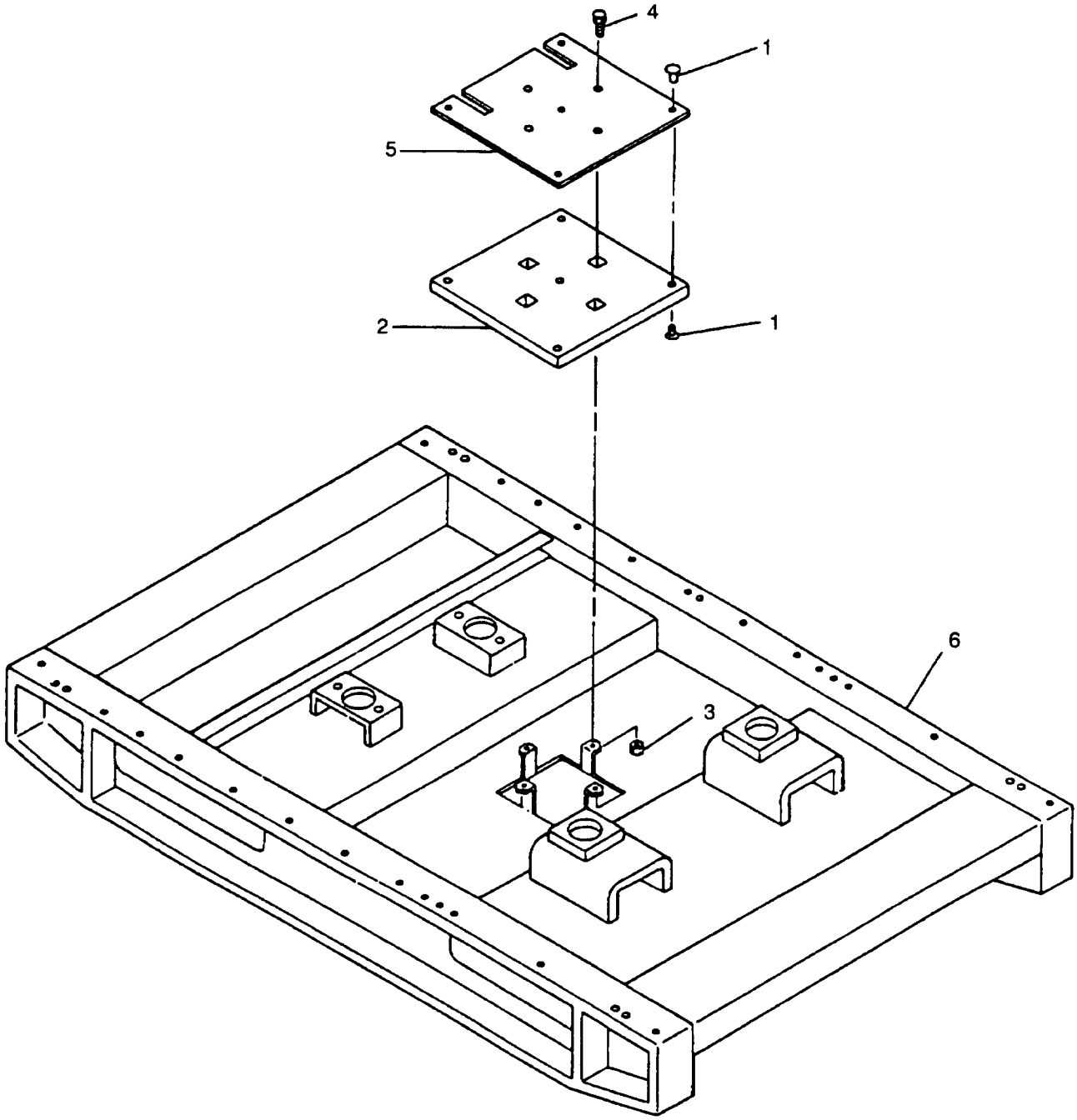


Figure 4-14. Skid Base

Section VII. MAINTENANCE OF GENERATOR ASSEMBLY

4-9. TECHNICAL DESCRIPTION.

4-9-1. General. The generator is a four–pole, revolving field, brushless exciter, reconnectable model of drip–proof construction. The generator rotor is mounted on a center rotor shaft which is supported in the rear by a single ball bearing mounted in the end bell. The forward end of the rotor shaft is connected to the engine by means of a flywheel and drive plate. The brushless exciter stator mounts to the end bell while the exciter rotor and rotating rectifier assembly mount on the generator rotor shaft,

The generator has four wires extending from the stator housing in addition to the AC output leads (Figure 4-15). Lead F1 + and F2– are from the exciter field winding and are connected to the output terminals of the voltage regulator. Leads Q1 and Q2 are connected to the stator windings and provide reference voltage and input power to the AC voltage regulator.

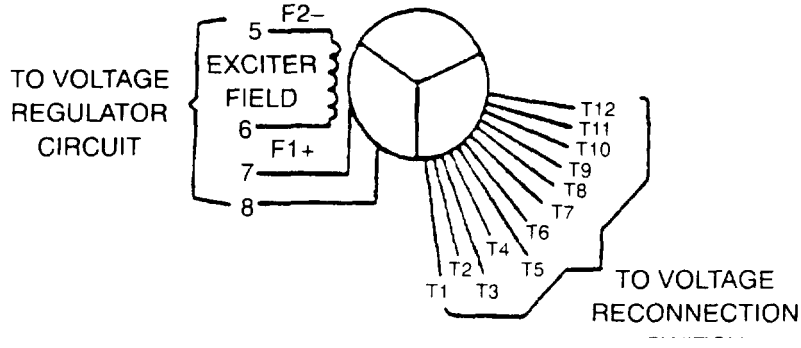


Figure 4-15. Generator Schematic

4-9-2. Operation. Operation of the generator involves the stator, AC voltage regulator, exciter rotor, exciter stator, a full wave bridge rectifier, and the generator rotor, Figure 4–16. The generator set field flash circuit, activated during the engine starting process, begins the voltage build–up process. Single–phase AC voltage, taken from one of the stator windings, is fed to the AC voltage regulator as a reference for maintaining the generator output voltage, AC voltage is converted to DC in the AC voltage regulator and fed into the exciter rotor windings. The exciter stator produces three–phase AC voltage that is converted to DC by the rotating rectifier assembly. The resultant DC voltage excites the generator rotor winding to produce the stator output voltage for the AC load.

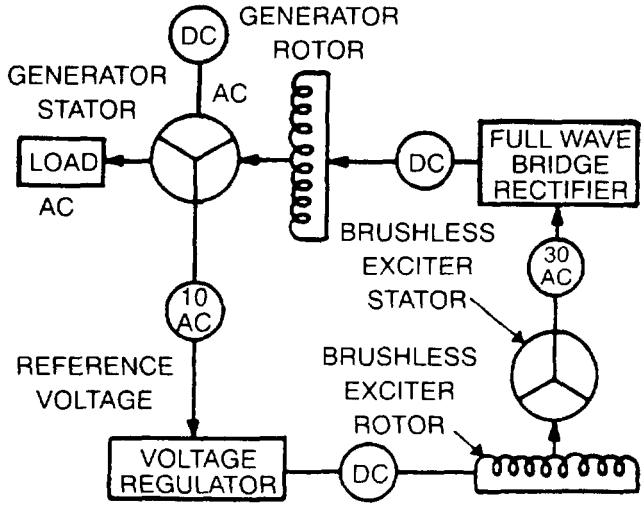


Figure 4-16. Excitation Block Diagram

4-10. ADJUSTMENTS AND TESTS.

4-10-1. General. All of the following adjustments and tests can be performed without disassembly of the generator. They should be used for testing generator and regulator components to ensure proper operation.

4-10-2. Residual Magnetism. Residual magnetism is automatically maintained in the generator exciter field poles by the generator set electrical control system. Therefore, there will be no requirement to restore the residual magnetism.

Table 4-1. GENERATOR RESISTANCE VALUES AT 25°C (77°F)

Component	Resistance	
	MEP–802A	MEP-812A
Exciter Stator Leads	10.54 to 14.26 ohms	10.5 to 14.206 ohms
Exciter Rotor Leads	0.4926 to 0.6664 ohms	0.4889 to 0.6613 ohms
Generator Rotor Leads	2.46 to 3.33 ohms	1.553 to 2.101 ohms
Generator Stator Leads	0.3731 to 0.5047 ohms	0.1494 to 0.2022 ohms
Q, and Q_2 Leads	0.9053 to 1.224 ohms	1.207 to 1.633 ohms

NOTE

Ambient temperature must be expressed in ‘C, To convert °C to °F use: °F = °C X 9 + 5+32

(1) To determine the resistance values at current ambient temperature, use the following formula:

$R_t = R_{25}[1 + 0.00385 (T-25)]$

R_t = Unknown resistance

R_{25} = Known resistance at 25°C (77°F)

T = Current ambient temperature

(2) Example for exciter stator leads at 5°C (41°F):

$R_t = 12.4 [1 + 0.00385 (5-25]]$

$R_t = 12.4 [1 + 0.00385 (-20)]$

$R_t = 12.4 [1 + (–0.077)]$

$R_t = 12.4 [0.923]$

$R_t = 11.4$ +/– 15% ohms

4-10-3. Testing Rotating Rectifiers. Two rectifier assemblies (Fl + and F2–) make up the rotating rectifier bridge assembly (Figure 4–1 7). Set multimeter for ohms and test each CR using negative and positive polarities. Test rectifiers as follows:

a. Shut down generator set. Allow generator to cool to ambient temperature.

b. Open left side engine access door and disconnect negative battery cable.

c. Open storage box access door and output terminal board access door.

d. Remove end bell cover from generator, paragraph 4–11–1, step e (MEP-802A) or paragraph 4–12–2 step h (MEP-812A).

NOTE

The following steps will require turning the generator by hand. Use engine fan to turn engine and generator.

e. Tag and disconnect four leads from F1 + assembly

f. Connect positive lead of multimeter to F1 + stud and negative lead to CR1. Record resistance value.

4-1o-3. Testing Rotating Rectifiers. - Continued.

g. Connect negative lead of multimeter to F1 + stud and positive lead to CR1. Record resistance value.

h. Repeat steps f and g for CR2 and CR3.

i. Resistanc readings should be high in step f and low in step g. If any reading is high or low in both steps, rectifier assembly is defective and must be replaced.

j. Connect all leads to F1 + assembly and tighten nuts to 24 in–lbs (2.7 Nm). Remove tags.

k. Tag and disconnect four leads from F2– assembly.

i. Connect negative lead of multimeter to F2- stud and positive lead to CR4. Record resistance value.

m. Connect positive lead of multimeter to F2– stud and negative lead to CR4. Record resistance value.

n. Repeat step 1 and m for CR5 and CR6.

o. Resistance readings should be low in step I and high in step m. If any reading is high or low in both tests, rectifier assembly is defective and must be replaced.

p. Reconnect all leads to F2– assembly and tighten nuts to 24 in–lbs (2.7 Nm). Remove tags.

q. Install end bell cover on generator, paragraph 4–11-4, step n (MEP-802A) or paragraph 4–12–5, step g (MEP-812A).

r. Connect negative battery cable and close access doors.

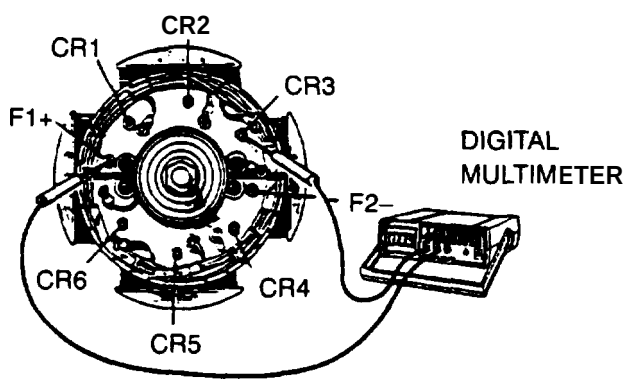


Figure 4-17. Testing Rotating Rectifiers

4-10-4. Testing Brushless Exciter Stator. Using multimeter, set for ohms, test the brushless exciter stator (Figure 4-18) for open or shorted windings and grounds as follows:

NOTE

Tests are performed with component installed.

a. Shut down generator set. Allow generator to cool to ambient temperature,

b. Open left side engine access door and disconnect negative battery cable.

c. Open storage box and output terminal board access doors.

d. Remove end bell cover from generator, paragraph 4-1 1–1, step e (M EP–802A) or paragraph 4-1 2–2, step h (MEP-812A).

e. Disconnect F1 + and F2– exciter stator leads from terminal block (13, Figure 4–24) or (35, Figure 4-25) in generator end bell. Set multimeter for ohms and connect between disconnected leads, The resistance between leads should be as shown in Table 4-1.

f. Readings other than shown in Table 4–1 indicates open or shorted windings and exciter stator must be replaced.

g. Connect multimeter between each exciter stator field lead and exciter stator lamination. Multimeter reading of less than infinity indicates defective ground insulation and exciter stator must be replaced.

4-10-4. Testing Brushless Exciter Stator. - Continued.

h. Connect F1
1 + and F2– exciter stator leads to terminal block in generator end bell.

i. Install end bell cover on generator, paragraph 4–11-4, step n (MEP-802A) or paragraph 4–12-5, step g (MEP-812A).

j Connect negative battery cable and close access doors.

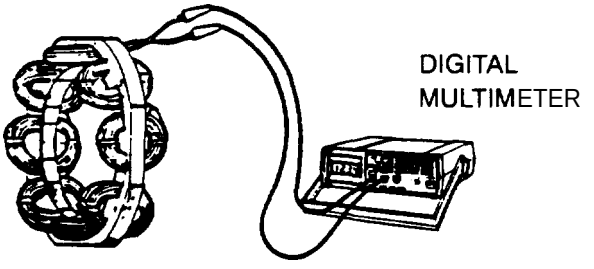


Figure 4-18. Testing Exciter Field

4-10-5. Testing Brushless Exciter Rotor (Armature). Using resistance bridge and multimeter, set for ohms, test the brushless exciter rotor (Figure 4-19) for open or shorted windings and grounds as follows:

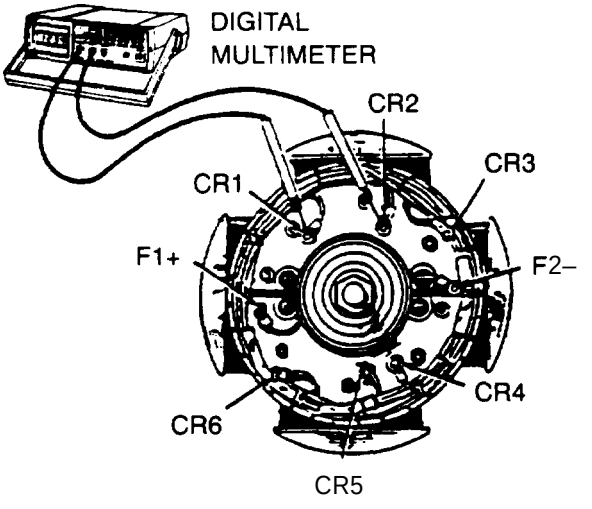


Figure 4-19. Testing Exciter Armature

a. Shut down generator set. Allow generator to cool to ambient temperature.

b. Open left side engine access door and disconnect negative battery cable.

c. Open storage box and output terminal board access doors.

d. Remove end bell cover from generator, paragraph 4–11–1, step e (MEP-802A) or paragraph 4-12-2, step h (MEP-812A).

e. Tag and disconnect lead wires from diodes CRI, CR2, CR3, CR4, CR5, and CR6 on rotating rectifier.

f. Connect resistance bridge between leads CR1 and CR2, CR2 and CR3, CR1 and CR3, CR4 and CR5, CR4 and CR6, and CR5 and CR6. Resistance between leads should be as shown in Table 4-1.

g Readings other than shown in Table 4-1 indicate open or shorted windings and exciter rotor must be replaced.

h. Connect leads of multimeter between each CR lead and exciter rotor lamination. Multimeter reading less than infinity indicates defective ground insulation and exciter rotor must be replaced.

i. Connect exciter rotor lead wires to diodes CR1, CR2, CR3, CR4, CR5, and CR6. lighten nuts to 24 in–lbs (2.7 Nm) and remove tags.

4-I0-5. Testing Brushless Exciter Rotor (Armature). - Continued.

j. Install end bell cover on generator, paragraph 4–11-4, step n (MEP-802A) or paragraph 4-12-5, step g (MEP-812A).

k, Connect negative battery cable and close access doors.

4-10-6. Testing Generator Rotor. Set multimeter for ohms and test the generator rotor, for open or shorted windings and grounds as follows:

a. Shut down generator set. Allow generator to cool to ambient temperature.

b. Open left side engine access door and disconnect negative battery cable.

c. Open storage box and output terminal board access doors.

d. Remove end bell cover from generator, paragraph 4–1 1–1, step e (MEP-802A) or paragraph 4-1 2–2, step h (MEP-812A).

e. Disconnect rotor leads Fl+ and F2– from rotating rectifier assemblies.

f. Connect multimeter between F1 + and F2- leads (Figure 4-20). Resistance reading should be as shown in Table 4-1.

g. If resistance is low, there are shorted windings. If resistance is high, rotor winding is open. In either case, rotor must be replaced.

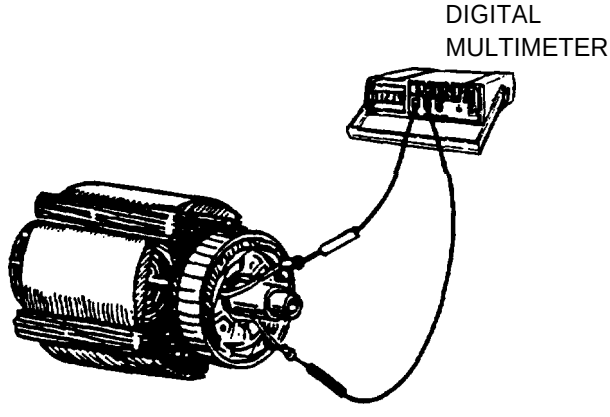


Figure 4-20. Testing Rotor for an Open or Shorted Windings.

h. Connect multimeter leads between F1 + and rotor shaft and between F2- and rotor shaft in turn (Figure 4-21). Multimeter should not register,

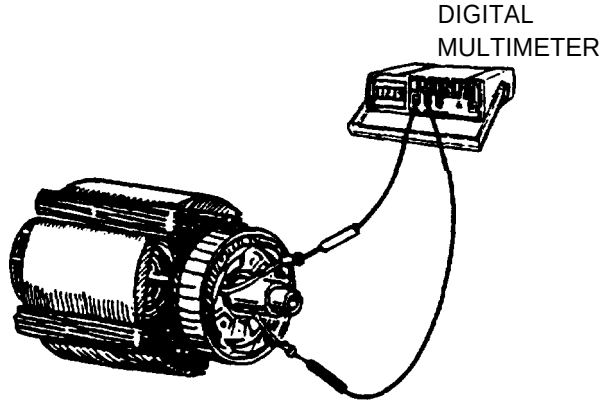


Figure 4-21. Testing Rotor for Grounds

4-10-6. Testing Generator Rotor. - Continued.

i. If multimeter registers, rotor is grounded and must be replaced.

j. Connect F1+ and F2- leads to rotating rectifier assemblies. Tighten nuts to 24 in-lbs (2.7 Nm).

k. Install end bell cover on generator, paragraph 4-11-4, step n (MEP–802A) or paragraph 4–12–5, step g (MEP-812A).

l. Connect negative battery cable and close access doors.

4-10-7. Testing Generator Stator Using resistance bridge and multimeter, set for ohms, test the stator for grounds, opens, and shorts in the windings as follows:

a. Shut down generator set. Allow generator to cool to ambient temperature.

b. Open left side engine access door and disconnect negative battery cable.

c. Remove control box top panel, paragraph 2-18-1.

d. Tag and disconnect twelve main generator coil leads from TB3 in output box.

e. Tag and disconnect (Q1 and Q2 leads from terminals 7 and 8 of AC voltage regulator.

f. Open storage box and output terminal board access doors.

g. Connect resistance bridge between coil leads (Figure 4–22). All readings should be as shown for generator stator leads in Table 4-1.

h. Connect resistance bridge between leads Q1 and Q2. Reading should be as shown in Table 4–1.

NOTE

Before replacing stator assembly, check leads for broken wires or insulation. Repair or replace, as necessary.

i. If resistance is low, there are shorted windings. If resistance is high, stator winding is open. In either case, stator must be replaced.

j Connect multimeter between generator housing and generator set ground. Multimeter should register.

k. Connect multimeter between each coil lead and generator housing, in turn. Multi meter should not register.

l. If multimeter registers on any reading, stator windings are grounded and stator assembly must be replaced.

m Connect Q1 and Q2 leads to terminals 7 and 8 of AC voltage regulator and remove tags.

n. Connect main generator coil leads to TB3 and remove tags.

o. Install control box top panel, paragraph 2–16-4.

p. Connect negative battery cable and close access doors.

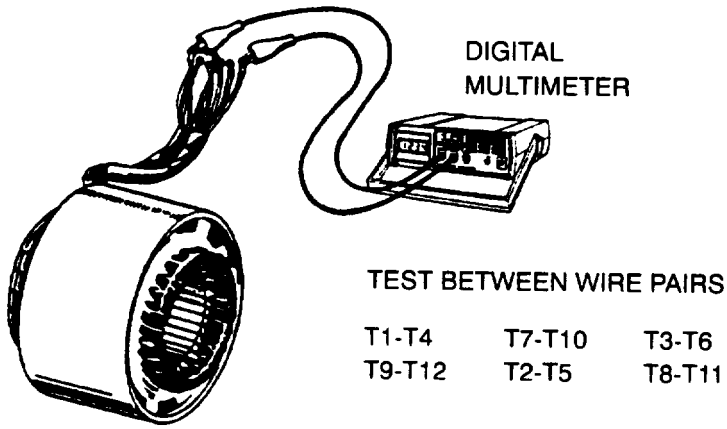


Figure 4-22. Testing Stator Windings

4-11. GENERATOR ASSEMBLY (MEP-802A).

4-11-1. Removal/Disassembly

a. Shut down generator set.

b. Remove rear housing section, paragraph 2-20-1.

c. Remove generator mounting hardware, paragraph 3-6-1, step z.

d. Insert wooden wedges between rear end of engine and skid base to support engine when generator is removed.

e. Remove bolts (1, Figure 4-24) and end bell cover (2).

f. Remove nuts (3), washers (4), and end bell (5).

g. Tag and disconnect exciter stator leads (6) and AC voltage regulator leads (7) from terminal block (13) in end bell (5).

h. Remove bolts (8), washers (9), brushless exciter stator (10), and packing (11) from end bell (5),

i. Remove bolts (12) and terminal board (13) from end bell (5).

CAUTION

Use care to avoid contact between stator (14) and rotor assembly (16).

j. Using lifting device attached to stator (14) lifting point, carefully pry loose (screwdriver slots provided), and remove stator (14) from engine/generator adapter (15).

k. Use rope sling to support rotor (16), refer to Figure 4-23.

4-11-1. Removal/Disassembly. - Continued.

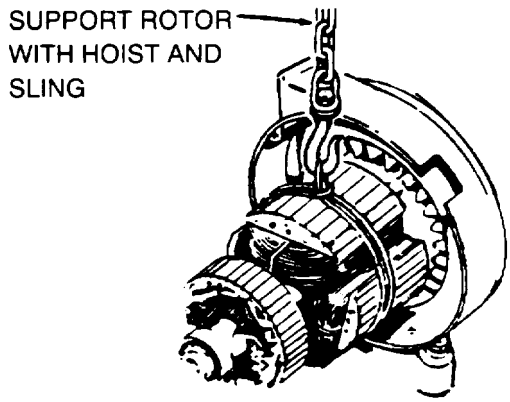


Figure 4-23. Support of Rotor Assembly

NOTE

Use securing device to keep flywheel/generator fan (20) from turning.

l. Remove bolts (1 7), washers (1 8), Iockwashers (19), and rotor assembly (16) from engine flywheel/generator fan (20).

m. Remove bolts (22), washers (23), Iockwashers (23), and drive disc (25) from rotor assembly (16).

n. Using gear puller, remove bearing (26) from rotor assembly (16).

o. Tag and disconnect F1 + and F2- leads (29) from rotating rectifiers by removing nuts (27) and washers (28).

p. Using gear puller, carefully remove exciter rotor (30) from rotor assembly (16).

q. Remove thru-bolts (31) from engine/generator adapter (15).

r. Remove bolts (32) and engine flywheel/generator fan (20) from engine crankshaft.

4-11-2. Inspection.

a. Inspect end bell assembly (5, Figure 4–24) for cracks, torn packing (11), broken terminal board (13), and other damage.

b. Inspect exciter stator (10) for broken windings, evidence of overheating, damaged insulation, and loose terminal ends.

c. Inspect bearing (26) for looseness and evidence of overheating.

d. Inspect exciter rotor (30) for broken windings, evidence of overheating, damaged insulation, and other damage.

e. Inspect rotor assembly (16) for broken windings, evidence of overheating, damaged insulation, and loose terminal ends.

f. Inspect stator(14) for broken windings, evidence of overheating, damaged insulation, loose terminal ends, and damaged housing.

g. Inspect drive disc (25) for bends, cracks, elongated mounting holes, and other damage.

h. Inspect flywheel/generator fan (20) for cracks, bent or broken fan blades, broken teeth, stripped threads, and other damage.

4-11-3. Repair generator assembly by replacing damaged components.

a. If ring gear (21, Figure 4-24) is damaged, place the flywheel (20) on a solid flat surface.

b. Drive ring gear (21) off with a brass drift and hammer.

Oil fumes or oil can ignite above 380°F (193°C). Use a thermometer and do not exceed 360°F (182°C). Do not allow a flame or heating element to be In direct contact with oil. Heat oil In a well ventilated area. Plan a safe handling procedure to avoid burns.

Wear protective gloves to help prevent burns from handling hot ring gear (21).

CAUTION

If flame heat is used, be sure gear is heated uniformly around circumference. Do not overheat. Overheating may also destroy original heat treatment of gear.

c. Heat new ring gear (21) to 300°F (148°C) using either heated oil, oven heat, or flame heat.

d. Turn gear so side with chamfer is toward engine with flywheel installed.

e. Install ring gear (21) against shoulder of flywheel.

4-11-4. Assembly/l nstallation.

a. Clean and inspect all mating surfaces.

b. Coat mating area between bearing (26, Figure 4-24) and end bell (5) with grease (Item 9, Appendix C).

c. Install engine flywheel/generator fan (20) on engine crankshaft with bolts (32). Torque bolts (32) to 51 ft-lbs. (69 Nm).

d. Install thru-bolts (31) in adapter (15).

e. Press exciter rotor (30) on rotor assembly(16) to shoulder of shaft. Connect F1 + and F2- leads (29) on rotating rectifiers with nuts (27) and washers (28), and remove tags. Torque nuts (27) to 24 in-lbs (2-7 Nm).

f. Press bearing (26) onto shaft of rotor assembly (16).

g. Install drive disc (25) on rotor assembly(16) with lockwashers (24), washers (23), and bolts (22). Torque bolts **(22) 48** to 53 ft-lbs (65 to 72 Nm).

h. Using rope sling and lifting device (Figure 4-23), install rotor assembly (16) on engine flywheel/generator fan (20) with lockwashers (19), washers (18), and bolts (17). Torque bolts (17) 19 to 21 ft-lbs (26 to 28 Nm).

CAUTION

Use care to avoid contact between stator (14) and rotor assembly (16).

i. Using lifting device, install stator (14) into engine/generator adapter (15).

j Install packing (11), bolts (8), washers (9), and brushless exciter stator (1 O) on end bell (5).

k. Install terminal board (13) on end bell (5) with bolts (12).

1. Connect leads (6) of brushless exciter stator (1 0) and AC voltage regulator leads (7) to terminal block (13) in end bell (5) and remove tags.

m. Install end bell (5) with washers (4) and nuts (3). Torque nuts (3) 19 to 21 ft-lbs (26 to 28 Nm).

n. Install end bell cover (2) with bolts (1).

4-114. Assembly/installation. - Continued.

o. Install generator mounting hardware, paragraph 3–6-2, step i

p. Remove wooden wedges between engine and skid frame.

q. Install rear housing section, paragraph 2–20–4.

4-12. GENERATOR ASSEMBLY (MEP-812A).

4-12-1. Removal.

a. Shut down generator set.

b. Remove rear housing section, paragraph 2–20–1

c. Remove generator mounting hardware, paragraph 3-6-1, step z.

d. Insert wooden wedges between rear end of engine and skid base to support engine when generator is removed.

e. Remove bolt (1, Figure 4-25), washer (2), Iockwasher (3), and screen (4) from generator frame/stator assembly (5).

CAUTION

Rated capacity of lifting device must be at least 1000 lbs (454 kg).

f. Attach overhead lifting device to generator assembly lifting point. Take up slack to support weight of generator.

NOTE

The following step requires turning the generator by hand. Use engine fan to turn engine and generator.

g. Remove bolts (6) and washers (7) securing fan (8) and drive plate (9) to flywheel (10).

h. Remove bolts(11) and gently pry (screwdriver slots provided) generator assembly away from engine assembly.

i. Move generator assembly to maintenance work area. Support assembly to prevent damage.

j. Remove bolts (12) and flywheel (10) from engine crankshaft.

4-12-2. Disassemble.

CAUTION

Rated capacity of lifting device must be at least 1000 lbs (454 kg).

a. Using overhead lifting device, carefully lift and position generator assembly on work table with end bell (31, Figure 4-25) resting on table.

b. Remove bolts (14), Iockwashers (1 5), retention disk (16), spacer (1 7), drive plate (9), and fan (8) from rotor assembly (18).

CAUTION

Use care to avoid contact between frame/stator assembly (5) and rotor assembly (18).

c. Attach overhead lifting device to rotor assembly (18) and carefully lift rotor assembly (18) out of frame/stator assembly (5).

d. Using gear puller, remove bearing (19) from rotor assembly (18).

e. Tag and disconnect Fl+ and F2- leads from rotating rectifiers by removing nuts (20) and washers (21).

f. Using gear puller, carefully remove exciter rotor (22) from rotor assembly (18).

g. Using overhead lifting device, turn generator assembly over so that flywheel end is resting on table.

h. Remove bolts (23), Iockwashers (24), retention plate (25), bolts (26), Iockwashers (27), and cover (27) from end bell (31).

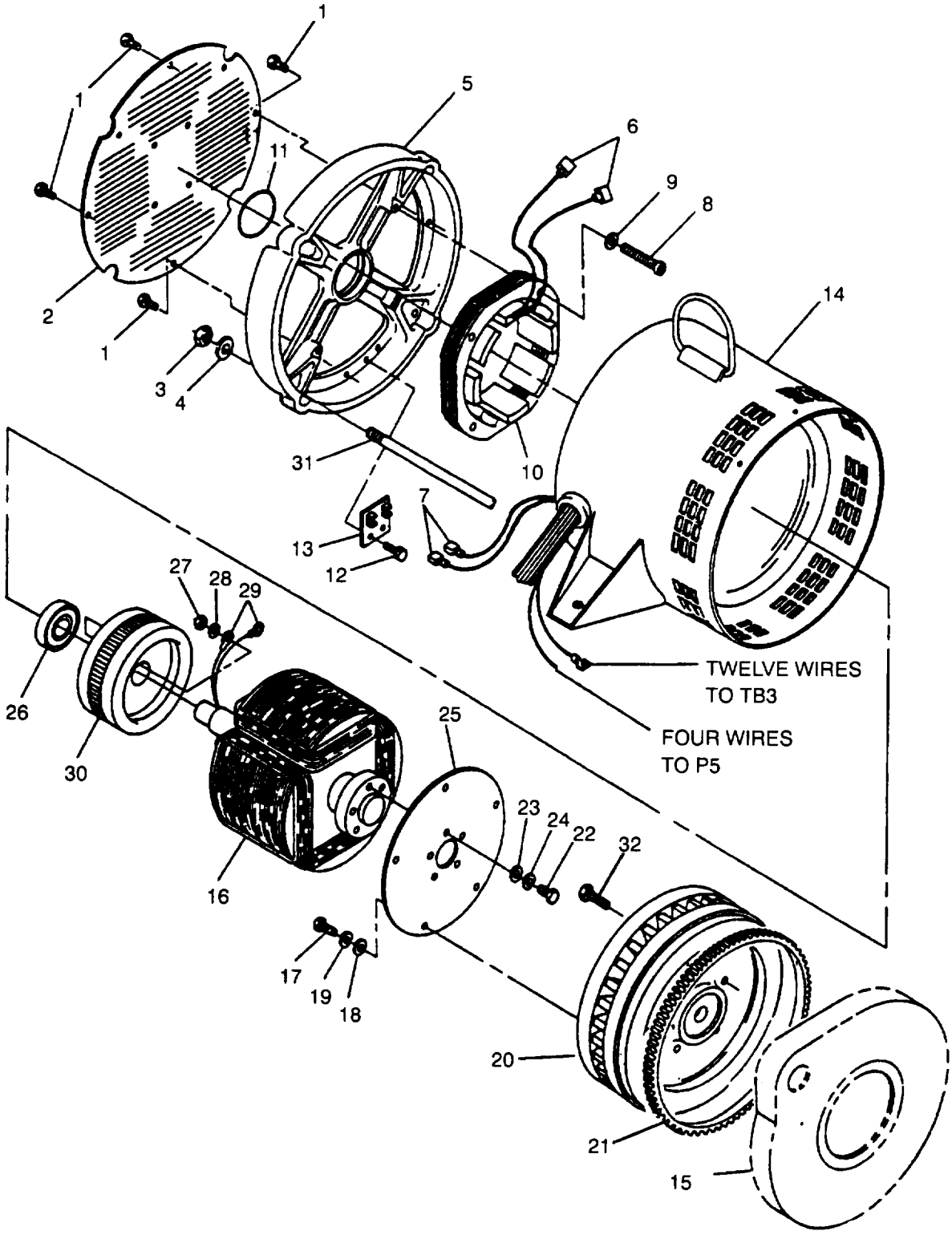


Figure 4-24. Generator Assembly (MEP-802A)

4-12-2. Disassembly Continued.

i. Remove bolts (29), washers (30), and end bell (31) from frame/stator assembly (5).

j. Tag and disconnect exciter stator leads and AC voltage regulator leads from terminal block (36).

k. Remove bolts (32), Iockwashers (32), and exciter stator (34) from end bell (31).

l. Remove bolts (35), terminal block (36), and packing (37) from end bell (31).

4-12-3. Inspection.

a. Inspect end bell assembly (31, Figure 4–25) for cracks, torn packing (37), broken terminal board (36), and other damage.

b. Inspect exciter stator (34) for broken windings, evidence of overheating, damaged insulation, and loose terminal ends.

c. Inspect bearing (19) for looseness and evidence of overheating.

d. Inspect exciter rotor (22) for broken windings, evidence of overheating, damaged insulation, and other damage.

e. Inspect rotor assembly (18) for broken windings, evidence of overheating, damaged insulation, and loose terminal ends.

f. Inspect frame/stator (5) for broken windings, evidence of overheating, damaged insulation, loose terminal ends, and damaged housing.

g. Inspect drive plate (9) and retention disk (15) for bends, cracks, elongated mounting holes, and other damage.

h. Inspect flywheel (10) for cracks, broken teeth, stripped threads, and other damage.

i. Inspect generator fan (8) for cracks, bent, or broken blades and other damage.

4-12-4. Repair.

a. If ring gear (11, Figure 4-25) is damaged, place the flywheel (10) on a solid flat surface.

b. Drive ring gear (11) off with a brass drift and hammer.

Oil fumes or oil can ignite above 380°F (193°C). Use a thermometer and do not exceed 360° F (182°C). Do not allow a flame or heating element to be in direct contact with oil. Heat oil in a well ventilated area. Plan a safe handling procedure to avoid burns.

Wear protective gloves to help prevent burns from handling hot ring gear (4).

CAUTION

If flame heat is used, be sure gear is heated uniformly around circumference. Do not overheat. Overheating may also destroy original heat treatment of gear.

c. Heat new ring gear (11) to 300°F (148°C) using either heated oil, oven heat, or flame heat.

d. Turn gear so side with chamfer is toward engine with flywheel installed.

e. Install ring gear (11) against shoulder flywheel.

4-12-5. Assembly.

a. Clean and inspect all mating surfaces.

b. Coat mating area between bearing (19, Figure 4-25) and end bell (31) with grease (Item 9, Appendix C).

c. Install packing (37), terminal block (36), and bolts (35) on end bell (31).

d. Install exciter stator (34) on end bell (31) with Iockwashers (33) and bolts (32).

e. Attach exciter stator leads and AC voltage regulator leads to terminal block (36) and remove tags.

f. Install end bell (31) on frame/stator assembly (5) with washers (30) and bolts (29). Torque bolts (29) 29 to 31 ft-lbs (39 to 42 Nm).

g. Install cover (28) and retention plate (25) on end bell (31) with Iockwashers (24) and (27), and bolts (23) and (26).

h. Using overhead lifting device, reposition generator assembly on work table with end bell (31) resting on table.

i. Using arbor press, press exciter rotor (22) on rotor assembly(18) to shoulder of shaft. Connect F1 + and F2- leads on rotating rectifiers with washers (20) and nuts (19). Torque nuts (20) 23 to 26 in-lbs (2.6 to 2.9 Nm). Remove tags.

j. Press bearing (19) onto shaft of rotor assembly (18).

CAUTION

Use care to avoid contact between frame/stator assembly (5) and rotor assembly (18).

k. Attach lifting device to rotor assembly (18) and carefully lower rotor assembly(18) into frame/stator assembly (5). Ensure bearing (19) enters bearing bore in end bell (31).

l. Align mounting holes on fan (8) and drive plate (9), and wire together through two mounting holes.

m. Install fan (8), drive plate (9), spacer (17), and retention disk (16) on rotor assembly (18) with Iockwashers (15) and bolts (14). Torque bolts (14) 29 to 31 ft-lbs (39 to 42 Nm).

4-12-6. Installation.

a. Install flywheel (10, Figure 4–25) to engine crankshaft with bolts (13). Torque bolts (13) 48 to 53 ft-lbs (65 to 72 Nm).

CAUTION

Rated capacity of lifting device must be at least 1000 lbs (454 kg).

b. Using overhead lifting device, carefully lift generator assembly and align with engine flywheel housing.

c. Install bolts (12) and tighten alternately to draw generator assembly and engine assembly smoothly and evenly together. Torque bolts (12) 19 to 21 ft-lbs (26 to 28 Nm).

NOTE

The following step requires turning the generator by hand. Use engine fan to turn engine and generator.

d. Align mounting holes and install bolts (6) and washers (7) securing fan (8) and drive plate (9) to flywheel (10). Remove wires holding fan and drive plate together when installing bolts. Torque bolts (6) 29 to 31 ft-lbs (39 to 42 Nm).

e. Install screen (4) on generator frame/stator assembly (5) with Iockwasher (3), washer (2), and bolt (1). Torque bolt (1) 7 to 9 ft-lbs (9.5 to 12 Nm).

f. Remove wooden wedges from between engine and skid base.

g. Install generator mounting hardware, paragraph 3-6-2, step i.

h. Install rear housing section, paragraph 2–20-4.

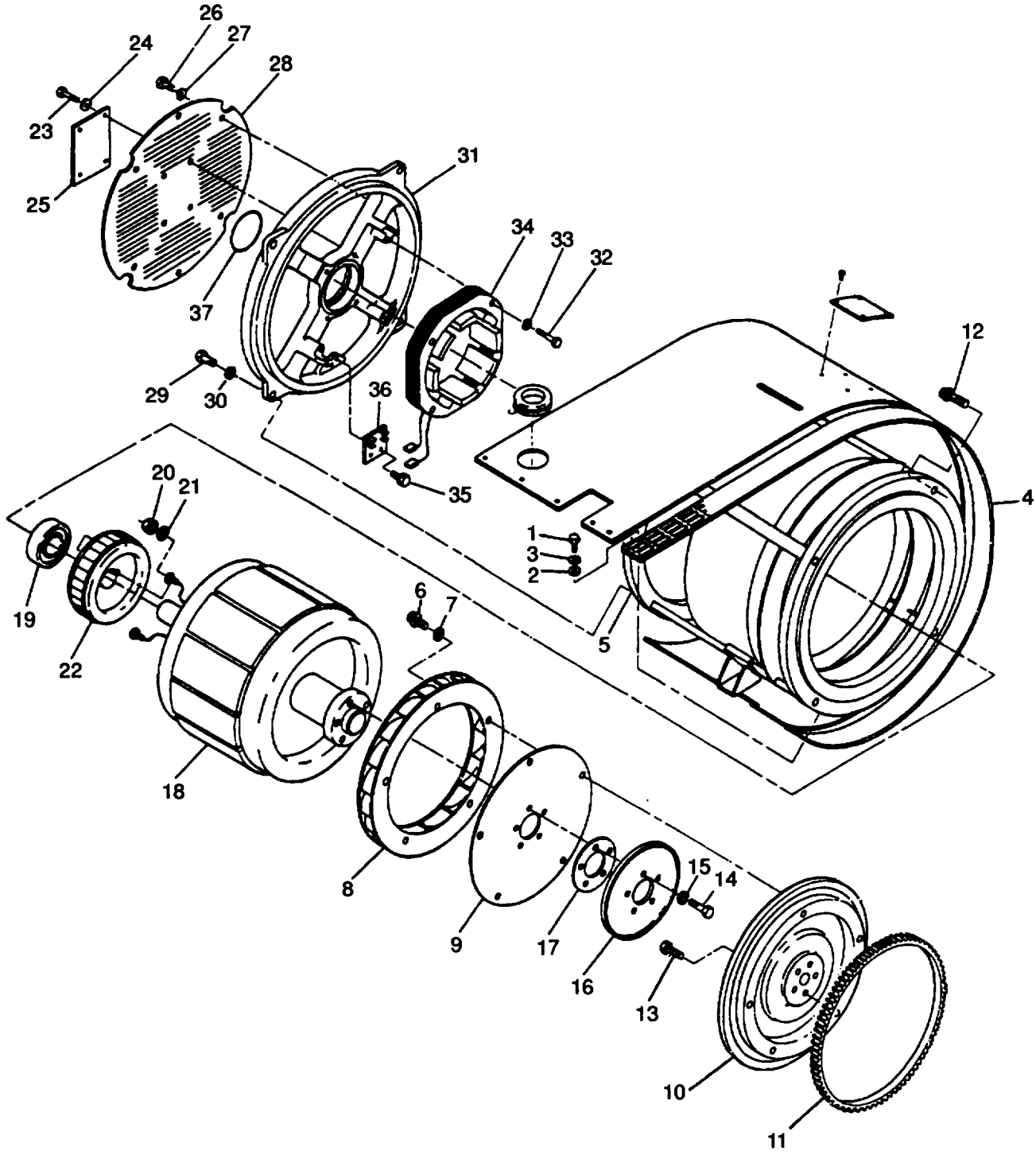


Figure 4-25. Generator Assembly (MEP-812A)

Appendix A.

REFERENCES

A-1 SCOPE.

This appendix lists all forms, field manuals. technical manuals and miscellaneous publications referenced in this manual.

A-2 FORMS.

Equipment Inspection and Maintenance Work Sheet . . . . . DA Form 2404
Product Quality Deficiency Report . . . . . SF 368
Recommended Changes to Publications and Blank Forms . . . . . DA Form 2028
Recommended Changes to DA Publications . . . . . DA Form 2028–2
Air Force Reporting of Errors Form AFTOForm22

A-3 FIELD MANUALS.

NBC Decontamination . . . . . .FM 3-5
NBC Contamination Avoidance FM3–3
NBC Protection FM-3-4
First Aid for Soldiers FM-21-11

A-4 TECHNICALMANUALS.

Operator's Manual Generator Set Tactical Quiet, 5kW,60/400 Hz. TM9-6115-641-10
Repair Parts and Special Tools List Generator Set, Tactical Quiet,5kW,60/400 Hz . . . . . TM 9–6115–641–24P
Unit, Direct Support Maintenance Manual Engine, Diesel TM9-2815-252-24
Destruction of Materiel TM750-244-3
Cooling Systems, Tactical Vehicles . . . . . TM 750–254
Painting Instructions for Army Materiel . . . . . TM 43–0139
Operator's, Unit, Direct Support General Support Maintenance Manual for Lead acid Storage Batteries TM9-6140-200-14

A-5 MISCELLANEOUSPUBLICATIONS.

Lubrication Order Generator Set, Tactical Quiet, 5kW,60/400 Hz. . . . . LO 9–6115–641–12
Maintenance Management Policy (MMP) AFR–66-1
Corrosion and Corrosion Prevention Metals MIL-HDBK-729
Marking For Shipment and Storage MIL-STD-129
Packaging of Generator Set, Mobile Power and Supplemental Equipment MIL-G-28554
Preparation For Shipment and Storage of Engines MIL-E-10062
The Army Maintenance Management System (TAMMS) . . . . . DA PAM 738-750
Preservation for USAMECOM Mechanical Equipment for Storage and Shipment . . . . . TB 740-97-2
Processing&Inspection of Nonmounted, Nonaircraft Gasoline and Diesel Engines for Storage and Shipment . . . . . .TO 38-1-5

Appendix B.

MAINTENANCE ALLOCATION CHART (MAC)

Section 1. INTRODUCTION

B-1 **GENERAL.**

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

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the T.Q. Generator Sets and its components. The application of the maintenance functions to the generator sets or components will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section Ill lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section Il.

d. Section IV contains supplemental instructions and explanatory notes for particular maintenance functions.

B-2 MAINTENANCE FUNCTIONS. Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (include decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or Test, Measuring, and Diagnostic Equipment (TMDE) used in precision measurement. Consists of comparisons 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.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions, Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. “Replace” is authorized by the MAC and is shown as the 3rd position code of the SMR code.

i. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

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

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

B-3 EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which are to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00".

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

c. Column 3, Maintenance Function. Column 3 lists the function to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph B–2).

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the Maintenance Allocation Chart. The symbol designations for the various maintenance categories are as follows:

C . . . . . Operator or crew
O . . . . . Organization Maintenance
F . . . . . Direct Support Maintenance
H . . . . . General Support Maintenance
D . . . . . Depot Maintenance

e. Column 5, Tools and Equipment, Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetical order, which shall be keyed to the remarks contained in Section IV.

B-4 EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS. Section III.

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section 11, Column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National Stock Number of the tool or test equipment,

e. Column 5, Tool Number. The manufacturer's part number of the tool or test equipment.

B-5 EXPLANATION OF COLUMNS IN REMARKS, Section IV.

a. Column 1, Reference Code, The code recorded in column 6, Section II

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

FOR

MFP-802A AND MEP-812A.

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP.	(6) REMARKS
			C	O	F	H	D		
00	GENERATOR SET 5KW (LESS ENGINE)	INSPECT	.2	.5					
		TEST		1.0	1.0			1, 2, 3, 4,	
		SERVICE	.3	.3				4	
		ADJUST		.3				4	
		REPAIR		1.5	1.5			4	
01	D.C. ELECTRICAL SYSTEM	INSPECT	.1	.1					
		TEST		.2				1, 4	
		REPAIR		.3				4	
0101	BATTERY CABLES	INSPECT	.1	.1					
		REPAIR		.2				1, 4	
		REM/INST		.2				4	
		REPLACE		.3				1, 4	
0102	BATTERY	INSPECT	.1	.1					
		TEST		.1				1, 4	
		SERVICE	.1	.1				4	
		REM/INST		.2				4	
		REPLACE		.2				4	B
0103	SLAVE RECEPTACLE CABLES	INSPECT	.1	.1					
		REPAIR		.2				1, 4	
		REM/INST		.2				4	
		REPLACE		.3				1, 4	
0104	SLAVE RECEPTACLE	INSPECT	.1	.1					
		REM/INST		.1				4	
		REPLACE		.1				4	B
0105	ALTERNATOR	INSPECT	.1	.1					
		TEST		.5	1.0			1, 4	
		REPAIR			2.0			1, 4	
		REM/INST		1.0				4	
		REPLACE		1.0				4	B
02	HOUSING	INSPECT	.2	.3					
		REPAIR		1.0				4	
0201	ACCESS DOORS	INSPECT	.1	.1					
		REPAIR		.5				4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0202	FRONT HOUSING SECTION	INSPECT	.1	.2					
		REPAIR		1.0				4	
		REM/INST		2.0				4	
		REPLACE		2.0				4	B
0203	REAR HOUSING SECTION	INSPECT	.1	.2					
		REPAIR		1.0				4	
		REM/INST		2.0				4	
		REPLACE		2.0				4	B

Section II MAINTENANcE ALLOCATION CHART - Continued
FOR
MEP-802A AND MEP-812A.

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP.	(6) REMARKS
			C	O	F	H	D		
0204	DECALS AND PLATES	INSPECT	.1	.1					
		REM/INST		.3				1, 6	
		REPLACE		.3				1, 6	B
03	CONTROL BOX ASSEMBLY	INSPECT	.1	.1					
		TEST		1.0	1.0			1, 4	
		REPAIR		1.0	1.0			4	
		REM/INST		1.0				4	
		REPLACE		1.0				4	B
0301	CONVENIENCE RECEPTACLE	INSPECT	.1	.1					
		TEST		.2				1, 4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0302	GROUND FAULT INTERRUPTER	INSPECT	.1	.1					
		TEST	.1	.1				1, 4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0303	MALFUNCTION INDICATOR PANEL	INSPECT	.1	.1					
		TEST	.1	.1				1	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0304	FUSE AND CIRCUIT BREAKER	INSPECT	.1	.1					
		TEST		.2				1, 4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0305	VOLTAGE REGULATOR	INSPECT		.1					
		TEST		.5				1, 4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0306	RELAYS AND TRANSDUCERS	INSPECT		.1					
		TEST		.3				1, 4	
		REM/INST		.4				4	
		REPLACE		.4				4	B
0307	RESISTOR–DIODE ASSEMBLY	INSPECT	.1	.1					
		TEST		.5				1, 4	
		REM/INST		1.0				4	B
		REPLACE		1.0				4	
		REPAIR		1.0				1,4	
0308	CONTROL BOX HARNESS	INSPECT	.1	.2					
		TEST		1.0	1.0			1, 4	
		REPAIR		1.0	1.0			1, 4	
		REM/INST			1.5			4	
		REPLACE			1.5			4	B

Section II. MAINTENANCE ALLOCATION CHART - Continued
FOR
MEP-802A AND MEP-812A.

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP.	(6) REMARKS
			C	O	F	H	D		
0309	PANEL LIGHTS	INSPECT	.1	.1					
		REM/INST		.3				4	
		REPLACE		.3				4	B
		REPAIR		.2					C
0310	INDICATORS	INSPECT	.1	.1					
		TEST		.3				1, 4	
		REM/INST		.2				4	
		REPLACE		.2				4	B
0311	SWITCHES	INSPECT	.1	.1					
		TEST		.2				1, 4	
		REM/INST		.2				4	
		REPLACE		.2				4	B
0312	CONTROL BOX PANELS	INSPECT	.1	.1					
		REPAIR		.2				4	
		REM/INST		2.0				4	
		REPLACE		2.0				4	B
0313	DECALS AND PLATES	INSPECT	.1	.1					
		REM/INST		.3				1, 6	
		REPLACE		.3				1, 6	B
04	OUTPUT BOX ASSEMBLY	INSPECT		.2	.2				
		TEST		.5	.5			1, 2, 4	
		REPAIR		1.0	1.0			4	
		REM/INST			2.0			4	
		REPLACE			2.0			4	B
0401	OUTPUT BOX HARNESS	INSPECT	.1	.2	.2				
		TEST			.6			1, 2, 4	
		REPAIR		1.0	1.0			4	
		REM/INST			2.0			4	
		REPLACE			2.0			4	B
0402	A.C. CIRCUIT INTERRUPTER	INSPECT		.2					
		TEST		.5				1, 4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0403	RELAYS	INSPECT		.2					
		TEST		.5				1, 4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0404	RECONNECTION SWITCH	INSPECT		.2					
		TEST		.5				1, 4	
		REM/INST		.7				4	
		REPLACE		.7				4	B

Section II. MAINTENANCE ALLOCATION CHART - Continued
FOR
MEP-802A AND MEP-812A.

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP.	(6) REMARKS
			C	O	F	H	D		
0405	OUTPUT BOX	INSPECT	.1	.1					
	PANELS	REPAIR		.2				4	
		REM/INST			2.0			4	
		REPLACE			2.0			4	B
05	AIR INTAKE/	INSPECT	.2	.2					
	EXHAUST SYSTEM	REPAIR		.8				4	
0501	MUFFLER AND PIPES	INSPECT	.1	.2					
		REM/INST		.5				4	
		REPLACE		.5				4	B
0502	AIR CLEANER	INSPECT	.2	.2					
	ASSEMBLY	SERVICE	.2	.2					
		REPAIR		.5				4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
06	COOLANT SYSTEM	INSPECT	.1	.1					
		SERVICE	.1	.5				4	
		REPAIR		1.0				4	
		TEST		.1				1, 7	
0601	RADIATOR	INSPECT	.1	.2					
		REPAIR		.5	2.0			3, 4	
		REM/INST		1.0				4	
		REPLACE		1.0				4	B
0602	COOLANT HOSES	INSPECT	.1	.1					
		REM/INST		.5				4	
		REPLACE		.5				4	B
0603	COOLANT RECOVERY	INSPECT	.1	.1					
	SYSTEM	REM/INST		.5				4	
		REPLACE		.5				4	B
0604	COOLING FAN	INSPECT	.1	.1					
		REM/INST		.8				4	
		REPLACE		.8				4	B
0605	FAN BELT	INSPECT	.1	.1					
		ADJUST		.5				4, 5	
		REM/INST		.5				4	
		REPLACE		.5				4	B
07	FUEL SYSTEM	INSPECT	.1	.2					
		REPAIR		1.0				4	
0701	FUEL TANK FLOATS	INSPECT		.2					
	AND SWITCHES	TEST		.3				1, 4	
		REM/INST		.5				4	
		REPLACE		.5				4	B

Section II. MAINTENANCE ALLOCATION CHART - Continued
FOR
MEP-802A AND MEP-812A.

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP.	(6) RE-MARKS
			C	O	F	H	D		
0702	LOW PRESSURE FUEL LINES	INSPECT	.1	.2					
		REM/INST		.4				4	
		REPLACE		.4				4	B
0703	FUEL TANK	INSPECT	.1	.2					
		SERVICE	.3						
		REM/INST		1.5				4	
		REPLACE		1.5				4	B
0704	AUX. FUEL PUMP	INSPECT	.1	.1					
		TEST		.5				1	
		REM/INST		.5				4	
		REPLACE		.5				1, 4	
0705	FUEL TRANSFER PUMP	INSPECT	.1	.1					
		TEST		.3				1	
		REM/INST		.5				4	
		REPLACE		.5				1, 4	
0706	FUEL FILTER/WATER SEPARATOR	INSPECT	.1	.2					
		SERVICE	.1	.4				4	
		REPAIR		.3				4	
		REM/INST		1.0				4	
		REPLACE		1.0				4	B
0707	AUXILIARY FUEL FILTER	INSPECT	.1						
		REM/INST		.2				4	
		REPLACE		.2				4	B
08	LUBRICATION SYSTEM	INSPECT	.1	.2					
		SERVICE	.2						A
		REPAIR		.5				4	A
0801	OIL DRAIN ASSEMBLY	INSPECT	.1	.2					
		REPAIR		.5				4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
09	ENGINE ACCESSORIES	INSPECT	.1	.1					
		REPAIR		.5					
0901	FREQUENCY ADJUST CABLE	INSPECT	.1	.1					
		ADJUST		.3				4	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0902	SENDERS AND SWITCHES	INSPECT	.1	.1					
		TEST		.5				1, 4	
		REM/INST		.5				4	
		REPLACE		.5				4	B

Section II. MAINTENANCE ALLOCATION CHART - Continued
FOR
MEP-802A AND MEP-812A.

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP.	(6) RE-MARKS
			C	O	F	H	D		
0903	FUEL SOLENOID ASSEMBLY	INSPECT	.1	.1					
		TEST		.3				4	
		REPAIR		.3				4	
		REM/INST		.5				4	
		REPLACE		.5				1, 4	
0904	DEAD CRANK SWITCH	INSPECT	.1	.1					
		TEST		.5				1	
		REM/INST		.5				4	
		REPLACE		.5				4	B
0905	DECALS AND PLATES	INSPECT	.1	.1					
		REM/INST		.3				1, 6	
		REPLACE		.3				1, 6	B
10	SKID BASE	INSPECT	.1		.1				
		REPAIR			1.0			4	
		REM/INST			1.0			4	
		REPLACE			1.0			4	B
11	OUTPUT LOAD TERMINAL BOARD ASSEMBLY	INSPECT	.1	.1					
		TEST		.5				1	
		REPAIR		1.0				4	
		REM/INST		1.5				4	
1101	LOAD TERMINALS	INSPECT	.1	.1					
		REM/INST		.5				4	
		REPLACE		.5				4	B
1102	VARISTORS	INSPECT		.1					
		TEST		.5				1	
		REM/INST		1.0				4	
		REPLACE		1.0				4	B
1103	LOAD TERMINAL BOARD	INSPECT	.1	.1					
		REM/INST		1.5				4	
		REPLACE		1.5				4	B
12	GENERATOR ASSEMBLY	INSPECT			.3				
		TEST			4.0			1, 2, 4	
		REPAIR			4.0			4	
		REM/INST			4.0			4	
		REPLACE			4.0			4	B
1201	ENDBELL ASSEMBLY	INSPECT			.2				
		REM/INST			.3			4	
		REPLACE			.5			4	B
120101	STATOR CORE, EXCITER	INSPECT			.2				
		TEST			.5			1, 4	
		REPAIR			.3			1	
		REM/INST			.5			4	
		REPLACE			.5			4	B

Section II. MAINTENANCE ALLOCATION CHART - Continued
FOR
MEP-802A AND MEP-812A.

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP.	(6) RE-MARKS
			C	O	F	H	D		
1202	FLYWHEEL ASSEMBLY	INSPECT			.2				
		REM/INST			.3			4	
		REPLACE			.3			4	B
		REPAIR			1.0			4	
1203	ROTOR ASSEMBLY	INSPECT			.2				
		TEST			.5			1, 2, 4	
		REPAIR			1.0			1, 2, 4	
		REM/INST			.5			4	
		REPLACE			.5			4	B
120301	ROTOR CORE, EXCITER	INSPECT			.2				
		TEST			.3			1, 2, 4	
		REPAIR			.3			1, 4	
		REM/INST			.5			1, 4	
		REPLACE			.5			1, 4	B
120302	ROTOR ASSEMBLY, MAIN	INSPECT			.2				
		TEST			.3			1, 4	
		REPAIR			.3			1, 4	
		REM/INST			.5			1, 4	
1204	FRAME AND STATOR ASSEMBLY	INSPECT			.2				
		TEST			.3			1, 2, 4	
		REPAIR			.3			4	
		REM/INST			.5			4	
		REPLACE			.5			4	B
13	ENGINE ASSEMBLY	INSPECT	.2	.5					A
		TEST			1.5				
		SERVICE	.3	.5					A
		ADJUST		1.0					A
		REPAIR	1.0	2.0	2.0				A
		REM/INST			4.0			1, 4	
		REPLACE			8.0			1, 4	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR MEP-802A AND MEP-812A

(1) TOOL OR TEST EQUIPMENT REF CODE	(2) MAINTENANCE CATEGORY	(3) NOMENCLATURE	(4) NATIONAL/ NATO STOCK NUMBER	(5) TOOL NUMBER
1	O, F	SHOP EQUIPMENT, AUTOMOTIVE MAINT AND REPAIR	4910-00-754-0654	SC4910-95-CL-A74
2	F	SHOP EQUIPMENT, ELECTRICAL REPAIR	4910-01-096-4475	SC4940-95-CL-B05
3	F	SHOP EQUIPMENT, AUTOMOTIVE MAINT AND REPAIR, FIELD	4910-00-348-7696	SC4910-95-CL-A02
4	O, F	TOOL KIT, GENERAL MECHANIC	5180-00-177-7033	SC5180-90-CL-N26
5	O	SCALE, DIAL	6670-00-254-4634	AAA-S-133
6	O	POP RIVET GUN	5120-00-508-1588	GGG-R-00395

Section IV. REMARKS FOR MEP-802A AND MEP-812A

(1) REFERENCE CODE	(2) REMARKS
A	Refer to TM 9-2815-252-24.
B	Replace function is identical to remove/install function.
C	Repair is limited to replacement of light bulbs.

Appendix C.

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section 1. INTRODUCTION

C-1 SCOPE

This appendix lists expendable supplies and materials YOU wiII need to operate and maintain the generator set: These items are authorized to you by CTA 50-970. Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

C-2 EXPLANATION OF COLUMNS.

a. Column (1) - Item Number. This number IS assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning cloth, Item 6, Appendix C "),

b. Column (2) – Level, This column identifies the lowest level of maintenance that requires the listed item.

c. Column (3) – National Stock Number, This is the National Stock Number assigned to the item; use it to request or requisitionI the item.

d. Column (4) – Description, Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Commercial and Government Entity (CAGE) code in parentheses followed by the part number.

e. Column (5) – Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. TABULAR LIST

(1) Item No.	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	O, F	-- -- --	Adhesive, Contact, R27780,1 Gal. Can	OZ
2	O, F	6850-00-181-7929	Antifreeze, MIL-A-46153,1 Gal. Can	GL
3	O, F	6850-00-181-7933	Antifreeze, MIL-A-46153,5 Gal. Can	GL
4	O, F	6850-00-181-7946	Antifreeze, MIL-A-46153,55 Gal. Drum	GL
5	O, F	6850-00-174-1806	Antifreeze, MIL-A-11755, 1 Gal. Can	GL
6	O, F	8030-01-234-2792	Antiseize, Compound, 1/2 lb. can	OZ
7	O, F	7920-01-338-3329	Cloth, Cleaning, TX-1250	EA
8	F	6080-01-143-4553	Compound, Heat Sink, 5202217	OZ
9	O, F	9150-00-663-1770	Grease, General Purpose, 630AA, 6 Lb. Can	LB
10	F	9150-00-053-0101	Grease, Molybdenum Disulfide, Molykote 2	OZ
11	O, F	6850-01-160-3868	Inhibitor, Corrosion. MIL-A-53009	QT
12	O, F	9150-00-152-4117	Lubricating Oil. Engine, MIL-L-2104,15/40W	QT
13	O, F	9150-00-189-6727	Lubrication Oil, Engine, BRAYC0421C, 10W	QT
14	O, F	9150-00-186-6681	Lubricating Oil, Engine, ALLIEDC030, 30W	QT
15	O, F	9150-00-402-2372	Lubricating Oil, Engine, MIL-L-46167, OEA	QT
16	O, F	5330-00-543-3600	Paper, Abrasive, ALOXGRIT 80	SH
17	O, F	8040-00-843-0802	Sealant, RTV 108	OZ
18	O, F	3439-00-974-1873	Solder. Tin Alloy, SN60WRAP2, 1 Lb. Spool	OZ
19	O, F	6850-00-264-9038	Solvent, Dry Cleaning, P-D-660,5 Gal. Can	GL
20	O, F	8030-00-849-0071	Sealing Compound, FORM GASKET 2	TU
21	O, F	8030-01-014-5869	Sealing Compound (LOCTITE 242)	OZ

Appendix D.

FABRICATION/ASSEMBLY OF PARTS

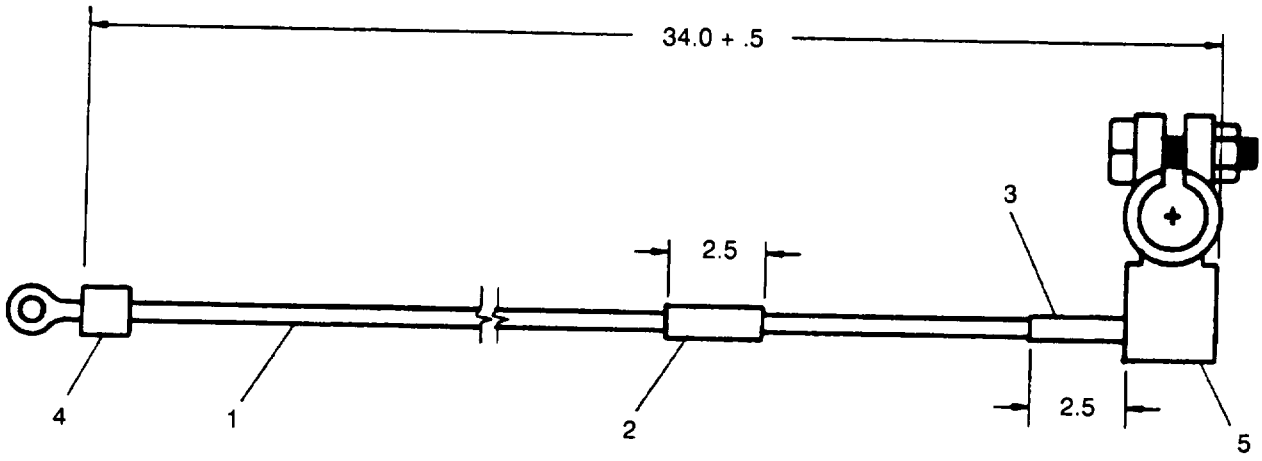
D-1 INTRODUCTION.

This appendix includes complete instructions for fabricating or assembling parts as required on this generator set.

NOTE

All dimensions are expressed in inches, refer to Table D–1 for inches to metric conversions.

D-2 ILLUSTRATIONS.



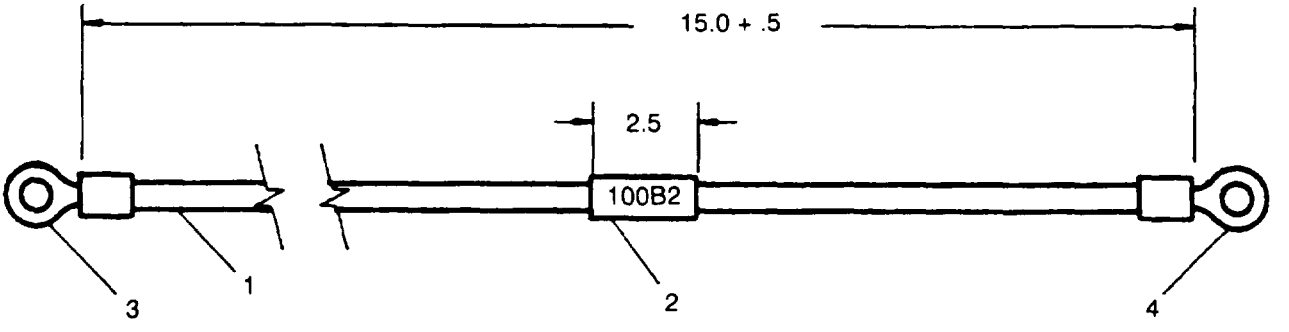
NOTES:

1. Dimensions shown are in inches.
2. Refer to TM 9-6115–641-24P for materials required.

PROCEDURES:

1. Cut wire (1) to length indicated.
2. Strip 0.75 inch of insulation from each end of wire (1).
3. Mark insulation sleeving (2) with wire number “100A2”, position on center of wire (1) and shrink to fit.
4. Mark insulation sleeving (3) with "NEGATIVE" and slide over end of wire (1).
5. Crimp terminal (4) on end of wire (1) sulation sleeving (3).
6. Crimp and solder terminal (5) on end of wire (1) with bolt orientation as shown, and battery post hole tapering open to far side.
7. Position insulation sleeving (3) as shown and shrink to fit.

Figure D-1. Cable Assembly, Battery (P/N: 88-20312)



NOTES:

1. Dimensions shown are in inches.

2. Refer to TM 9-6115-641-24P for materials required.

PROCEDURES:

1. Cut wire (1) to length indicated.

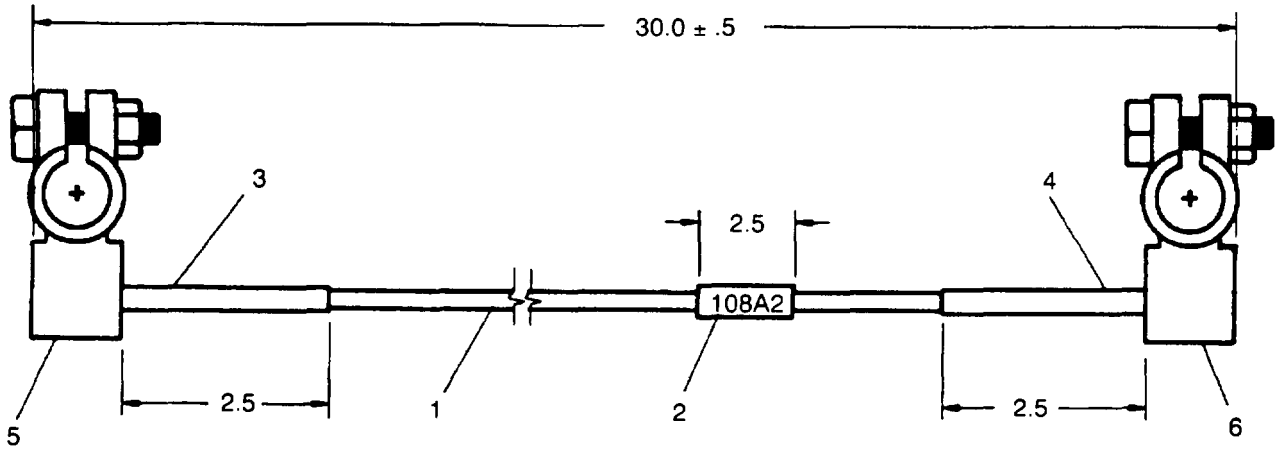
2. Strip 0.75 inch of insulation from each end of wire (1).

3. Position insulation sleeving (2) on center of wire, mark with wire number"100B2" and shrink to fit.

4. Crimp terminal (3) on one end of wire (1).

5. Crimp terminal (4) on other end of wire (1).

Figure D-2. Cable Assembly, Battery (P/N: 88-20313)



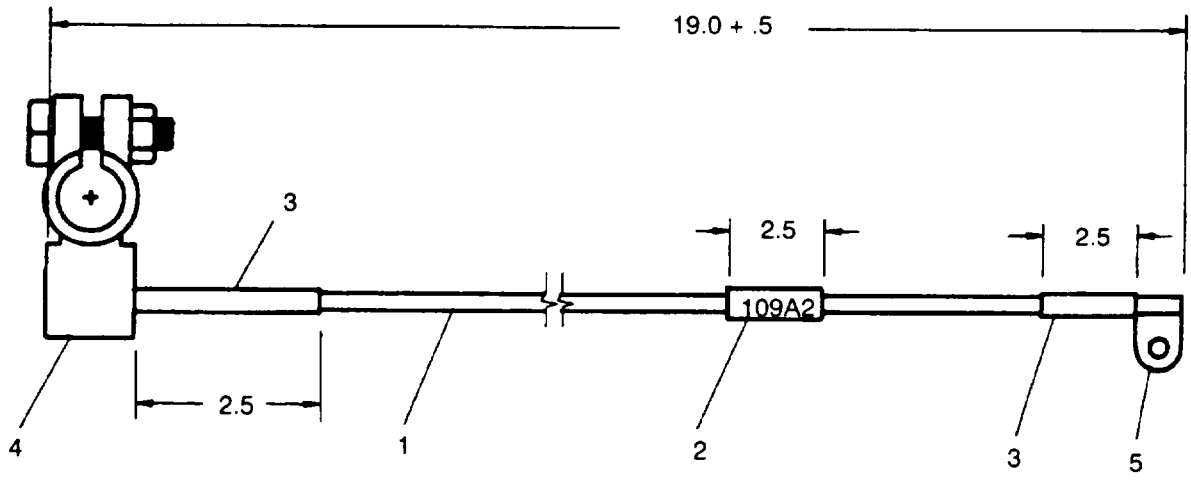
NOTES:

1. Dimensions shown are in inches.
2. Refer to TM 9–6115-641-24P for materials required.

PROCEDURES:

1. Cut wire (1) to length indicated.
2. Strip 0.75 inch of insulation from each end of wire (1).
3. Position insulation sleeving (2) on center of wire, mark with wire number”108A2" and shrink to fit.
4. Mark insulation sleeving (3) with “POSITIVE” and slide over one end of wire (1).
5. Mark insulation sleeving (4) with “NEGATIVE” and slide over one end of wire (1),
6. Crimp and solder terminal (5) on end of wire (1) with insulation sleeving (3). Install with bolt orientation as shown and battery post hole tapering open to far side.
7. Crimp and solder terminal (6) on end of wire (1) with insulation sleeving (4). Install with bolt orientation as shown and battery post hole tapering open to far side.
8. Position insulation sleeving (3) and (4) as shown and shrink to fit.

Figure D-3. Cable Assembly, (P/N: 88-20314)



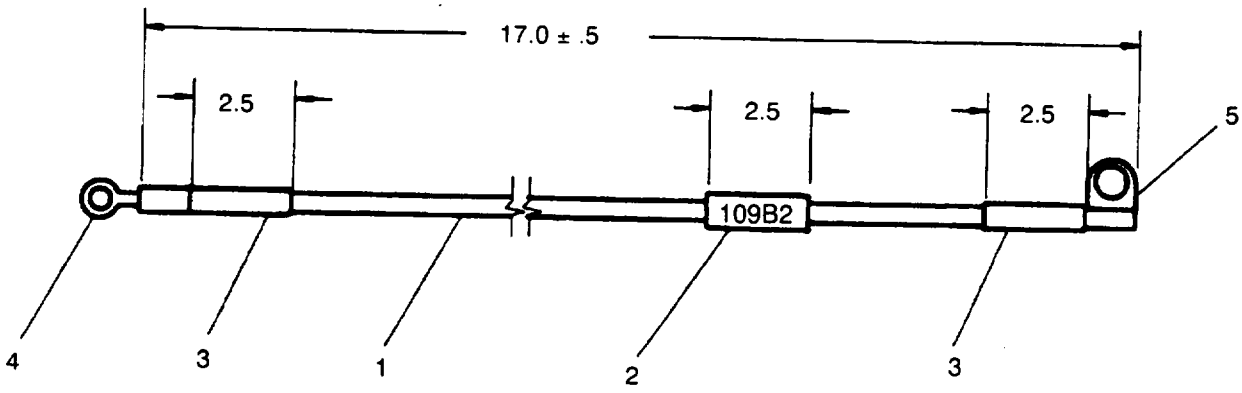
NOTES:

1. Dimensions shown are in inches.
2. Refer to TM 9-6115-641-24P for materials required.

PROCEDURES:

1. Cut wire (1) to length indicated.
2. Strip 0.75 inch of insulation sleeving from each end of wire (1).
3. Mark insulation sleeving (2) with wire number “109A2”, position on center of wire and shrink to fit.
4. Mark insulation sleeving (3) with “POSITIVE” and slide over each end of wire (1).
5. Crimp and solder terminal (4) on one end of wire (1) with bolt orientation as shown and battery post hole tapering open to far side.
6. Crimp terminal (5) on other end of wire (1) as shown.
7. Position insulation sleeving (3) as shown and shrink to fit.

Figure D-4. Cable Assembly, Battery (P/N: 88-20315)



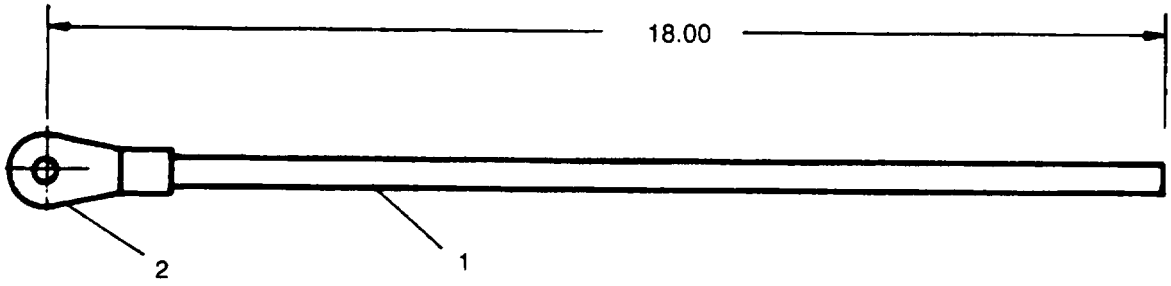
NOTES:

1. Dimensions shown are in inches.
2. Refer to TM 9-6115-641-24P for materials required.

PROCEDURES:

1. Cut wire (1) to length indicated.
2. Strip 0.75 inch of insulation from each end of wire (1).
3. Mark insulation sleeving (2) with wire number “109B2”, position on center of wire and shrink to fit.
4. Mark insulation sleeving (3) with “NEGATIvE” and slide over each end of wire (1).
5. Crimp terminal (4) on one end of wire (1) and terminal (5) on other end as shown.
6. Position insulation sleeving (3) as shown and shrink to fit.

Figure D-5. Cable Assembly, Battery (P/N: 88-20316)



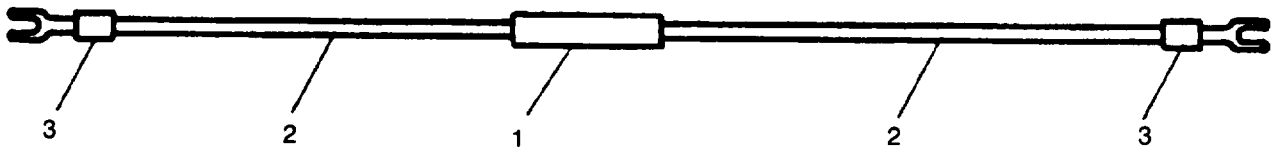
NOTES:

1. Dimensions shown are in inches.
2. Refer to TM 9-6115–641-24P for materials required.

PROCEDURES:

1. Cut rope (1) to length indicated.
2. Crimp terminal (2) on one end of rope (1).

Figure D-6 Cord, Load Wrench (P/N: 88-22460)



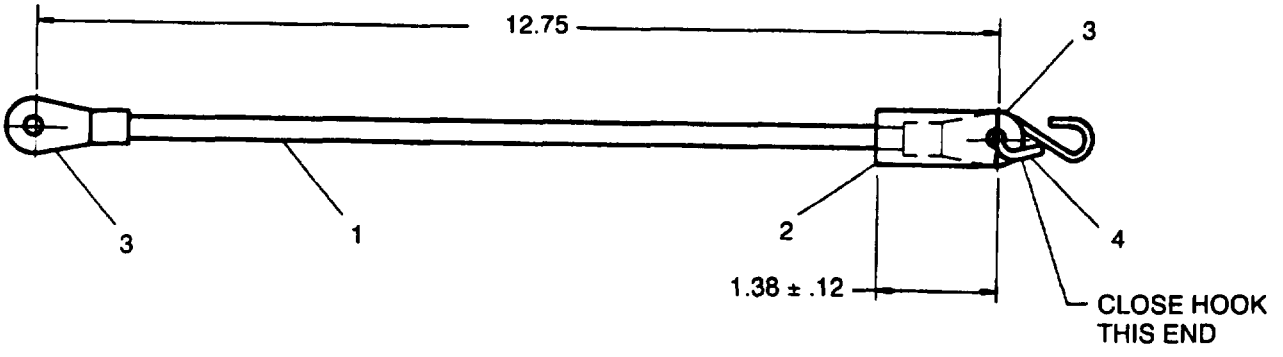
NOTES:

1. Refer to TM 9-6115-641-24P for materials required.

PROCEDURES:

1. Position 0.75 inch of insulation sleeving (2) on each lead of diode (1), leaving 0.25 inch of bare wire on each lead. Shrink sleeving to fit.
2. Crimp and solder terminals (3) on end of each diode (1) lead.

Figure D-7. Diode Assembly (P/N: 88-22418-1)



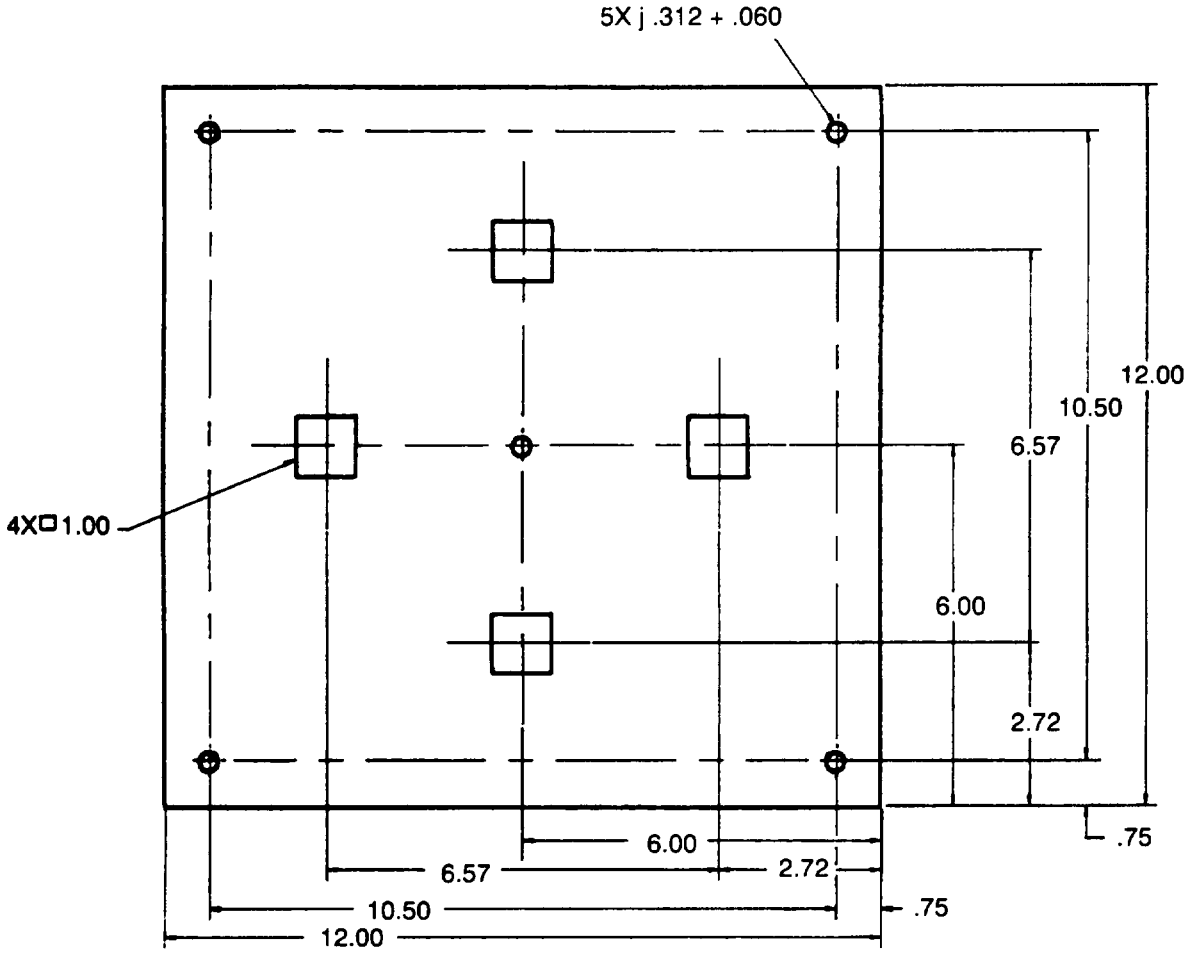
NOTES:

1. Dimensions shown are in inches.
2. Refer to TM 9-6115-641-24P for materials required.

PROCEDURES:

1. Cut rope (1) to length indicated.
2. Slide insulation sleeving (2) over one end of rope (1).
3. Crimp terminal (3) on each end of rope (1).
4. Install hook (4) in one terminal (3) and close hook end securing it to terminal.
5. Position insulation sleeving (2) as shown and shrink to fit.

Figure D-8. Holder, Control Panel (P/N: 88-20134)



MATERIALS	
Description	Part Number
Foam, Sound Absorbing	FF40JM02

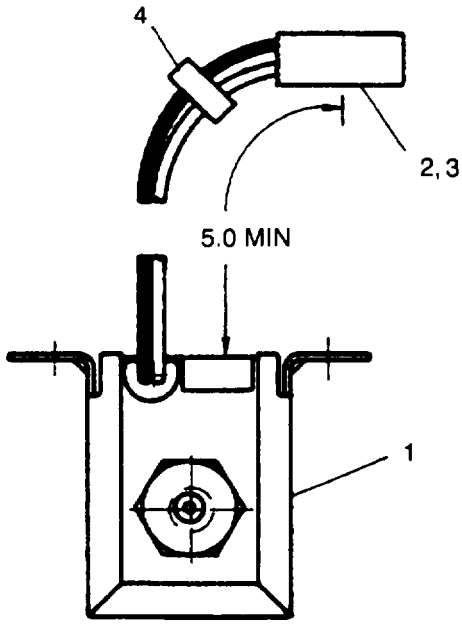
NOTES:

1. Dimensions shown are in inches.
2. Tolerances are 0.1 inch unless otherwise stated.

PROCEDURES:

1. Cut foam to dimensions shown.
2. Drill holes as shown.

Figure D-9. Insulation, Skid (P/N: 88-20296)



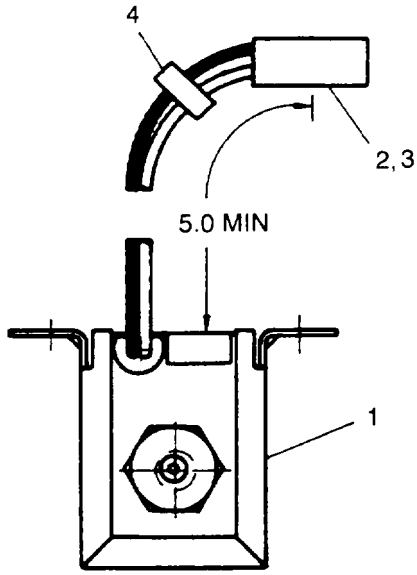
NOTES:

1. Dimensions shown are in inches.
2. Refer to TM 9-6115-641-24P for materials required.

PROCEDURES:

1. Remove and discard terminals supplied with fuel pump (1).
2. Strip 0.125 inch of insulation from end of each pump (1) lead.
3. Crimp pin (2) on end of each lead.
4. Insert pins (2) into housing (3) with red/white wire in position 1 and black wire in position 2.
5. Mark strap (4) with “P13” and install in position shown.

Figure D-10. Pump Assembly, Fuel (P/N: 88-20479)



NOTES:

1. Dimensions shown are in inches.

2. Refer to TM 9-6115–641–24P for materials required.

PROCEDURES:

1. Remove and discard terminals supplied with fuel pump (1).

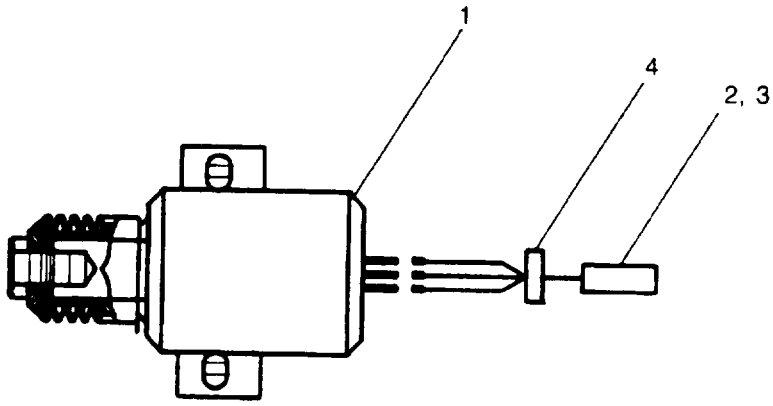
2. Strip 0.125 inch of insulation from end of each pump (1) lead.

3. Crimp pin (2) on end of each lead.

4. Insert pins (2) into housing (3) with red wire in position 1 and black wire in position 2.

5. Mark strap (4) with “P11 ” and install in position shown.

Figure D-11. Pump Assembly, Fuel (P/N: 88-22546)



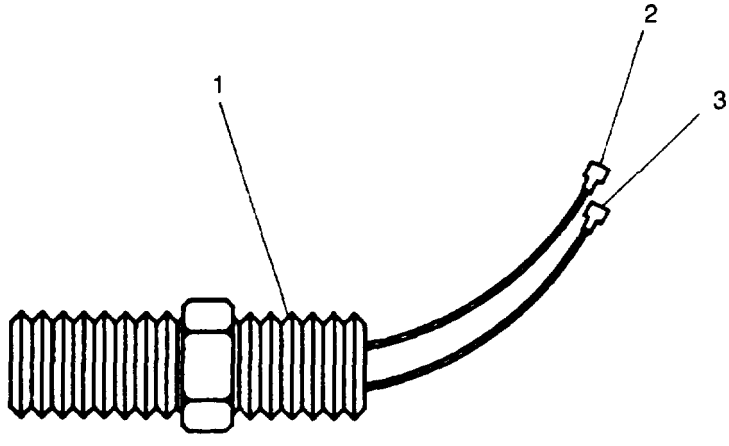
NOTES:

1. Refer to TM 9-6115-641-24P for materials required.

PROCEDURES:

1. Strip 0.125 inch of insulation from end of each solenoid (1) lead.
2. Crimp pins (2) on end of each solenoid (1) lead.
3. Insert pins (2) into housing (3) with “HOLD” wire in position 1, “PULL” wire in position 2, and “C” wire in position 3.
4. Mark strap (4) with “P14” and install in position shown.

Figure D-12. Solenoid Assembly, Fuel (P/N: 88-20482)



NOTES:

1. Refer to TM 9-6115-641-24P for materials required.

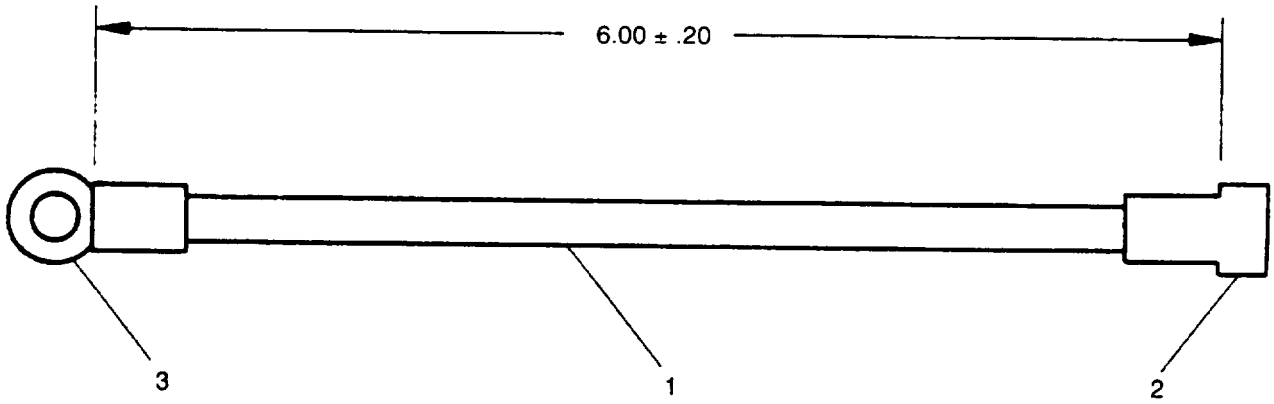
2. Transducer wiring is not polarity sensitive, so position of terminals is not important.

PROCEDURES:

1. Strip 0.25 inch of insulation from end of each transducer (1) lead,

2. Crimp male terminal (2) on one wire and female terminal (3) on other wire.

Figure D-13. Transducer Assembly (P/N: 88-20480)



NOTES:

1. Dimensions shown are in inches.
2. Refer to TM 9-6115–641-24P for materials required.

PROCEDURES:

1. Cut wire (1) to length indicated.
2. Strip 0.50 inch from each end of wire (1).
3. Crimp terminal (2) on one end of wire (1) and terminal (3) on other end.

Figure D-14. Wire, Varistor (P/Ns: 88-20305-1 through 88-203054)

Table D-1. INCHES TO METRIC CONVERSION

PART I. Fractional Equivalent

Fractional Inches	Decimal Inches	mm
1/16	.0625	1.587
1/8	.1250	3.175
3/16	.1875	4.762
1/4	.2500	6.350
5/16	.3125	7.937
3/8	.3750	9.525
7/16	.4375	11.112
1/2	.5000	12.700
9/16	.5625	14.287
5/8	.6250	15.875
11/16	.6875	17.462
3/4	.7500	19.050
13/16	.8125	20.637
7/8	.8750	22.225
15/16	.9375	23.812
1	1	25.400

PART II. Inches to Centimeters

Inches	cm
1	2.540
2	5.080
3	7.620
4	10.16
5	12.70
6	15.24
7	17.78
8	20.32
9	22.86
10	25.40
20	50.80
30	76.20
40	101.6
50	127.0
60	152.4
70	177.8
80	203.2
90	228.6
100	254.0

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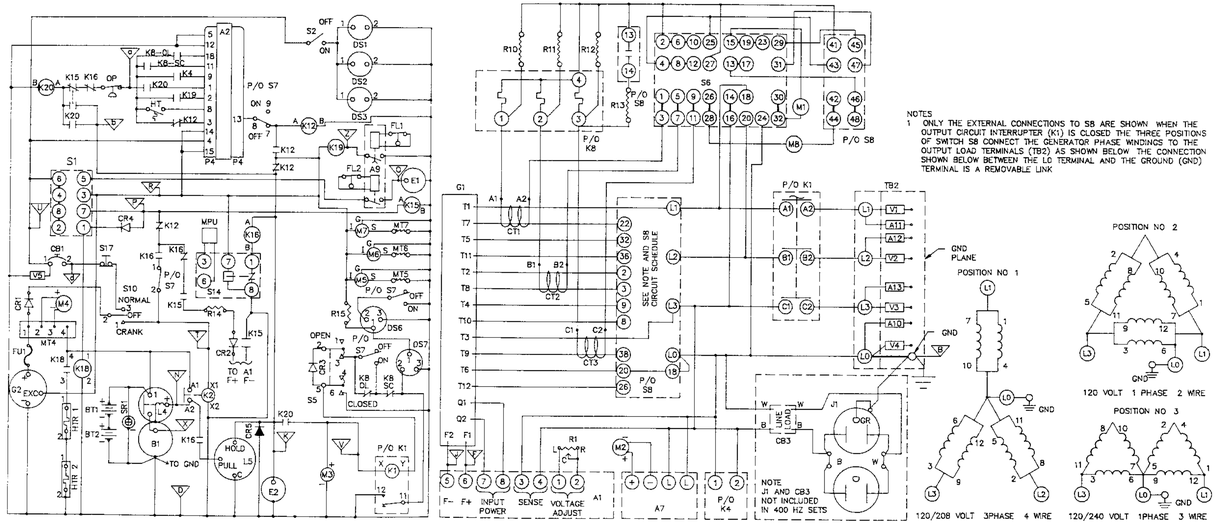
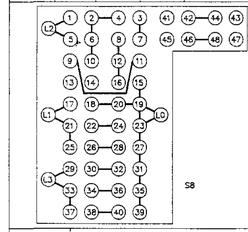


NOTES

1 ONLY THE EXTERNAL CONNECTIONS TO S8 ARE SHOWN. WHEN THE OUTPUT CIRCUIT INTERRUPTER (K1) IS CLOSED THE THREE POSITIONS OF SWITCH S8 CONNECT THE GENERATOR PHASE WINDINGS TO THE OUTPUT LOAD TERMINALS (TB2) AS SHOWN BELOW. THE CONNECTION SHOWN BELOW BETWEEN THE L0 TERMINAL AND THE GROUND (GND) TERMINAL IS A REMOVABLE LINK

S6 CIRCUIT SCHEDULE			
POSITION			
1 PHASE L3 – L1 L3	1 – 2 7 – 8 9 – 10	15 – 16 17 – 18	31 – 32 27 – 28
1 PHASE L3 – L0 L3	1 – 2 7 – 8 9 – 10	13 – 14 23 – 24	31 – 32 27 – 28
3 PHASE L1 – L2 L1	3 – 4 5 – 6 9 – 10	17 – 18 19 – 20	29 – 30 25 – 26
3 PHASE L2 – L3 L2	1 – 2 7 – 8 9 – 10	13 – 14 19 – 20	29 – 30 25 – 26
3 PHASE L3 – L1 L3	1 – 2 5 – 6 11 – 12	15 – 16 17 – 18	29 – 30 25 – 26
3 PHASE L3 – L0 L3	1 – 2 5 – 6 11 – 12	13 – 14 23 – 24	29 – 30 25 – 26

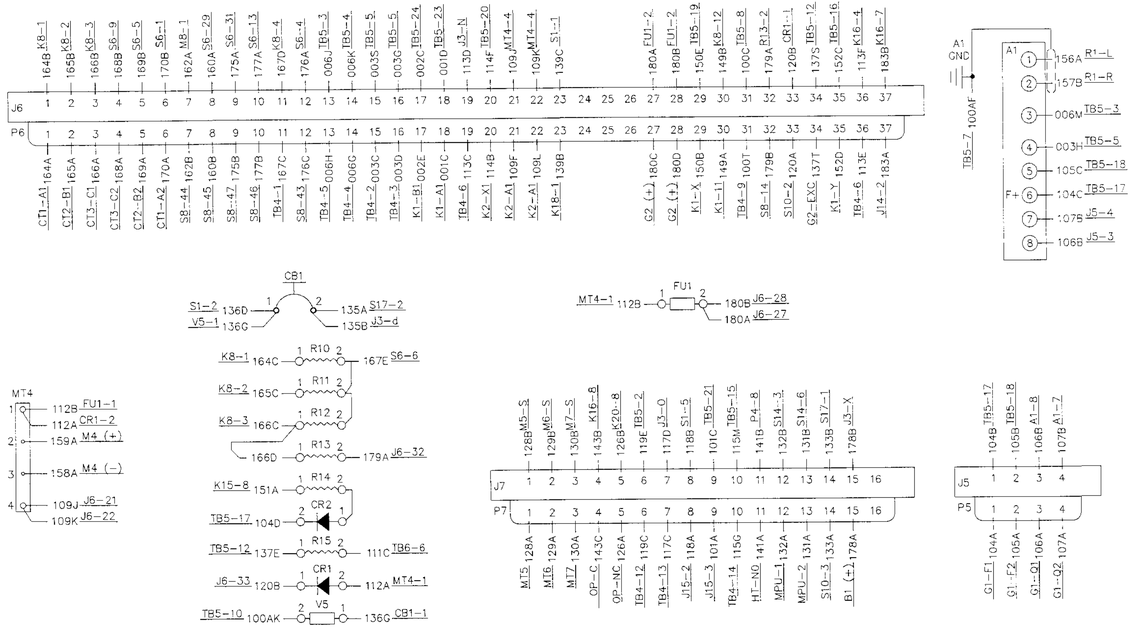
S1 CIRCUIT SCHEDULE	
POSITION	CIRCUITS MADE (2–8–4–6 ARE COMMON)
1 PREHEAT	COMMON TO 1
2 OFF	NONE
3 PRIME & RUN AUX. FUEL	COMMON TO 3 & 5
4 PRIME & RUN	COMMON TO 3
5 START	COMMON TO 3 & 7



POSITION	S8 SWITCH SCHEDULE			
1 120/208 V 3 PHASE 4–WIRE	1 – 2 3 – 4 5 – 6 11 – 12	15 – 16 21 – 22 27 – 28	31 – 32 35 – 36 37 – 38	41 – 42 45 – 46
2 120 V 1 PHASE 2–WIRE	3 – 4 7 – 8 9 – 10 11 – 12 13 – 14	17 – 18 21 – 22 23 – 24 25 – 26 27 – 28	29 – 30 33 – 34 37 – 38	43 – 44 47 – 48
3 120/240 V 1 PHASE 3–WIRE	7 – 8 9 – 10 13 – 14 23 – 24	25 – 26 31 – 32 33 – 34 39 – 40		43 – 44 47 – 48

A1	AC VOLTAGE REGULATOR	L0	OUTPUT TERMINAL
A2	MALFUNCTION INDICATOR	L1	OUTPUT TERMINAL
A7	FREQUENCY TRANSDUCER	L2	OUTPUT TERMINAL
A9	FLOAT SWITCH MODULE	L3	OUTPUT TERMINAL
A10 A13	EMI FILTER	L4	STARTER SOLENOID
B1	CRANKING MOTOR	L5	FUEL SOLENOID
BT1	BATTERY 12V	M1	AC VOLTMETER
BT2	BATTERY 12V	M2	FREQUENCY METER
CB1	DC CONTROL POWER CIRCUIT BREAKER	M3	TIME METER
CB3	GROUND FAULT CIRCUIT INTERRUPTER	M4	BATTERY CHARGING AMMETER
CBGND	CONTROL BOX GROUND	M5	FUEL LEVEL INDICATOR
CPGND	CONTROL PANEL GROUND	M6	COOLANT TEMPERATURE INDICATOR
CR	DIODES	M7	OIL PRESSURE INDICATOR
CT1	CURRENT TRANSFORMER	M8	AC AMMETER
CT2	CURRENT TRANSFORMER	MPU	MAGNETIC PICKUP
CT3	CURRENT TRANSFORMER	MT4	BATTERY CHARGING AMMETER SHUNT
DS1	PANEL LIGHT	MT5	FUEL LEVEL SENDER
DS2	PANEL LIGHT	MT6	COOLANT TEMPERATURE SENDER
DS3	PANEL LIGHT	MT7	OIL PRESSURE SENDER
DS6	IND LT BATTLE SHORT	OP	LOW OIL PRESSURE SWITCH
DS7	IND LT AC CIRCUIT INTERRUPTER	P4	PLUG MALFUNCTION INDICATOR
E1	AUXILIARY FUEL PUMP	R1	VOLTAGE ADJUST POTENTIOMETER
E2	FUEL PUMP	R10	BURDEN RESISTOR
FL1	LOW FUEL LEVEL FLOAT SWITCH	R11	BURDEN RESISTOR
FL2	AUXILIARY FUEL PUMP FLOAT SWITCH	R12	BURDEN RESISTOR
FU1	FUSE	R13	BURDEN RESISTOR
G1	AC GENERATOR	R14	FIELD FLASH RESISTOR
G2	BATTERY CHARGING ALTERNATOR	R15	LED RESISTOR
GND	GROUND	S1	MASTER SWITCH
HT	COOLANT HIGH TEMPERATURE SWITCH	S2	PANEL LIGHT SWITCH
HTR	ENGINE PRE HEATER	S5	AC CIRCUIT INTERRUPTER SWITCH
J1	CONVENIENCE RECEPTACLE	S6	AM/VM TRANSFER SWITCH
J3	DIAGNOSTIC RECEPTACLE	S7	BATTLE SHORT SWITCH
K1	AC CIRCUIT INTERRUPTER	S8	VOLTAGE RECONNECTION SWITCH
K2	CRANKING RELAY	S10	DEAD CRANK SWITCH
K4	OVERVOLTAGE RELAY	S14	CRANK DISCONNECT SWITCH
K8	OVERLOAD/SHORT CIRCUIT RELAY	S17	EMERGENCY STOP SWITCH
K12	ENGINE FAULT RELAY	SR1	SLAVE RECEPTACLE
K15	FIELD FLASH RELAY	SRGND	SLAVE RECEPTACLE GROUND
K16	CRANK DISCONNECT RELAY	TB2	OUTPUT LOAD TERMINAL BOARD
K18	PRE HEAT RELAY	TB	TERMINAL BOARD(S)
K19	FUEL LEVEL RELAY	V1 V4	VARISTOR AC LOAD LINES
K20	OIL PRESSURE RELAY	V5	VARISTOR DC SYSTEM

FO-1 Electrical Schematic



A1	AC VOLTAGE REGULATOR
A2	MALFUNCTION INDICATOR
A7	FREQUENCY TRANSDUCER
A9	FLOAT SWITCH MODULE
A10 A13	EMI FILTER
B1	CRANKING MOTOR
BT1	BATTERY 12V
BT2	BATTERY 12V
CB1	DC CONTROL POWER CIRCUIT BREAKER
CB3	GROUND FAULT CIRCUIT INTERRUPTER
CBGND	CONTROL BOX GROUND
CPGND	CONTROL PANEL GROUND
CR	DIODES
CT1	CURRENT TRANSFORMER
CT2	CURRENT TRANSFORMER
CT3	CURRENT TRANSFORMER
DS1	PANEL LIGHT
DS2	PANEL LIGHT
DS3	PANEL LIGHT
DS6	IND LT BATTLE SHORT
DS7	IND LT AC CIRCUIT INTERRUPTER
E1	AUXILIARY FUEL PUMP
E2	FUEL PUMP
FL1	LOW FUEL LEVEL FLOAT SWITCH
FL2	AUXILIARY FUEL PUMP FLOAT SWITCH
FU1	FUSE
G1	AC GENERATOR
G2	BATTERY CHARGING ALTERNATOR
GND	GROUND
HT	COOLANT HIGH TEMPERATURE SWITCH
HTR	ENGINE PRE HEATER
J1	CONVENIENCE RECEPTACLE
J3	DIAGNOSTIC RECEPTACLE
K1	AC CIRCUIT INTERRUPTER
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K15	FIELD FLASH RELAY
K16	CRANK DISCONNECT RELAY
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K19	FUEL LEVEL RELAY
K20	OIL PRESSURE RELAY
L0	OUTPUT TERMINAL
L1	OUTPUT TERMINAL
L2	OUTPUT TERMINAL
L3	OUTPUT TERMINAL
L4	STARTER SOLENOID
L5	FUEL SOLENOID
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M3	TIME METER
M4	BATTERY CHARGING AMMETER
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MT4	BATTERY CHARGING AMMETER SHUNT
MT5	FUEL LEVEL SENDER
MT6	COOLANT TEMPERATURE SENDER
MT7	OIL PRESSURE SENDER
OP	LOW OIL PRESSURE SWITCH
P4	PLUG MALFUNCTION INDICATOR
R1	VOLTAGE ADJUST POTENTIOMETER
R10	BURDEN RESISTOR
R11	BURDEN RESISTOR
R12	BURDEN RESISTOR
R13	BURDEN RESISTOR
R14	FIELD FLASH RESISTOR
R15	LED RESISTOR
S1	MASTER SWITCH
S2	PANEL LIGHT SWITCH
S5	AC CIRCUIT INTERRUPTER SWITCH
S6	AM/VM TRANSFER SWITCH
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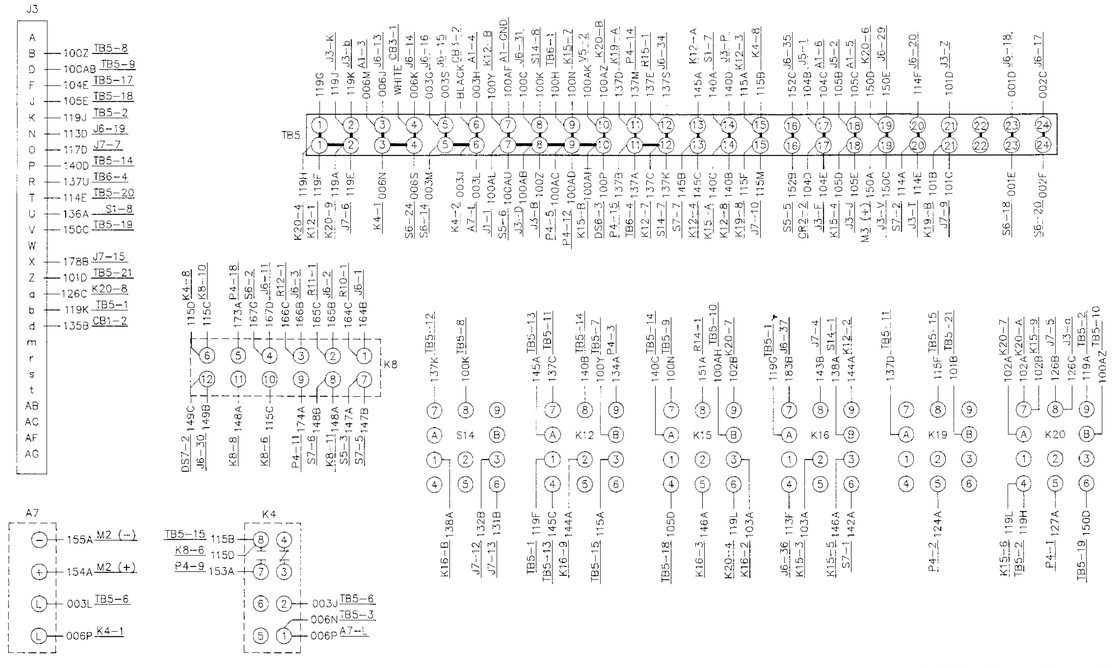
SR1	SLAVE RECEPTACLE
SRGND	SLAVE RECEPTACLE GROUND
TB2	OUTPUT LOAD TERMINAL BOARD
TB	TERMINAL BOARD(S)
V1-V4	VARISTOR AC LOAD LINES
V5	VARISTOR DC SYSTEM

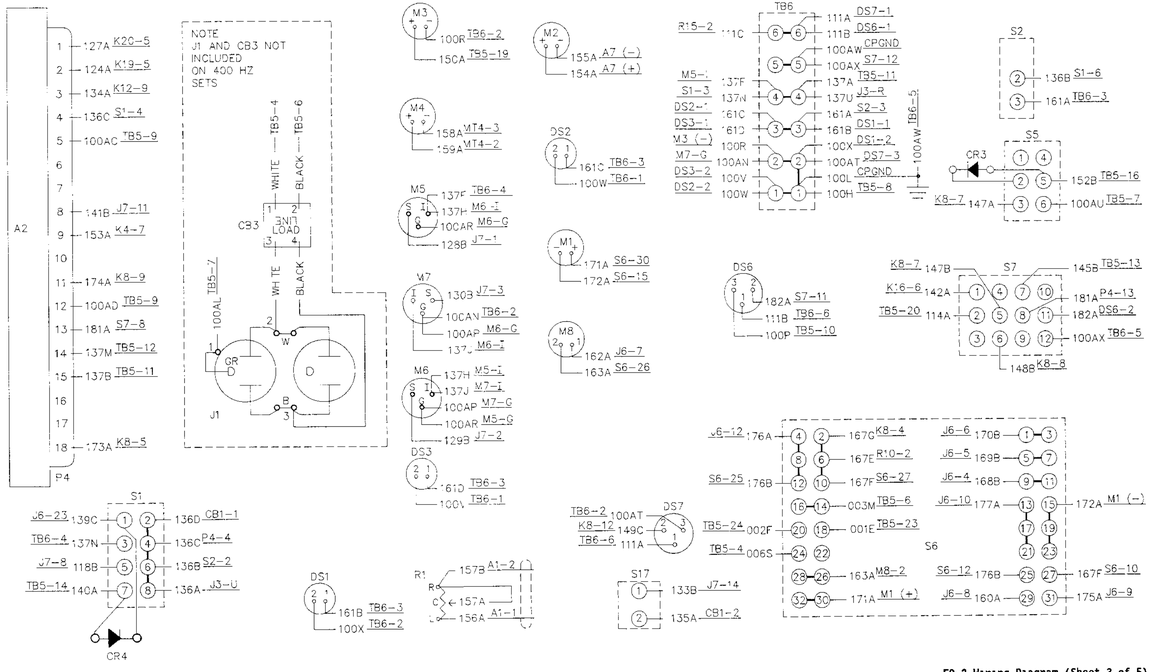
NOTE SIZE DESIGNATOR OMITTED FROM WIRE NUMBERS FOR CLARITY

FO-2 Wiring Diagram (Sheet 1 of 5)
FP-3/(FP-4 blank)

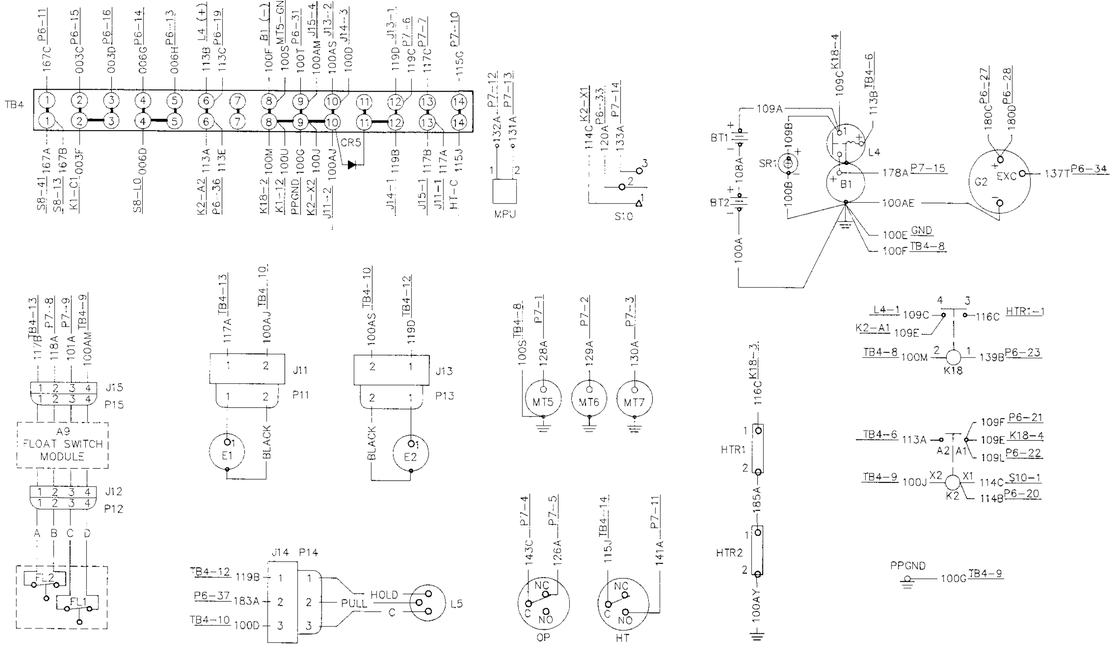


FO-2 Wiring Diagram (Sheet 2 of 5)

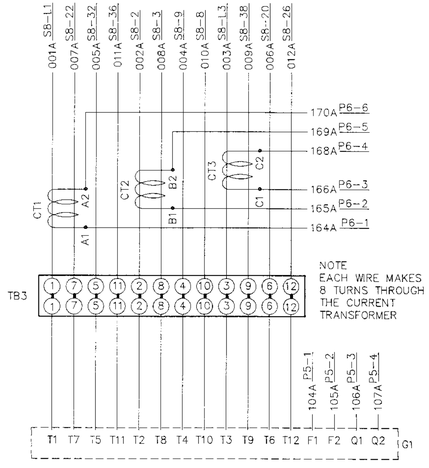
FP-5/(FP-6 blank)

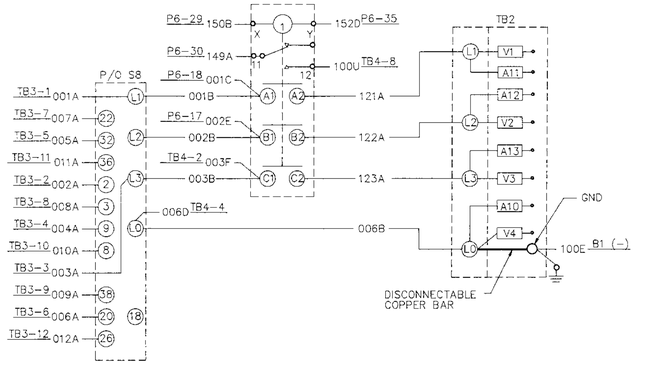


FO-2 Wiring Diagram (Sheet 3 of 5)



FO-2 Wiring Diagram (Sheet 4 of 5)


001A S8-L1
007A S8-22
005A S8-32
011A S8-36
002A S8-2
008A S8-3
004A S8-9
010A S8-8
003A S8-L3
009A S8-38
006A S8-20
012A S8-26
170A P6-6
169A P6-5
168A P6-4
166A P6-3
165A P6-2
164A P6-1
CT1
CT2
CT3
A1
A2
B1
B2
C1
C2
TB3
NOTE
EACH WIRE MAKES
8 TURNS THROUGH
THE CURRENT
TRANSFORMER
104A P5-1
105A P5-2
106A P5-3
107A P5-4
T1 T7 T5 T11 T2 T8 T4 T10 T3 T9 T6 T12 F1 F2 Q1 Q2 G1


K1
P6-29 150B
P6-30 149A
P6-18 001C
P6-17 002E
TB4-2 003F
TB4-4 006D
152D P6-35
100U TB4-8
121A
122A
123A
006B
P/O S8
TB3-1 001A
TB3-7 007A
TB3-5 005A
TB3-11 011A
TB3-2 002A
TB3-8 008A
TB3-4 004A
TB3-10 010A
TB3-3 003A
TB3-9 009A
TB3-6 006A
TB3-12 012A
TB2
GND
100E B1 (-)
DISCONNECTABLE
COPPER BAR
P6-7 162B
P6-10 177B
P6-32 179B
167A TB4-1
176C P6-12
160B P6-8
175B P6-9
167B TB4-1
P/O S8

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GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army

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CDR, 1st Br, 65th ADA
ATTN: SP4 J. Brown
Key West, FL 33040

DATE SENT
10 Jun 79

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1430-550-34-1	7 Sep 72 .	Unit of Radar Set AN/MPQ-50 Tested at the HFC

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
9-19		9-5	
21-2	step 1C	21-2	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.

Reads: Multimeter B indicates 600 K ohms to 9000 K ohms.

Change to read: Multimeter B indicates 600 K ohms minimum.

Reason: Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER
SP4 J.T. Brown, Jr.

SIGN HERE
SP4 James Brown, Jr.

TEAR ALONG PERFORATED LINE

DA FORM 2 JUL 79 2028-2

REPLACES DA FORM 2028-2, 1 APR 78 WHICH WILL BE USED UNTIL EXHAUSTED
AMSAV M Overprint 3, 1 Mar 81

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PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-6115-641-24	1 SEP 93	GENERATOR SET, SKID MOUNTED, TACTICAL QUIET

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PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO

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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 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

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

Cubic Measure

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

Approximate Conversion Factors

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

Temperature (Exact)

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