

**ARMY  
AIR FORCE  
MARINE CORPS**

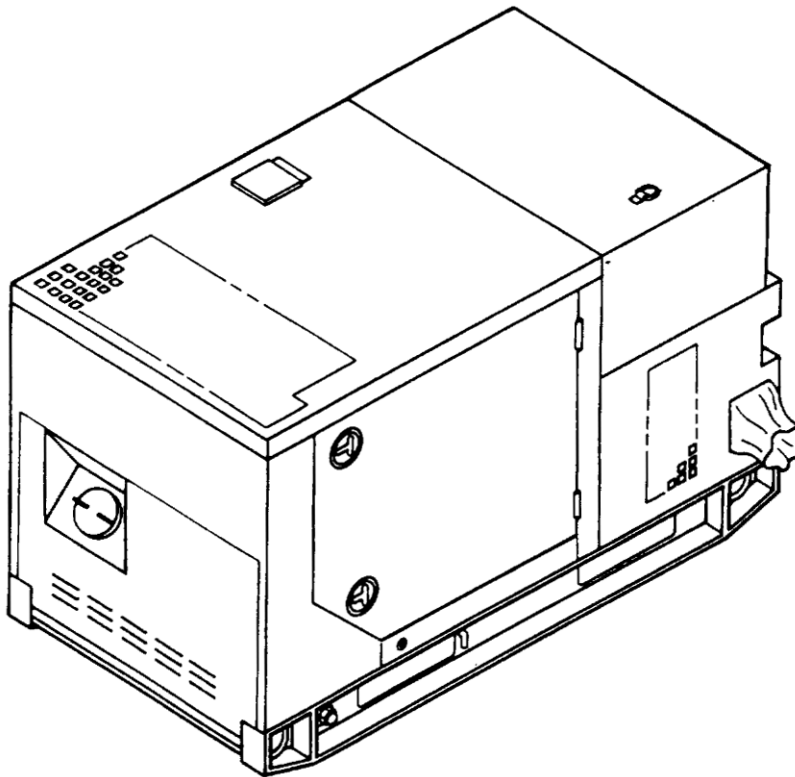
**\*TM 9-6115-642-10  
TO 35C2-3-455-11  
TM 09247A/09248A-10/1**

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**TECHNICAL MANUAL**

**OPERATOR'S MANUAL  
FOR**

**GENERATOR SET, SKID MOUNTED,  
TACTICAL QUIET, 10 KW, 60 HZ  
MEP-803A (NSN 6115-01-275-5061) (EIC VG3)  
GENERATOR SET, SKID MOUNTED,  
TACTICAL QUIET, 10 KW, 400 HZ  
MEP-813A (NSN 6115-01-274-7392) (EIC VN3)**



\*This manual supersedes TM 9-6115-642-10, TO 35C2-3-455-11 & TM 09247A/09248a-10/1 dated 30 December 1992. Date of issue for the revised manual is: 15 September 2010.

**DISTRIBUTION STATEMENT A.** Approved for public release; distribution is unlimited.

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**HEADQUARTERS, DEPARTMENTS OF THE ARMY, AIR  
FORCE AND HEADQUARTERS, U.S. MARINE CORPS  
15 SEPTEMBER 2010**

**PCN 184 092471 00**



## WARNING SUMMARY

### FIRST AID

For First Aid information, refer to FM 4-25.11.



**5**

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK:

**1**

DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL.

**2**

IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.

**3**

IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL.

**4**

SEND FOR HELP AS SOON AS POSSIBLE.

**5**

AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION.

### WARNING AND CAUTION STATEMENTS

Warning and Caution statements have been strategically placed throughout this text prior to operating procedures, practices, or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION).

A WARNING or CAUTION will apply each time the related step is repeated. Prior to starting any task the WARNINGS or CAUTIONS included in the text for that task must be reviewed and understood. Refer to the materials list at the beginning of the appropriate manual section for materials used during maintenance of this equipment. This warning summary contains the WARNINGS included in the manual.

**WARNING SUMMARY – CONTINUED**

**WARNING**

High voltage is produced when this generator set is in operation. Improper operation could result in personal injury or death by electrocution.

**WARNING**

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.

**WARNING**

Never attempt to connect or disconnect load cables while the generator is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

**WARNING**

Jumper will not be removed unless the equipment being powered specifically required an isolated ground (floating ground). Failure to comply with this warning can cause injury or death to personnel.

**WARNING**

DC voltages are present at generator set electrical components even with generator set shut down. Avoid grounding self when touching any electrical components. Failure to observe this warning can result in personal injury.

**WARNING**

Battery acid will cause burns to unprotected skin.

**WARNING**

The fuels in this generator set are highly explosive. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in severe personal injury or death.

**WARNING**

Hot fueling of generators while they are 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. Failure to observe this warning could cause severe personal injury or death may result.

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING SUMMARY – CONTINUED**

**WARNING**

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

**WARNING**

Cooling system operates at high temperatures. Personal injury or death from burns or scalding could result from contact with high pressure steam and/or liquid.

**WARNING**

Avoid contacting metal items with bare skin in extreme cold weather. Failure to observe this warning can result in personal injury.



## LIST OF EFFECTIVE PAGES / WORK PACKAGES

**NOTE:** This manual supersedes TM 9-6115-642-10, TO 35C2-3-455-11 & TM 09247A/09248a-10/1 dated 30 December 1992. Date of issue for the revised manual is: 15 September 2010. Zero in the "Change No." column indicates an original page or work package.

Date of issue for the original manual is:

Original 15 September 2010

**THE TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 18 AND THE TOTAL NUMBER OF WORK PACKAGES IS 22, CONSISTING OF THE FOLLOWING:**

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Blank	0	Back cover	0
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Chp 1 index	0		
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WP 0013 (2 pgs)	0		
WP 0014 (2 pgs)	0		
WP 0015 (2 pgs)	0		
WP 0016 (2 pgs)	0		
WP 0017 (2 pgs)	0		
WP 0018 (2 pgs)	0		
Chp 5 title page	0		
Chp 5 index	0		
WP 0019 (2 pgs)	0		
WP 0020 (2 pgs)	0		
WP 0021 (2 pgs)	0		
WP 0022 (2 pgs)	0		
Index-1 - Index-2	0		





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**HEADQUARTERS, DEPARTMENTS OF THE ARMY, AIR FORCE  
AND HEADQUARTERS, U.S. MARINE CORPS  
WASHINGTON, D.C.  
15 SEPTEMBER 2010**

**TECHNICAL MANUAL**

**OPERATOR'S MANUAL  
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**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET, 10 KW, 60 HZ  
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**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET, 10 KW, 400 HZ  
MEP-813A (NSN 6115-01-274-7392) (EIC VN3)**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

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. Reports, as applicable by the requiring Service, should be submitted as follows:

- (a) (A) Army - Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), located in the back of this manual, directly to: Commander, U.S. Army CECOM (LCMC) and Fort Monmouth, ATTN: AMSEL-LC-LEO-E-CM, Fort Monmouth, NJ 07703-5006. You may also send in your recommended changes via electronic mail or by fax. Our fax number is 732-532-3421, DSN 992-3421. Our e-mail address is [MONM-AMSELLEOPUBSCHG@conus.army.mil](mailto:MONM-AMSELLEOPUBSCHG@conus.army.mil). Our online web address for entering and submitting DA Form 2028s is <http://edm.monmouth.army.mil/pubs/2028.html>.
- (b) (MC) Marine Corps -Submit notice of discrepancies or suggest changes on a NAVMC 10772 The NAVMC may be submitted via the Internet using website <https://www.ala.usmc.mil>, click on Publications, Technical Publications, follow the instructions, and then click on the NAVMC 10772. it may also be submitted by electronic mail to [smb.log.tech.pubs.fct@usmc.mil](mailto:smb.log.tech.pubs.fct@usmc.mil), or by mailing a paper copy NAVMC 10772 in an envelope addressed to Commander, Marine Corps systems Command, ATTN. Assistant Commander Acquisition and Logistics (AC LCL/TP), 814 Radford Blvd, suite 20343, Albany, Georgia 31704-0343. In addition, forward an information copy to the Project Officer at the following address: Commander, Marine Corps Systems Command (GTES-EPS), 2200 Lester Street, Quantico, VA. 22134-6050
- (c) (F) Air Force - By Air Force AFTO Form 22 (Technical Manual (TM) change Recommendation and Reply) in accordance with paragraph 6-5, Section VI, TO 00-5-1 directly to prime ALC/MST.

A reply will be furnished to you.

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## HOW TO USE THIS MANUAL

This manual contains operator maintenance instructions for the MEP-803A/MEP-813A, 10 kW 60 and 400 Hz, skid mounted, tactical quiet generator sets.

### NOTE

Throughout the family of manuals, directional orientation in relation to the equipment is described from the point of view of the operator facing the operator's controls looking out over the equipment. From this perspective, the end of the equipment containing the operator's controls will be referred to as the rear.

This manual provides operating procedures, troubleshooting, maintenance, and supporting information required to operate and maintain the generator set. Listed below are some of the features included in this TM to help locate and use the provided information.

### WORK PACKAGES

This TM has been organized using the WP format. Each chapter contains a series of WPs rather than sections and paragraphs. Each WP is designed to stand alone as a complete information module; if the user keeps the section(s) of this TM in a loose-leaf binder, the user will be able to remove just the WP needed to complete a specific task. Here are some WP features of which the user should be aware.

Each WP is numbered using a four-digit number beginning with WP 0001. WPs are numbered sequentially throughout the TM (ex. WP 0016. WP 0020. etc.). The Table of Contents lists each chapter and WP title as well as all figures and tables contained within each. Figures and tables are numbered sequentially for each WP.

The WP number is located at the top right of each page. It is also located at the bottom of the page with the WP page number included (0001-1 would be page 1 of the General Information WP (WP 0001, General Information)).

Each WP starts on a right-hand page. This is done so the user can remove a single WP from the paper TM if needed for a task. Blank pages are assigned a number, but it appears on the preceding or following page. For example, if page 0001-10 of a WP is blank, page 0001-9 will have the number 0001-9/10 blank; or if page 0001-1 of a WP is blank, page 0001-2 will have the number 0001-1 blank/2.

Each WP containing step-by-step maintenance or troubleshooting procedures will end with the words END OF TASK, and each WP ends with the statement END OF WORK PACKAGE. Think of each WP as a small, stand-alone TM.

Typographical conventions are as follows:

[Unload] indicates a soft key or a switch.

[Previous] + [Next] indicates two simultaneous key presses. [ + ] [ - ] indicates two sequential key presses.

References to equipment Data and Description Plates are printed as they appear on the equipment whenever possible.

### WARNINGS, CAUTIONS AND NOTES DEFINITIONS

Warnings, cautions, notes, chapter titles, and paragraph headings are printed in bold type.

The following definitions apply to WARNINGS, CAUTIONS and NOTES found throughout this publication. Warning, cautions and notes provide supplemental information. Personnel must understand and apply these Warnings, Cautions and Notes during many phases of operation and maintenance to ensure personnel safety and health and the protection of property. Portions of this information may be repeated in certain chapters of this publication for emphasis.

**WARNINGS, CAUTIONS AND NOTES DEFINITIONS – CONTINUED****WARNING**

A warning identifies a clear danger to the person doing that procedure.

**CAUTION**

A caution identifies a clear danger to the person doing that procedure.

**NOTE**

A note highlights essential procedures, conditions, or statements or conveys important instructional data to the user.

**CHAPTER OVERVIEW****Chapter 1 - General Information, Equipment Description and Theory of Operation**

Chapter 1 provides an introduction to the 10 kW 60 and 400 Hz skid mounted, tactical quiet generator sets. It is divided into three work packages, as follows:

**General Information.** This work package provides general information about this manual and the related forms and records. Instructions are provided for making equipment improvement recommendations. Coverage includes a reference to the TM that contains instructions on destruction of materiel to prevent enemy use. Also, a list of abbreviations and acronyms is provided. Also, a nomenclature cross-reference list is provided as well as a list of abbreviations and acronyms.

**Equipment Description and Data.** This work package describes capabilities, characteristics, and features. It provides basic equipment data and shows the locations of major components. Descriptions of the major components are also provided.

**Theory of Operation.** This work package provides functional descriptions of the equipment.

**Chapter 2 - Operator Instructions**

Chapter 2 provides instructions for operating the 10 kW 60 and 400 Hz skid mounted, tactical quiet generator sets. The chapter is divided into three work packages, as follows:

**Description and Use of Operator Controls and Indicators.** This work package provides references to the applicable generator set technical manuals and trailer technical manuals. Those references contain information on operator's controls and indicators for the equipment.

**Operation Under Usual Conditions.** This work package contains instructions for preparing the equipment for use and operation under normal conditions. Coverage includes connection instructions and preparation instructions for movement to a new worksite.

**Operation Under Unusual Conditions.** This work package provides unusual operating procedures or references to the applicable accompanying technical manuals.

**Chapter 3 - Operator Troubleshooting Procedures**

Chapter 3 covers troubleshooting procedures of the 10 kW 60 and 400 Hz skid mounted, tactical quiet generator sets to be performed by the operator. The chapter is divided as follows:

**Operator Troubleshooting Index.** This work package provides a troubleshooting introduction and malfunction/symptom index to direct you to the appropriate troubleshooting procedure at the operator level.

**Operator Troubleshooting Procedures.** This work package provides troubleshooting procedures and corrective actions that are to be performed by the operator. It also provides references to the applicable technical manuals.

**Chapter 4 - Operator Maintenance Instructions**

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## CHAPTER OVERVIEW – CONTINUED

Chapter 4 covers maintenance procedures for the 10 kW 60 and 400 Hz skid mounted, tactical quiet generator sets to be performed by the operator. Its purpose is to provide you with the information that you need to keep the equipment in good operating condition. The chapter is divided as follows:

**Operator Preventive Maintenance Checks and Services (PMCS) Introduction.** This work package provides a detailed explanation of each table entry in the PMCS table along with applicable warnings, cautions and notes prior to starting on the PMCS procedures.

**Operator Preventive Maintenance Checks and Services (PMCS).** This work package contains detailed instructions that the operator must perform before, during, and after preventive maintenance checks and services. Coverage includes all operator PMCS for the equipment.

**Operator Lubrication Instructions.** This work package section provides references to the applicable lubrication instructions.

**Operator Maintenance Procedures.** These work packages refer the operator to the preventive maintenance checks and services required by WP 0010.

### Chapter 5 - Supporting Information

Chapter 5 covers maintenance procedures for the 10 kW 60 and 400 Hz skid mounted, tactical quiet generator sets to be performed by the operator. Its purpose is to provide you with the information that you need to keep the equipment in good operating condition. The chapter is divided as follows:

**Components of End Item (COEI) and Basic Issue Items (BII) Lists.** This work package lists the items usually packaged separately but needed for installation and operation of the equipment. The work package has three sections, as follows:

**Introduction.** This section explains the entries in Tables 1 and 2.

**Components of End Item.** The equipment is normally shipped fully assembled, so this section is not applicable.

**Basic Issue Items.** This section contains a list of the accessories needed for installation and operation of the equipment.

**Additional Authorization List (AAL).** This work package lists additional items you are authorized for support of the equipment. This work package contains two sections, as follows:

**Introduction.** This section explains the entries in Tables 1.

**Additional Authorized Items List.** This table lists the Additional Authorized Items.

**Expendable and Durable Items List.** This work package lists expendable/durable supplies and materials needed to operate and maintain your equipment. The work package contains two sections, as follows:

**Introduction.** This section explains the entries in Tables 1.

**Expendable and Durable Items List.** The list indicates the maintenance level that needs each item and identifies the items by National Stock Number (NSN), description, and unit of measure.

**Definition of Unusual Terms.** This section lists and defines the terms used in this technical manual that are not listed in the Army Regulation (AR 310-25).

### Rear Matter

**Alphabetical Index.** An alphabetical index at the back of this technical manual provides a listing of subjects covered, cross-referenced to the applicable work packages.

## HOW TO FIX AN EQUIPMENT MALFUNCTION

### Determining the Cause

Finding the cause of a malfunction, troubleshooting, is the first step in fixing your equipment and returning it to operation. Follow these simple steps to determine the root of the problem:

1. Turn to the Table of Contents in this manual.

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**HOW TO FIX AN EQUIPMENT MALFUNCTION – CONTINUED**

2. Locate "Troubleshooting" under the chapter that covers your level of maintenance. Turn to the page indicated.
3. For operator troubleshooting, follow the instructions in the references listed in Chapter 3.
4. For troubleshooting at the field level, find the malfunction listing in Chapter 5. Follow the instructions provided as indicated by the symptom index.

**Preparing for a Task**

Be sure that you understand the entire maintenance procedure before beginning any maintenance task. Make sure that all parts, materials, and tools are handy. Read all steps before beginning.

Prepare to do the task as follows:

1. Carefully read the entire task before starting. It tells you what you will need and what you have to know to start the task. **DO NOT START THE TASK UNTIL:**
  - a. You know what is needed
  - b. You have everything you need
  - c. You understand what to do
2. If parts are listed, they can be drawn from technical supply. Before you start the task, check to make sure you can get the needed parts. National stock numbers (NSNs) and part numbers for Electric Power Plant III parts are listed in the Repair Parts and Special Tools List (RPSTL).
3. If expendable/durable supplies or materials are needed, get them before starting the task. Refer to WP 0022 for the correct nomenclature and NSN.

**How to Do the Task**

Before starting, read the entire task. Be sure that you understand the entire procedure before you begin the task.

As you read, remember the following:

1. **PAY ATTENTION TO WARNINGS, CAUTIONS, AND NOTES.**
2. Use the List of Abbreviations/Acronyms if you do not understand the special abbreviations or unusual terms used in this manual.
3. The following are standard maintenance practices. Instructions about these practices are usually not included in task steps. When standard maintenance practices do not apply, the task steps will tell you.
  - a. Tag electrical wiring before disconnecting it.
  - b. Discard used preformed packing, retainers, gaskets, cotter pins, lockwashers, and similar items. Install new parts to replace the discarded items.
  - c. Coat packing before installation, in accordance with the task instructions.
  - d. Disassembly procedures describe the disassembly needed for total authorized repair. You may not need to disassemble an item as far as described in the task. Follow the disassembly steps only as far as needed to repair/replace worn or damaged parts.
  - e. Clean the assembly, subassembly, or part before inspecting it.
  - f. Before installing components having mating surfaces, inspect the mating surfaces to make sure they are in serviceable condition.
  - g. Hold the bolt (or screw) head with a wrench (or screwdriver) while tightening or loosening a nut on the bolt (or screw).
  - h. Torque to the special torque cited when the task instructions include the words "torque to." Use standard torques at all other times.
  - i. When a cotter pin is required, align the cotter pin holes within the allowable torque range.
  - j. Inspect for foreign objects after performing maintenance.





## **CHAPTER 1**

### **OPERATOR GENERAL INFORMATION, EQUIPMENT DESCRIPTION AND THEORY OF OPERATION**

#### **FOR**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**

**10 kW, 60 Hz**

**MEP-803A**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**

**10 kW, 400 Hz**

**MEP-813A**

CHAPTER 1

OPERATOR GENERAL INFORMATION, EQUIPMENT DESCRIPTION AND THEORY OF OPERATION

WORK PACKAGE INDEX

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GENERAL INFORMATION .....	0001
EQUIPMENT DESCRIPTION AND DATA .....	0002
THEORY OF OPERATION .....	0003

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**OPERATOR MAINTENANCE****GENERAL INFORMATION**

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**SCOPE**

This manual is designed to help you operate and maintain the MEP-803A and MEP-813A Tactical Quiet Generator (TQG) Sets. Warning pages are located at the front of this manual. Read the warnings before operating or doing maintenance on the equipment.

**Type of Manual.** This manual contains operation and operator maintenance instructions for the Tactical Quiet (TQ), 10 kW 60 and 400 Hz Generator Sets (Figure 1), herein referred to as generator set. Included are descriptions of major components and their functions in relation to other components.

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

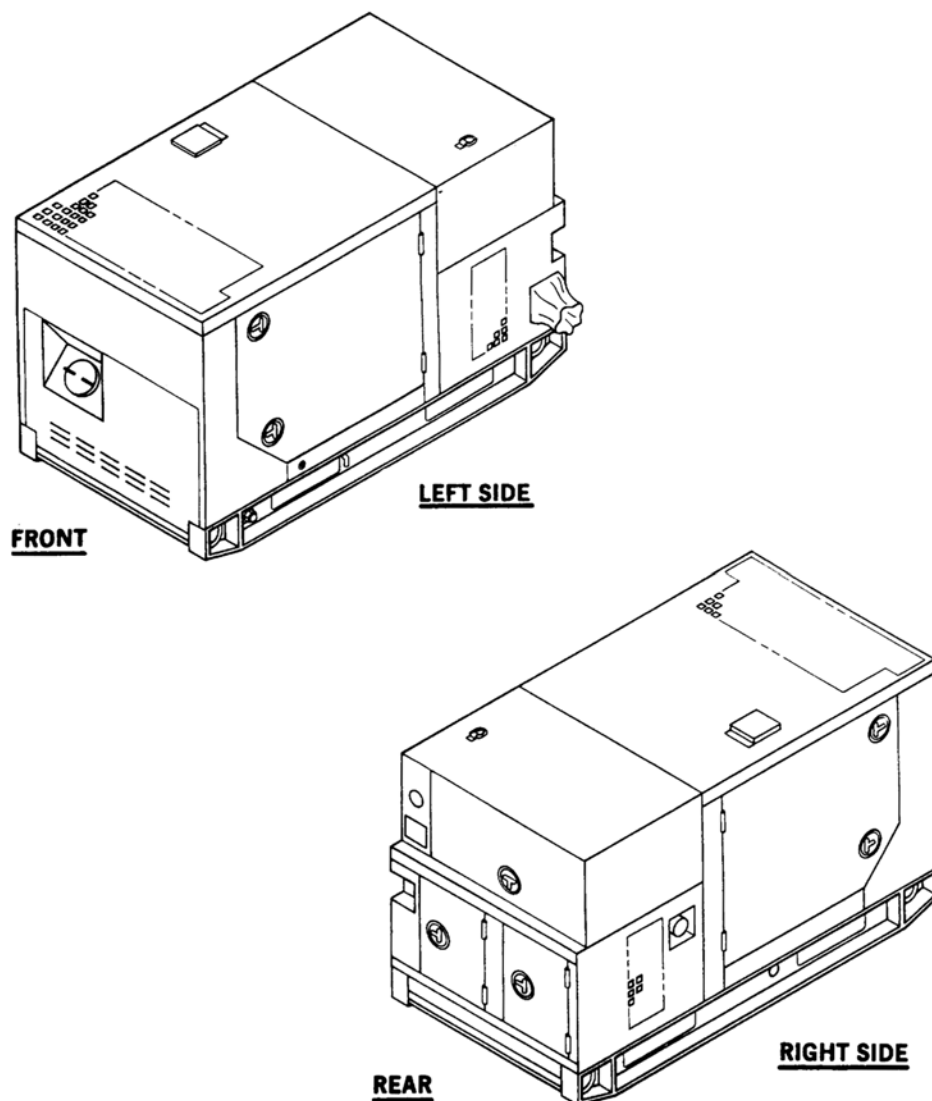


Figure 1. Generator Set, 10 kW, Tactical Quiet.

## **MAINTENANCE FORMS, RECORDS, AND REPORTS**

(A) Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual; DA PAM 738-751, Functional Users Manual for the Army Maintenance Management Systems - Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.

(MC) Maintenance forms and records used by Marine Corps personnel are prescribed by TM 4700-15/1.

(F) Maintenance forms and records used by Air Force personnel are prescribed in AFI 21-101 and the applicable TO 00-20 Series Technical Orders.

## **REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)**

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. If you have Internet access, the easiest and fastest way to report problems or suggestions is to go to <https://aeps.ria.army.mil/aepspublic.cfm> (scroll down and choose the "Submit Quality Deficiency Report" bar). The Internet form lets you choose to submit an Equipment Improvement Recommendation (EIR), a Product Quality Deficiency Report (PQDR or a Warranty Claim Action (WCA). You may also submit your information using an SF 368 (Product Quality Deficiency Report). You can send your SF 368 via e-mail, regular mail, or facsimile using the addresses/facsimile numbers specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual. We will send you a reply.

## **CORROSION PREVENTION AND CONTROL (CPC)**

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation of metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is the rusting of iron. Corrosion damage in metals can be seen, depending on the metal, as tarnishing, pitting, fogging, surface residue, and/or cracking.

Plastics, composites, and rubbers can also degrade. Degradation is caused by thermal (heat), oxidation (oxygen), solvation (solvents), or photolytic (light, typically UV) processes. The most common exposures are excessive heat or light. Damage from these processes will appear as cracking, softening, swelling, and/or breaking.

SF Form 368, Product Quality Deficiency Report should be submitted to the address specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual.

## **DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE**

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command) TM 750-244-3.

## **PREPARATION FOR STORAGE OR SHIPMENT**

For information on Preparation for Storage or Shipment, refer to WP 0005, Preparation for Movement.

**WARRANTY INFORMATION**

The generator sets, models MEP-803A and MEP-813A, are warranted by Libby Corporation for a period of 36 months or 1,800 operating hours, whichever occurs first. Refer to Warranty Technical Bulletin TB 9-6115-642-24. The warranty starts on the date found in block 23, DA Form 2408-9 Equipment Control Record. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your Unit Maintenance Shop.

**NOMENCLATURE CROSS-REFERENCE LIST**

<b>Model Number</b>	<b>Equipment Name</b>
MEP-803A	Generator Set, Skid Mounted, Diesel Powered, Tactical Quiet 10 kW 60 Hz.
MEP-813A	Generator Set, Skid Mounted, Diesel Powered, Tactical Quiet 10 kW 400 Hz.

**LIST OF ABBREVIATIONS/ACRONYMS**

<b>Abbreviation</b>	<b>Definition</b>
°C	Degrees Celsius
°F	Degrees Fahrenheit
AAL	Additional Authorization List
AMP	Ampere
BII	Basic Issue Item
BOI	Basis Of Issue
CAGE	Commercial And Government Entity
CAGEC	Commercial And Government Entity Code
cm	Centimeter
COEI	Components Of End Item
CPC	Corrosion Prevention And Control
CTA	Common Table of Allowance
DMWR	Depot Maintenance Work Requirement
DOD	Department Of Defense
EIR	Equipment Improvement Recommendation
FGC	Functional Group Code
Hz	Hertz
JTA	Joint Table of Allowances

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**LIST OF ABBREVIATIONS/ACRONYMS – CONTINUED**

kg	Kilogram
kPa	Kilopascals
kVa	Kilovolt-ampere
kW	Kilowatt
kW	Kilowatt
L	Liter
lbf•ft	Foot Pound•Force
m	Meter (Metric Measure)
mS	Millisecond
MTOE	Modified Table of Organization and Equipment
NATO	North Atlantic Treaty Organization
NBC	Nuclear Biological Chemical
NHA	Next Higher Assembly
NIIN	National Item Identification Number
NSN	National Stock Number
N•m	Newton•Meter
P/N	Part Number
pa	Pascal
PMCS	Preventive Maintenance Checks And Services
PSI	Pounds per Square Inch
SMR	Source, Maintenance, And Recoverability
TAMMS	The Army Maintenance Management System
UOC	Usable On Code
V	Volts
VAC	Volts Alternating Current
VDC	Volts Direct Current

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**EQUIPMENT DESCRIPTION AND DATA**

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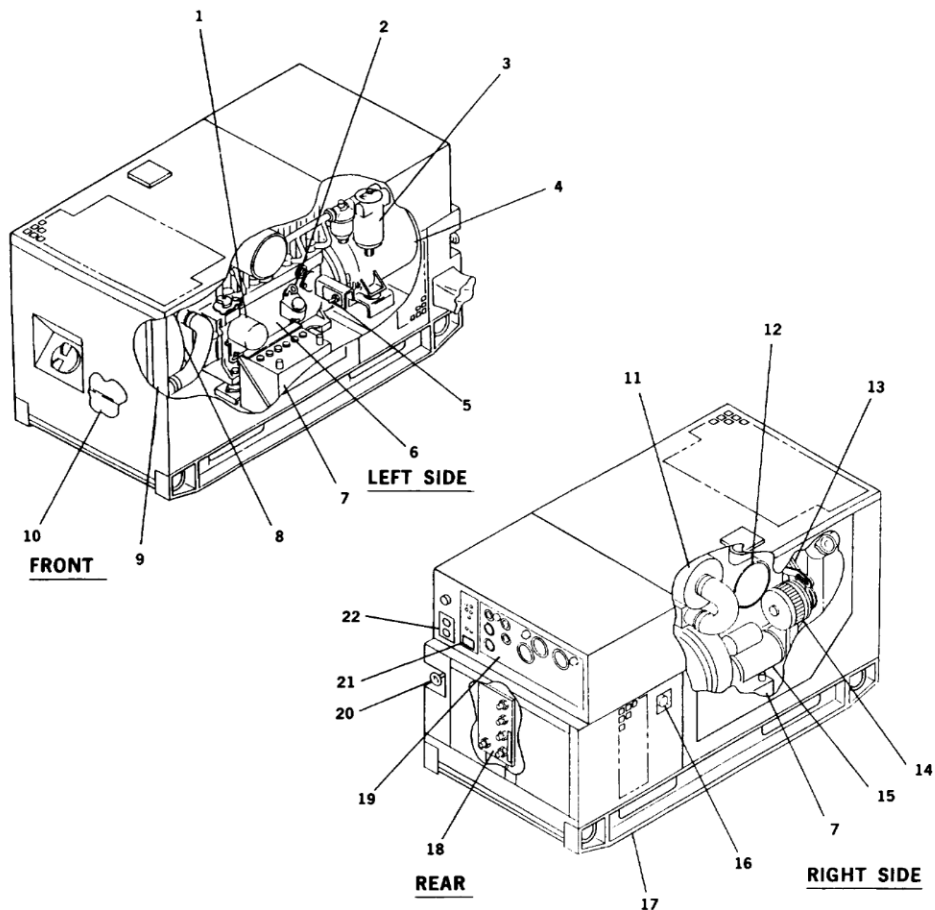
**EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES**

The generator sets, models MEP-803A and MEP-813A (Figure 1), are fully enclosed, self-contained, skid-mounted, portable units. They are equipped with controls, instruments and accessories necessary for operation. 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.

**NOTE**

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

## LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



### Legend

- |                               |                                |                                |
|-------------------------------|--------------------------------|--------------------------------|
| 1 Oil Filter                  | 9 Radiator                     | 17 Skid Base                   |
| 2 Dipstick                    | 10 Fuel Tank                   | 18 Load Output Terminal Board  |
| 3 Fuel Filter/Water Separator | 11 Air Cleaner Assembly        | 19 Control Panel Assembly      |
| 4 AC Generator                | 12 Muffler                     | 20 Frequency Adjust Control    |
| 5 Dead Crank Switch           | 13 Fan Belt                    | 21 Malfunction Indicator Panel |
| 6 Engine                      | 14 Battery Charging Alternator | 22 Convenience Receptacle      |
| 7 Batteries                   | 15 Stator                      |                                |
| 8 Water Pump                  | 16 NATO Slave Receptacle       |                                |

**Figure 1. Generator Set Components.**

### 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.

### 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.



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**LOCATION AND DESCRIPTION OF MAJOR COMPONENTS – CONTINUED****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.

**AC Generator (4)**

The AC generator is a single bearing, drip-proof, synchronous, brushless, three phase, fan-cooled generator. The generator is coupled directly to the rear of the diesel engine.

**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.

**Engine (6)**

The generator is powered by a four 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, over-voltage.

**Batteries (7)**

Two batteries are required, one on each side of the generator set. The batteries are maintenance free, 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.

**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.

**Radiator (9)**

The radiator is located at the front of the generator set. It acts as a heat exchanger for the engine coolant.

**Fuel Tank (10)**

The 9 gallon (34 L) 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.

**Air Cleaner Assembly (11)**

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 canister. The air cleaner assembly features a dust collector which traps large dust particles. The air cleaner assembly has a restriction indicator which will indicate red when the air filter element requires servicing.

---

**LOCATION AND DESCRIPTION OF MAJOR COMPONENTS – CONTINUED****Muffler (12)**

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.

**Fan Belt (13)**

The fan belt is located in the engine compartment on the front of the engine. The belt drives the fan, water pump and battery charging alternator.

**Battery Charging Alternator (14)**

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.

**Starter (15)**

The starter is located on the right side of the engine. The electric starter mechanically engages the engine fly-wheel in order to start the diesel engine.

**NATO Slave Receptacle (16)**

The NATO slave receptacle is located on the right side (rear) of the generator set. It is used for slave starting.

**Skid Base (17)**

The skid base supports the generator set. It has fork lift access openings and cross members for short distance movement. The skid base has provisions in the bottom for installation of the generator set on a trailer.

**Load Output Terminal Board (18)**

The load output terminal board is located on the right side (rear) of the generator set. Four output terminals are located on the board. They are marked L1, L2, L3 and LO. 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 LO and GND terminals.

**Control Panel Assembly (19)**

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.

**Frequency Adjust Control (20)**

The Frequency Adjust Control is located at the rear left side of generator set. It is used to adjust the generator frequency output.

**Malfunction Indicator Panel (21)**

The malfunction indicator panel is located to the left of the control panel assembly. It indicates malfunctions of the generator set components.

**LOCATION AND DESCRIPTION OF MAJOR COMPONENTS – CONTINUED****Convenience Receptacle (22)**

The convenience receptacle is a 10 Amp, 120 VAC receptacle used to operate small plug in type equipment. It is protected by a Ground Fault Circuit Interrupter located below the malfunction indicator panel (21), an overload circuit breaker located inside the control box, and an in-line fuse on generator sets, contract number DAAK01-88- D-D080. The convenience receptacle power is available at all times during operation of the generator set.

**DIFFERENCES BETWEEN MODELS**

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

Model MEP-803A is equipped with a 60 Hz generator.

Model MEP-813A is equipped with a 400 Hz generator.

**EQUIPMENT DATA**

For a list of Leading Particulars refer to Table 1

**Table 1. Leading Particulars.**

1. Generator Set:		
Model Numbers:		
10 kW 60 Hz Tactical Quiet	MEP-803A	
10 kW 400 Hz Tactical Quiet	MEP-813A	
National Stock Numbers:		
10 kW 60 Hz Tactical Quiet	NSN 6115-01-275-5061	
10 kW 400 Hz Tactical Quiet	NSN 6115-01-274-7392	
Overall Length:		
MEP-803A	62 in. (157.5 cm)	
MEP-813A	62 in. (157.5 cm)	
Overall Width:		
MEP-803A	32 in. (81.28 cm)	
MEP-813A	32 in. (81.28 cm)	
Overall Height:		
MEP-803A	37 in. (93.98 cm)	
MEP-813A	37 in. (93.98 cm)	
Dry Weights (less Basic Issue Items):		
MEP-803A	1,140 lb. (516.4 kg)	
MEP-813A	1,170 lb. (530 kg)	
Wet Weights:		
MEP-803A	1,242 lb. (562.6 kg)	
MEP-813A	1,272 lb. (576.2 kg)	

## EQUIPMENT DATA – CONTINUED

Table 1. Leading Particulars. – Continued

2. Engine:	
Manufacturer	Onan
Model	DN4M
Type	Naturally-aspirated, four cylinder, four cycle diesel
Displacement	114 cu. in. (1.9 L)
Altitude Degradation, 4,000 to 8,000 ft. (1,220 to 2,240 m)	3.5% per 1,000 feet (305 m)
Firing Order	1, 3, 4, 2
Cold Weather Starting Aid System Use	When temperature is +40 °F (4 °C)
Valve Tappet Clearance Adjustment	None Required
3. Cooling System:	
Type	Pressurized radiator and pump
Capacity	8.2 qts. (7.8 L)
Normal Operating Temperature	170-200 °F (77-93 °C)
Temperature Indicating System	
Voltage Rating	24 VDC
4. Lubricating System:	
Type	Full flow, circulating pressure
Oil Pump Type	Positive displacement gear
Normal Operating Pressure	25-60 psi (172-414 kPa)
Oil Filter Type	Full flow, spin-on, replaceable element
Lubricating System Capacity	5.9 qts. (5.6 L)
Pressure Indicating System	
Voltage Rating	24 VDC
5. Fuel System:	
Type of Fuel	DF-1, DF-2, DF-A, JP4, JP5, JP8
Fuel Tank Capacity	9 gal. (34 L)
Fuel Consumption Rate	60 Hz: .99 gal. (3.75 L) per hour 400 Hz: 1.07 gal. (4.05 L) per hour
Auxiliary Fuel Pump:	
Voltage Rating	24 VDC
Delivery Pressure	5.0-6.5 psi (34.5-65.5 kPa) range
Fuel Level Switch:	
Type	Float
Current	3.0 amp at 6 to 32 VDC
6. Engine Starting System:	
Batteries	Two 12 VDC, connected in series

## EQUIPMENT DATA – CONTINUED

Table 1. Leading Particulars. – Continued

Starter:		
Manufacturer	Onan	
Model	191-1550	
Voltage Rating	24 VDC	
Drive Type	Gear Reduction	
Battery Charging Alternator:		
Manufacturer	Prestolite	
Models	8EM3005CA and 8MR3005CA	
Rating	18 amps at 24 VDC	
Protective Fuse	30 amps	
7. AC Generator:		
Manufacturer	Onan	
	MEP-803A	MEP-813A
Type	Rotating field synchronous	Rotating field synchronous
Load Capacity	10 kW	10 kW
Current Rating:	60 Hz:	400 Hz:
120/240 volt connection	52 amps	52 amps
120/208 volt connection	34 amps	34 amps
120 volt connection	104 amps	104 amps
Power Factor	0.8	0.8
Cooling	Fan cooled	Fan cooled
Drive Type	Direct coupling	Direct coupling
Duty Classification	continuos	continuos
8. Protective Devices:		
Low Oil Pressure Switch:		
Trip Temperature	15 ±3 psi (103.4 ±20.7 kPa)	
Voltage Rating	24 VDC	
Current Rating	5 amps	
Coolant High Pressure Switch:		
Trip Temperature	225 °F ±5 °F (107 °C ±3 °C)	
Voltage Rating	12-24 VDC	
Current Rating	5 amps	
Overvoltage:		
Trip Point Conditions	153 ±3 VAC for no less than 200 mS (120 VAC coil winding)	
Trip Point	No more than 1.25 seconds after trip conditions exist.	

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EQUIPMENT DATA – CONTINUED

END OF WORK PACKAGE

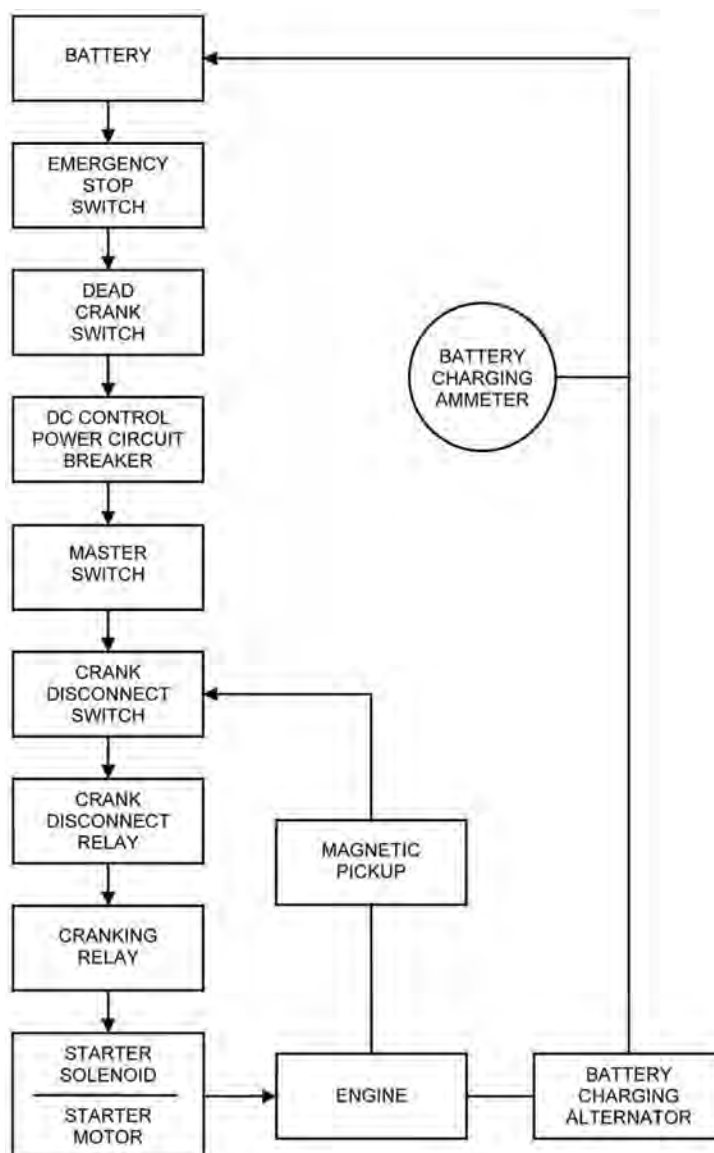
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**OPERATOR MAINTENANCE**
**THEORY OF OPERATION**


---

**INTRODUCTION**

This WP contains functional descriptions of the generator set and explains how the controls and indicators interact with the system.

**ENGINE STARTING SYSTEM**


**Figure 1. Engine Starting System.**

The Engine Starting System (Figure 1), consists of two 12-Volt batteries connected in series, a starter, a 24 Volt battery charging alternator, a magnetic pickup (for sensing engine speed) and the related switches and relays required for control of the starting system. For engine cranking, battery power is supplied to the starter motor

## ENGINE STARTING SYSTEM – CONTINUED

through the starter solenoid which in turn is controlled by the cranking relay. The starter then engages the engine flywheel causing the engine to turn over. For engine starting, the DEAD CRANK switch must be in the NORMAL position, the DC Control power circuit breaker must be pushed in, the EMERGENCY STOP SWITCH must be in the OUT position, and the MASTER SWITCH is moved to the START position. The cranking relay is then controlled by a circuit consisting of the crank disconnect relay and crank disconnect switch. As the engine accelerates to the preset speed (sensed by the magnetic pickup), the crank disconnect switch opens and de-energizes the cranking relay to stop and disengage the starter. The starting sequence may also be stopped by moving the MASTER SWITCH to OFF. 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 day, starter solenoid and starter motor are energized without activating any other starting or control function.

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/discharge rate of the batteries, from -10 AMPS to +20 AMPS, in 5 AMPS increments. Normal operating indication depends on the state of charge in the batteries. A low charge, such as exists 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.

## FUEL SYSTEM

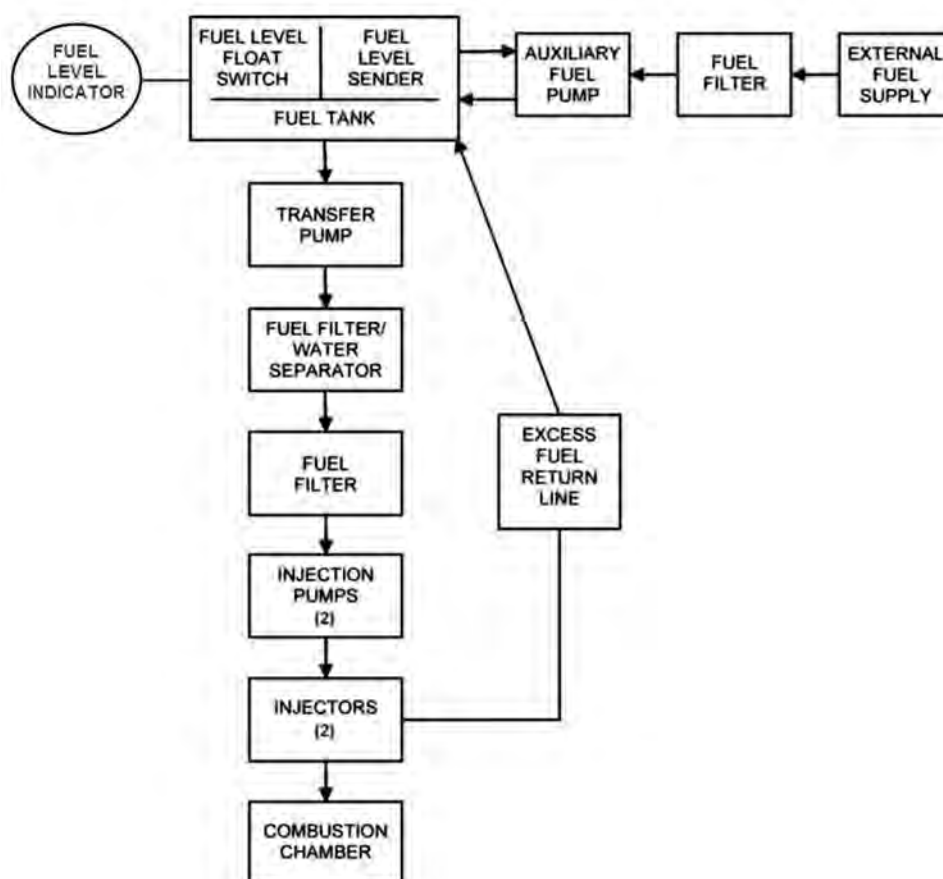


Figure 2. Fuel System.



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**FUEL SYSTEM – CONTINUED**

The Fuel System (Figure 2), consists of piping, fuel tank, fuel filter, electrically driven transfer pump, fuel filter/water separator, four injection pumps and four injectors, one for each cylinder. Fuel is drawn from the fuel tank by the transfer pump when the MASTER SWITCH is in the PRIME & RUN position. After reaching the transfer pump, fuel passes through a fuel filter/water separator where water and small impurities are removed. The fuel then goes to the injection pumps where it is pressurized and pushed into the injectors. Through the injectors fuel enters the diesel engine combustion chamber, where it is mixed with air and ignited. The fuel that is not used is returned to the fuel tank via an excess fuel return line.

The Auxiliary Fuel System consists of an external fuel supply, piping, fuel filter, a 24 VDC auxiliary fuel pump and a fuel level float switch. When the MASTER SWITCH is set on PRIME & RUN AUX FUEL it actuates the auxiliary fuel pump and transfers fuel from the external fuel supply to the generator fuel tank. The fuel level float switch shuts off the auxiliary fuel pump when the generator fuel tank is full and reactivates the pump as the level drops. The FUEL LEVEL indicator indicates fuel level of generator fuel tank from (E) empty to (F) full in quarter tank increments.

## ENGINE COOLING SYSTEM

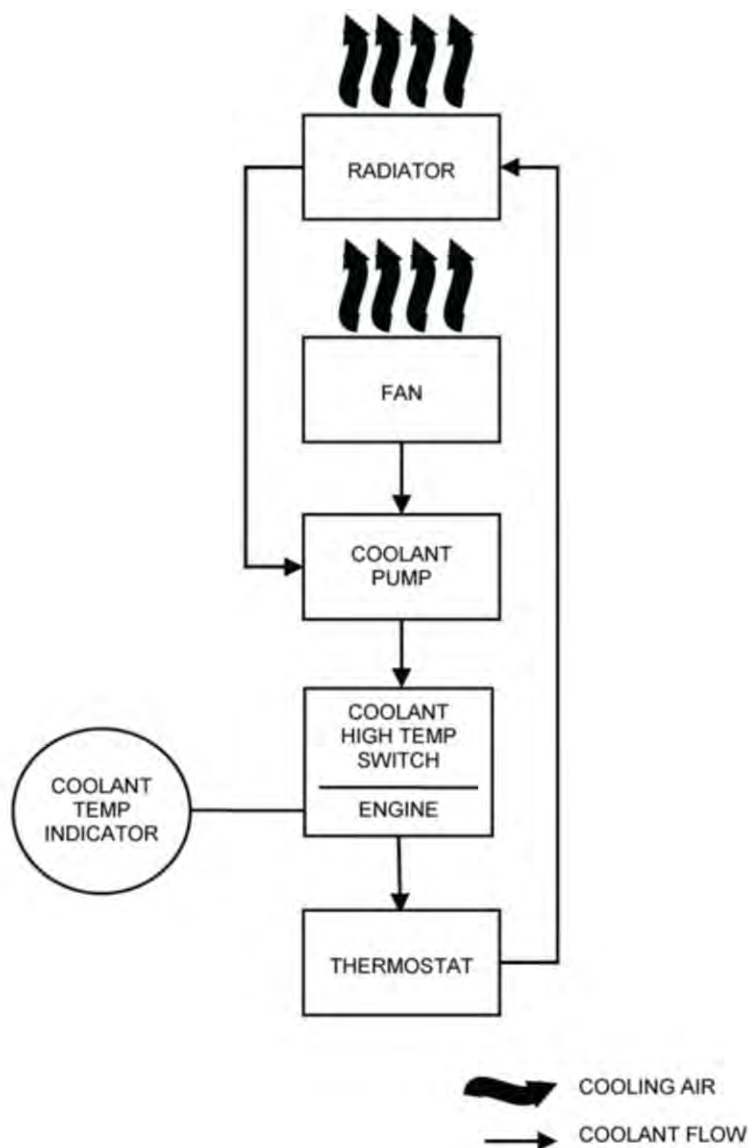
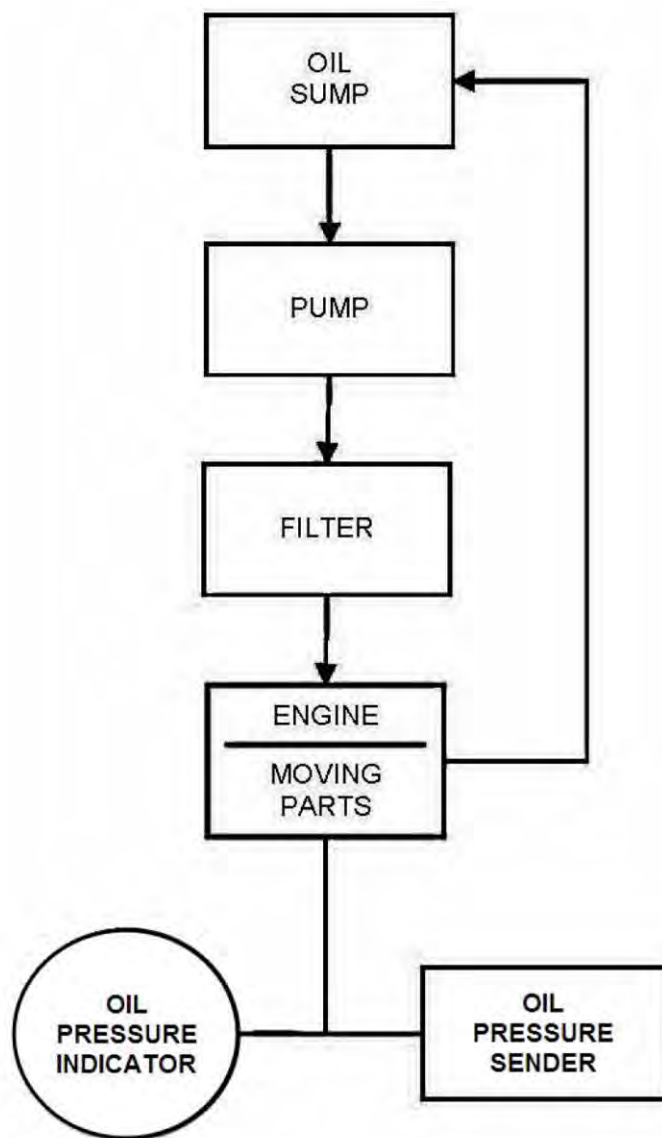


Figure 3. Engine Cooling System.

The Engine Cooling System (Figure 3) consists of a radiator, hoses, thermostat, water pump, a belt driven fan, and cooling jackets. 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.

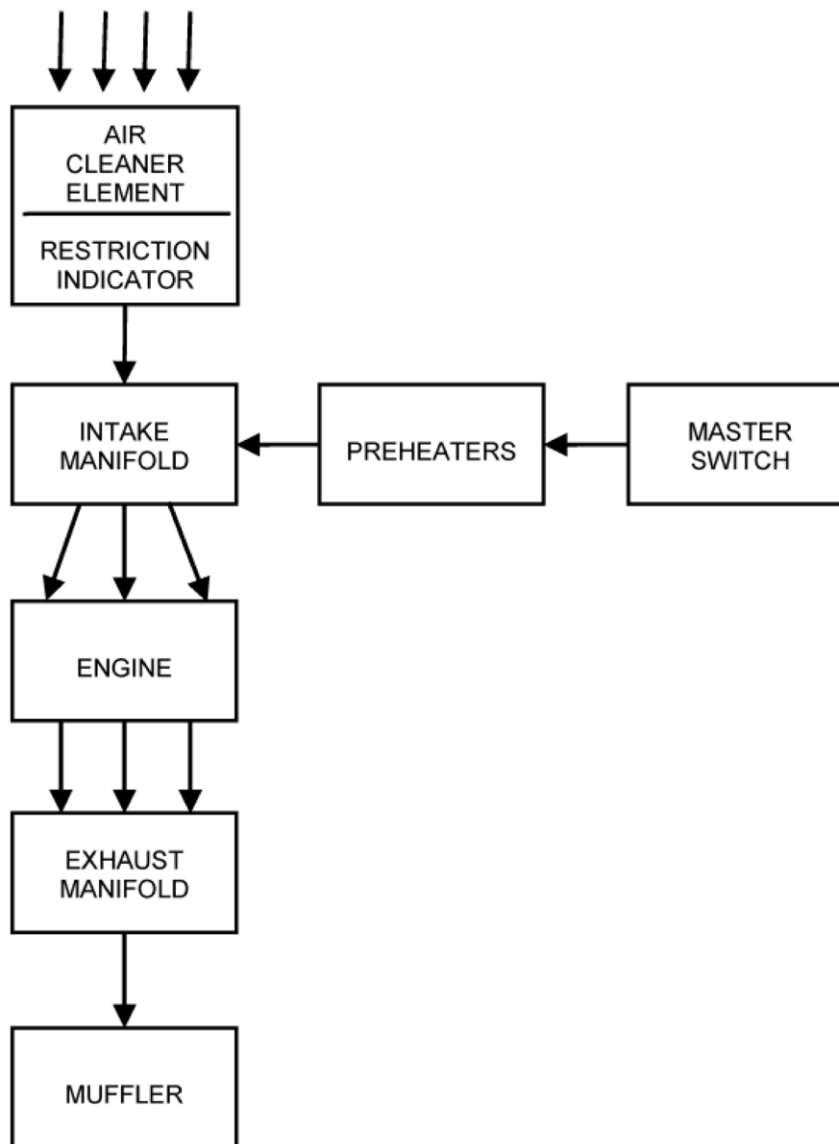
A coolant high temperature switch provides automatic shut down in the event that coolant temperature exceeds  $225 \pm 5$  °F ( $107 \pm 3$  °C). The COOLANT TEMP indicator indicates the engine coolant temperature, from 120 °F to 240 °F (48 °C to 115 °C).

**LUBRICATION SYSTEM**

**Figure 4. Engine Lubrication System.**

The Lubrication System (Figure 4) consists of an oil sump, dipstick, pump, oil pressure sender, and filter. The oil sump is a reservoir for engine lubricating oil. The dipstick indicates oil level in the sump. A pump draws oil from the sump and through a screen removing large impurities. The oil then passes through a spin-on type filter where d impurities are removed. From the filter, oil enters the engine and is distributed to the engine's internal moving parts.

After passing through the engine, the oil returns to the oil sump. The OIL PRESSURE indicator indicates oil pressure sensed by the oil pressure sender in the engine. The engine will shut off automatically if the oil pressure drops to a dangerously low level. The oil level can be checked when the engine is not operating.

**AIR INTAKE AND EXHAUST SYSTEM**

**Figure 5. Air Intake and Exhaust System.**

The Air Intake and Exhaust System (Figure 5). consists of an air cleaner assembly, intake manifold, exhaust manifold and muffler. Ambient air is drawn into the air cleaner assembly where it passes through the air cleaner element.

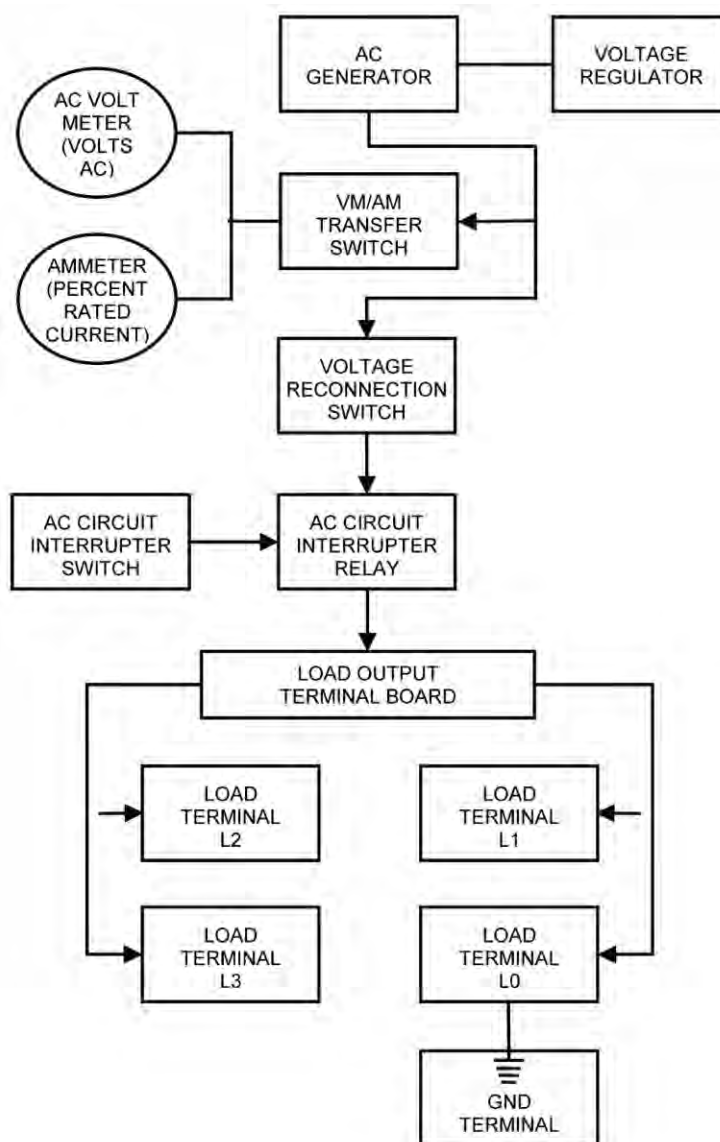
Airborne dirt is removed and trapped in the element. A restriction indicator, located on the air cleaner assembly housing, displays red when the air cleaner element should be serviced. Filtered air is drawn out of the air cleaner assembly through air intake tubes to the air intake manifold where it passes into the engine and is mixed with fuel from the injectors.

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.

## AIR INTAKE AND EXHAUST SYSTEM – CONTINUED

Cold outside temperatures make starting the engine difficult. To improve engine starting, a cold weather starting aid has been provided that features four preheaters. The preheaters warm up the air intake manifold when the MASTER SWITCH is in the PREHEAT position

## OUTPUT SUPPLY SYSTEM



**Figure 6. Output Supply System.**

The Output Supply System (Figure 6) consists primarily of the generator, the output load terminal board, the AC voltage reconnection switch, AM-VM transfer switch and the AC circuit interrupter relay.

Power created by the generator is supplied through the voltage reconnection switch and the AC output load terminals on the output load terminal board.

The voltage reconnection switch allows configuration of the generator set for the following voltage ranges:

---

**OUTPUT SUPPLY SYSTEM – CONTINUED**

120-Volt, single phase, 2 wire.

120/240-Volt, single phase, 3 wire,

120/208-Volt, 3-phase, 4 wire.

The AC INTERRUPTER switch closes and opens the AC circuit interrupt relay. This enables or interrupts the power flow between the voltage reconnection switch and the output load terminals. The AC circuit interrupter relay is also opened automatically during any of the specified set faults. The voltage regulator senses AC generator output voltage and provides control voltage to the AC generator exciter to maintain the desired AC generator output voltage. The position of the AM-VM transfer switch selects the output load terminals from which current and voltage are measured and are indicated on the ammeter (PERCENT RATED CURRENT) and AC volt meter (VOLTS AC).

**END OF WORK PACKAGE**

**CHAPTER 2**

**OPERATOR INSTRUCTIONS**

**FOR**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**  
**10 kW, 60 Hz**  
**MEP-803A**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**  
**10 kW, 400 Hz**  
**MEP-813A**

CHAPTER 2

OPERATOR INSTRUCTIONS

WORK PACKAGE INDEX

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<u>Title</u>	<u>WP Sequence No.</u>
DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS .....	0004
OPERATION UNDER USUAL CONDITIONS .....	0005
OPERATION UNDER UNUSUAL CONDITIONS .....	0006
EMERGENCY INFORMATION .....	0007



## OPERATOR MAINTENANCE

### DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

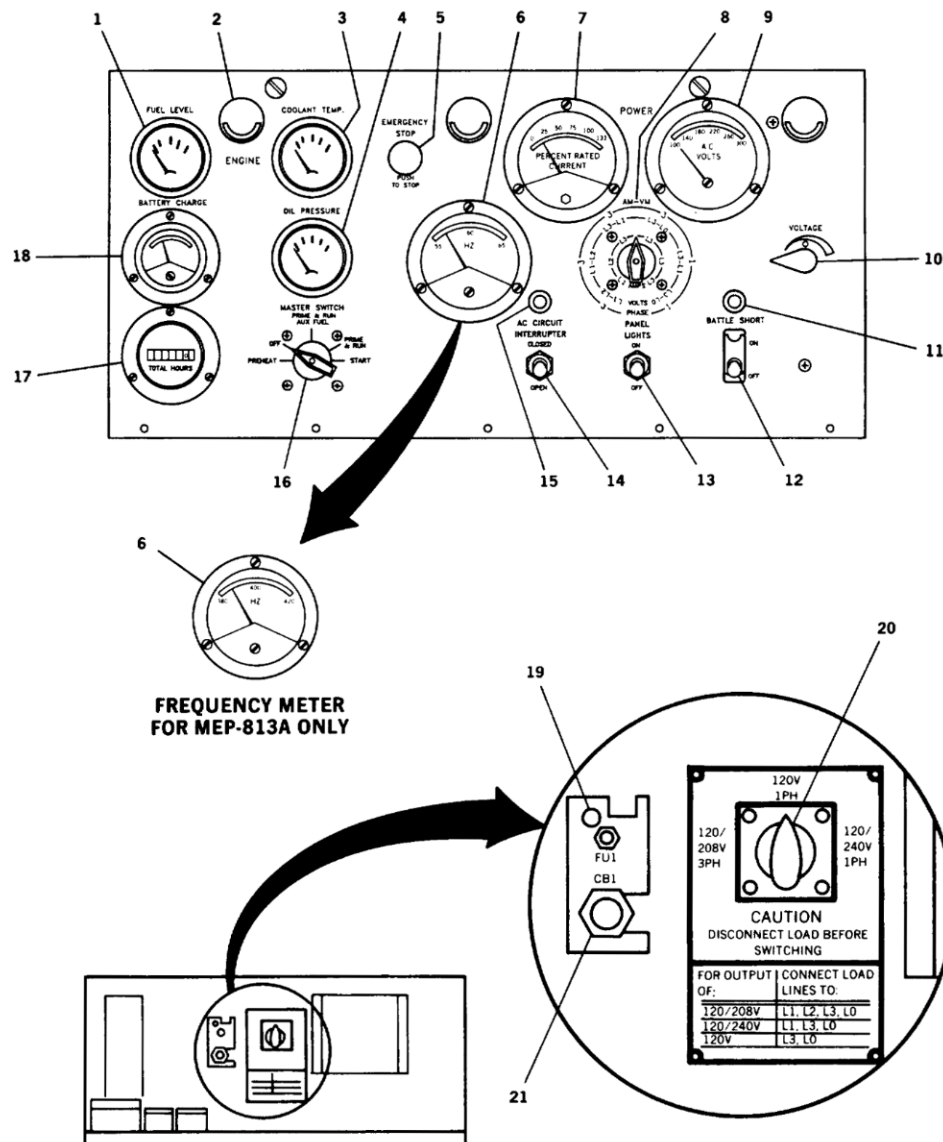
#### SCOPE

This WP describes and illustrates the controls and indicators to ensure proper operation of the generator set.

#### CONTROL PANEL ASSEMBLY

The control panel assembly contains most of the operating controls and indicator for the generator set. Figure 1 shows the control panel assembly layout and Table 1 describes each control and indicator.

**Table 1. Operator's Controls and Indicators.**



**Figure 1. Operator's Controls and Indicators.**

**CONTROL PANEL ASSEMBLY – CONTINUED****Table 1. Operator's Controls and Indicators – Continued**

<b>KEY</b>	<b>CONTROL/INDICATOR</b>	<b>FUNCTION</b>																					
1	FUEL LEVEL indicator	Indicates fuel level.																					
2	Panel lights	Illuminates control panel.																					
3	COOLANT TEMP indicator	Indicates engine coolant temperature.																					
4	OIL PRESSURE indicator	Indicates oil pressure.																					
5	EMERGENCY STOP pushbutton	Shuts down generator set.																					
6	FREQUENCY meter (Hz)	Indicates generator set output frequency.																					
7	Ammeter (PERCENT RATED CURRENT METER)	Indicates generator set load current as a percent of rated current.																					
8	AM-VM transfer switch	Allows selection of current and voltage readings between output load terminals as follows: <table> <tr> <th><b>SWITCH POSITION</b></th><th><b>VOLTAGE</b></th><th><b>CURRENT</b></th></tr> <tr> <td>L1 - L2 (3 Phase)</td><td>L1 - L2</td><td>L1</td></tr> <tr> <td>L2 - L3 (3 Phase)</td><td>L2 - L3</td><td>L2</td></tr> <tr> <td>L3 - L1 (3 Phase)</td><td>L3 - L1</td><td>L3</td></tr> <tr> <td>L3 - L0 (3 Phase)</td><td>L3 - L0</td><td>L3</td></tr> <tr> <td>L3 - L1 (1 Phase)</td><td>L3 - L0</td><td>L3</td></tr> <tr> <td>L3 - L0 (1 Phase)</td><td>L3 - L0</td><td>L3</td></tr> </table>	<b>SWITCH POSITION</b>	<b>VOLTAGE</b>	<b>CURRENT</b>	L1 - L2 (3 Phase)	L1 - L2	L1	L2 - L3 (3 Phase)	L2 - L3	L2	L3 - L1 (3 Phase)	L3 - L1	L3	L3 - L0 (3 Phase)	L3 - L0	L3	L3 - L1 (1 Phase)	L3 - L0	L3	L3 - L0 (1 Phase)	L3 - L0	L3
<b>SWITCH POSITION</b>	<b>VOLTAGE</b>	<b>CURRENT</b>																					
L1 - L2 (3 Phase)	L1 - L2	L1																					
L2 - L3 (3 Phase)	L2 - L3	L2																					
L3 - L1 (3 Phase)	L3 - L1	L3																					
L3 - L0 (3 Phase)	L3 - L0	L3																					
L3 - L1 (1 Phase)	L3 - L0	L3																					
L3 - L0 (1 Phase)	L3 - L0	L3																					
9	AC Voltmeter (VOLTS AC)	Indicates output voltage of generator set.																					
10	VOLTAGE adjust Potentiometer	Adjusts generator set voltage.																					
11	BATTLE SHORT light	Amber light indicates battle short switch on.																					
12	BATTLE SHORT switch	Bypasses protective devices.																					
13	PANEL LIGHTS switch	ON - Activates or deactivates panel lights.																					
14	AC CIRCUIT INTERRUPTER switch	Opens and closes AC circuit interrupter relay.																					
15	AC CIRCUIT INTERRUPTER light	Green light indicates AC circuit interrupter relay is closed.																					
16	MASTER SWITCH	<p>PREHEAT - Energizes heater plugs.</p> <p>OFF - Deenergizes all circuits, except panel lights.</p> <p>PRIME 8 RUN AUX FUEL -Energizes generator set run circuits with fuel pump operating and with auxiliary fuel pump system activated.</p> <p>PRIME 8 RUN - Energizes generator set run circuits with fuel pump operating and auxiliary fuel system deenergized.</p> <p>START - Energizes starter.</p>																					
17	Time meter (TOTAL HOURS)	Indicates total engine operating hours.																					

**CONTROL PANEL ASSEMBLY – CONTINUED****Table 1. Operator's Controls and Indicators – Continued**

<b>KEY</b>	<b>CONTROL/INDICATOR</b>	<b>FUNCTION</b>
18	BATTERY CHARGE ammeter	Indicates charge/discharge rate of batteries.
19	DC CONTROL POWER circuit breaker (CB1) (Located Behind Control Panel)	Energizes or deenergizes DC circuits.
20	AC Voltage Reconnection Switch (Located Behind Control Panel)	Selects 120/208 VAC, three-phase; 120 VAC, single phase; or 120/240 VAC, single phase output at load terminal board.
21	BATTERY CHARGER FUSE (FU1) (Located Behind Control Panel)	Protects battery charging alternator.

**MALFUNCTION INDICATOR PANEL**

The malfunction indicator panel (Figure 2) is located to the left of the control panel. It contains a series of lights which indicate a generator set failure or abnormal operating condition. Table 2 describes each indicator light.

## MALFUNCTION INDICATOR PANEL – CONTINUED

Table 2. Malfunction Indicator Panel.

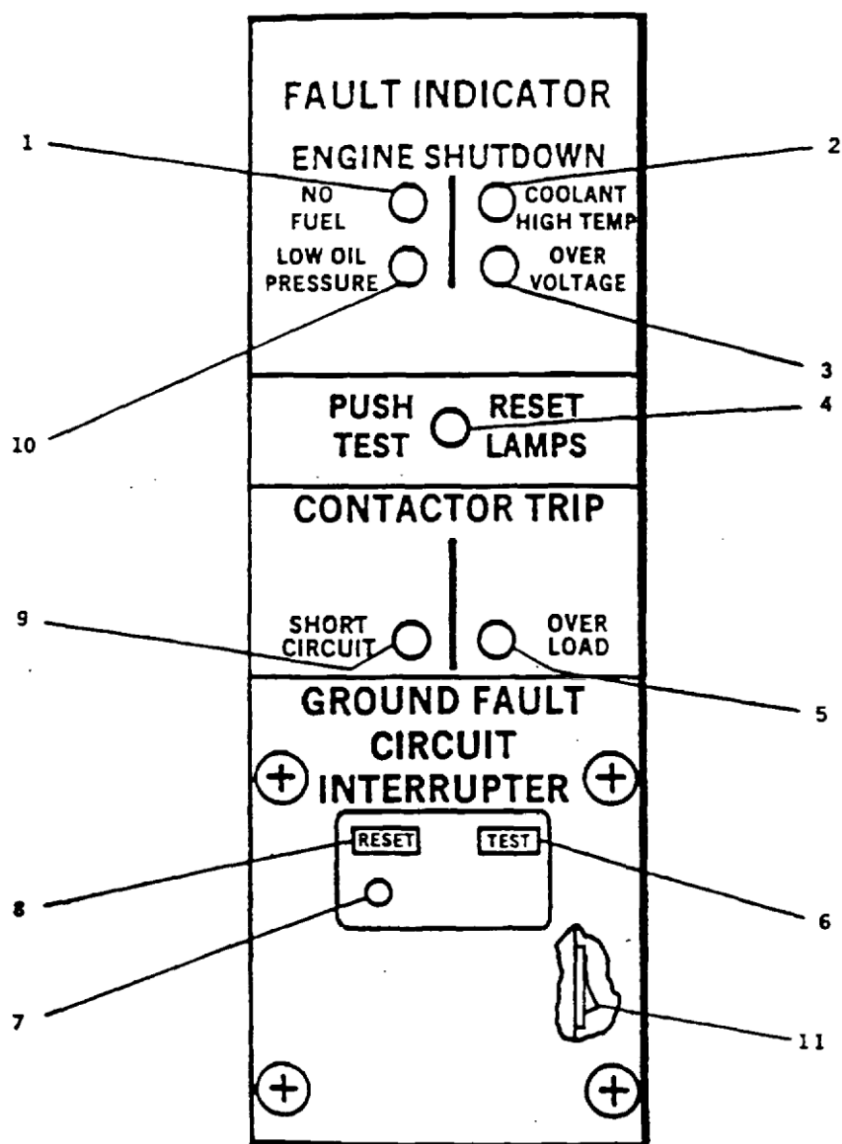


Figure 2. Malfunction Indicator Panel.

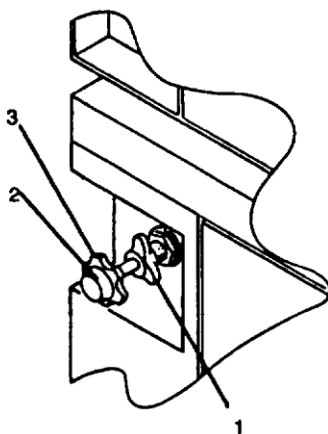
KEY	CONTROL/INDICATOR	FUNCTION
1	NO FUEL indicator	Lights when fuel level in fuel tank is below preset level.
2	COOLANT HIGH TEMP indicator	Lights when engine coolant temperature exceeds $225 \pm 5$ °F ( $107 \pm 30$ °F).
3	OVERVOLTAGE indicator	Lights when voltage in 120 Volt generator coil exceeds $153 \pm 3$ Volts.
4	PUSH TEST RESET LAMPS	Tests and resets fault indicator lamps.

**MALFUNCTION INDICATOR PANEL – CONTINUED****Table 2. Malfunction Indicator Panel – Continued**

KEY	CONTROL/INDICATOR	FUNCTION
5	OVER LOAD indicator	Lights when current in any phase exceeds 110 percent of rated current.
6	GROUND FAULT CIRCUIT INTERRUPTER TEST pushbutton	Tests Ground Fault Circuit Interrupter.
7	Ground Fault Circuit Interrupter indicator	Mechanically trips red indicator, at ground fault condition in circuit of convenience receptacle.
8	Ground Fault Circuit Interrupter PUSH TO TEST Pushbutton	Depress to reset Ground Fault Circuit Interrupter after test or ground fault has occurred.
9	SHORT CIRCUIT indicator	Lights when generator set output in any phase exceeds $425 \pm 25$ percent of rated current.
10	LOW OIL PRESSURE indicator	Lights when engine lubrication systems pressure is less than 15 + 3 psi ( $103.4 \pm 20.7$ kPa) during engine operation.
11	Convenience Receptacle Overload Circuit Breaker (10-amp in-line fuse on generator sets, contract number DAAK01-88-D-D080)	Circuit breaker trips on when load on convenience receptacle exceeds 10 amps (fuse blows on generator sets, contract number DAAK01-88-D-D080).

**FREQUENCY ADJUST CONTROL**

The frequency adjust control (Figure 3), is to the left and below the control panel. Table 3 describes each part and its function.

**Table 3. Frequency Adjust Control.****Figure 3. Frequency Adjust Control.**

KEY	CONTROL/INDICATOR	FUNCTION
1	Locking Ring	Turn locking ring counterclockwise to unlock frequency adjust control. Turn locking ring clockwise to lock frequency adjust control at desired setting.

---

**FREQUENCY ADJUST CONTROL – CONTINUED****Table 3. Frequency Adjust Control – Continued**

<b>KEY</b>	<b>CONTROL/INDICATOR</b>	<b>FUNCTION</b>
2	Frequency adjust button	Press frequency adjust button and pull frequency adjust knob to increase frequency. Press frequency adjust button and push frequency adjust knob to decrease frequency. This enables a rapid adjustment of frequency.
3	Frequency adjust knob	Turn knob clockwise to increase frequency and counterclockwise to decrease frequency. This provides a fine adjustment in frequency.

---

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**OPERATION UNDER USUAL CONDITIONS**

---

**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**References**

WP 0004 (Table 1 & Figure 1, Item 10 & Figure 1,  
Item 10)  
WP 0011 (Table 1)

**Materials/Parts**

Ground Rod Assembly P/N  
Ground Conductor Cable P/N

**Equipment Condition**

Grounded, Off & Operational (Stopping Procedure,  
WP 0005)

**Personnel Required**

One (1): Power Generation Mechanic (91D)

---

**SCOPE**

This WP provides information and guidance for generator set operation under normal conditions, refer to FM 20-31.

## ASSEMBLY AND PREPARATION FOR USE

### Installation of Ground Rod

#### WARNING

Do not operate the generator set until it has been connected to a suitable ground. Serious injury or death can result from operating an ungrounded generator set.

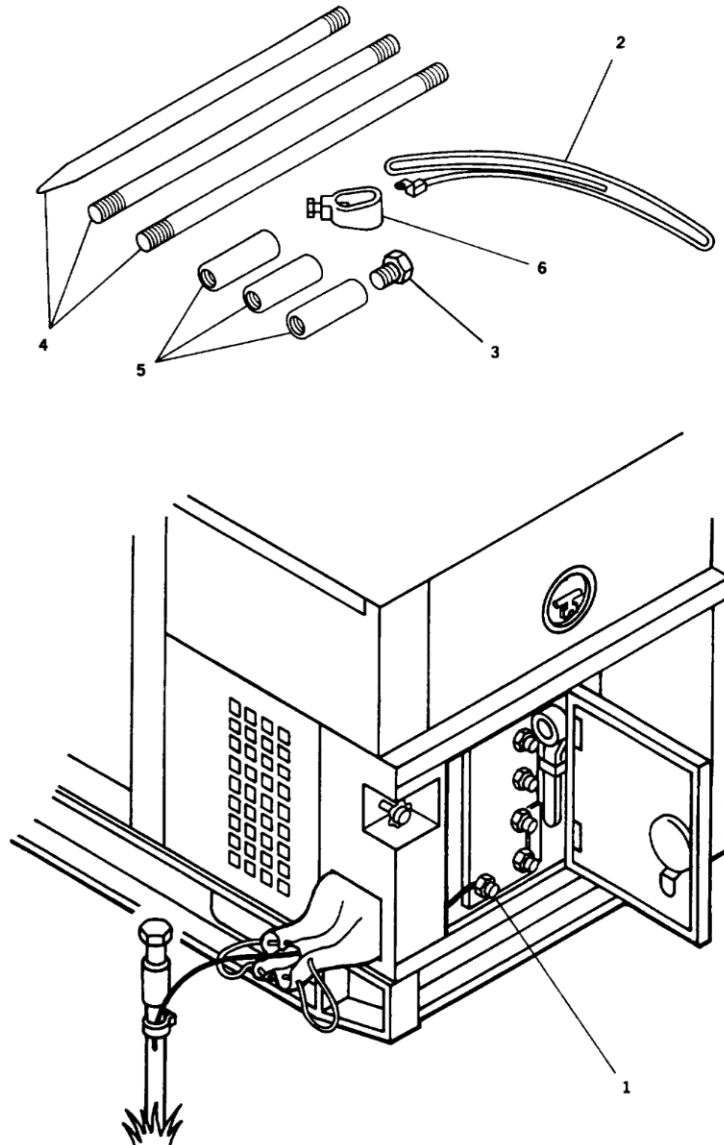


Figure 1. Grounding Connections.

1. Insert ground cable (Figure 1, Item 2) through slot on load output terminal board terminal marked GND (1). Tighten terminal nut.
2. Connect coupling (5) to ground rod (4) and screw driving stud (3) into coupling (5). Make sure that driving stud (3) seats on ground rod (4).



**ASSEMBLY AND PREPARATION FOR USE – CONTINUED**

3. Drive ground rod into ground until coupling is just above surface.
4. Remove driving stud and install another section of ground rod.
5. Install another coupling (5) and driving stud (3). Drive ground rod down until new coupling is just above ground surface.
6. Repeat Steps 4 and 5 until ground rod has been driven eight feet or deeper, providing an effective ground.
7. Connect clamp (6) and ground cable (2) to ground rod (4) and tighten clamp screw.

**Installation of Load Cables****WARNING**

Never attempt to connect or disconnect load cables while the generator set is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

**CAUTION**

Do not connect the load cables to the convenience receptacle. Failure to observe this caution can result in damage to the generator set.

1. Shutdown generator set.

**CAUTION**

When using single phase connections, always attempt to balance loads between terminals (do not connect all loads between one terminal and LO). Failure to observe this caution can result in damage to generator set.

2. Select required output terminals from Table 1.
3. Open output load terminal door.

**WARNING**

Jumper will not be removed unless the equipment being powered specifically required an isolated ground (floating ground). Failure to comply with this warning can cause injury or death to personnel.

4. Ensure jumper is securely fastened between LO and ground.
5. Using terminal nut wrench (Figure 2, Item 3) loosen terminal nuts (1) on terminals (2) selected in Step 2.
6. Insert ends of load cables through load cable exit. then insert ends of cables into slots of load terminal studs (2).
7. Tighten load terminal nuts (1).
8. Secure wrench (3) in bracket inside load terminal door, and close door.

**Table 1. Load Terminal, AC Voltage Reconnection  
Switch and AM-VM Transfer Switch Selection.**

RECONNECTION SWITCH POSITION	TERMINALS	AM-VM TRANSFER SWITCH POSITION	VOLTAGE READING	CURRENT READING (TERMINAL)
120/208V 3PH	L1, L2,	L1-L2 3 PHASE	208 VOLTS	L1

## ASSEMBLY AND PREPARATION FOR USE – CONTINUED

Table 1. Load Terminal, AC Voltage Reconnection Switch and AM-VM Transfer Switch Selection. – Continued

RECONNECTION SWITCH POSITION	TERMINALS	AM-VM TRANSFER SWITCH POSITION	VOLTAGE READING	CURRENT READING (TERMINAL)
120V 1PH 120/240V 1PH	L3, LO	L2-L3 3 PHASE	208 VOLTS	L2
		L3-L1 3 PHASE	208 VOLTS	L3
		L3-LO 3 PHASE	120 VOLTS	L3
	L3-LO	L3-LO 1 PHASE	120 VOLTS	L3
	L3-L1	L3-L1 1 PHASE	240 VOLTS	L3
	L3-LO	L3-LO 1 PHASE	120 VOLTS	L3
	OR			
	L1-LO	L1-LO 1 PHASE	120 VOLTS	L1

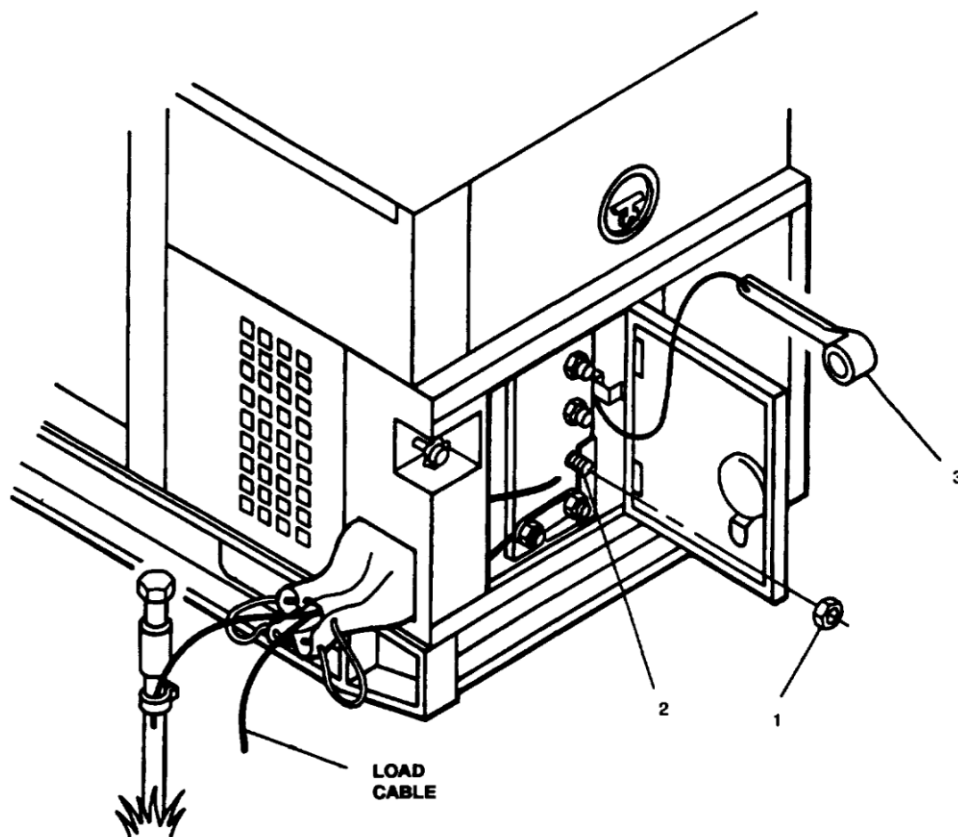


Figure 2. Installation of Load Cables.

## INITIAL ADJUSTMENTS, BEFORE USE, AND SELF-TEST

Perform all before (B) PMCS, refer to WP 0011.

---

**INITIAL ADJUSTMENTS, BEFORE USE, AND SELF-TEST – CONTINUED****Initial Adjustments**

1. Place DEAD CRANK SWITCH in NORMAL position.
2. Push DC CONTROL POWER circuit breaker in.
3. Ensure AC voltage reconnection switch is positioned to match voltage requirements.
4. Place AM-VM transfer switch in a position corresponding to output terminal load connections, refer to WP 0004, Table 1.
5. Pull out EMERGENCY STOP switch.

**Self Test**

1. Place MASTER SWITCH to PRIME 8 RUN position.
2. Push PRESS TO TEST pushbutton on malfunction indicator panel. Ensure all indicator lights are lit. When PRESS TO TEST pushbutton is released, all lights should go out.
3. Press BATTLE SHORT press to test light on the control panel assembly. Ensure indication light is lit. When press to test light is released, light should go out.
4. Press AC CIRCUIT INTERRUPTER press to test light on the control panel assembly. Ensure indicator light is lit. When press to test light is released, light should go out.

**OPERATING PROCEDURES****WARNING**

High voltage is produced when generator set is in operation. Improper operation could result in personal injury or a death by electrocution.

**WARNING**

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

**Starting Procedures****WARNING**

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.

**CAUTION**

Do not crank engine in excess of 15 seconds. Allow starter to cool at least 15 seconds between attempted starts. Failure to observe this caution could result in damage to the starter.

**NOTE**

At temperatures below 40 °F (4 °C) it may be necessary to use the Cold Weather Starting Aid.

---

**OPERATING PROCEDURES – CONTINUED****NOTE**

Ensure all generator set access doors, except control are closed.

1. In cold weather conditions, place MASTER SWITCH to PREHEAT position for approximately 30 seconds.
2. Rotate MASTER SWITCH to START position.
3. Hold MASTER SWITCH in START position until oil pressure reaches at least 25 psi (172 kPa), voltage has increased to its approximate rated value, and engine has reached stable operating speed.
4. Release MASTER SWITCH to PRIME 8 RUN position.
5. If operating with an auxiliary fuel source, rotate MASTER SWITCH to PRIME 8 RUN AUX FUEL position.

**NOTE**

Under normal conditions warm up engine without load for five minutes. (If required, load can be applied immediately.)

6. Check COOLANT TEMP 170-200 °F (77-93 °C) and OIL PRESSURE 25-60 psi (172-414 kPa) indicators for normal readings.
7. Using VOLTAGE adjust potentiometer (WP 0004, Figure 1, Item 10) and Frequency Adjust Control (WP 0004, Figure 3), adjust voltage and frequency to rated values.
8. Press GROUND FAULT CIRCUIT INTERRUPTER TEST pushbutton. Ensure indicator window is clear. Press RESET pushbutton and ensure indicator is red.
9. Place AC CIRCUIT INTERRUPTER switch to CLOSED position.
10. Ensure frequency and voltage are still at required values. Adjust if necessary.
11. Rotate AM-VM transfer switch to each phase position while observing ammeter (PERCENT RATED CURRENT meter). If more than rated load is indicated in any phase, reduce load.

**WARNING**

High Voltage is produced when this generator set is in operation. Improper operation could result in personal injury or death by electrocution.

**WARNING**

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

12. Perform all DURING (D) OPERATION PMCS requirements in accordance with WP 0011, Table 1.

**Stopping Procedure**

1. Place AC CIRCUIT INTERRUPTER switch in OPEN position.
2. Allow generator set to operate 5 minutes with no load applied.
3. Place MASTER SWITCH in OFF position.
4. Perform all AFTER OPERATION (A) PMCS requirements in accordance with WP 0011, Table 1.
5. Place DEAD CRANK switch to OFF position

## USE OF THE CONVENIENCE RECEPTACLE

### **WARNING**

Power is available when the main contactor is open. Avoid accidental contact. Failure to observe this warning can result in severe personal injury or death by electrocution.

### **CAUTION**

The maximum power rating for the convenience receptacle is 10 Amps. Continuous operation above 10 Amps can result in damage to the generator set.

1. Start the generator set if it is not operating. Refer to Operating Procedures.
2. Ensure the load does not exceed the maximum rating.
3. Reset the Ground Fault Circuit Interrupter.
4. Plug appropriate connector into convenience receptacle.

## DECALS AND INSTRUCTION PLATES

There are identification and instruction plates on the generator set. Figure 3 through 19 show the location and contents of each plate on the generator set.

DECALS AND INSTRUCTION PLATES – CONTINUED

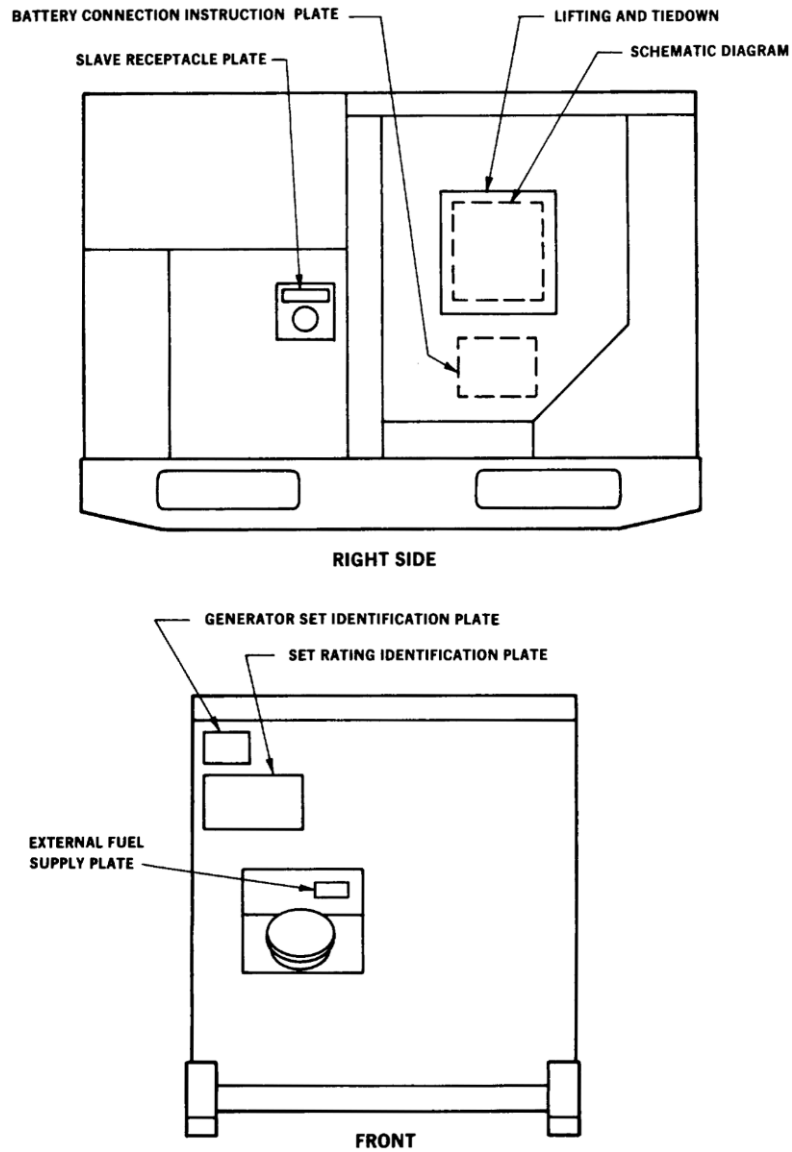


Figure 3. Operating Instructions (Front and Right Side).

## DECALS AND INSTRUCTION PLATES – CONTINUED

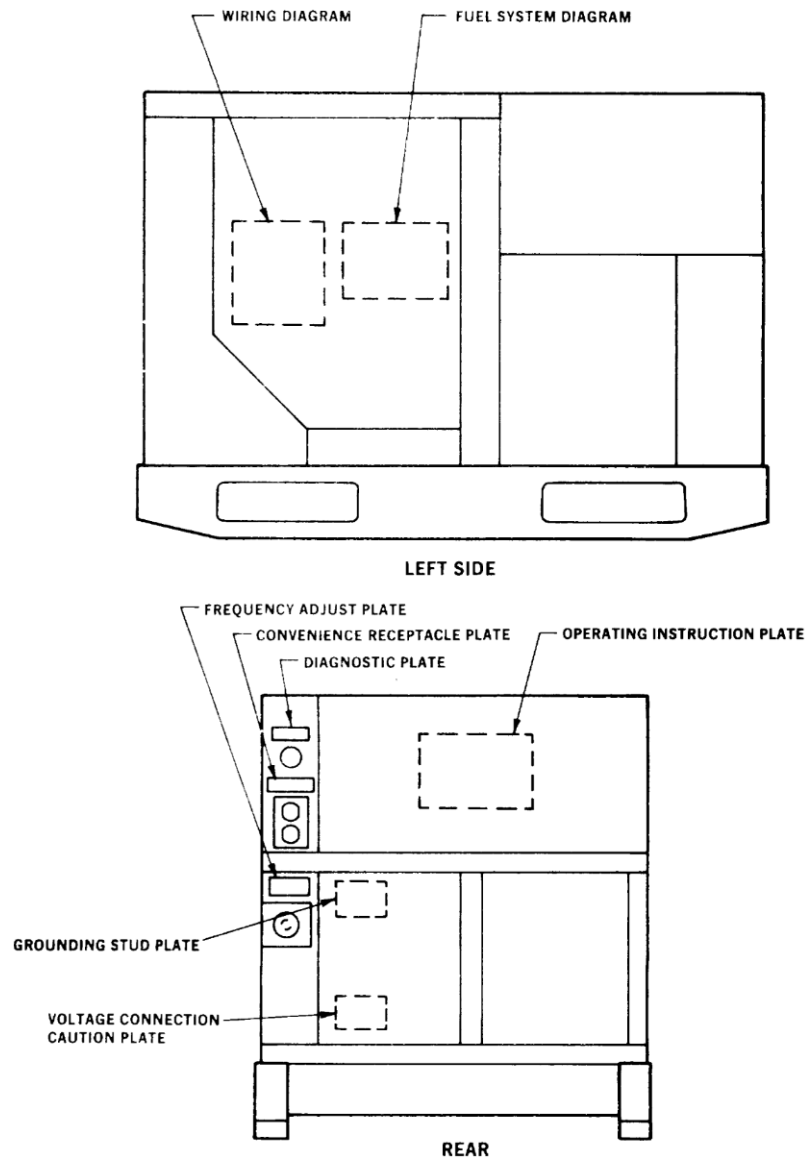


Figure 4. Operating Instructions Plates (Rear and Left Side).

OPERATING INSTRUCTIONS				SERVICE INSTRUCTIONS																																										
<p><b>WARNING:</b></p> <p>A. TO AVOID SHOCK HAZARD SET FRAME MUST BE GROUNDED. CONNECT WIRE NO. 8 WIRE OR LARGER FROM CIRCUIT TERMINAL, LEAD TO EARTH GROUND.</p> <p>B. BATTERY NEGATIVE TERMINAL IS CONNECTED TO GROUND.</p> <p>C. ISOLATE THE ENGINE AT SPEEDS LOWER THAN THOSE ATTAINABLE THROUGH THE CONTROLS MAY RESULT IN DAMAGE TO ELECTRICAL COMPONENTS.</p> <p>1. PRESTART CHECKS</p> <p>A. CHECK RADIATOR COOLANT, ENGINE LUBE OIL, FUEL, AND BATTERY ELECTROLYTE LEVEL.</p> <p>B. CHECK FUEL-WATER SEPARATOR. DRAIN WATER IF PRESENT.</p> <p>C. PLACE CONTROL SWITCHES TO OFF OR EQUIVALENT POSITION.</p> <p>2. NORMAL START (TEMPERATURE ABOVE -25° F)</p> <p>A. CRANK THE ENGINE BY PLACING THE MASTER SWITCH IN THE START POSITION. DO NOT CRANK FOR CONTINUOUS PERIODS LONGER THAN 15 SECONDS.</p> <p>B. AT TEMPERATURES BELOW APPROXIMATELY 40° F IF IT MAY BE NECESSARY TO USE THE AIR HEAT EXCHANGER HEATER. HOLD THE MASTER SWITCH IN THE PRE-HEAT POSITION FOR APPROXIMATELY 30 SECONDS PRIOR TO STOP C.</p> <p>C. HOLD MASTER SWITCH IN START POSITION UNTIL OIL PRESSURE BUILDS UP TO AT LEAST 25 PSI THEN RELEASE TO PRIME A.</p> <p>D. ADJUST VOLTAGE AND FREQUENCY TO PROPER VALUES. IF NECESSARY, RESET FAULT INDICATOR LIGHTS.</p> <p>E. UNDER NORMAL CONDITIONS RUN ENGINE AT NO LOAD FOR 5 MINUTES FOR WARM UP. IF REQUIRED LOAD CAN BE APPLIED IMMEDIATELY.</p> <p>F. CLOSE THE AC CIRCUIT INTERRUPTER BY PLACING THE AC CIRCUIT INTERRUPTER SWITCH IN THE CLOSE POSITION.</p> <p>3. STOPPING THE UNIT</p> <p>A. REMOVE LOAD BY PLACING THE AC CIRCUIT INTERRUPTER SWITCH IN OPEN POSITION.</p> <p>B. STOP UNIT BY PLACING MASTER SWITCH IN OFF POSITION.</p> <p>4. REFER TO APPLICABLE TECHNICAL MANUAL FOR ADDITIONAL INFORMATION ON MAINTENANCE AND TROUBLESHOOTING PROCEDURES.</p>				<p><b>FUEL AND OIL</b></p> <table border="1"> <thead> <tr> <th>AMBIENT TEMPERATURE</th> <th>FUEL</th> <th>LUBRICATING OIL</th> <th>COOLANT</th> </tr> </thead> <tbody> <tr> <td>+20°F TO +120°F</td> <td>W-7-400 OR SF-2</td> <td>W-7-400 OR SF-2</td> <td>WATER ML-1-53098</td> </tr> <tr> <td>0°F TO +20°F</td> <td>W-7-400 OR SF-1</td> <td>W-7-400 OR SF-1</td> <td>WATER ML-1-48153</td> </tr> <tr> <td>-20°F TO 0°F</td> <td>W-7-400 OR SF-1</td> <td>W-7-400 OR SF-1</td> <td>WATER ML-1-11753</td> </tr> <tr> <td>-20°F TO 0°F</td> <td>W-7-400 OR SF-4</td> <td>W-7-400 OR SF-4</td> <td>WATER ML-1-11753</td> </tr> </tbody> </table> <p><b>SYSTEM CAPACITY</b></p> <table border="1"> <thead> <tr> <th rowspan="2">FUEL TANK</th> <th colspan="2">LUBRICATING OIL</th> <th colspan="2">COOLING SYSTEM</th> </tr> <tr> <th>CHASSIS</th> <th>FLUID</th> <th>WATER</th> <th>WATER</th> </tr> </thead> <tbody> <tr> <td>9</td> <td>5.0</td> <td>4.7</td> <td>5</td> <td>3.3</td> </tr> <tr> <td>GALLONS</td> <td>QTS</td> <td>QTS</td> <td>QTS</td> <td>QTS</td> </tr> </tbody> </table> <p>NOTE: FOR OPERATION USING JPL, JPL, OR JPL FUEL REFER TO APPLICABLE OPERATING INSTRUCTION MANUAL.</p>				AMBIENT TEMPERATURE	FUEL	LUBRICATING OIL	COOLANT	+20°F TO +120°F	W-7-400 OR SF-2	W-7-400 OR SF-2	WATER ML-1-53098	0°F TO +20°F	W-7-400 OR SF-1	W-7-400 OR SF-1	WATER ML-1-48153	-20°F TO 0°F	W-7-400 OR SF-1	W-7-400 OR SF-1	WATER ML-1-11753	-20°F TO 0°F	W-7-400 OR SF-4	W-7-400 OR SF-4	WATER ML-1-11753	FUEL TANK	LUBRICATING OIL		COOLING SYSTEM		CHASSIS	FLUID	WATER	WATER	9	5.0	4.7	5	3.3	GALLONS	QTS	QTS	QTS	QTS
AMBIENT TEMPERATURE	FUEL	LUBRICATING OIL	COOLANT																																											
+20°F TO +120°F	W-7-400 OR SF-2	W-7-400 OR SF-2	WATER ML-1-53098																																											
0°F TO +20°F	W-7-400 OR SF-1	W-7-400 OR SF-1	WATER ML-1-48153																																											
-20°F TO 0°F	W-7-400 OR SF-1	W-7-400 OR SF-1	WATER ML-1-11753																																											
-20°F TO 0°F	W-7-400 OR SF-4	W-7-400 OR SF-4	WATER ML-1-11753																																											
FUEL TANK	LUBRICATING OIL		COOLING SYSTEM																																											
	CHASSIS	FLUID	WATER	WATER																																										
9	5.0	4.7	5	3.3																																										
GALLONS	QTS	QTS	QTS	QTS																																										

Figure 5. Operating Instructions Plate.

DECALS AND INSTRUCTION PLATES – CONTINUED

US DEPARTMENT OF DEFENSE  
NATO STANDARD OTAN

GENERATOR SET DIESEL ENGINE 10KW 60HZ

MODEL MEP-803A NSN 6115-01-275-5061

SER NO RZC REG NO.           

TM 9-6115-642-10 NAVFAC 9-6115-642-10

TO 35C2-3-455-11 TM 09247A/09248A-10/1

VOLTS 120V 1PH, 120/240V 1PH,  
120/208V 3PH

AMPS 104, 52, 34 PF 0.8

DRY WT 1140 LG 62 IN W 32 IN HGT 37 IN

DATE MFD            CONTR NO DAAK01-88-D-0080

WARRANTY            DATE INSP           

MFD BY LIBBY CORP INSP STAMP           

30554-88-20063-03

US DEPARTMENT OF DEFENSE  
NATO STANDARD OTAN

GENERATOR SET DIESEL ENGINE 10KW 400HZ

MODEL MEP-813A NSN 6115-01-274-7392

SER NO RZC REG NO.           

TM 9-6115-642-10 NAVFAC 9-6115-642-10

TO 35C2-3-455-11 TM 09247A/09248A-10/1

VOLTS 120V 1PH, 120/240V 1PH,  
120/208V 3PH

AMPS 104, 52, 34 PF 0.8

DRY WT 1170 LG 62 IN W 32 IN HGT 37 IN

DATE MFD            CONTR NO DAAK01-88-D-0080

WARRANTY            DATE INSP           

MFD BY LIBBY CORP INSP STAMP           

30554-88-20063-04

Figure 6. Generator Set Identification Plate.

US DEPARTMENT OF DEFENSE  
NATO STANDARD OTAN

GENERATOR SET DIESEL ENGINE 10KW 60HZ

MODEL MEP-803A NSN 6115-01-275-5061

SER NO FZ REG NO.           

TM 9-6115-642-10 NAVFAC 9-6115-642-10

TO 35C2-3-455-11 TM 09247A/09248A-10/1

VOLTS 120V 1PH, 120/240V 1PH,  
120/208V 3PH

AMPS 104, 52, 34 PF 0.8

DRY WT 1140 LG 62 IN W 32 IN HGT 37 IN

DATE MFD            CONTR NO DAAK01-94-D-0036

WARRANTY            DATE INSP           

MFD BY FERMONT DIV INSP STAMP           

30554-88-20063-03

US DEPARTMENT OF DEFENSE  
NATO STANDARD OTAN

GENERATOR SET DIESEL ENGINE 10KW 400HZ

MODEL MEP-813A NSN 6115-01-274-7392

SER NO FZ REG NO.           

TM 9-6115-642-10 NAVFAC 9-6115-642-10

TO 35C2-3-455-11 TM 09247A/09248A-10/1

VOLTS 120V 1PH, 120/240V 1PH,  
120/208V 3PH

AMPS 104, 52, 34 PF 0.8

DRY WT 1170 LG 62 IN W 32 IN HGT 37 IN

DATE MFD            CONTR NO DAAK01-94-D-0036

WARRANTY            DATE INSP           

MFD BY FERMONT DIV INSP STAMP           

30554-88-20063-04

Figure 7. Generator Set Identification Plate.

GENERATOR SET, DIESEL FUELED  
TACTICAL QUIET  
MODE III (60 HERTZ), SIZE 10 (10 KW)

KW CAPACITY		PF	FREQ	FUEL	OUTPUT VOLTAGE	VOLTAGE ADJUST RANGE	PHASE	CURRENT CAPACITY AMPS
150 RES F S/L	150 RES F 8000 FT							
10.0	10.0	8.5	.80	60	120/208	205-220	3	34
10.0	10.0	8.5	.80	60	120/240	228-252	1	52
10.0	10.0	8.5	.80	60	120	114-126	1	104
10.0	10.0	8.5	.80	60	120/208	205-220	3	34
10.0	10.0	8.5	.80	60	120/240	228-252	1	52
10.0	10.0	8.5	.80	60	120	114-126	1	104

KW CAPACITY		PF	FREQ	FUEL	OUTPUT VOLTAGE	VOLTAGE ADJUST RANGE	PHASE	CURRENT CAPACITY AMPS
150 RES F S/L	150 RES F 3000 FT							
8.5	8.5	—	.80	60	120/208	205-220	3	28
8.5	8.5	—	.80	60	120/240	228-252	1	42
8.5	8.5	—	.80	60	120	114-126	1	86

30554-88-20160-02

GENERATOR SET, DIESEL FUELED  
TACTICAL QUIET  
MODE II (400 HERTZ), SIZE 10 (10 KW)

KW CAPACITY		PF	FREQ	FUEL	OUTPUT VOLTAGE	VOLTAGE ADJUST RANGE	PHASE	CURRENT CAPACITY AMPS
150 RES F S/L	150 RES F 8000 FT							
10.0	10.0	8.5	.80	400	120/208	205-220	3	34
10.0	10.0	8.5	.80	400	120/240	228-252	1	52
10.0	10.0	8.5	.80	400	120	114-126	1	104
10.0	10.0	8.5	.80	400	120/208	205-220	3	34
10.0	10.0	8.5	.80	400	120/240	228-252	1	52
10.0	10.0	8.5	.80	400	120	114-126	1	104

KW CAPACITY		PF	FREQ	FUEL	OUTPUT VOLTAGE	VOLTAGE ADJUST RANGE	PHASE	CURRENT CAPACITY AMPS
150 RES F S/L	150 RES F 3000 FT							
8.5	8.5	—	.80	400	120/208	205-220	3	28
8.5	8.5	—	.80	400	120/240	228-252	1	42
8.5	8.5	—	.80	400	120	114-126	1	86

30554-88-20160-04

Figure 8. Set Rating Identification Plate.



## DECALS AND INSTRUCTION PLATES – CONTINUED

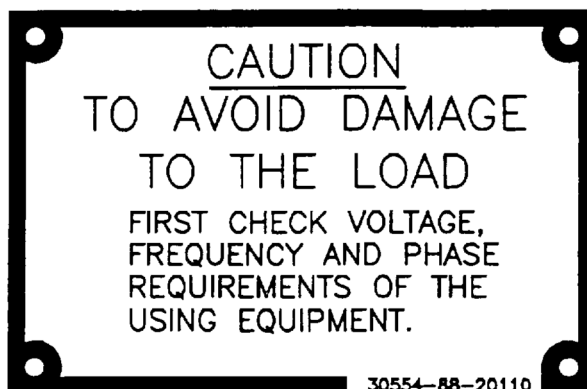


Figure 9. Voltage Connection Caution Plate.

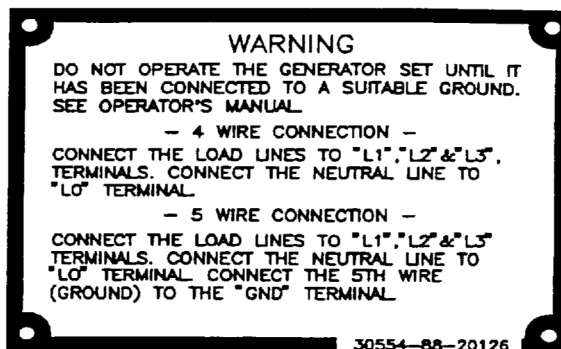


Figure 10. Grounding Stud Plate.

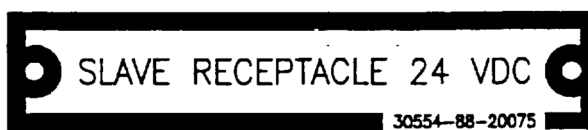


Figure 11. NATO Slave Receptacle Plate.

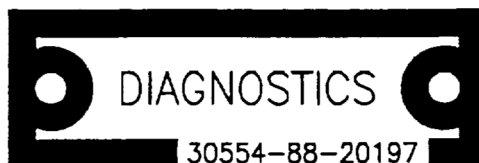


Figure 12. Diagnostics Plate.

## DECALS AND INSTRUCTION PLATES – CONTINUED

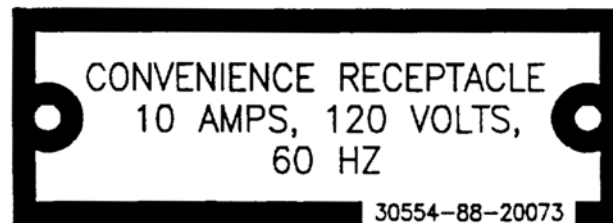


Figure 13. Convenience Receptacle Plate.



Figure 14. External Fuel Supply Plate.

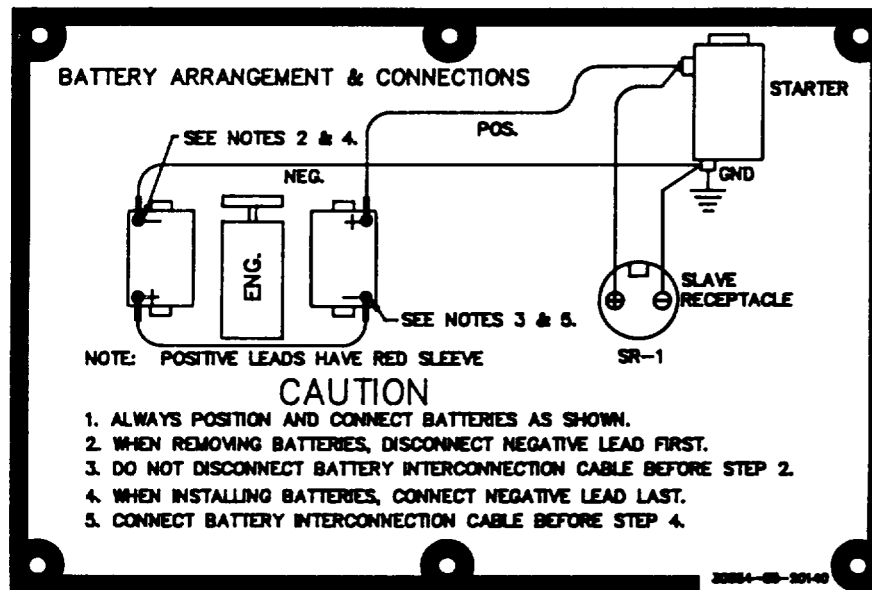


Figure 15. Battery Connection Instruction Plate.

DECALS AND INSTRUCTION PLATES – CONTINUED

US DEPARTMENT OF DEFENSE	
NOM	GENERATOR, ALTERNATING CURRENT, SYNCHRONOUS BRUSHLESS
MAKE	MILITARY DESIGN
MODEL	88-20040
SER NO.	NO OF WIRES 12
VOLTS 120V	AMPS 34.7/17.4
KW 10	KVA 12.50 PF 0.8
HERTZ 60	PH 1, 3 RPM 1800
MFD BY ONAN CORPORATION	
30554-88-20064-03	

US DEPARTMENT OF DEFENSE	
NOM	GENERATOR, ALTERNATING CURRENT, SYNCHRONOUS BRUSHLESS
MAKE	MILITARY DESIGN
MODEL	88-20041
SER NO.	NO OF WIRES 12
VOLTS 120V	AMPS 34.7/17.4
KW 10	KVA 12.50 PF 0.8
HERTZ 400	PH 1, 3 RPM 2000
MFD BY ONAN CORPORATION	
30554-88-20064-04	

Figure 16. Generator Identification Plate.

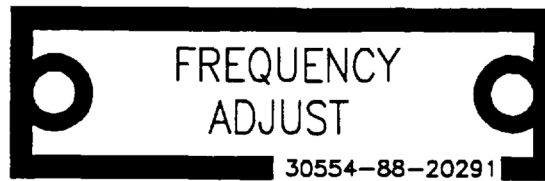


Figure 17. Frequency Adjust Plate.

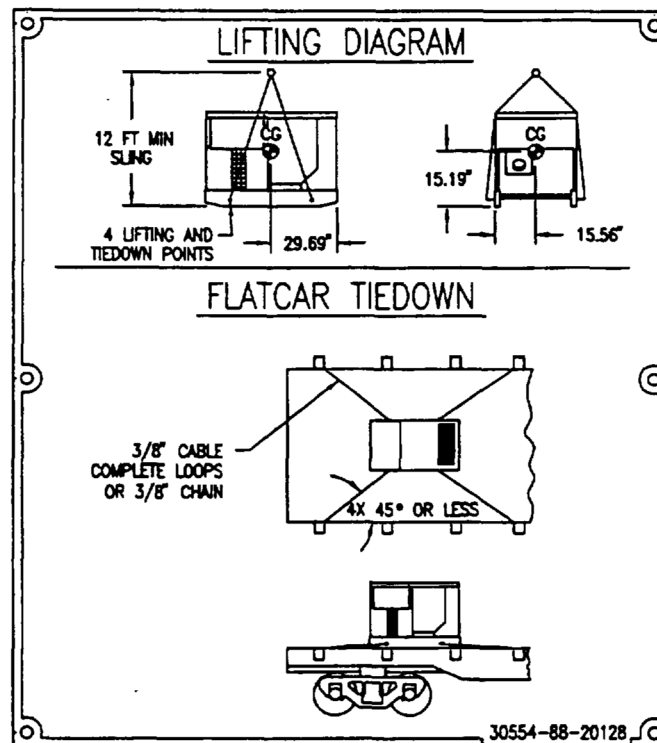


Figure 18. Lifting and Tiedown Diagram Plate.

## DECALS AND INSTRUCTION PLATES – CONTINUED

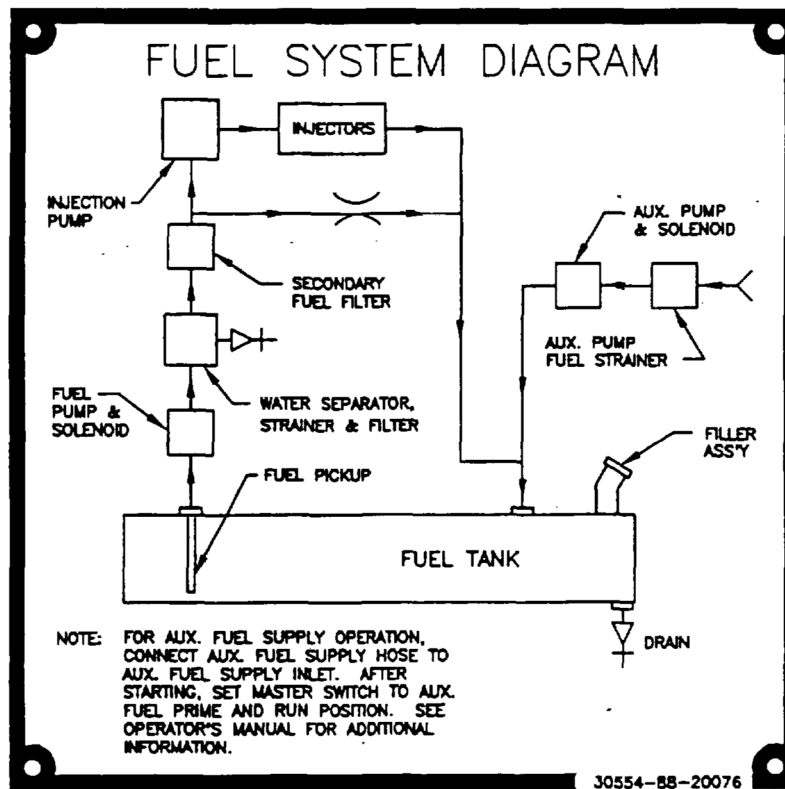


Figure 19. Fuel System Diagram Plate.

**PREPARATION FOR MOVEMENT**

1. Shut down generator set, refer to Stopping Procedure.
2. Disconnect load cables.
3. When using auxiliary fuel line, disconnect line, drain excess fuel from line and store line in storage box.
4. Disconnect ground cable and remove ground rods. Store ground rod in holding clip on right side of skid base. Store cable and couplings in storage box.
5. Secure all generator set access doors and panels.
6. For initial set up after movement, refer to Assembly and Preparation for Use.

**END OF TASK****END OF WORK PACKAGE**

---

## OPERATOR MAINTENANCE

### OPERATION UNDER UNUSUAL CONDITIONS

---

#### INITIAL SETUP:

##### Tools and Special Tools

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

##### References

WP 0014 (Air Cleaner Assembly)  
WP 0019, NBC Decontamination

##### Materials/Parts

Antifreeze Coolant P/N (81349) A-A-52624

##### Equipment Condition

Grounded, Off & Operational

##### Personnel Required

One (1): Power Generation Mechanic (91D)

---

#### UNUSUAL ENVIRONMENT/WEATHER

##### Operation in Extreme Cold Weather Below -25 °F (-31 °C)

The generator set operates in ambient temperatures as low as -25 °F (-31 °C) without special winterization equipment. To ensure satisfactory operation under extreme cold weather the following steps must be taken.

### WARNING

Avoid contacting metal items with bare skin in extreme cold weather. Failure to observe this warning can cause personal injury.

1. Keep generator set and surrounding area as free of ice and snow as practical.
2. Keep fuel tank full to protect against moisture, condensation and accumulation of water.
3. Ensure that proper grade diesel fuel is used.
4. Keep batteries free from corrosion and in a well charged condition.

##### OPERATION IN EXTREME HEAT ABOVE 120 °F (49 °C)

1. Check vents and radiator air passages frequently for obstructions.
2. Check coolant temperature indicator frequently for any indication of overheating.
3. Allow sufficient space for fuel expansion when filling fuel tank.
4. Keep generator clean and free of dirt. Clean obstructions from generator intake and outlet screens.
5. Clean external surface of engine when generator set is not operating.

##### OPERATION IN DUSTY OR SANDY AREAS

1. If possible, provide a shelter for generator set. Use available natural barriers to shield generator set from blowing dust or sand.

---

**OPERATION IN DUSTY OR SANDY AREAS – CONTINUED**

2. Wet down dusty and sandy surface areas around generator set frequently if water is available.
3. Keep all access doors closed, as much as possible, to prevent entry of dust and sand into housing assembly.
4. Wipe dust and sand frequently from the generator set external surface and components. Wash exterior surfaces frequently with clean water when generator set is not operating.
5. Service engine air cleaner assembly frequently to compensate for intake of additional dust or sand. Refer to WP 0014.
6. Drain sediment frequently from fuel filter/water separator. When servicing fuel tank be careful to prevent dust or sand from entering fuel tank.
7. Change engine oil and oil filter frequently.
8. Store oil and fuel in dust-free containers.
9. Ensure that generator set ground connections are free of dust and sand and connections are tight before starting the unit.

**OPERATION UNDER RAINY OR HUMID CONDITIONS****CAUTION**

Failure to remove waterproof material before operating generator set could result in equipment damage.

1. If possible, provide a shelter for generator set. Cover generator set with canvas or other waterproof material when it is not being operated.
2. Provide adequate drainage to prevent water from accumulating on operation site.
3. Keep all generator set access doors closed, as much as possible, to prevent entry of water into housing assembly.
4. Drain water frequently from fuel filter/water separator

**WARNING**

DC voltages are present at generator set electrical components even with generator set shutdown. Avoid grounding yourself when touching any electrical components. Failure to follow this warning can result in personal injury.

5. Remove moisture from generator set components before and after each operating period.
6. Keep fuel tank full to protect against moisture, condensation and accumulation of water.

**OPERATION IN SALT WATER AREAS****CAUTION**

Failure to remove waterproof material before operating generator set could result in equipment damage.

1. If possible, provide a shelter for the generator set. Locate generator set so that radiator faces into prevailing winds. Use natural barriers or, if possible, construct a barrier to protect generator set from salt water. Cover generator set with canvas or other waterproof material when it is not being operated.

---

**OPERATION IN SALT WATER AREAS – CONTINUED**

2. Keep all generator access doors closed, as much as possible, to prevent entry of salt water into housing assembly.
3. Wash exterior surfaces frequently with clean water when generator set is not operating.
4. Check wiring connections for corrosion insulation for signs of deterioration.

**OPERATION IN SALT WATER AREAS**

The generator set will operate at elevations up to 4,000 feet (1,219.1 meters) above sea level without special adjustment or reduction in load. At elevations greater than 4,000 feet (1219.1 meters) above sea level, the kilowatt rating is reduced approximately 3.5 percent for each additional 1,000 feet (304.8 meters).

**OPERATION WHILE IN CONTAMINATED AREAS**

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

1. Control panel indicators sealing gasket, 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. Lubricants, fuel, coolant, or battery fluids 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.
3. Continued decontamination of external generator set surfaces with supertropical bleach (STB)/decontamination 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 soldiers wearing protective masks. Therefore, the use of STB or DS2 decontamination in these areas should be minimized. Indicators should be decontaminated with warm soapy water.
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 lettering. Therefore, the recommended method of decontamination for these areas is with warm soapy water.
5. Areas that will entrap contaminants, making efficient decontamination extremely difficult, include the following:
  - a. Exposed heads of screws.
  - b. Areas adjacent to and behind exposed wiring conduits.
  - c. Hinged areas or access doors.
  - d. Retaining chains for external receptacle covers.
  - e. Areas around the tie-down/lifting rings, crevices around access doors, external screens covering ventilation areas, the external oil drain valve, and areas adjacent to the external fuel drain valve.
  - f. Areas behind knobs and switches on the control panel, externally mounted equipment specification data plates, external receptacle covers, access doors, access door locking mechanisms, recessed wells for access door handles, fuel cap, load terminal board, slave receptacles, and frequency adjustment controls.

---

**OPERATION WHILE IN CONTAMINATED AREAS – CONTINUED**

Replacements of these items, if available, is the preferred method of decontamination. Conventional methods of decontamination should be used on these areas, while stressing the importance of thoroughness and the probability of some degree of continuing contact and vapor hazard.

6. In an NBC contaminated environment, the generator set should be operated with all access doors closed to reduce the effects of contamination.
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. However, if using covers, care should be taken to provide adequate space for air flow and exhaust.
8. For additional NBC information, refer to FM 3-3 and FM 3-4. Other services use applicable publications for NBC.

**END OF TASK**

**END OF WORK PACKAGE**



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**OPERATOR MAINTENANCE**  
**EMERGENCY INFORMATION**

---

**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**References**

WP 0005, Starting Procedures

**Personnel Required**

One (1): Power Generation Mechanic (91D)

**Equipment Condition**

Grounded, Off & Operational

---

**NATO SLAVE RECEPTACLE START OPERATION**

General. The NATO slave receptacle can be used to start the generator set when batteries are discharged.

**NATO Slave Emergency Starting Procedure**

1. Connect one end of NATO slave cable to fully charged 24 VDC system and other end to discharged generator set's NATO slave receptacle. Start discharged generator set.
2. Refer to WP 0005, Operating Procedures.
3. Remove NATO slave cable after generator set starts.

**EMERGENCY STOPPING**

General. Depressing the EMERGENCY STOP pushbutton will stop the generator set.

**NOTE**

The generator set cannot be restarted without resetting the EMERGENCY STOP pushbutton and turning MASTER SWITCH to OFF position.

**OPERATION USING BATTLE SHORT SWITCH****CAUTION**

Continued operation using the BATTLE SHORT switch can result in damage to the generator set.

**NOTE**

If any emergency situation requires continued operation of the generator set, the BATTLE SHORT switch is used to override all the safety devices except the short circuit devices, and EMERGENCY STOP function.

**NOTE**

BATTLE SHORT switch must be OFF to start generator set.

OPERATION USING BATTLE SHORT SWITCH – CONTINUED

- 1. Start generator set if set is not running. Refer to WP 0005, Starting Procedures.
- 2. Lift cover on BATTLE SHORT switch and position switch to ON.

END OF WORK PACKAGE

**CHAPTER 3**

**OPERATOR TROUBLESHOOTING PROCEDURES**

**FOR**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**  
**10 kW, 60 Hz**  
**MEP-803A**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**  
**10 kW, 400 Hz**  
**MEP-813A**

CHAPTER 3

OPERATOR TROUBLESHOOTING PROCEDURES

WORK PACKAGE INDEX

---

<u>Title</u>	<u>WP Sequence No.</u>
TRUBLESHOOTING INDEX .....	0008
TRUBLESHOOTING PROCEDURES .....	0009

## OPERATOR MAINTENANCE TROUBLESHOOTING INDEX

### GENERAL

This section lists common malfunctions you may find during operation of the generator set. You should perform the tests/inspections and corrective actions in the order listed.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

### NOTE

Air Force and Marine Corps users may perform maintenance only as authorized.

### SYMPTOM TROUBLESHOOTING PROCEDURES INDEX

MALFUNCTION/SYMPTOM	TROUBLESHOOTING PROCEDURE
<b>COOLING SYSTEM</b>	
COOLANT TEMPERATURE indicator indicates engine overheating.	Symptom 11
<b>ELECTRICAL SYSTEM</b>	
BATTERY CHARGE ammeter shows low or no charge.	Symptom 12
BATTERY CHARGE ammeter shows excessive charge.	Symptom 13
AC VOLTMETER (VOLTS AC) Indicates low voltage.	Symptom 14
AC VOLTMETER (VOLTS AC) Indicates correct voltage but frequency meter (HERTZ) is off scale.	Symptom 15
AC VOLTMETER (VOLTS AC) Voltage fluctuates.	Symptom 16
FREQUENCY meter (HERTZ) Frequency fluctuates.	Symptom 17
AC CIRCUIT INTERRUPTER Light fails to light when AC CIRCUIT INTERRUPTER switch is closed.	Symptom 18
No voltage at the Convenience Receptacle.	Symptom 19
<b>ENGINE</b>	
Fails to crank.	Symptom 1
Cranks but fails to start.	Symptom 2
Stops when MASTER SWITCH is released from START position.	Symptom 3
Stops suddenly.	Symptom 4

---

**SYMPTOM TROUBLESHOOTING PROCEDURES INDEX – CONTINUED**

<b>MALFUNCTION/SYMPTOM</b>	<b>TROUBLESHOOTING PROCEDURE</b>
Runs erratically or misfires.	Symptom 5
Does not develop full power.	Symptom 6
Knocks.	Symptom 7
<b>EXHAUST SYSTEM</b>	
Blue or white exhaust smoke.	Symptom 8
Black exhaust smoke.	Symptom 9
<b>LUBRICATING SYSTEM</b>	
Low oil pressure.	Symptom 10

**END OF WORK PACKAGE**

---

**OPERATOR MAINTENANCE**  
**TROUBLESHOOTING PROCEDURES**

---

**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**Personnel Required**

One (1): Power Generation Mechanic (91D)

**References**

LO 9-6115-642-12  
WP 0004 (Figure 1 & Table 1, Items: 3, 18 & 21)  
WP 0005, Starting Procedures

**References - cont'd**

WP 0005 (Installation of Load Cables)  
WP 0014 (Air Cleaner Assembly) (Figure 1 & Table 1, Items: 3, 18 & 21)  
WP 0015 (Adding Coolant)  
WP 0016 (No Fuel Light & Table 1)  
WP 0017 (Fuel Filter/Water Separator)

**Equipment Condition**

Grounded, Off & Operational

---

**TROUBLESHOOTING PROCEDURE(S)****SYMPTOM**

1. Engine fails to crank.

**TEST OR INSPECTION**

Step 1. Check that DEAD CRANK switch is in the NORMAL position.

**CORRECTIVE ACTION**

Place switch in NORMAL position.

**TEST OR INSPECTION**

Step 2. Check that DC CONTROL POWER circuit breaker is energized (in).

**CORRECTIVE ACTION**

If DC CONTROL POWER circuit breaker is deenergized (out), go to Step 3.

**TEST OR INSPECTION**

Step 3. Check that Emergency Stop Switch is out.

**CORRECTIVE ACTION**

Pull Emergency Stop Switch out.

---

**TROUBLESHOOTING – CONTINUED****TEST OR INSPECTION**

Step 4. Defect is Engine Starting/Electrical System. Check battery connections.

**CORRECTIVE ACTION**

If loose or corroded, notify next higher maintenance level.

**SYMPTOM**

2. Engine cranks but fails to start.

**TEST OR INSPECTION**

Step 1. Cold ambient temperature.

**CORRECTIVE ACTION**

If ambient temperature is below 40 °F (4 °C) turn MASTER SWITCH to PREHEAT position for a maximum of 30 seconds prior to cranking engine, refer to WP 0005, Starting Procedures.

**TEST OR INSPECTION**

Step 2. Check for dirty air cleaner element.

**CORRECTIVE ACTION**

Service air cleaner assembly, refer to WP 0014, Servicing.

**TEST OR INSPECTION**

Step 3. Check for dirty fuel filter/water separator.

**CORRECTIVE ACTION**

Service fuel filter/water separator, refer to WP 0017, Servicing. If engine still fails to start, notify next higher maintenance level.

**SYMPTOM**

3. Engine starts but stops when MASTER SWITCH is released from START position.

**TEST OR INSPECTION**

Step 1. Check for proper starting procedure.

**CORRECTIVE ACTION**

Hold MASTER SWITCH in START position until 25 PSI (172 kPa) is reached, refer to WP 0005, Operating Procedures.



---

**TROUBLESHOOTING – CONTINUED****TEST OR INSPECTION**

Step 2. Check to see if any FAULT INDICATOR lights are lit.

**CORRECTIVE ACTION**

NO FUEL light is lit. refer to WP 0016. If any other lights are lit, notify next higher maintenance level.

**SYMPTOM**

4. Engine stops suddenly.

**TEST OR INSPECTION**

Step 1. Check to see if any FAULT INDICATOR lights are lit.

**CORRECTIVE ACTION**

NO FUEL light is lit, refer to WP 0016. If any other lights are lit, go to step 2.

**TEST OR INSPECTION**

Step 2. Check that DC CONTROL POWER circuit breaker is energized (in).

**CORRECTIVE ACTION**

If DC CONTROL POWER circuit breaker is deenergized (out), notify next higher maintenance level.

**SYMPTOM**

5. Engine runs erratically or misfires.

**TEST OR INSPECTION**

Step 1. Check for dirty air cleaner element.

**CORRECTIVE ACTION**

Service air cleaner assembly. refer to WP 0014, Servicing.

**TEST OR INSPECTION**

Step 2. Check for contaminated fuel.

**CORRECTIVE ACTION**

Service fuel filter/water separator, refer to WP 0017, Servicing.

**TEST OR INSPECTION**

Step 3. Check for improper type of fuel.

---

**TROUBLESHOOTING – CONTINUED****CORRECTIVE ACTION**

If improper fuel is suspected, refer to WP 0016, Table 1, notify next higher maintenance level.

**SYMPTOM**

6. Engine does not develop full power.

**TEST OR INSPECTION**

Step 1. Check for dirty air clearer element.

**CORRECTIVE ACTION**

Service air cleaner assembly, refer to WP 0014, Servicing.

**TEST OR INSPECTION**

Step 2. Check for contaminated fuel.

**CORRECTIVE ACTION**

Service fuel filter/water separator, refer to WP 0017, Servicing.

**TEST OR INSPECTION**

Step 3. Check for restricted exhaust system.

**CORRECTIVE ACTION**

Make sure exhaust opening is free from obstructions. If no obstructions are found, notify next higher maintenance level.

**TEST OR INSPECTION**

Step 4. Check for improper type of fuel.

**CORRECTIVE ACTION**

If improper type of fuel is suspected, refer to WP 0016, Table 1, notify next higher maintenance level.

**SYMPTOM**

7. Engine knocks.

**TEST OR INSPECTION**

Step 1. Check for low lubrication oil level.

**CORRECTIVE ACTION**

If necessary add oil, refer to LO 9-6115-642-12.

---

**TROUBLESHOOTING – CONTINUED****TEST OR INSPECTION**

Step 2. Check for loose parts or foreign objects in engine compartment.

**CORRECTIVE ACTION**

If no loose parts or foreign objects are found, go to Step 3.

**TEST OR INSPECTION**

Step 3. Check for improper type of fuel.

**CORRECTIVE ACTION**

If improper type of fuel is suspected, refer to WP 0016, Table 1, notify next higher maintenance level.

**SYMPTOM**

8. Blue or white exhaust smoke.

**TEST OR INSPECTION**

Check for improper type of fuel.

**CORRECTIVE ACTION**

If improper type of fuel is suspected, refer to WP 0016, Table 1, notify next higher maintenance level.

**SYMPTOM**

9. Black exhaust smoke.

**TEST OR INSPECTION**

Step 1. Check for improper type of fuel.

**CORRECTIVE ACTION**

If improper type of fuel is suspected, refer to WP 0016, Table 1, notify next higher maintenance level.

**TEST OR INSPECTION**

Step 2. Check for dirty air cleaner element.

**CORRECTIVE ACTION**

Service air cleaner assembly, refer to WP 0014, Servicing.

---

**TROUBLESHOOTING – CONTINUED****TEST OR INSPECTION**

Step 3. Check for generator set overload

**CORRECTIVE ACTION**

Check for generator set overload by checking the ammeter (PERCENT RATED CURRENT) on the control panel assembly, refer to WP 0004, Figure 1. If unable to adjust, notify next higher maintenance level.

**SYMPTOM**

10. Low oil pressure.

**TEST OR INSPECTION**

Step 1. Check for low lubrication oil level.

**CORRECTIVE ACTION**

If necessary add oil, refer to LO 9-6115-642-12.

**TEST OR INSPECTION**

Step 2. Check for high coolant temperature, above 200 °F (93 °C), refer to WP 0004, Table 1, Item 3.

**CORRECTIVE ACTION**

If coolant temperature is high, go to Step 3.

**TEST OR INSPECTION**

Step 3. Check coolant level. If low, add coolant, refer to WP 0015, Servicing.

**CORRECTIVE ACTION**

If full, go to Step 4.

**TEST OR INSPECTION**

Step 4. Check for obstruction in air intake system.

**CORRECTIVE ACTION**

If obstructions are found, remove debris. If no obstructions are found, go to Step 5.

**TEST OR INSPECTION**

Step 5. Check for loose fan belt.

**CORRECTIVE ACTION**

If loose, notify next higher maintenance level.

---

**TROUBLESHOOTING – CONTINUED****SYMPTOM**

11. COOLANT TEMPERATURE indicator indicates engine overheating.

**TEST OR INSPECTION**

Step 1. Check for generator set overload by checking the ammeter (PERCENT RATED CURRENT) on the control panel assembly, refer to WP 0004, Table 1.

**CORRECTIVE ACTION**

If unable to adjust, notify next higher maintenance level.

**TEST OR INSPECTION**

Step 2. Check coolant level.

**CORRECTIVE ACTION**

If low, add coolant, refer to WP 0015, Servicing. If full, go to Step 3.

**TEST OR INSPECTION**

Step 3. Check for low lubrication oil level.

**CORRECTIVE ACTION**

If necessary add oil, refer to LO 9-6115-642-12. If full, go to Step 4.

**TEST OR INSPECTION**

Step 4. Check for obstruction in air intake system.

**CORRECTIVE ACTION**

If obstructions are found, remove debris. If no obstructions are found, go to Step 5.

**TEST OR INSPECTION**

Step 5. Check for loose fan belt.

**CORRECTIVE ACTION**

If loose, notify next higher maintenance level.

**SYMPTOM**

12. BATTERY CHARGE ammeter shows low or no charge.

**TEST OR INSPECTION**

Step 1. Check BATTERY CHARGER FUSE.

---

**TROUBLESHOOTING – CONTINUED****CORRECTIVE ACTION**

If BATTERY CHARGER FUSE (WP 0004, Table 1, Item 21) is blown, notify next higher maintenance level.

**TEST OR INSPECTION**

Step 2. Check fan belt.

**CORRECTIVE ACTION**

If fan belt is loose, notify next higher maintenance level.

**TEST OR INSPECTION**

Step 3. Check for loose or broken wires.

**CORRECTIVE ACTION**

Check for loose or broken wires at the back of the battery charging alternator (WP 0004, Figure 1) and BATTERY CHARGE ammeter (WP 0004, Table 1, Item 18). If wires are loose or broken, notify next higher maintenance level.

**SYMPTOM**

13. BATTERY CHARGE ammeter shows excessive charging after prolonged operation.

**TEST OR INSPECTION**

Step 1. Check batteries for low electrolyte level.

**CORRECTIVE ACTION**

If low refer to WP 0013. If level is correct, go to step 2.

**TEST OR INSPECTION**

Step 2. Check battery connection.

**CORRECTIVE ACTION**

If loose or corroded, notify next higher maintenance level.

**SYMPTOM**

14. AC voltmeter (VOLTS AC) indicates low voltage.

**TEST OR INSPECTION**

Step 1. Check that AM-VM transfer switch position corresponds to readings on the AC voltmeter (VOLTS AC), refer to WP 0011, Table 1.

---

**TROUBLESHOOTING – CONTINUED****CORRECTIVE ACTION**

Set VOLTAGE adjust potentiometer.

**TEST OR INSPECTION**

Step 2. Check for loose or broken wires at back of AM-VM transfer switch VOLTAGE adjust potentiometer. and AC voltmeter (VOLTS AC).

**CORRECTIVE ACTION**

If wires are loose or broken, notify next higher maintenance level.

**SYMPTOM**

15. AC voltmeter (VOLTS AC) indicates correct voltage, but frequency meter (HERTZ) is off scale.

**TEST OR INSPECTION**

Step 1. Check FREQUENCY adjust control.

**CORRECTIVE ACTION**

Set FREQUENCY adjust control.

**TEST OR INSPECTION**

Step 2. Check for loose or broken wires at back of FREQUENCY adjust control.

**CORRECTIVE ACTION**

If wires are loose or broken, notify next higher maintenance level.

**SYMPTOM**

16. AC voltmeter (VOLTS AC) fluctuates.

**TEST OR INSPECTION**

Check back of AC voltmeter (VOLTS AC) for loose or broken wires.

**CORRECTIVE ACTION**

If wires are loose or broken, notify next higher maintenance level.

**SYMPTOM**

17. Frequency meter (HERTZ) fluctuates.

**TEST OR INSPECTION**

Check back of frequency meter (HERTZ) for loose or broken wires.

---

**TROUBLESHOOTING – CONTINUED****CORRECTIVE ACTION**

If wires are loose or broken, notify next higher maintenance level.

**SYMPTOM**

18. AC CIRCUIT INTERRUPTER light fails to light when AC CIRCUIT INTERRUPTER switch is closed.

**TEST OR INSPECTION**

Step 1. TEST AC CIRCUIT INTERRUPTER light by depressing.

**CORRECTIVE ACTION**

If light fails to light, refer to next higher maintenance level.

**TEST OR INSPECTION**

Step 2. Check load cables for proper connection. For proper connection of the load cables, refer to WP 0005, Installation of Load Cables.

**CORRECTIVE ACTION**

If correct go to Step 3.

**TEST OR INSPECTION**

Step 3. Ensure load does not exceed generator rating.

**CORRECTIVE ACTION**

Decrease load, if load is correct, refer to next higher maintenance level.

**SYMPTOM**

19. No voltage at the Convenience Receptacle.

**TEST OR INSPECTION**

Step 1. Open control panel and inspect circuit breaker on side of Ground Fault Circuit Interrupter device.

**CORRECTIVE ACTION**

If tripped, reset device. Check fuse on black wire of Ground Fault Circuit Interrupter for generator sets, contract number DAAK01-88-D-D080.

**TEST OR INSPECTION**

Step 2. Check reset button for red band.



---

**TROUBLESHOOTING – CONTINUED****CORRECTIVE ACTION**

If red band is visible, push reset button. If Ground Fault Circuit Interrupter can not be reset, refer to next higher maintenance level.

**END OF WORK PACKAGE**



**CHAPTER 4**

**OPERATOR MAINTENANCE INSTRUCTIONS**

**FOR**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**  
**10 kW, 60 Hz**  
**MEP-803A**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**  
**10 kW, 400 Hz**  
**MEP-813A**

## CHAPTER 4

### OPERATOR MAINTENANCE INSTRUCTIONS

#### WORK PACKAGE INDEX

---

<u>Title</u>	<u>WP Sequence No.</u>
PMCS INTRODUCTION .....	0010
PMCS, INCLUDING LUBRICATION INSTRUCTIONS .....	0011
GENERATOR SET: INSPECTION AND SERVICE .....	0012
BATTERIES: INSPECTION, SERVICING .....	0013
AIR CLEANER ASSEMBLY: INSPECTION, SERVICING .....	0014
COOLING SYSTEM: INSPECTION, SERVICING .....	0015
FUEL TANK: SERVICING .....	0016
FUEL FILTER/WATER SEPARATOR: INSPECTION, SERVICING .....	0017
LUBRICATION SYSTEM: INSPECTION, SERVICING .....	0018

---

## OPERATOR MAINTENANCE

### PMCS INTRODUCTION

---

#### INITIAL SETUP:

##### References

WP 0002 (Figure 1)  
WP 0004, Figure 1  
WP 0009, Troubleshooting

##### References - cont'd

WP 0011, Table 1  
WP 0019, Equipment Inspection and Maintenance Worksheet

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#### 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.

##### Before You Operate

Always keep in mind the CAUTIONS and WARNINGS. Perform your Before PMCS.

##### While You Operate

Always keep in mind the CAUTIONS and WARNINGS. Perform your During PMCS.

##### After You Operate

Be sure to perform your After PMCS.

##### If Your Equipment Fails to Operate

If your equipment does not perform as required, refer to WP 0009 under Troubleshooting for possible problems. Report any malfunctions or failures on the proper DA Form 2404, or refer to DA PAM 750-8.

#### PMCS PROCEDURES

#### NOTE

For general location of the items to be inspected in WP 0011, Table 1, refer to WP 0002, Figure 1, and WP 0004, Figure 1 through Figure 3.

##### Purpose of PMCS Table

Preventive Maintenance Checks and Services (WP 0011, Table 1) list the inspections and care of your equipment required to keep it in good operating condition.

##### Warnings, Cautions, and Notes

Always observe the **WARNINGS**, **CAUTIONS**, and **NOTES** appearing in your PMCS table. Warnings and cautions appear before applicable procedures. You must observe **WARNINGS** to prevent serious injury to yourself and others. You must observe **CAUTIONS** to prevent your equipment from being damaged. You must observe **NOTES** to ensure procedures are performed properly.

## GENERAL – CONTINUED

### Explanation of Table Entries

The PMCS table is divided into five columns. Each column is explained in the following paragraphs.

**Item No. Column.** Numbers in this column are for reference. When completing DA Form 2404 (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do checks and services for the intervals listed.

**Interval Column.** This column tells you when you must do the procedure described in the procedure column. "BEFORE" procedures must be done before you operate the equipment for its intended mission. "DURING" procedures must be done during the time you are operating the equipment for its intended mission. "AFTER" procedures must be done immediately after you have operated the equipment. Perform "WEEKLY" procedures at the listed interval.

**Item to be Checked or Service Column.** This column lists the location and the item to be checked or serviced. The item location is underlined.

**Procedure Column.** This column gives the procedure for checking or servicing the item listed in the location, item to check/service column. You must perform the procedure to know if the power unit or power plant is ready or available for its intended mission or operation. You must do the procedure at the time stated in the interval column.

**Equipment Not Ready/Available if: Column.** Information in this column tells you what faults will keep your equipment from being capable of performing its primary mission. If you perform checks or services that show faults listed in this column, do not operate the equipment.

### Other Table Entries

Be sure to observe all special information and notes that appear in your table.

### Special Instructions

Preventive maintenance is not limited to performing the checks and services listed in the PMCS Table. Covering unused receptacles, stowing unused accessories and performing other routine procedures such as equipment inventory, cleaning components, and touch-up painting are not listed in the table. These are things you should do any time you see that they need to be done. If a routine check is listed in the PMCS Table, it is because experience has shown that problems may occur with this item. Take along tools and cleaning cloths needed to perform the required checks and services. Use the information in the following paragraphs to help you identify problems at any time and to help identify potential problems before and during checks and services.

1. Keep the generator set clean. Dirt, grease, and oil get in the way and may cover up a serious problem. Use cleaning solvent to clean metal surfaces.
2. Use soap and water to clean rubber or plastic parts and material.
3. Check all bolts, nuts, and screws to make sure they are not loose, missing, bent, or broken. Do not try to check them with a tool, but look for chipped paint, bare metal, or rust around bolt heads. If you find one loose, report it to the next-higher level of maintenance.
4. Inspect welds for loose or chipped paint, rust, or gaps where parts are welded together. If a broken weld is found, report it to the next-higher level of maintenance.
5. Inspect electrical wires, connectors, terminals, and receptacles for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors. Examine terminals and receptacles for serviceability. If deficiencies are found, report them to the next-higher level of maintenance.
6. Inspect hoses and fluid lines. Look for wear, damage, and leaks. Make sure that clamps and fittings are tight. Wet spots and stains around a fitting or connector can mean a leak. If a leak comes from a loose connector, or if something is broken or worn out, report it to the next-higher level of maintenance.

**GENERAL – CONTINUED****Leakage Definitions**

You must know how fluid leakage affects the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them. When in doubt, notify your supervisor.

**Table 1. Leakage Definitions.**

<b>LEAKAGE CLASS</b>	<b>LEAKAGE DEFINITION</b>
Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops
Class II	Leakage of fluid great enough to form drops, but not enough to cause drops to drip from the item being checked/inspected.
Class III	Leakage of fluid (other than fuel) greater than three drops per minute that fall from the item being inspected.

**Operation of Generator Set with Minor Leaks**

- a. Consider the equipment's capacity for the fluid that is leaking. If the capacity is small, the fluid level may soon become too low for continued operation. If in doubt, notify your supervisor.
- b. Check the fluid level more often than required in the PMCS Table. Add fluid as needed.
- c. All leaks should be reported to the next higher level of maintenance.

**Corrosion Prevention and Control (CPC)**

CPC of Army material is of continuing concern. It is important that any corrosion problems with the equipment be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items. Although corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem. If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA PAM 750-8.

**Removal of Assemblies/Equipment to Perform PMCS**

There is no requirement to remove assemblies/equipment prior to performing the PMCS.

**END OF WORK PACKAGE**





**OPERATOR MAINTENANCE**  
**PMCS, INCLUDING LUBRICATION INSTRUCTIONS**

**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
 N (S25885) (NSN 4910-01-490-6453)

**References**

LO 9-6115-642-12  
 WP 0019, Equipment Inspection and Maintenance  
 Worksheet

**Personnel Required**

One (1): Power Generation Mechanic (91D)

**Equipment Condition**

Grounded, Off & Operational (Stopping Procedure,  
 WP 0005)

**Table 1. Operator Preventive Maintenance Checks and Services.**

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
<p style="text-align: center;"><b>NOTE</b></p> <p>The generator set can be operated continuously at any load from no load up to and including rated load; However, at light loads (less than 25% of set rating) and oily residue (unburned fuel oil) may occasionally be noticed in the exhaust system outlet and around connection joints in the exhaust system. This residue is caused by the inability of the fuel injection system to consistently meter the small amount of fuel required to operate at these low load levels. It is not a defect in the fuel system. The oily residue could affect engine performance and create a cosmetic problem on and around the generator set. Operation at rated load will burn off this oily residue. The length of time required at rated load depends on the amount of residue. The muffler may also need to be removed and cleaned if excessive build up occurs. This oily residue can be prevented by increasing the electrical load on the set.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disrupting operations. Complete all checks and services when equipment is shut down.</p>				
1	Before	Generator Set Exterior: Housing	<b>Operator</b> 1. Check door panels, hinges, and latches for damage, loose, or corroded items. 2. Inspect air intake and exhaust grills for debris.	Cannot secure door.
2	Before	Generator Set Exterior: Identification Plates	<b>Operator</b> Check to ensure identification plates are secure.	

Table 1. Operator Preventive Maintenance Checks and Services – Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
3	Before	Generator Set Exterior: Skid Base	<b>Operator</b> Inspect skid base for cracks and/or corrosion.	Skid base is cracked or shows signs of structural damage.
4	Before	Generator Set Exterior: Acoustical Materials	<b>Operator</b> Inspect to ensure acoustical materials, located in the grill areas and under the engine are secure, not damaged, or missing.	
5	Before	Engine Assembly	<b>Operator</b>  <p style="text-align: center;"><b>WARNING</b></p> <p>With any access door open, the noise level of this generator set when operating could cause hearing damage. Hearing protection must be worn when working near the generator set while running.</p> <p style="text-align: center;"><b>WARNING</b></p> <p>The fuels in this generator set are highly explosive. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in severe personal injury or death.</p> Inspect for loose, damaged, or missing hardware.	Any loose, damaged, or missing hardware.
6	Before	Engine Assembly: Fuel System	<b>Operator</b> Inspect for leaks, damage, loose, or missing hardware.	Any fuel leaks, damaged, or missing parts.
7	Before	Engine Assembly: Fuel Filter/Water Separator	<b>Operator</b> 1. Inspect for leaks, cracks, damage, proper mounting, loose, or missing hardware.  2. Drain water from fuel filter/water separator WP 0017, Servicing.	Any fuel leaks.  Water not drained.
8	Before	Engine Assembly: Lubrication System	<b>Operator</b> 1. Inspect for leaks, damage, loose, or missing parts.	Class III leaks, damage, loose, or missing parts.

Table 1. Operator Preventive Maintenance Checks and Services – Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			2. Inspect oil level. 3. Inspect for contamination.	Oil level is low. Oil shows signs of contamination.
9	Before	Cooling System: Radiator	<b>Operator</b>  <b>WARNING</b>  Cooling system operates at high temperatures. Personal injury or death from burns or scalding could result from contact with high pressure steam and/or liquid.  Inspect for leaks, damage, loose, or missing parts.	Class III leaks or missing radiator cap.
10	Before	Cooling System: Hoses	<b>Operator</b> Inspect for leaks, cracks, or missing parts.	Class III leaks or missing clamps or hoses.
11	Before	Cooling System: Cooling Fan	<b>Operator</b> 1. Inspect for obstruction, damage, or looseness. 2. Inspect for unusual noise in fan area.	Damaged or loose.  Unusual noise from area.
12	Before	Cooling System: Fan Belt	<b>Operator</b> Inspect for cracks, fraying or looseness.	Broken or missing belt.
13	Before	Cooling System: Overflow Bottle	<b>Operator</b> Inspect for proper mounting, leaks, or missing hardware.	Class III leaks or missing hardware.

Table 1. Operator Preventive Maintenance Checks and Services – Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
14	Before	Exhaust/Intake System: Exhaust System	<b>Operator</b>  <b>WARNING</b>  Exhaust discharge contains deadly gases. Do not operate generator set in enclosed area unless exhaust discharge is properly vented outside. Severe personal injury or death due to carbon monoxide poisoning could result.  Inspect for leaks, corrosion, and missing parts.	Leaks, damaged, or missing parts.
15	Before	Exhaust/Intake System: Air Cleaner Assembly	<b>Operator</b> 1. Inspect for loose, damaged, or missing parts.  2. Inspect restriction indicator for clogged air cleaner element.	Loose or missing parts  Clogged air cleaner element.
16	Before	Grounding Rod Assembly: Ground Rod Cable and Connections	<b>Operator</b>  <b>WARNING</b>  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.  Inspect for damage, corrosion, and loose connections.	Damaged, corroded, or loose connections.
17	Before	Electrical System: Batteries	<b>Operator</b>  <b>WARNING</b>  Battery acid will cause burns to unprotected skin.	

Table 1. Operator Preventive Maintenance Checks and Services – Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			<p><b>WARNING</b></p> <p>Batteries give off flammable gas. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in personal injury or death.</p> <p><b>WARNING</b></p> <p>DC voltages are present at generator set electrical components even with generator set shut down. Avoid grounding self when touching any electrical components. Failure to observe this warning can result in personal injury.</p> <p>Inspect for secure mounting.</p>	Broken or missing mounting hardware.
18	Before	Electrical System: Battery Cables	<p><b>Operator</b></p> <p>Inspect for corrosion, damage, loose connections, or missing parts.</p>	Damaged, loose, or missing parts.
19	Before	Electrical System: Output Box Assembly	<p><b>Operator</b></p> <ol style="list-style-type: none"> <li>1. Inspect cables for damage or loose connections.</li> <li>2. Inspect output terminals for damage or missing hardware.</li> </ol>	<p>Damaged, loose, or missing parts.</p> <p>Damaged or missing hardware.</p>
20	Before	Control Box Assembly: Controls and Indicators	<p><b>Operator</b></p> <p>Inspect for damage or missing parts.</p>	Damaged or missing parts.
21	Before	Control Box Assembly: Control Box Harness	<p><b>Operator</b></p> <p><b>WARNING</b></p> <p>High Voltage is produced when this generator set is in operation. Improper operation could result in personal injury or death by electrocution.</p> <p>Inspect for damage and looseness.</p>	Damaged or loose.

Table 1. Operator Preventive Maintenance Checks and Services – Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
22	During	Generator Set Exterior: Housing	<p><b>Operator</b></p> <p><b>NOTE</b></p> <p>If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disrupting operations. Complete all checks and services when equipment is shut down.</p> <p>Check door panels, hinges, and latches for damage, loose, or corroded items.</p>	Cannot secure door.
23	During	Engine Assembly	<p><b>Operator</b></p> <p><b>WARNING</b></p> <p>With any access door open, the noise level of this generator set when operating could cause hearing damage. Hearing protection must be worn when working near the generator set while running.</p> <p><b>WARNING</b></p> <p>The fuels in this generator set are highly explosive. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in severe personal injury or death.</p> <p>Inspect for loose, damaged or missing hardware.</p>	Any loose, damaged or missing hardware.
24	During	Engine Assembly: Fuel System	<p><b>Operator</b></p> <p>Inspect for leaks, damage, loose, or missing hardware.</p>	Any fuel leaks, damage, loose, or missing parts.

Table 1. Operator Preventive Maintenance Checks and Services – Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
25	During	Engine Assembly: Lubrication System	<b>Operator</b> 1. Inspect for leaks, damage or missing parts. 2. Inspect for contamination.	Class III leaks, damage, loose, or missing parts. Oil shows signs of contamination.
26	During	Cooling System: Cooling Fan	<b>Operator</b> 1. Inspect for obstruction, damage, or looseness. 2. Inspect for unusual noise in fan area.	Damaged or loose. Unusual noise from area.
27	During	Cooling System: Overflow Bottle	<b>Operator</b> Inspect for proper mounting, leaks, or missing hardware.	Class III leaks or missing hardware.
28	During	Grounding Rod Assembly: Ground Rod Cable and Connections	<b>Operator</b> Inspect for damage, corrosion, and loose connections.	Damaged, corroded, or loose connections.
29	During	Control Box Assembly: Controls and Indicators	<b>Operator</b>  <b>WARNING</b>  High Voltage is produced when this generator set is in operation. Improper operation could result in personal injury or death by electrocution.  Inspect indicators are operating properly.	      Indicators are not operating properly.
30	After	Generator Set Exterior: Housing	<b>Operator</b>  <b>NOTE</b>  If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disrupting operations. Complete all checks and services when equipment is shut down.  Check door panels, hinges, and latches for damage, loose, or corroded items.	      Cannot secure door.

Table 1. Operator Preventive Maintenance Checks and Services – Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
31	After	Generator Set Exterior: Identification Plates	<b>Operator</b> Check to ensure identification plates are secure.	
32	After	Generator Set Exterior: Skid Base	<b>Operator</b> Inspect skid base for cracks and/or corrosion.	Skid base is cracked or shows signs of structural damage.
33	After	Engine Assembly	<b>Operator</b>  <b>WARNING</b>  The fuels in this generator set are highly explosive. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in severe personal injury or death.  Inspect for loose, damaged or missing hardware.	Any loose, damaged or missing hardware.
34	After	Engine Assembly: Fuel System	<b>Operator</b> Inspect for leaks, damage, loose, or missing hardware.	Any fuel leaks, damage, loose, or missing parts.
35	After	Engine Assembly: Fuel Filter/Water Separator	<b>Operator</b> 1. Inspect for leaks, cracks, damage, proper mounting, loose, or missing parts.  2. Drain water from fuel filter/water separator WP 0017, Servicing.	Any fuel leaks.  Water not drained.
36	After	Engine Assembly: Lubrication System	<b>Operator</b> 1. Inspect for leaks, damage or missing parts.  2. Inspect oil level.  3. Inspect for contamination.	Class III leaks, damage, loose, or missing parts.  Oil level is low.  Oil shows signs of contamination.



Table 1. Operator Preventive Maintenance Checks and Services – Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
37	After	Cooling System: Radiator	<b>Operator</b>  <b>WARNING</b>  Cooling system operates at high temperatures. Personal injury or death from burns or scalding could result from contact with high pressure steam and/or liquid.  Inspect for leaks, damage, loose, or missing parts.	Class III leaks or missing radiator cap.
38	After	Cooling System: Hoses	<b>Operator</b>  Inspect for leaks, cracks, or missing parts.	Class III leaks or missing clamps or hoses.
39	After	Cooling System: Fan Belt	<b>Operator</b>  Inspect for cracks, fraying or looseness.	Broken or missing belt.
40	After	Control Box Assembly: Controls and Indicators	<b>Operator</b>  Inspect for damage or missing parts.	Damaged or missing parts.

**MANDATORY REPLACEMENT PARTS**

There are no replacement parts required for these PMCS procedures.

**LUBRICATION INSTRUCTIONS**

Refer to LO 9-6115-642-12 for lubrication information.

**END OF WORK PACKAGE**



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**OPERATOR MAINTENANCE**  
**GENERATOR SET: INSPECTION AND SERVICE**

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**INITIAL SETUP:**

**Not Applicable**

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**GENERATOR SET INSPECTION AND SERVICE**

**INTRODUCTION**

This section contains operator maintenance procedures. Deficiencies noted during inspection which are beyond the maintenance scope of the operator shall be reported to next higher maintenance level.

**END OF WORK PACKAGE**



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**OPERATOR MAINTENANCE**  
**BATTERIES: INSPECTION, SERVICING**

---

**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**References**

WP 0005, Stopping Procedure

**Materials/Parts**

Protective Clothing P/N foo mtrlpart partno

**Equipment Condition**

Grounded, Off & Operational

**Personnel Required**

One (1): Power Generation Mechanic (91D)

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**WARNING**

Battery acid will cause burns to unprotected skin.

**WARNING**

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

**INSPECTION**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Open engine access door.
3. Inspect for damaged battery case, corrosion, and loose connections on terminal cable, and damaged or missing battery caps.

**WARNING**

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

4. Remove battery caps.

**CAUTION**

Electrolyte level must cover battery plates in all cells. Failure to observe this caution can cause damage to the battery.

**NOTE**

Electrolyte level should be at bottom of each cap cylinder.

5. Inspect electrolyte level.

---

**INSPECTION – CONTINUED**

6. Perform service procedures if required.
7. Install battery caps.
8. Close engine access door.

**END OF TASK****SERVICING**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Open engine access door.

**WARNING**

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

3. Remove battery caps.

**NOTE**

Electrolyte level should be at bottom of each cap cylinder.

4. Add distilled water to each battery cell as required.
5. Replace battery caps.
6. Close engine access door.
7. If necessary contact next higher maintenance level to clean or replace batteries or battery terminals.

**END OF TASK****END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**AIR CLEANER ASSEMBLY: INSPECTION, SERVICING**

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**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**References**

WP 0005, Stopping Procedure

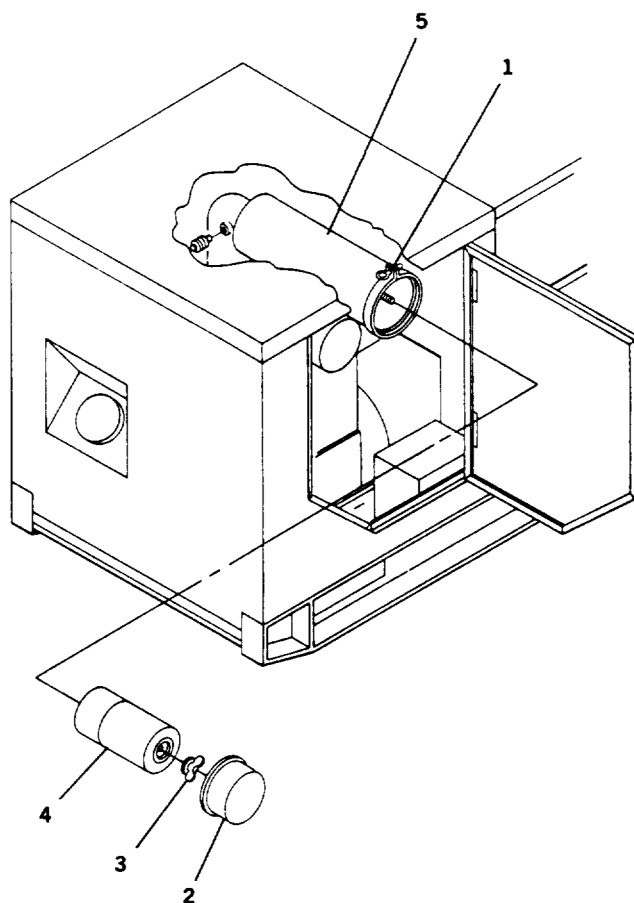
**Equipment Condition**

Grounded, Off & Operational

**Personnel Required**

One (1): Power Generation Mechanic (91D)

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**Figure 1. Air Cleaner Element Replacement.**

**INSPECTION**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.

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**INSPECTION – CONTINUED**

2. Open left side engine access door.
3. Inspect air cleaner housing (Figure 1, Item 5) for dents, corrosion, missing hardware and other damage.
4. Open right side engine access door and inspect air cleaner restriction indicator for indication of a clogged air cleaner element.
5. Close engine access door.

**END OF TASK****SERVICING**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Open left side engine access door.
3. Loosen wing nut clamp (1) and remove end cap (2) on air cleaner housing (5).
4. Remove wing nut (3) and air cleaner element (4). If fouled, discard air cleaner element.
5. Inspect inside of air cleaner housing (5) for debris. Wipe air cleaner housing interior with clean lint-free cloth.
6. Install air cleaner element (4), wing nut (3), end cap (2) and tighten wing nut (1).
7. Close engine compartment access door.

**END OF TASK****END OF WORK PACKAGE**



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**OPERATOR MAINTENANCE**  
**COOLING SYSTEM: INSPECTION, SERVICING**

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**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**Personnel Required**

One (1): Power Generation Mechanic (91D)

**Materials/Parts**

Inhibitor P/N MIL-A-53009  
Antifreeze P/N MIL-A-46153  
Antifreeze P/N MIL-A-11755

**References**

WP 0005, Stopping Procedure

**Equipment Condition**

Grounded, Off & Operational

---

**INSPECTION**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Open both engine access doors.

**WARNING**

Cooling system operates at high temperatures. Personal injury or death from burns or scalding could result from contact with high pressure steam and/or liquid.

3. Check radiator for dirt, leaves, insects, etc. blocking air flow.
4. Check radiator and hoses for leaks, loose connections, loose mounting, corrosion, chafing and missing parts.
5. Check coolant level in coolant recovery (overflow) bottle.
6. Close engine compartment access doors.

**END OF TASK****SERVICING****WARNING**

Cooling system operates at high temperatures. Personal injury or death from burns or scalding could result from contact with high pressure steam and/or liquid.

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Open right side engine access door.
3. Remove coolant recovery (overflow) bottle cap.
4. Fill coolant recovery (overflow) bottle to HOT line if coolant is hot or to COLD line if coolant is cold, with proper coolant/antifreeze in accordance with Table 1.
5. Install coolant recovery (overflow) bottle cap. Close right side engine access door.

---

**SERVICING – CONTINUED****Table 1. Coolant.**

<b>AMBIENT TEMPERATURE</b>	<b>RADIATOR COOLANT</b>	<b>RATIO</b>
+40 to +120 °F (+4 to +49 °C)	Water: MIL-A-53009 Inhibitor, Corrosion	35:1
-25 to +120 °F (-32 to +49 °C)	Water: MIL-A-46153 Antifreeze	1:1
-25 to +120 °F (-32 to +49 °C)	MIL-A-11755 Antifreeze	NA

**END OF TASK****END OF WORK PACKAGE**

**OPERATOR MAINTENANCE****FUEL TANK: SERVICING****INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**Personnel Required**

One (1): Power Generation Mechanic (91D)

**Materials/Parts**

Disel Fuel P/N W-F 800 Grade DF-2 JP4, JP5, JP8

Disel Fuel P/N W-F 800 Grade DF-1 JP4, JP5, JP8

Disel Fuel P/N W-F 800 Grade DF-1

Disel Fuel P/N W-F 800 Grade DF-A

**References**

WP 0005, Stopping Procedure

**Equipment Condition**

Grounded, Off & Operational

**SERVICING****WARNING**

The fuels in this generator set are highly explosive. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in severe personal injury or death.

**CAUTION**

Use only specified diesel fuel to service the fuel tank, refer to Table 1. Otherwise, equipment damage could result, if improper fuel is used.

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Remove fuel cap.
3. Remove strainer, clean as necessary and reinstall.

**NOTE**

Fuel tank holds 9 gallons (34 liters).

4. Add diesel fuel to fuel tank.
5. Install fuel cap.

**Diesel Fuel**

**Table 1. Fuel.**

<b>AMBIENT TEMPERATURE</b>	<b>DIESEL FUEL</b>
+20 to +120 °F (-7 to +49 °C)	W-F-800 GRADE DF-2 JP4, JP5, JP8
0 to +20 °F (-17 to +7 °C)	W-F-800 GRADE DF-1 JP4, JP5, JP8

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**SERVICING – CONTINUED****Table 1. Fuel. – Continued**

<b>AMBIENT TEMPERATURE</b>	<b>DIESEL FUEL</b>
-25 to 0 °F (-32 to -17 °C)	W-F-800 GRADE DF-1
-25 to 0 °F (-32 to -17 °C)	W-F-800 GRADE DF-A

**END OF TASK****END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**FUEL FILTER/WATER SEPARATOR: INSPECTION, SERVICING**

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**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**References**

WP 0005, Stopping Procedure

**Materials/Parts**

Suitable Container to Drain Contaminants P/N

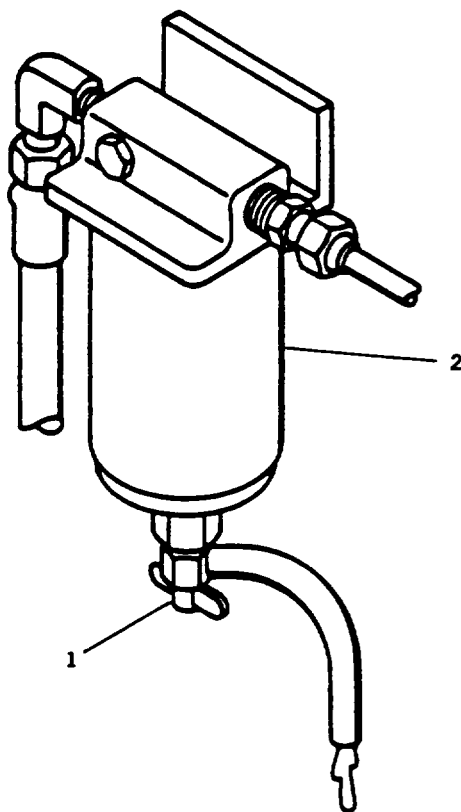
**Equipment Condition**

Grounded, Off & Operational

**Personnel Required**

One (1): Power Generation Mechanic (91D)

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**Figure 1. Draining Fuel Filter/Water Separator.**

**INSPECTION**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Open left side engine access door.
3. Inspect fuel filter/water separator assembly (Figure 1) for proper mounting, cracks, dents, leaks, loose fuel lines and other damage.
4. Close left engine access door.

**END OF TASK****SERVICING**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Rotate MASTER SWITCH to PRIME & RUN.
3. Open left side engine access door.
4. Open fuel drain cock (1) on fuel filter/water separator housing (2) and drain contaminants into a suitable container.
5. Close drain cock (1).
6. Close left side engine access door.
7. Rotate MASTER SWITCH to OFF.

**END OF TASK****END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**LUBRICATION SYSTEM: INSPECTION, SERVICING**

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**INITIAL SETUP:****Tools and Special Tools**

Generator Mechanical Tool Kit P/  
N (S25885) (NSN 4910-01-490-6453)

**References**

WP 0005, Stopping Procedure  
LO 9-6115-642-12

**Personnel Required**

One (1): Power Generation Mechanic (91D)

**Equipment Condition**

Grounded, Off & Operational

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**INSPECTION**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Open both engine access doors.
3. Inspect engine assembly for oil leaks.
4. Check for damage, proper mounting, or missing parts.
5. Check engine crankcase oil level. Refer to LO 9-6115-642-12.
6. Close both engine access doors.

**END OF TASK****SERVICING**

1. Shut down generator set, refer to WP 0005, Stopping Procedure.
2. Open left engine access door.
3. Remove oil filler cap.
4. Add oil to engine crankcase. Refer to LO 9-6115-642-12.
5. Install oil filler cap.
6. Close left engine access door.

**END OF TASK****END OF WORK PACKAGE**





**CHAPTER 5**

**OPERATOR SUPPORTING INFORMATION**

**FOR**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**  
**10 kW, 60 Hz**  
**MEP-803A**

**GENERATOR SET, SKID MOUNTED, TACTICAL QUIET**  
**10 kW, 400 Hz**  
**MEP-813A**

CHAPTER 5

OPERATOR SUPPORTING INFORMATION

WORK PACKAGE INDEX

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EXPENDABLE AND DURABLE ITEMS LIST .....	0022

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**OPERATOR MAINTENANCE****REFERENCES**

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**SCOPE**

This work package lists all forms, field manuals, technical manuals and miscellaneous publications referenced in this manual.

**FORMS**

AFTO Form 22	Recommending Improvements to Technical Publications
DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2028-2	Recommended Changes to Equipment Technical Publications
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Form 2408-9	Equipment Control Log
NAVMC 10772	Reporting Errors and Recommending Improvements to Technical Publications
SF 368	Quality Deficiency Report

**FIELD MANUALS**

FM 3-3	NBC Contamination Avoidance
FM 3-4	NBC Protection
FM 3-5	NBC Decontamination
FM 4-25.11	First Aid
FM 20-31	Electric Power Generation in the Field

**TECHNICAL MANUALS**

TM 4700-15/1	Marine Corps Forms
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**MISCELLANEOUS PUBLICATIONS**

AFR 66-1	Air Force Maintenance Forms and Records
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
LO 9-6115-642-12	Lubrication Order
MCO 4855.10	Quality and Deficiency Reporting
MIL-STD-12	Military Standard Abbreviations
TB 9-6115-642-24	Warranty Technical Bulletin

**END OF WORK PACKAGE**



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## OPERATOR MAINTENANCE

### COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

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## INTRODUCTION

### Scope

This work package lists COEI and BII for the generator set to help you inventory items for safe and efficient operation of the equipment.

### General

The COEI and BII information is divided into the following lists:

#### Components of End Item (COEI)

This list is for information purposes only and is not authority to requisition replacements. These items are part of the generator set. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

#### Basic Issue Items (BII)

These essential items are required to place the generator set in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the generator set during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

#### Explanation of Columns in the COEI List and BII List

Column (1), Illus Number, gives you the number of the item illustrated.

Column (2), National Stock Number, identifies the stock number of the item to be used for requisitioning purposes.

Column (3), Description, Part Number, and CAGEC, identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the CAGEC (Commercial and Government Entity Code) (in parentheses) and the part number.

Column (4), Usable on Code, gives you a code if the item you need is not the same for different models of equipment.

Column (5), U/I (unit of issue), indicates how the item is issued for the National Stock Number shown in column (2).

Column (6), Qty Rqr, indicates the quantity required.

Table 1. Component of End Items (COEI) List.

(1)	(2)	(3)	(4)	(5)	(6)
ILLUS NUMBER	NATIONAL STOCK NUMBER (NSN)	DESCRIPTION, PART NUMBER/(CAGEC)	USABLE ON CODE	U/I	QTY RQR
	0000-00-000-0000	NOT APPLICABLE			-

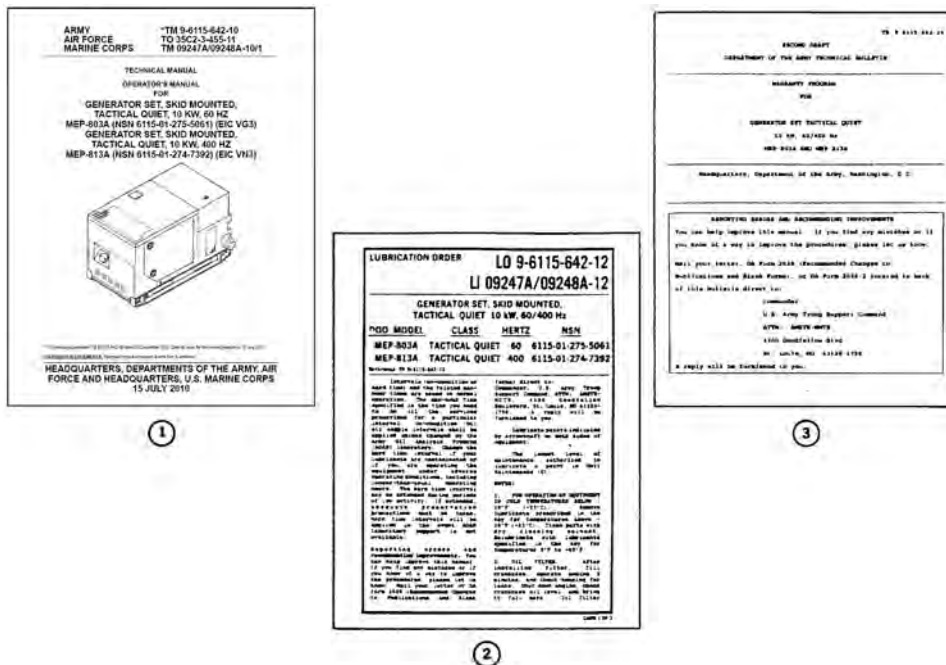


Figure 1. Basic Issue Items.

Table 2. Basic Issue Items (BII).

(1)	(2)	(3)	(4)	(5)	(6)
ILLUS NUMBER	NATIONAL STOCK NUMBER (NSN)	DESCRIPTION, PART NUMBER/(CAGEC)	USABLE ON CODE	U/I	QTY RQR
1		TECHNICAL MANUAL, TM 9-6115-642-10		EA	1
2		LUBRICATION ORDER, LO 9-6115-642-12		EA	1
3		WARRANTY TECHNICAL BULLETIN, TB 9-6115-642-24		EA	1

END OF WORK PACKAGE

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**OPERATOR MAINTENANCE**  
**ADDITIONAL AUTHORIZATION LIST (AAL)**

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**INTRODUCTION****Scope**

This work package lists additional items you are authorized for the support of the generator set.

**General**

This list identifies items that do not have to accompany the generator set and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

**Explanation of Entries in the AAL**

Column (1) National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (2) Description, Part Number/(CAGEC). Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (3) Usable On Code. When applicable, gives you a code if the item you need is not the same for different models of equipment.

Column (4) U/I. Unit of Issue (U/I) indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

Column (5) Qty Recm. Indicates the quantity recommended.

**Table 1. Additional Authorization List.**

(1) NATIONAL STOCK NUMBER (NSN)	(2) DESCRIPTION, PART NUMBER/(CAGEC)	(3) USABLE ON CODE	(4) U/I	(5) QTY RECM
2910-00-066-1235	ADAPTER, CONTAINER 13211E7541 (97403)		EA	1
7240-00-222-3088	CAN, GASOLINE, MILITARY 42-D-1280 (80372)		EA	1
4210-00-270-4512	EXTINGUISHER, FIRE, CARBON DIOXIDE O-E-91O (81348)		EA	1
5120-01-013-1676	SLIDE HAMMER, GROUND 13226E7741 (97403)		EA	1
7240-00-177-6154	SPOUT, CAN, FLEXIBLE MIL-S-1285 (81349)		EA	1

**END OF WORK PACKAGE**





## OPERATOR MAINTENANCE

### EXPENDABLE AND DURABLE ITEMS LIST

#### INTRODUCTION

##### Scope

This work package lists expendable and durable items that you will need to operate and maintain the generator set. This list is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items), CTA 50-909, Field and Garrison Furnishings and Equipment or CTA 8-100, Army Medical Department Expendable/Durable Items.

##### Explanation of Columns in the Expendable/Durable Items List

Column (1) Item No. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., Use brake fluid (WP 0098, item 5)).

Column (2) Level. This column identifies the lowest level of maintenance that requires the listed item (include as applicable: C = Crew, O = AMC, F = Maintainer or ASB, H = Below Depot or TASMG, D = Depot).

Column (3) National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (4) Item Name, Description, Part Number/(CAGEC). This column provides the other information you need to identify the item. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (5) U/I. Unit of Issue (U/I) code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

**Table 1. Expendable and Durable Items List.**

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER/(CAGEC)	(5) U/I
2	O	6850-00-181-7929	ANTIFREEZE, MIL-A-46153 (81349)	GL
1	O	7920-01-338-3329	CLOTH, CLEANING,	EA
4	O	9150-00-189-6727	LUBRICATING OIL, ENG, MIL-L-2104, OEA HDO 10 (81349)	QT
5	O	9150-01-152-4117	LUBRICATING OIL, ENG, MIL-L-2104, OEA HDO 15/40 (81349)	QT
3	O	6810-00-107-1510	WATER, DISTILLED,	GL

**END OF WORK PACKAGE**



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<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> For use of this form, see AR 25-30; the proponent agency is OAASA				Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE 30 August 2002
<b>TO:</b> (Forward to proponent of publication or form) (Include ZIP Code) Commander, US Army CECOM LCMC ATTN: AMSEL-LC-LEO-E-CM Fort Monmouth, NJ 07703-5006				<b>FROM:</b> (Activity and location) (Include ZIP Code) Jane Q. Doe, SFC 1234 Any Street Anytown, AL 34565		
<b>PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>						
PUBLICATION/FORM NUMBER TM 11-1234-567-14			DATE 16 Sep 2001		TITLE Operator, Field and Sustainment Support Maintenance Manual for Radio, AN/ABC-123	
ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
1	WP0005 PG 3		2			Test or Corrective Action column should identify a different WP number. <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%) rotate(-45deg); font-size: 100px; opacity: 0.5; pointer-events: none;">EXAMPLE</div>
TYPED NAME, GRADE OR TITLE Jane Q. Doe, SFC				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION 123-4567		SIGNATURE

<b>TO:</b> (Forward to proponent of publication or form) (Include ZIP Code)				<b>FROM:</b> (Activity and location) (Include ZIP Code)			<b>DATE</b>	
<b>PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS</b>								
PUBLICATION/FORM NUMBER				DATE		TITLE		
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
<div style="transform: rotate(-30deg); font-size: 100px; opacity: 0.5; pointer-events: none;">EXAMPLE</div>								
<b>PART III - REMARKS</b> (Any general remarks, recommendations, or suggestions for improvement of publications and blank spaces. Additional blank space may be used if more space is needed.)								
TYPED NAME, GRADE OR TITLE			TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE		



<b>TO:</b> <i>(Forward to proponent of publication or form) (Include ZIP Code)</i>				<b>FROM:</b> <i>(Activity and location) (Include ZIP Code)</i>			<b>DATE</b>	
<b>PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS</b>								
PUBLICATION/FORM NUMBER			DATE		TITLE			
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
<b>PART III - REMARKS</b> <i>(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)</i>								
TYPED NAME, GRADE OR TITLE			TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE		



<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> For use of this form, see AR 25-30; the proponent agency is OAASA						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
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<b>PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>							
PUBLICATION/FORM NUMBER				DATE		TITLE	
ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON	
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	

<b>TO:</b> <i>(Forward to proponent of publication or form) (Include ZIP Code)</i>				<b>FROM:</b> <i>(Activity and location) (Include ZIP Code)</i>			<b>DATE</b>	
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PUBLICATION/FORM NUMBER			DATE		TITLE			
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
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TYPED NAME, GRADE OR TITLE			TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE		

By Order of the Secretary of the Army:

Official:



JOYCE E. MORROW  
*Administrative Assistant to the  
Secretary of the Army*  
1024303

GEORGE W. CASEY, JR  
*General, United States Army  
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M.A. MICUCCI  
*Product Group Director, PG-15  
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Marine Corps System Command*

Army Distribution:

To be distributed in accordance with the initial distribution number (IDN) 255243 requirements for TM 9-6115-642-10.

Marine Corps Distribution:

To be distributed in accordance with PCN 184 092471 00.



## THE METRIC SYSTEM AND EQUIVALENTS

### LINEAR MEASURE

1 Centimeter = 10 Millimeter = 0.01 Meters = 0.3937 inches  
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 inches  
 1 kilometer = 1000 Meters = 0.621 Miles

### WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces  
 1 Kilogram = 100 Grams = 2.2 lb. 1 Cu. Meter = 1,000,000  
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

### LIQUID MEASURE

1 Millimeter = 0.001 Liters = 0.0338 Fluid Ounces  
 1 Liter = 1000 Millimeters = 32.82 Fluid Ounces

### SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeter = 0.155 Sq. Inches  
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Inches  
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

### CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches  
 1 Cu. Centimeters = 35.31 Cu. Feet

### TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
 212° Fahrenheit is equivalent to 100° Celsius  
 90° Fahrenheit is equivalent to 32.2° Celsius  
 32° Fahrenheit is equivalent to 0° Celsius  
 $9/5 ^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

## APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches.....	Centimeters.....	2.540
Feet.....	Meters.....	0.305
Yards.....	Meters.....	0.914
Miles.....	Kilometers.....	1.609
Square Inches.....	Square Centimeters.....	6.451
Square Feet.....	Square Meters.....	0.093
Square Yards.....	Square Meters.....	0.836
Square Miles.....	Square Kilometers.....	2.590
Acres.....	Square Hectometers.....	0.405
Cubic Feet.....	Cubic Meters.....	0.028
Cubic Yards.....	Cubic Meters.....	0.765
Fluid Ounces.....	Milliliters.....	29.573
Pints.....	Liters.....	0.473
Quarts.....	Liters.....	0.946
Gallons.....	Liters.....	3.785
Ounces.....	Grams.....	28.349
Pounds.....	Kilograms.....	0.454
Short Tons.....	Metric Tons.....	0.907
Pound-Feet.....	Newton-Meters.....	1.356
Pounds per Square Inch.....	Kilo pascals.....	6.895
Miles per Gallon.....	Kilometers per Liter.....	0.425
Miles per Hour.....	Kilometers per Hour.....	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters.....	Inches.....	2.540
Meters.....	Feet.....	0.305
Meters.....	Yards.....	0.914
Kilometers.....	Miles.....	1.609
Square Centimeters.....	Square Inches.....	6.451
Square Meters.....	Square Feet.....	0.093
Square Meters.....	Square Yards.....	0.836
Square Kilometers.....	Square Miles.....	2.590
Square Hectometers.....	Acres.....	0.405
Cubic Meters.....	Cubic Feet.....	0.028
Cubic Meters.....	Cubic Yards.....	0.765
Milliliters.....	Fluid Ounces.....	29.573
Liters.....	Pints.....	0.473
Liters.....	Quarts.....	0.946
Liters-Meters.....	Gallons.....	3.785
Grams.....	Ounces.....	28.349
Kilograms.....	Pounds.....	0.454
Metric Tons.....	Short Tons.....	0.907
Newton-Meters.....	Pound-Feet.....	1.356
Kilo pascals.....	Pounds per Square Inch.....	6.895
Kilometers per Liter.....	Miles per Gallon.....	0.425
Kilometers per Hour.....	Miles per Hour.....	1.609

