*ARMY TM 9-6115-641-10
AIR FORCE TO 35C2-3-456-11

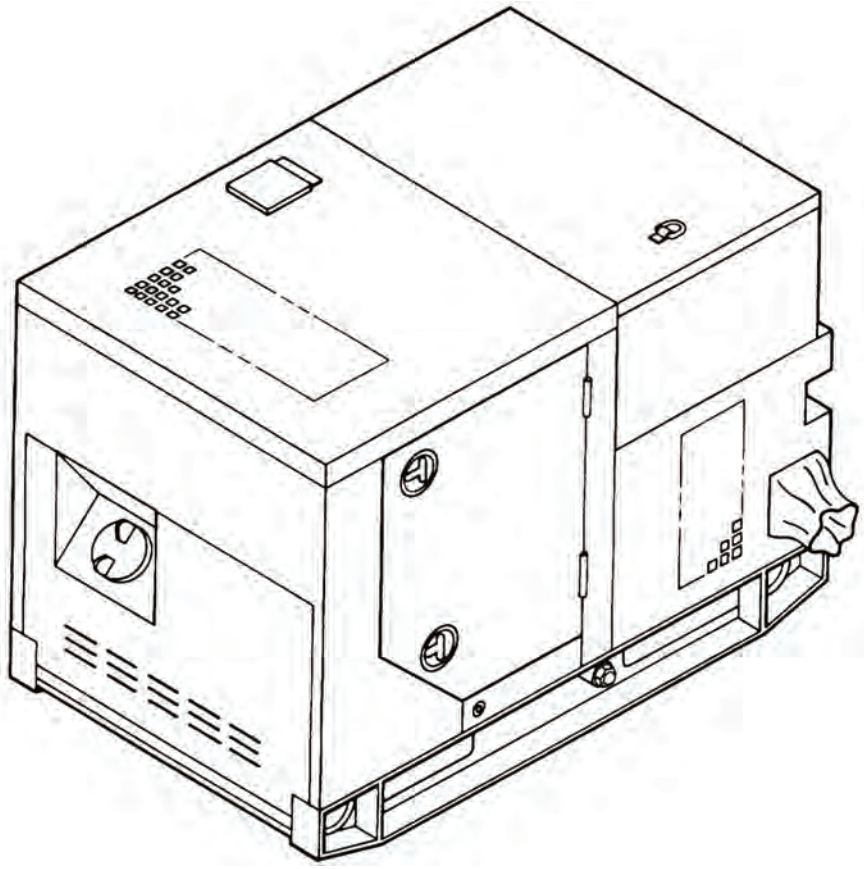
TECHNICAL MANUAL

OPERATOR'S MANUAL

FOR

GENERATOR SET, SKID MOUNTED, TACTICAL QUIET, 5 kW, 60 Hz, MEP-802A (NSN: 6115-01-274-7387) (EIC: VG2)

GENERATOR SET, SKID MOUNTED, TACTICAL QUIET, 5 kW, 400 Hz, MEP-812A (NSN: 6115-01-274-7391) (EIC: VN2)



***SUPERSEDURE NOTICE.** TM 9-6115-641-10 supersedes TM 9-6115-641-10 dated 30 December 1992, including all changes.

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HEADQUARTERS, DEPARTMENTS OF THE ARMY AND THE AIR FORCE
15 OCTOBER 2009

WARNING SUMMARY

FIRST AID

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

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.

This Warning Summary provides a summary of all critical safety information in this manual. The Summary contains all warnings used throughout this manual.

Prior to starting any procedure, the WARNINGS included in the text and at the beginning of each maintenance procedure must be reviewed and understood.

The WARNINGS located in the generator set technical manuals and the trailer technical manuals must also be considered.

This manual describes physical and chemical processes that may require the use of chemicals, solvents, paints, or other commercially available material. Users of the manual should obtain the material safety data sheets (Occupational Safety and Health Act (OSHA) Form 20 or equivalent) from the manufacturers or suppliers of materials to be used. Users must be completely familiar with manufacturer/supplier information and adhere to their procedures, recommendations, warnings, and cautions for safe use, handling, storage, and disposal of these materials.

WARNING SUMMARY - Continued

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. SHUT DOWN generator set and make sure it is free of any power source before attempting any repair or maintenance on the set, or when connecting or disconnecting load cables. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Shut down generator set before performing inspection of wiring. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start the generator set unless it is properly grounded. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Ensure nuts on ground terminals are properly secured creating a good ground. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. DO NOT touch live voltage connections. Never attempt to connect or disconnect load cables or paralleling cables while the generator set is running. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Ensure engine control and DEAD CRANK switches are set to OFF, negative battery cable is disconnected, and unit is completely shut down and free of any power source before attempting any troubleshooting or maintenance on unit. Failure to comply may cause injury or death to personnel.

WARNING

Dangerous voltage exists on live circuits. Always observe precautions and never work alone. Failure to comply with this warning can cause injury or death to personnel.

WARNING SUMMARY - Continued

WARNING

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

WARNING

Power is available when the main contactor is open. Avoid accidental contact. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Slave receptacle (NATO connector) is electrically live at all times and is unfused. The Battery Disconnect Switch does not remove power from the slave receptacle. NATO slave receptacle has 24 VDC even when Battery Disconnect Switch is set to OFF. This circuit is only dead when the batteries are fully disconnected. Disconnect the batteries before performing maintenance on the slave receptacle. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Diesel fuel is flammable and toxic to eyes, skin, and respiratory tract. Skin and eye protection are required when working in contact with diesel fuel. Avoid repeated or prolonged contact. Provide adequate ventilation. Operators are to wash exposed skin and change chemical soaked clothing promptly if exposed to fuel. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Fuels used in the generator set are flammable. Do not smoke or use open flames when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

WARNING

Fuels used in the generator set are flammable. When filling the fuel tank, maintain metal-to-metal contact between filler nozzle and fuel tank opening to eliminate static electrical discharge. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

WARNING

Cooling system operates at high temperature and pressure. Contact with high pressure steam and/or liquids can result in burns and scalding. Shut down generator set, and allow system to cool before performing checks, services and maintenance, or wear gloves and additional protective clothing and goggles as required. Failure to comply with this warning can cause injury or death to personnel.

WARNING

In extreme cold weather, skin can stick to metal. Avoid contacting metal items with bare skin in extreme cold weather. Failure to comply with this warning can cause injury to personnel.

WARNING SUMMARY - Continued

WARNING

Operating the generator set exposes personnel to a high noise level. Hearing protection must be worn when operating or working near the generator set when the generator set is running. Failure to comply with this warning can cause hearing damage to personnel.

WARNING

Exhaust discharge contains deadly gases including carbon monoxide. DO NOT operate generator set in enclosed areas unless exhaust discharge is properly vented outside. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Hot exhaust gases can ignite flammable materials. Allow room for safe discharge of hot gases and sparks. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Top housing panels and exhaust system can get very hot. Shut down generator set, and allow system to cool before performing checks, services and maintenance. Failure to comply with this warning can cause severe burns and injury to personnel.

WARNING

Top housing panels and exhaust system can get very hot. When performing DURING PMCS, wear gloves and additional protective clothing as required. Failure to comply with this warning can cause severe burns and injury to personnel.

WARNING

Exercise extreme caution when performing DURING PMCS checks inside engine compartment. Avoid contact with moving or hot engine parts. Failure to comply with this warning can cause injury or death to personnel.

WARNING

When running, winterization heater has hot metal surfaces that will burn flesh on contact. Shut down generator set and allow heater to cool before performing maintenance. Wear gloves and additional protective clothing as required. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Batteries give off a flammable gas. Do not smoke or use open flame when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

WARNING

Battery acid can cause burns to unprotected skin. Wear safety goggles and chemical gloves and avoid acid splash while working on batteries. Failure to comply with this warning can cause injury to personnel.

WARNING SUMMARY - Continued

WARNING

Solvent used to clean parts is potentially dangerous to personnel and property. Clean parts in a well-ventilated area. Avoid inhalation of solvent fumes. Wear goggles and rubber gloves to protect eyes and skin. Wash exposed skin thoroughly. Do not smoke or use near open flame or excessive heat. Failure to comply with this warning can cause injury to personnel, and damage to the equipment.

WARNING

Do not remove the Bonding Jumper between GND and N unless the Weapon System requires an ungrounded system. Failure to comply can cause death or serious injury to personnel. Refer to applicable Weapon System TM for specific guidance on power and connection requirements.

LIST OF EFFECTIVE PAGES / WORK PACKAGES

NOTE: This manual supersedes TM 9-6115-641-10 dated 30 December 1992, including all changes. Zero in the "Change No." column indicates an original page or work package.

Date of issue for the original manual is:

Original 15 OCTOBER 2009

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 24 AND TOTAL NUMBER OF WORK PACKAGES IS 16, CONSISTING OF THE FOLLOWING:

Page / WP No.	Change No.	Page / WP No.	Change No.
Front Cover	0		
Blank	0		
Warning summary (6 pgs)	0		
i - iii	0		
Chp 1 title page	0		
Index	0		
WP 0001 (4 pgs)	0		
WP 0002 (10 pgs)	0		
WP 0003 (8 pgs)	0		
Chp 2 title page	0		
Index	0		
WP 0004 (6 pgs)	0		
WP 0005 (16 pgs)	0		
WP 0006 (4 pgs)	0		
WP 0007 (4 pgs)	0		
Chp 3 title page	0		
Index	0		
WP 0008 (2 pgs)	0		
WP 0009 (10 pgs)	0		
Chp 4 title page	0		
Index	0		
WP 0010 (8 pgs)	0		
WP 0011 (10 pgs)	0		
WP 0012 (10 pgs)	0		
Chp 5 title page	0		
Index	0		
WP 0013 (2 pgs)	0		
WP 0014 (6 pgs)	0		
WP 0015 (2 pgs)	0		
WP 0016 (2 pgs)	0		
INDEX-1 - INDEX-6	0		
Inside back cover	0		
Back cover	0		

**HEADQUARTERS,
DEPARTMENTS OF THE ARMY AND THE AIR FORCE
WASHINGTON, D.C., 15 OCTOBER 2009**

TECHNICAL MANUAL

OPERATOR'S MANUAL

GENERATOR SET, SKID MOUNTED, TACTICAL QUIET, 5 kW, 60 Hz, MEP-802A (NSN: 6115-01-274-7387) (EIC: VG2)

GENERATOR SET, SKID MOUNTED, TACTICAL QUIET, 5 kW, 400 Hz, MEP-812A (NSN: 6115-01-274-7391) (EIC: VN2)

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 Life Cycle Management Command (LCMC) 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 732-532-1556, DSN 992-1556. Our e-mail address is MONM-AMSELLEOPUBSCHG@conus.army.mil. Our online web address for entering and submitting DA Form 2028 is http://edm.monmouth.army.mil/pubs/2028.html.

b. (F) Air Force - By Air Force AFTO Form 22 (Technical Manual (TM) Change Recommendation and Reply) in accordance with TO 00-5-1.

A reply will be furnished to you.

***SUPERSEDURE NOTICE.** TM 9-6115-641-10 supersedes TM 9-6115-641-10 dated 30 December 1992, including all changes.

TABLE OF CONTENTS

TABLE OF CONTENTS - Continued

HOW TO USE THIS MANUAL

Manual Overview

This manual is designed to help you operate and maintain the MEP-802A and MEP-812A Tactical Quiet Generator (TQG) Sets. Warning pages are located in the front of this manual. Read all warnings before operating or doing any maintenance on the equipment.

The major elements of this manual are chapters and work packages. Each chapter has one or more work packages. The Table of Contents, beginning on page ii, is provided for quick reference to the subjects covered by each chapter and work package. Each chapter also has a chapter index. The chapter index lists the work packages in the chapter.

An alphabetical index is at the end of the manual. That index is for use in locating specific items of information.

Chapters

This manual has chapters and each chapter is divided into work packages. Each work package is divided into descriptive paragraphs. The paragraphs have specific information about the generator sets and their major components.

Work Package Numbering

This manual is prepared in functionally divided individual task packages (work packages (WP)) in the logical order of work sequence. Work packages may contain a scope of tasks, initial setups, descriptive information, operating tasks and maintenance tasks. These data types are further divided into paragraphs, procedural steps, tables, listings, warnings, cautions and notes, and supporting illustrations.

The WPs are standalone general information, operating, maintenance, and supporting information units containing all information required for directing task performance.

Work Packages are numbered using four (4) digits starting with 0001 (that is, work package 1). Inserted work packages are indicated by a decimal point and a number. For example, 0001.1 indicates the first work package inserted between work package 0001 and work package 0002. This permits adding one or more WPs between any two existing WPs during any revision cycle. Page numbers within each work package are indicated by -1, -2, -3 (that is, 0001-1 indicates work package 1, page 1).

WARNING

Warning highlights an essential operating or maintenance procedure, practice, condition, statement, etc, which, if not strictly observed, could result in injury to, or death of, personnel or long term health hazards.

CAUTION

Highlights an essential operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effectiveness.

NOTE

Highlights an essential operating or maintenance procedure, condition, or statement.

Chapter 1 - Operator General Information, Equipment Description, and Theory of Operation

Chapter 1 provides an introduction to the generator sets. It is divided into three WPs, as follows:

WP 0001 - General Information

This WP 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.

WP 0002 - Equipment Description and Data

This WP describes generator set capabilities, characteristics, and features. It provides basic equipment data and shows the locations of major generator set components. Descriptions of the major components are also provided.

WP 0003 - Theory of Operation

This WP provides functional descriptions of the generator sets.

Chapter 2 - Operator Instructions

Chapter 2 provides instructions for operating the generator sets. The chapter is divided into four WPs, as follows:

WP 0004 - Description and Use of Operator's Controls and Indicators

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

WP 0005 - Operation Under Usual Conditions

This WP contains instructions for preparing the generator sets for use and operating them under normal conditions. Coverage includes instructions for connecting load cables to the generator sets. This section also covers preparation of the generator sets for movement to a new worksite.

WP 0006 - Operation Under Unusual Conditions

This WP provides detailed instructions for operation of the generator sets under unusual conditions.

WP 0007 - Emergency

This WP provides emergency information.

Chapter 3 - Operator Troubleshooting Procedures

Chapter 3 includes a troubleshooting index, troubleshooting procedures, and corrective actions that are to be performed by the operator.

WP 0008 - Troubleshooting Index

This WP provides an index of malfunctions and symptoms for troubleshooting procedures.

WP 0009 - Troubleshooting Procedures

This WP provides troubleshooting procedures and corrective actions that are to be performed by the operator.

Chapter 4 - Operator Maintenance Instructions

Chapter 4 covers maintenance of the generator sets to be performed by the operator. Its purpose is to provide you with the information that you need to keep the generator sets in good operating condition.

WP 0010 and WP 0011 - Preventive Maintenance Checks and Services (PMCS), including Lubrication Instructions

This section contains detailed instructions that the operator must perform BEFORE, DURING, and AFTER preventive maintenance checks and services. Coverage includes all operator PMCS for the generator sets.

WP 0012 - Generator Set Servicing and Inspection

This WP refers the operator to the preventive maintenance checks and services required by WP 0011.

Chapter 5 - Supporting Information

Chapter 5 provides supporting information.

WP 0013 - References

This WP lists all publications referenced in the various chapters of the technical manual. The listing includes the title and document number of each publication.

WP 0014 - Components of End Item (COEI) and Basic Issue Items (BII) Lists Work Packages

This WP lists the items usually packaged separately but needed for installation and operation of the generator sets.

WP 0015 - Additional Authorization List (AAL)

This WP lists additional items you are authorized for support of the generator sets.

WP 0016 - Expendable and Durable Items List

This WP lists expendable/durable supplies and materials needed to operate and maintain the generator sets.

Alphabetical Index

An alphabetical index at the back of this technical manual provides a listing of subjects covered, cross-referenced to the applicable page number.

HOW TO FIX A GENERATOR SET MALFUNCTION

Determining the Cause

Finding the cause of a malfunction, troubleshooting, is the first step in fixing the generator set 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.
2. Locate "Troubleshooting Procedures" under Chapter 3. Turn to the page indicated.
3. Follow the instructions in the references listed in Chapter 3.

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.

3. If expendable/durable supplies or materials are needed, get them before starting the task. Refer toWP 0016for 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 and Acronyms in WP 0001 if you do not understand the special abbreviations and acronyms 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.

CHAPTER 1

OPERATOR GENERAL INFORMATION, EQUIPMENT DESCRIPTION AND THEORY OF OPERATION

FOR

5 kW GENERATOR SET (60 Hz AND 400 Hz), SKID MOUNTED, TACTICAL QUIET

CHAPTER 1

OPERATOR GENERAL INFORMATION, EQUIPMENT DESCRIPTION AND THEORY OF OPERATION

WORK PACKAGE INDEX

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

GENERAL INFORMATION

SCOPE

Type of Manual

This manual contains operation and operator maintenance instructions for the Tactical Quiet (TQ), 5 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. SeeTable 1below for a list of model numbers and equipment names for the generator sets.

Table 1. Model Numbers and Equipment Names.

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

Purpose of Equipment

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

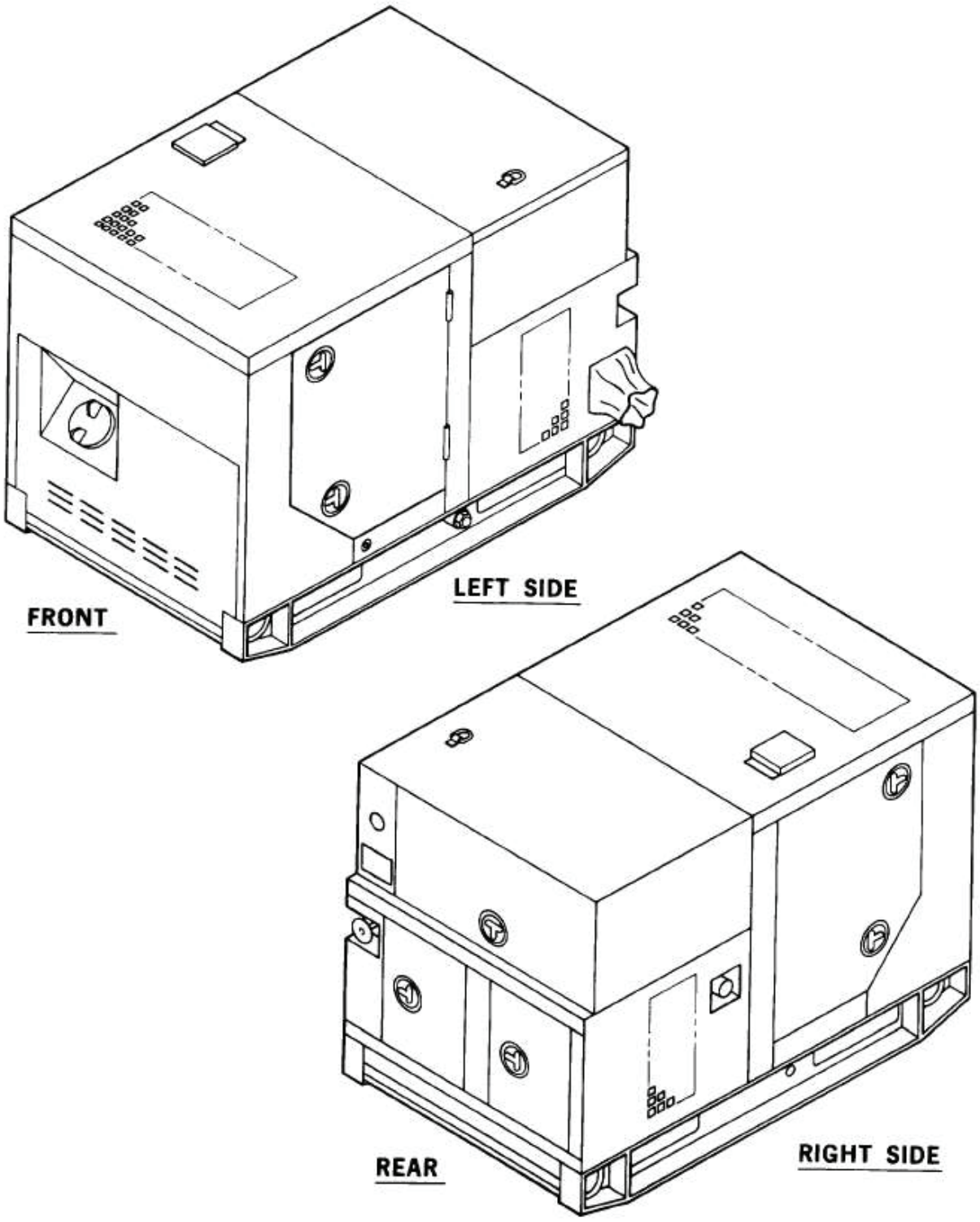


Figure 1. Generator Set, Skid Mounted, 5 kW, Tactical Quiet.

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.

(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)

(A) 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.

(F) USAF Deficiency Reporting and Investigating System, TO 00-35D-54, Appendix A procedures will be used for electronic submission. Submit mailed SF 368 forms to:

Robins AFB WRALC/LGMTC 375 Perry Street Robins AFB, GA 31098-1865

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 shall 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, The Army Maintenance Management System (TAMMS) Users Manual.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Destruction of Army materiel to prevent enemy use shall be in accordance with TM 750-244-3.

PREPARATION FOR STORAGE OR SHIPMENT

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

WARRANTY INFORMATION

Generator sets MEP-802A/MEP-812A manufactured under contract number DAAK01-97-D-0034 and W1SP7T-08-DA005 are warranted by Engineered Electric Company (Fermont), for a period of 36 months or 1800 operating hours, whichever occurs first. Refer to Warranty Technical Bulletin TB 9-6115-641-24. The warranty starts on the date found in block 23, DA Form 2408-9, in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your Maintenance Shop.

LIST OF ABBREVIATIONS / ACRONYMS

Term	Definition
AAL	Additional Authorization List
BII	Basic Issue Item
BOI	Basis Of Issue
CAGE	Commercial And Government Entity
CAGEC	Commercial And Government Entity Code
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
kg	Kilogram
kPa	Kilopascals
kVA	Kilovolt-ampere
kW	Kilowatt
lbf·ft	Foot Pound-Force
M	Meter (Metric Measure)
MTOE	Modified Table Of Organization And Equipment
N·m	Newton-Meter
NATO	North Atlantic Treaty Organization
NHA	Next Higher Assembly
NIIN	National Item Identification Number
NSN	National Stock Number
P/N	Part Number
PMCS	Preventive Maintenance Checks And Services
SMR	Source, Maintenance, And Recoverability
TAMMS	The Army Maintenance Management System
UOC	Usable On Code
ºC	Degrees Celsius
ºF	Degrees Fahrenheit

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

Generator sets MEP-802A/MEP-812A (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 (index numbers) referenced in Figure 1 are given facing the control box side (rear) of the generator set.

The Winterization Kit (NSN 6115-01-476-8973) is designed to be mounted in 5 kW Tactical Quiet Generator (TQG) Sets where extreme cold temperatures are anticipated. The kit contains a coolant heater that allows the generator set to operate to -50 °F (-45.6 °C). The kit heater pump circulates the generator set coolant through the heater pump, heats the coolant and then returns the coolant back through the radiator of the generator set. This cycle continues in high heat mode until the temperature reaches 176 °F (80 °C). The heater then switches into a low heat mode. If the coolant temperature drops to 158 °F (70 °C) the heater will automatically switch to the high heat mode.

The Winterization Kit contains a coolant heater that heats the coolant and allows the generator set to operate to -50 °F (-45.6 °C).

The heater burns fuel from the generator set fuel tank to heat the coolant that is pumped back through the engine block. The kit consists of a heater and coolant pump, a control unit, an ON-OFF switch, a fuel pump and line, coolant circulating lines, bypass valve, a wiring harness and mounting hardware to ensure operation to -50 °F (-45.6 °C).

LOCATION AND DESCRIPTION OF MAJOR 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.

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 two cylinder, four cycle, fuel injected, naturally-aspirated, liquid-cooled diesel engine which occupies the front half of the generator set. The engine is also equipped with a fuel filter/water separator, oil filter, and an air cleaner assembly. Protection devices automatically stop the engine during conditions of high coolant temperature, low oil pressure, no fuel, or over-voltage.

Batteries (7)

Two batteries are required, one on each side of the generator set. The batteries are electrolyte serviceable, lead acid, 12 volt type, connected in series. After starting, the generator set is capable of operating with batteries removed. A diode and a fuse, located behind the control panel assembly, protect 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 5 gallon (18.9 liters) fuel tank is located in the front of the generator set below the engine and between the skid base side members. The fuel tank is a fuel reservoir and has sufficient capacity to enable the generator set to operate for at least 8 hours without refueling.

Air Cleaner Assembly (11)

The air cleaner assembly is located on the right side behind the engine. It consists of a dry-type, disposable paper element 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.

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 flywheel 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 at the rear of the generator set. Four output terminals are located on the board. They are marked L1, L2, L3 and L0. A fifth terminal, marked GND, is located next to the output terminals and serves as equipment ground for the generator set. A removable, solid copper bar is connected between the L0 and GND terminals.

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)

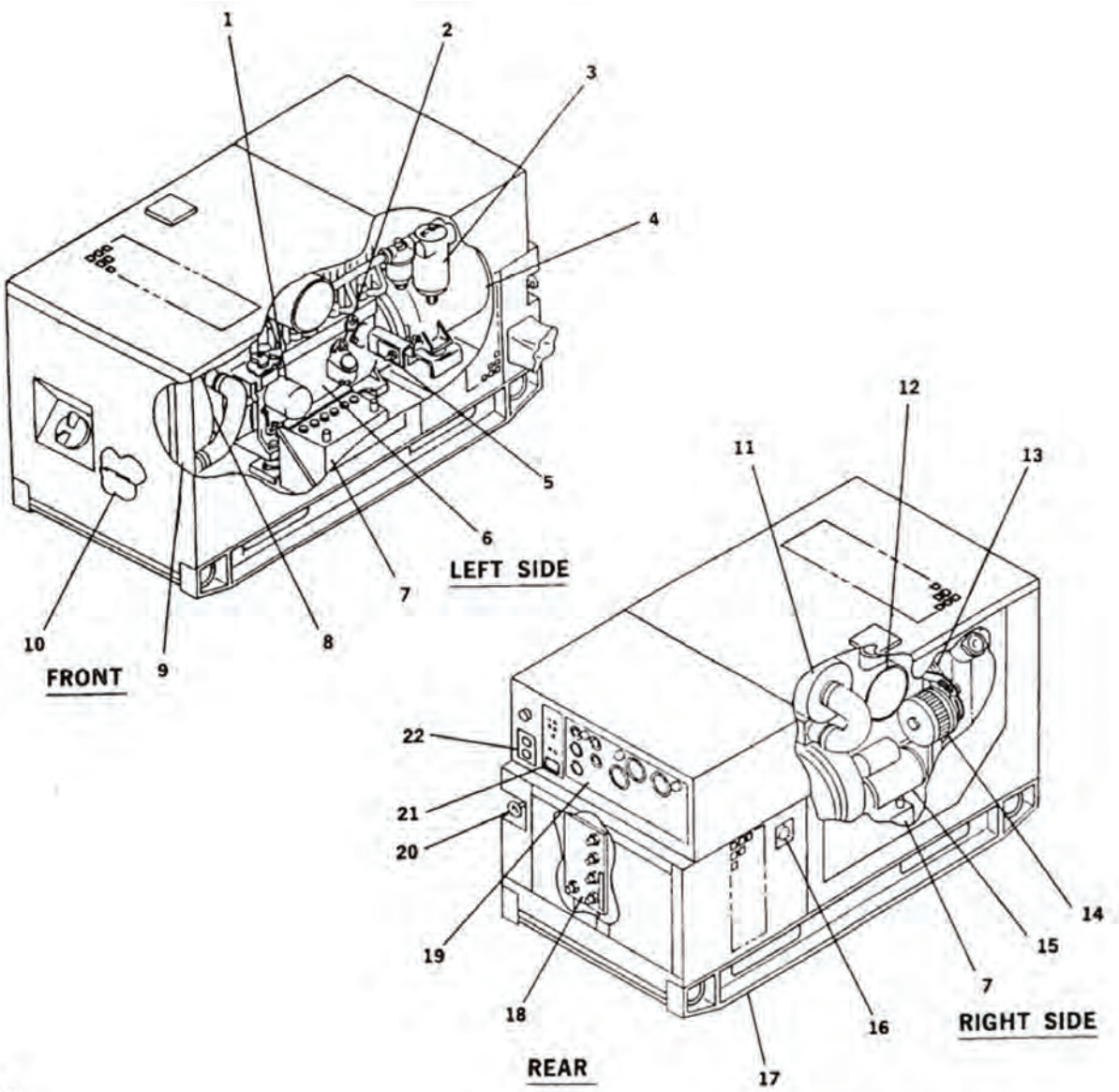
The Frequency adjust control is located at the rear left side of generator set. It is used to adjust the generator frequency output.

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.

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, an overload circuit breaker located inside the control box, and an in-line fuse on generator sets. The convenience receptacle power is available at all times during operation of the generator set.



Legend

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

Figure 1. Generator Set Components.

Winterization Kit

A fuel-burning heater pre-heats engine coolant permitting generator set Operation to -50 °F (-45.6 °C).Figure 2illustrates the major components of the Winterization kit and shows their locations on the 5 kW TQG Set.

Location and Description of Winterization Kit Major Components

A fuel-burning heater pre-heats engine coolant permitting generator set Operation to -50 °F (-45.6 °C).

Control Unit (1)

Controls heater operations.

Heater (2)

Heats coolant for operation in extreme cold temperatures.

Fuel Pump (3)

Pumps fuel from the generator set fuel tank to the heater.

Fuel Lines (4)

Provides a means of transporting fuel to heater.

Coolant Pump (5)

Circulates coolant from generator set through the heater.

Coolant Lines (6)

Provides a means of transporting coolant for circulation.

Switch/Lamp (7)

Switches heater on or off / lamp indicates heater function codes.

Wiring Harness (8)

Electrically connects Winterization Kit components.

Exhaust Hose (9)

Provides a means of exhausting combustion gases from heater.

Air Inlet Hose (10)

Provides intake air to Winterization Kit heater.

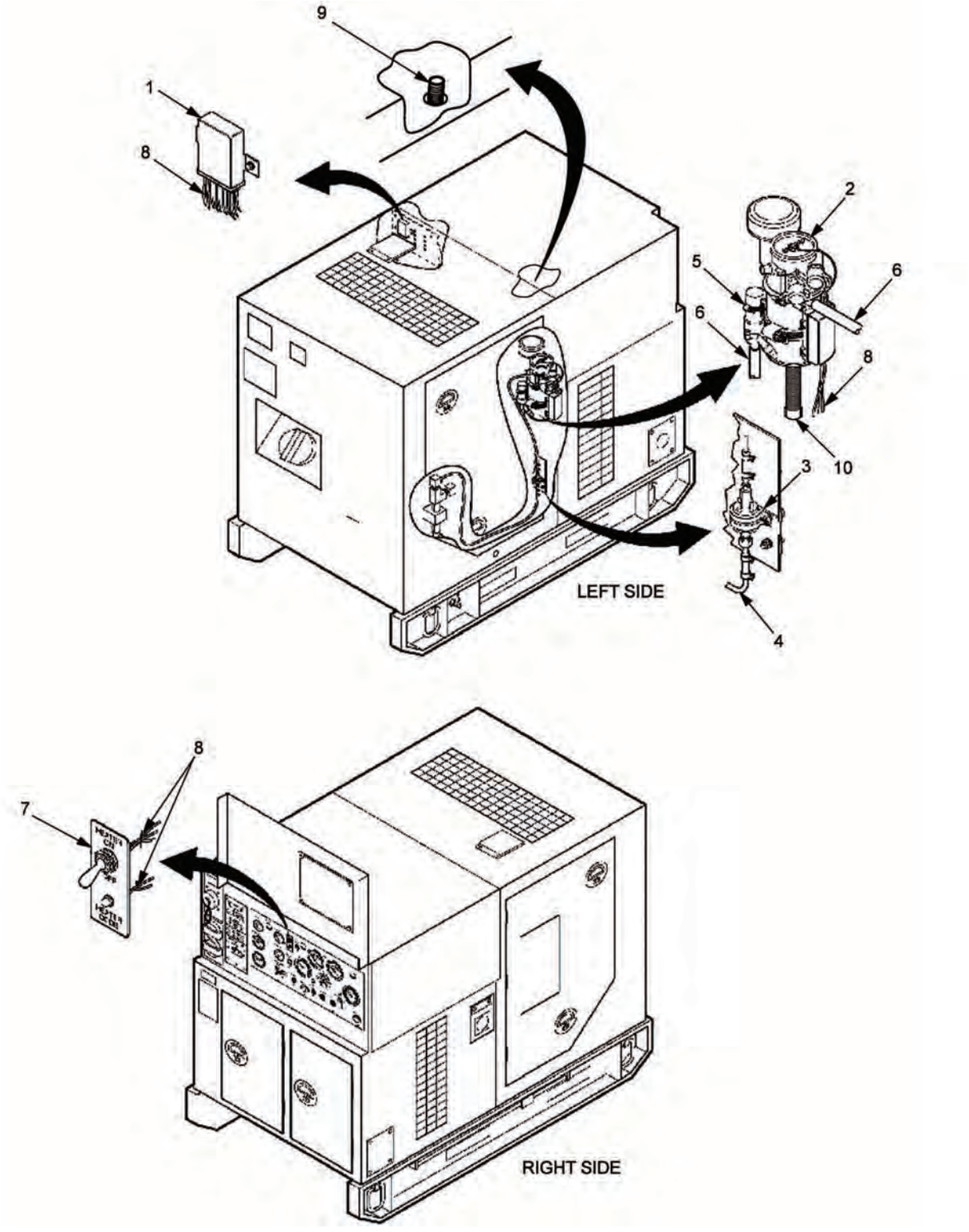


Figure 2. Location of Major Winterization Kit Components.

DIFFERENCES BETWEEN MODELS

The differences between models of the generator sets covered in this manual are as follows: Model MEP-802A is equipped with a 60 Hz generator. Model MEP-812A is equipped with a 400 Hz generator.

EQUIPMENT DATA

For a list of Leading Particulars refer toTable 1.

Table 1. Leading Particulars, Generator Set.

1. Generator Set:	
Model Numbers	
5 kW, 60 Hz Tactical Quiet	MEP-802A
5 kW, 400 Hz Tactical Quiet	MEP-812A
National Stock Numbers	
5 kW, 60 Hz Tactical Quiet	NSN 6115-01-274-7387
5 kW, 400 Hz Tactical Quiet	NSN 6115-01-274-7391
Overall Length	
MEP-802A	50.6 in. (128.6 cm)
MEP-812A	50.6 in. (128.6 cm)
Overall Width	
MEP-802A	32 in. (81.28 cm)
MEP-812A	32 in. (81.28 cm)
Overall Height	
MEP-802A	37 in. (93.98 cm)
MEP-812A	37 in. (93.98 cm)
Dry Weights (less Basic Issue Items)	
MEP-802A	800 lb. (362.8 kg.)
MEP-812A	825 lb. (374.2 kg.)
Wet Weights	
MEP-802A	868 lb. (393.7 kg.)
MEP-812A	878 lb. (398.2 kg.)
2. Engine:	
Manufacturer	Onan
Model	DN2M-1
Type	Two cylinder, four cycle, naturally-aspirated diesel
Displacement	57 cu. in. (0.9 liters)
Altitude Degradation	
4000 ft (1220 m) to 8000 (2440 m)	3.5% per 1000 ft (305 m)

Table 1. Leading Particulars, Generator Set. - Continued

Firing Order	1,2
Cold Weather Starting Aid System Use	When temperature is +40 °F (4 °C) or below
Valve Tappet Clearance Adjustment	None Required
3. Cooling System:	
Type	Pressurized radiator and pump
Capacity	6.2 qts. (5.9 liters)
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	3.2 qts. (3.0 liters)
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	5 gal. (18.9 liters)
Fuel Consumption Rate:	60 Hz: .55 gal. (2.1 liters) per hour 400 Hz: .61 gal. (2.3 liters) 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 volt, connected in series
Starter:	
Manufacturer	Onan
Model	191-1550
Voltage Rating	24 VDC
Drive Type	Gear Reduction
Battery Charging Alternator:	
Manufacturer	Prestolite
Model	8EM3005CA and 8MR3005CA

Table 1. Leading Particulars, Generator Set. - Continued

Rating	18 amps at 24 VDC
Protective Fuse	30 amps
7. AC Generator:	
Manufacturer	Onan
Type (MEP-802A/MEP-812A)	Rotating field synchronous
Load Capacity	5kW
Current Ratings:	60Hz: 400Hz:
120/240 volt connection	26 amps 26 amps
120/208 volt connection	17 amps 17 amps
120 volt connection	52 amps 52 amps
Power Factor	0.8
Cooling	Fan cooled
Drive Type	Direct coupling
Duty Classification	Continuous
8. Protection Devices:	
Low Oil Pressure Switch:	
Trip Pressure	15 ± 3 psi (103.4 ± 20.7 kPa)
Voltage Rating	24 VDC
Current Rating	5 amps
Coolant High Temperature Switch:	
Trip Temperature	225 ± 5 °F (107 + 3 °C)
Voltage Rating	12-120 VDC
Current Rating	2 amps
Overvoltage:	
Trip Point Conditions	153 ± 3 VAC for not less than 200 milliseconds (120 VAC coil winding)
Trip Point	No more than 1.25 seconds after trip conditions exist

Tabulated data for the heater is located inTable 2.

Table 2. Winterization Kit Heater Operating Data.

National Stock Number	6115-01-476-8973
Overall Length	10.787 inches
Overall Width	5.984 inches
Overall Height	7.815 inches
Weight	15 lbs.
Heater	

Table 2. Winterization Kit Heater Operating Data. - Continued

Manufacturer	Active Gear
Model	D5W
Heating	Water Coolant
Capacity	High: 17,000 BTU/Hr. Low: 4250 BTU/Hr.
Rated Voltage	24 VDC
Operating Voltage Range	20-28 VDC
Current at 24 VDC	Start: 20 Amps/Hr. Running High: 1.8 Amps/Hr. Running Low: 1.2 Amps/Hr.
Fuel	Diesel
Fuel Consumption	High: 0.06 Gal/Hr. Low: 0.04 Gal/Hr.
Coolant Pump Flow	250 Gal/Hr.

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

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

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 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 relay, 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 bean restored, the indicator moves near zero (0).

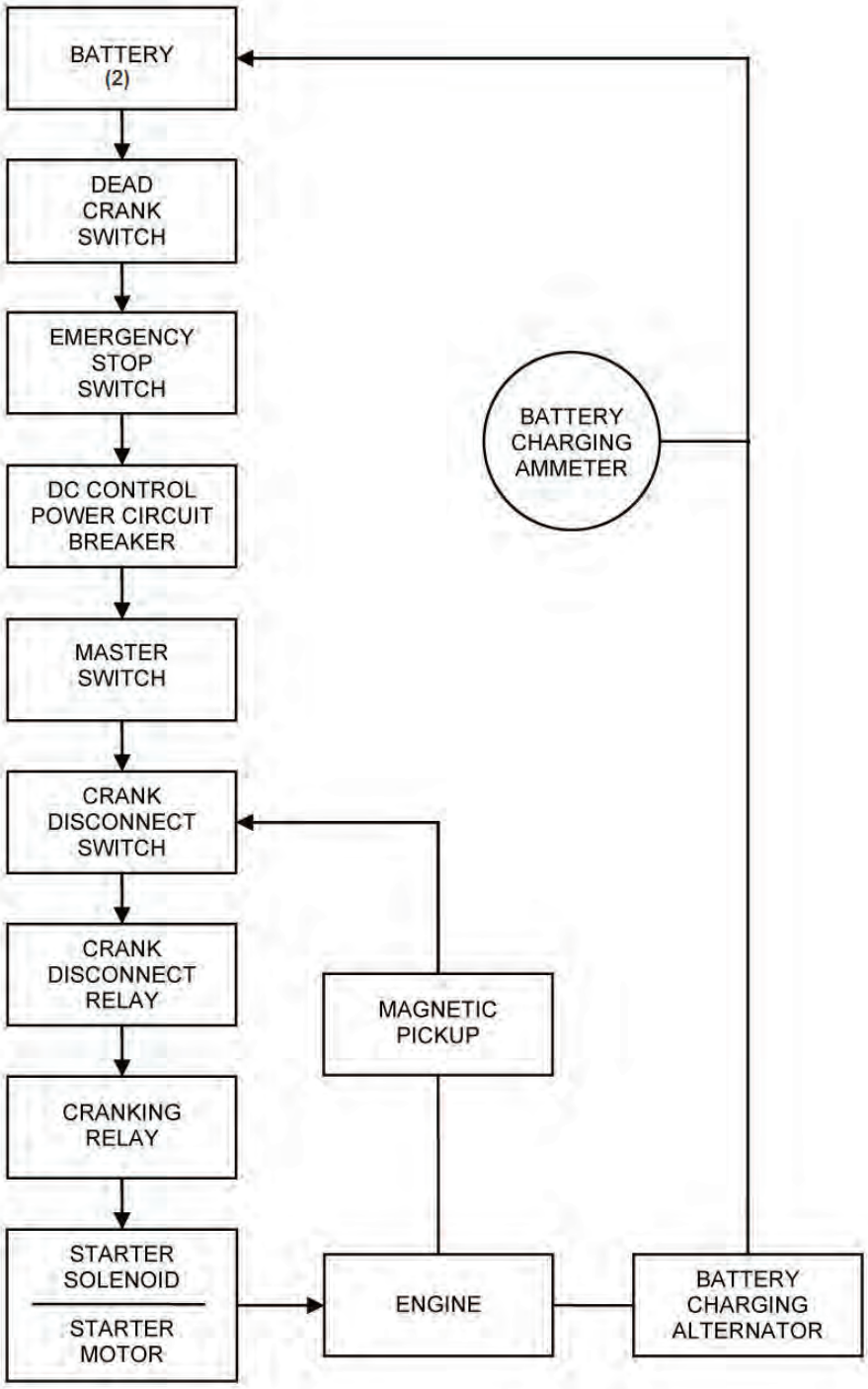


Figure 1. Engine Starting System.

FUEL SYSTEM

The Fuel System (Figure 2), consists of piping, fuel tank, fuel filter, electrically driven transfer pump, fuel filter/water separator, two injection pumps and two 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.

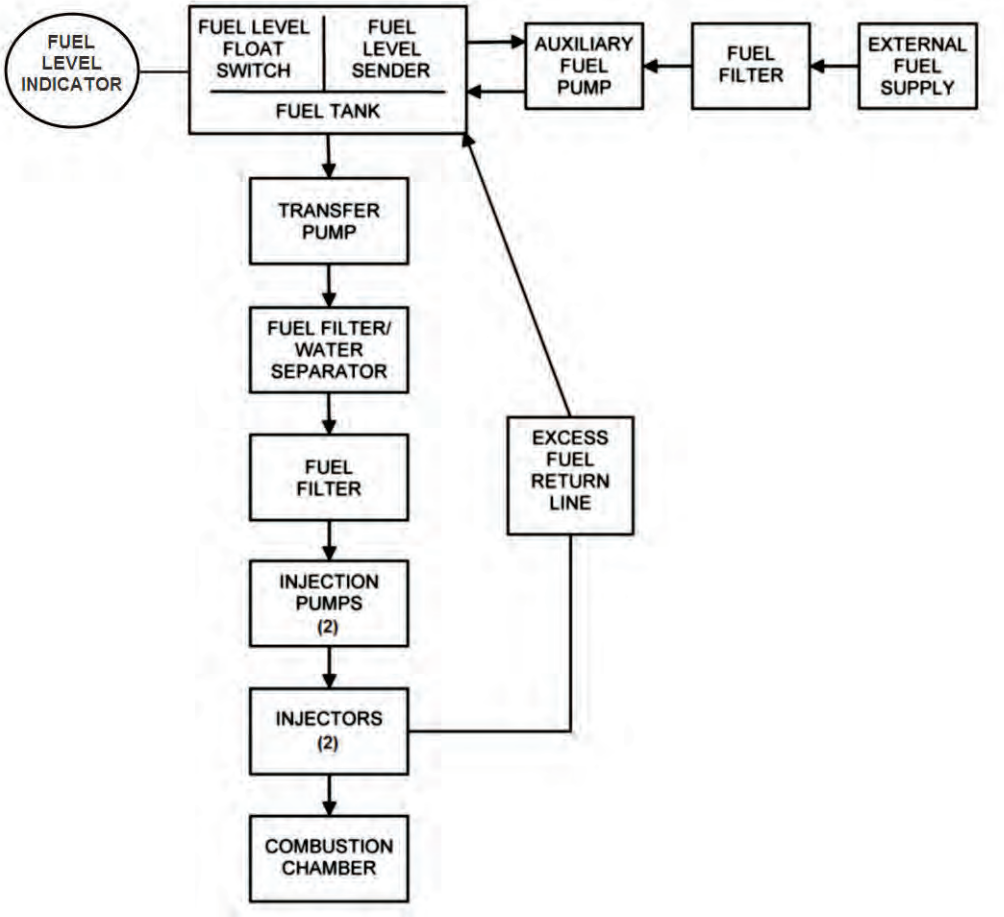


Figure 2. Fuel System.

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 ± 5 °F (107 ± 3 °C). The COOLANT TEMP indicator indicates the engine coolant temperature, from 120 °F to 240 °F (48 °C to 115 °C).

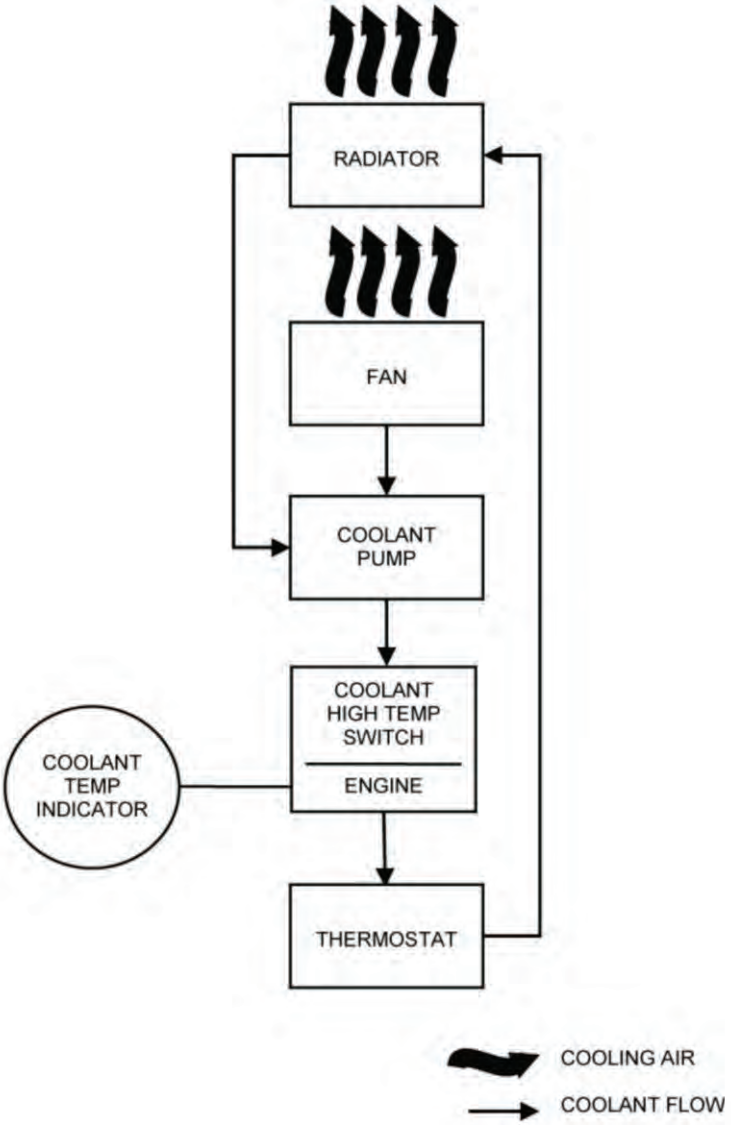


Figure 3. Engine Cooling System.

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

small 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.

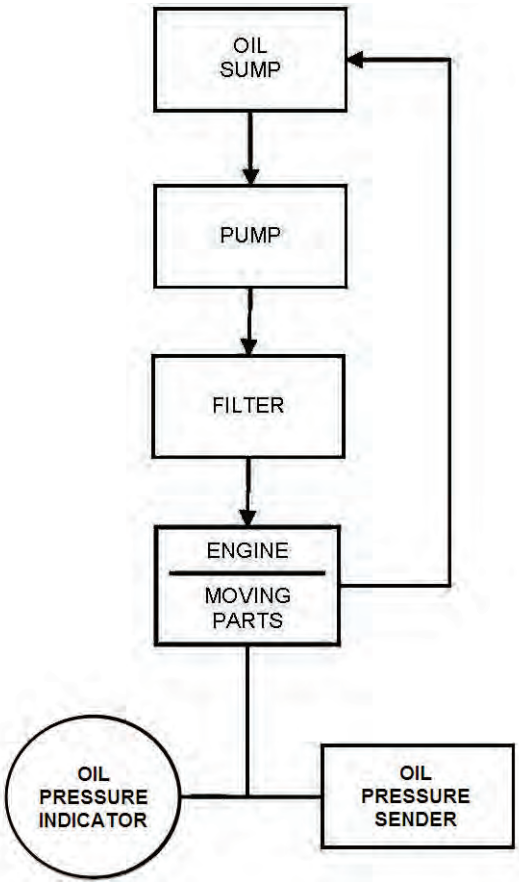


Figure 4. Engine Lubrication System.

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.

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

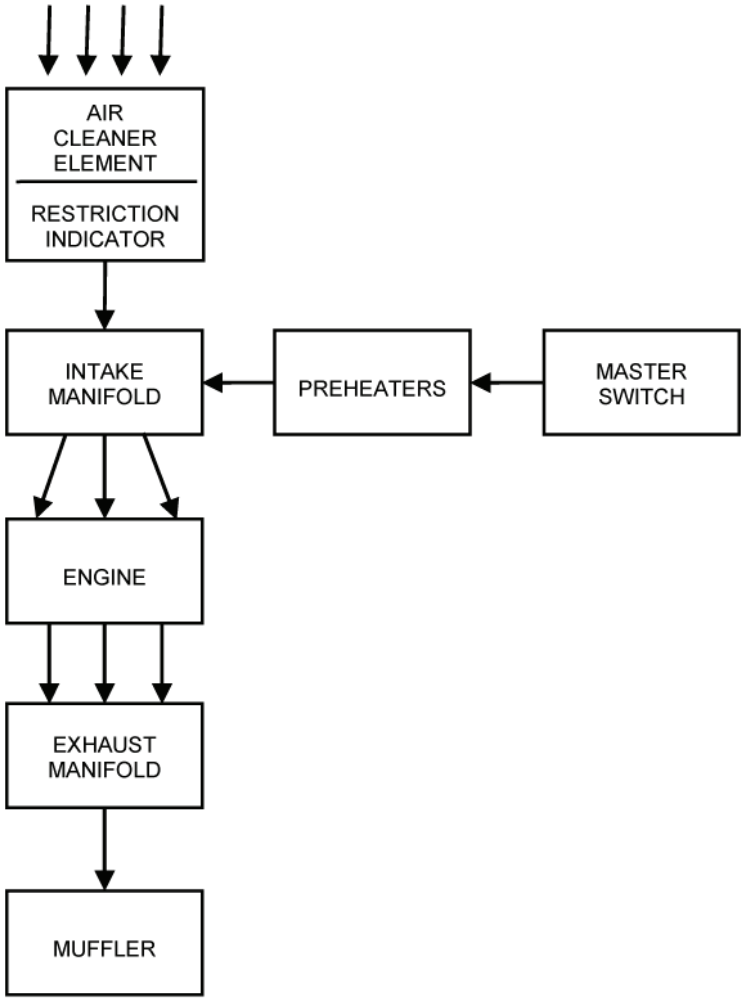


Figure 5. Air Intake and Exhaust System.

OUTPUT SUPPLY SYSTEM

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

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

The voltage reconnection switch allows configuration of the generator set for the following voltage ranges: 120-volt, single phase, 2 wire; 120/240-volt, single phase, 3 wire; and 120/208-volt, 3-phase, 4 wire.

The AC CIRCUIT INTERRUPTER switch closes and opens the AC circuit interrupter 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 VM-AM 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).

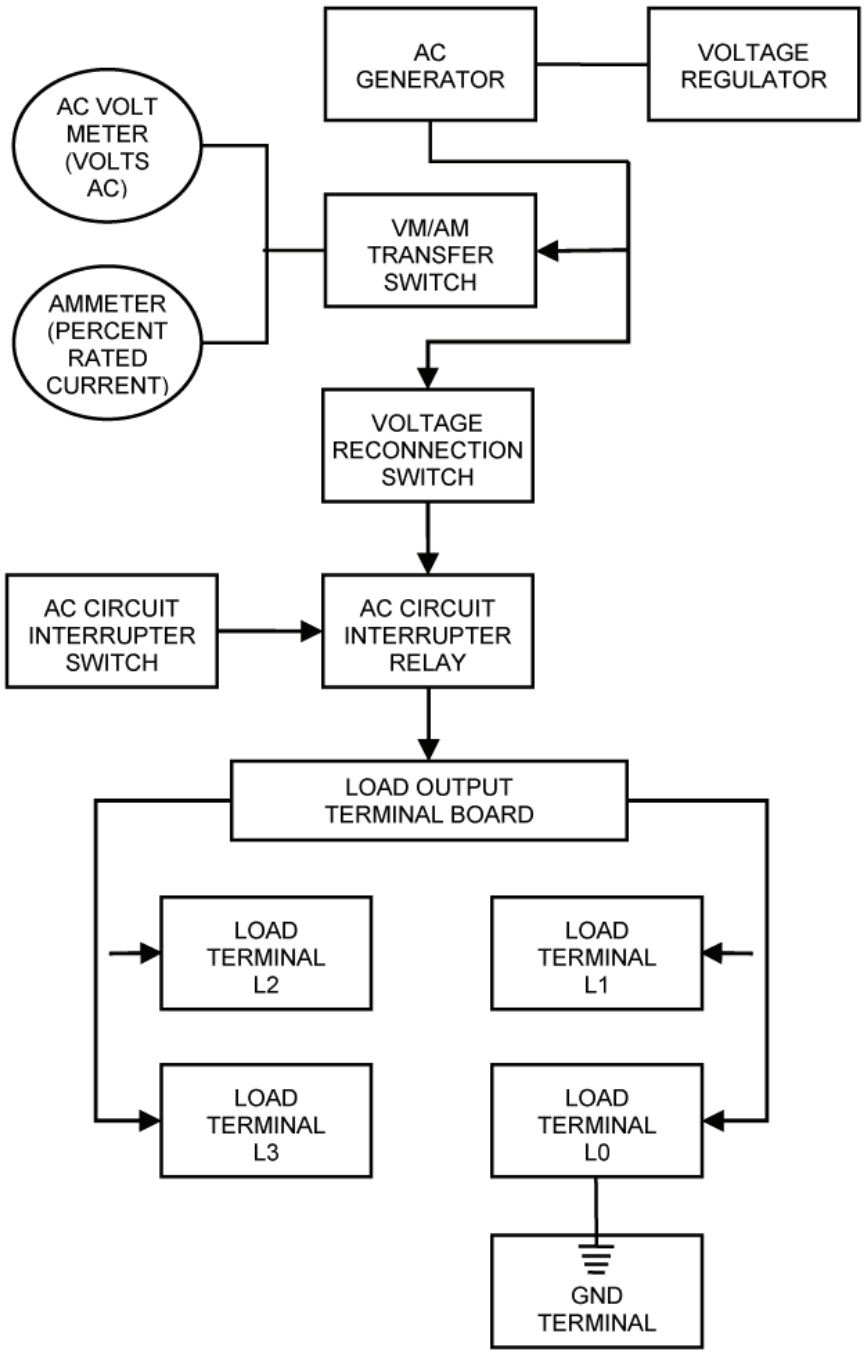


Figure 6. Output Supply System.

END OF WORK PACKAGE

CHAPTER 2

OPERATOR INSTRUCTIONS

FOR

5 kW GENERATOR SET (60 Hz AND 400 Hz), SKID MOUNTED, TACTICAL QUIET

CHAPTER 2

OPERATOR INSTRUCTIONS

WORK PACKAGE INDEX

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

GENERAL

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 indicators for the generator set.Figure 1shows the control panel assembly layout andTable 1describes each control and indicator.

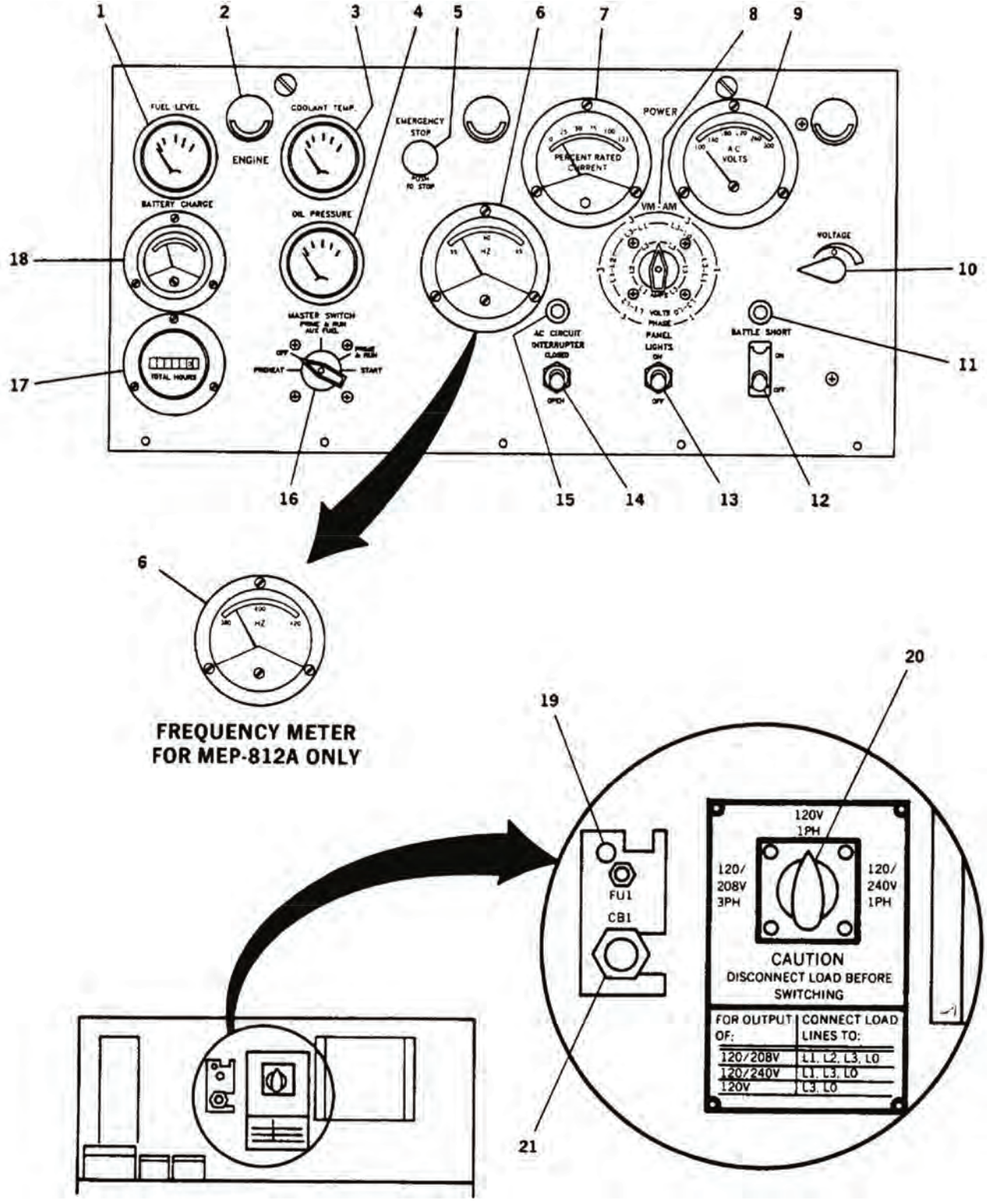


Figure 1. Operator's Controls and Indicators.

Table 1. Control Panel Controls and Indicators.

Key	Control or Indicator	Function
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 (HERTZ)	Indicates generator set output frequency.
7	Ammeter (PERCENT RATED CURRENT)	Indicates generator set load current as a percent of rated current.
8	VM-AM transfer switch	Allows selection of current and voltage readings between output load terminals, see Table 2.
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	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	PREHEAT - Energizes heater plugs.
		OFF - De-energizes all circuits, except panel lights.
		PRIME & RUN AUX FUEL - Energizes generator set run circuits with fuel pump operating and with auxiliary fuel pump system activated.
		PRIME & RUN - Energizes generator set run circuits with fuel pump operating and auxiliary fuel system de-energized.
		START - Energizes starter.
17	Time meter (TOTAL HOURS)	Indicates total engine operating hours.
18	BATTERY CHARGE ammeter	Indicates charge/discharge rate of batteries.
19	BATTERY CHARGER FUSE (FU1) (located behind control panel)	Protects battery charging alternator.
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	DC CONTROL POWER circuit breaker (CB1) (located behind control panel)	Energizes or de-energizes DC circuits.

Table 2. Load Terminal, AC Voltage Reconnection Switch and VM-AM Transfer Switch Selection.

RECONNECTION SWITCH POSITION	TERMINALS	VM-AM TRANSFER SWITCH POSITION	VOLTAGE READING	CURRENT READING (TERMINAL)
120/208V 3PH	L1, L2, L3, L0	L1 - L2 3 PHASE L2 - L3 3 PHASE L3 - L1 3 PHASE L3 - L0 3 PHASE	208 VOLTS 208 VOLTS 208 VOLTS 120 VOLTS	L1 L2 L3 L3
120V 1PH	L3 - L0	L3 - L0 1 PHASE	120 VOLTS	L3
120/240V 1PH	L3 - L1 L3 - L0 OR L1 - L0	L3 - L1 1 PHASE L3 - L0 1 PHASE L1 - L0 1 PHASE	240 VOLTS 120 VOLTS 120 VOLTS	L3 L3 L1

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 3describes each indicator light.

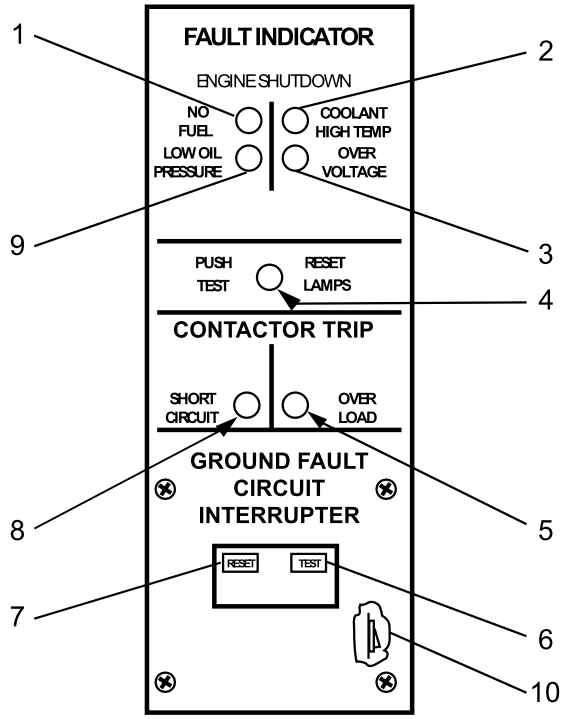


Figure 2. Malfunction Indicator Panel.

Table 3. Malfunction Indicator Panel.

Key	Control or 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 °F ± 5 °F (107 °C ± 3 °C).
3	OVERVOLTAGE indicator	Lights when voltage in 120 volt generator coil exceeds 153 ± 3 volts.
4	PUSH TEST RESET LAMPS	Tests and resets fault indicator lamps.
5	OVER LOAD indicator	Lights when current in any phase exceeds 110 percent of rated current.
6	GROUND FAULT CIRCUIT INTER-RUPTER TEST Pushbutton	Tests GROUND FAULT CIRCUIT INTERRUPTER.
7	Ground Fault Circuit Interrupter PUSH TO RESET Pushbutton	Push to reset GROUND FAULT CIRCUIT INTERRUPTER after test or ground fault has occurred. Reset button will be red if Ground Fault Circuit Interrupter has been tripped.
8	SHORT CIRCUIT indicator	Lights when generator set output in any phase exceeds 425 ± 25 percent of rated current.
9	LOW OIL PRESSURE indicator	Lights when engine lubrication systems pressure is less than 15 ± 3 psi (103.4 ± 20.7 kPa) during engine operation.
10	Convenience Receptacle Overload Circuit Breaker (10-amp in-line fuse on generator sets)	Circuit breaker trips when load on convenience receptacle exceeds 10 amps (fuse blows on generator sets).

FREQUENCY ADJUST CONTROL

The frequency adjust control (Figure 3) is to the left and below the control panel.Table 4describes each part and its function.

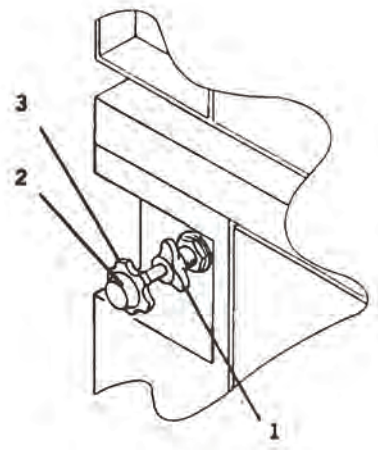


Figure 3. Frequency Adjust Control.

Table 4. Frequency Adjust Control.

Key	Control	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.
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

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

OPERATION UNDER USUAL CONDITIONS

INITIAL SETUP:

Tools and Special Tools
None

Personnel Required
1

Materials/Parts
Ground rod assembly, ground conductor/cable

References
FM 5-424 (WP 0013)
FM 20-31 (WP 0013)
Table 1 and Figure 1 (WP 0004)
Table 1 (WP 0011)

Equipment Condition
Ready for Operation
Engine Stopped (Refer to Stopping Procedure)

GENERAL

This WP provides information and guidance for generator set operation under normal conditions; refer to FM 20-31 (Electric Generation in the Field).

ASSEMBLY AND PREPARATION FOR USE

Installation of Ground Rod

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start the generator set unless it is properly grounded. Failure to comply with this warning can cause injury or death to personnel.

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).
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

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. DO NOT touch live voltage connections. Never attempt to connect or disconnect load cables while the generator set is running. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Dangerous voltage exists on live circuits. Always observe precautions and never work alone. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. SHUT DOWN generator set and make sure it is free of any power source before attempting any repair or maintenance on the set, or when connecting or disconnecting load cables. Failure to comply with this warning can cause injury or death to personnel.

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. Shut down generator set.
2. Select required output terminals fromTable 1.
3. Open output load terminal door.

WARNING

Do not remove the Bonding Jumper between GND and N unless the Weapon System requires an ungrounded system. Failure to comply can cause death or serious injury to personnel. Refer to applicable Weapon System TM for specific guidance on power and connection requirements.

4. Ensure that jumper is securely fastened between L0 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.

CAUTION

When using single phase connections, always attempt to balance loads between terminals (do not connect all loads between one terminal and L0). Failure to observe this caution can result in damage to the generator set.

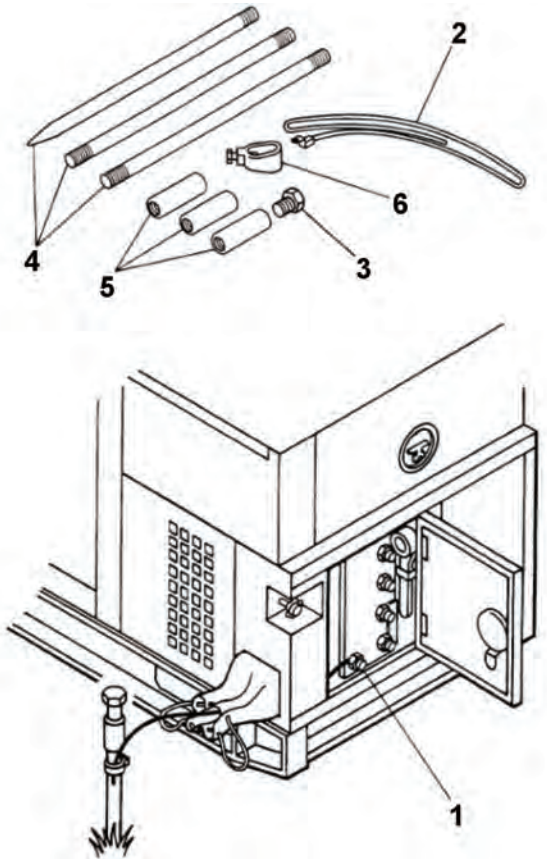


Figure 1. Grounding Connections.

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

RECONNECTION SWITCH POSITION	TERMINALS	VM-AM TRANSFER SWITCH POSITION	VOLTAGE READING	CURRENT READING (TERMINAL)
120/208V 3PH	L1, L2, L3, L0	L1 - L2 3 PHASE L2 - L3 3 PHASE L3 - L1 3 PHASE L3 - L0 3 PHASE	208 VOLTS 208 VOLTS 208 VOLTS 120 VOLTS	L1 L2 L3 L3
120V 1PH	L3 - L0	L3 - L0 1 PHASE	120 VOLTS	L3
120/240V 1PH	L3 - L1 L3 - L0 OR L1 - L0	L3 - L1 1 PHASE L3 - L0 1 PHASE L1 - L0 1 PHASE	240 VOLTS 120 VOLTS 120 VOLTS	L3 L3 L1

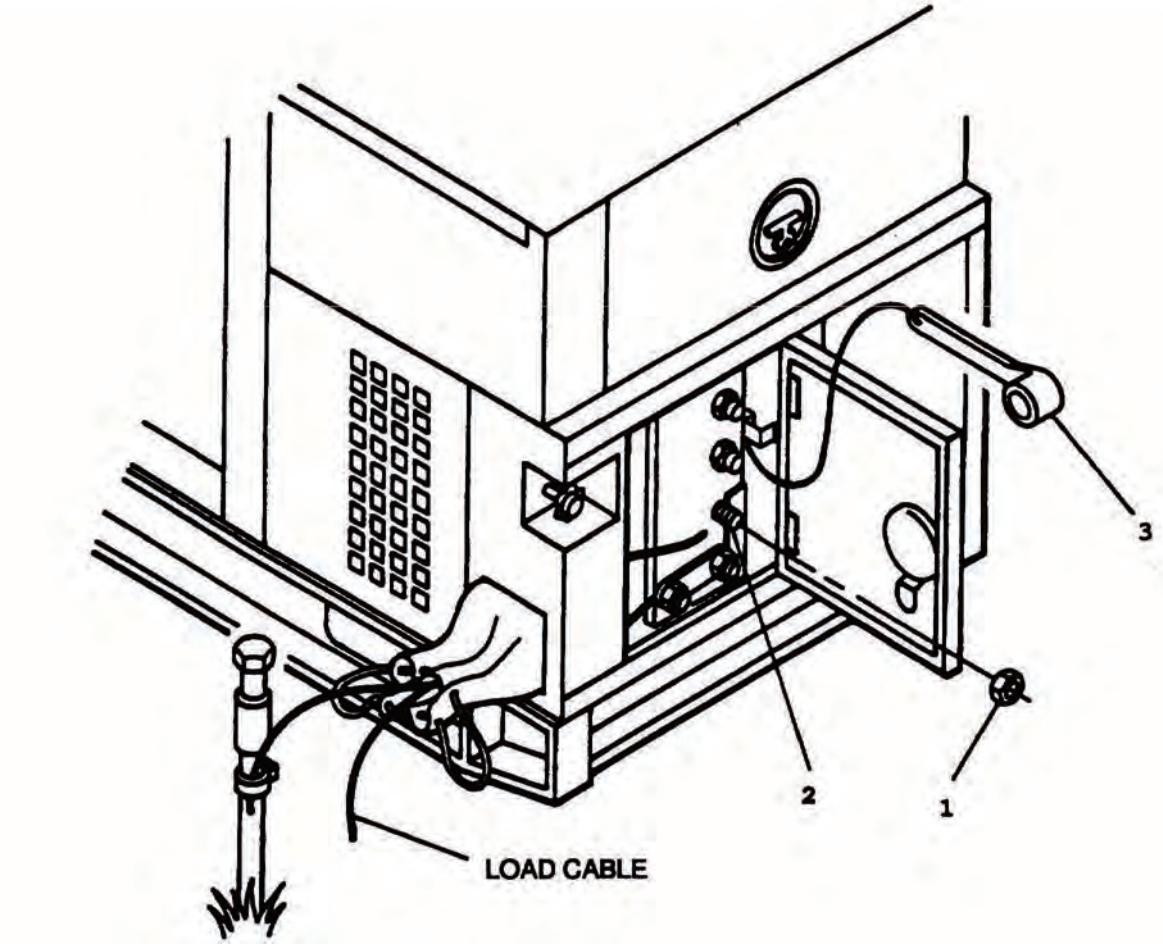


Figure 2. Installation of Load Cables.

END OF TASK

INITIAL ADJUSTMENTS, BEFORE USE AND SELF-TEST

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.

END OF TASK

Before Use

Perform all BEFORE PMCS, refer toWP 0011, Table 1.

1. Place VM-AM transfer switch in a position corresponding to output terminal load connections, refer toWP 0004, Table 1.
2. Pull out EMERGENCY STOP pushbutton.

END OF TASK

Self Test

1. Place MASTER SWITCH to PRIME AND RUN position.
2. Press PUSH TEST RESET LAMPS pushbutton on malfunction indicator panel. Ensure all indicator lights are lit. When PUSH TEST RESET LAMPS pushbutton is released, all lights should go out.
3. Press BATTLE SHORT 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.
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.

END OF TASK

OPERATING PROCEDURES

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start the generator set unless it is properly grounded. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. DO NOT touch live voltage connections. Never attempt to connect or disconnect load cables while the generator set is running. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Exhaust discharge contains deadly gases including carbon monoxide. DO NOT operate generator set in enclosed areas unless exhaust discharge is properly vented outside. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Hot exhaust gases can ignite flammable materials. Allow room for safe discharge of hot gases and sparks. Failure to comply with this warning can cause injury or death to personnel.

Starting Procedure

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start the generator set unless it is properly grounded. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Operating the generator set exposes personnel to a high noise level. Hearing protection must be worn when operating or working near the generator set when the generator set is running. Failure to comply with this warning can cause hearing damage to personnel.

CAUTION

Do not crank engine in excess of fifteen seconds. Allow starter to cool at least fifteen 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.

NOTE

Ensure all generator set access doors, except control panel access door, 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 AND RUN position.
5. If operating with an auxiliary fuel source, rotate MASTER SWITCH to PRIME AND 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 0002, Figure 1, Item 20 andWP 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 VM-AM 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.
12. Perform all DURING OPERATION PMCS requirements in accordance withWP 0011, Table 1.

END OF TASK

Stopping Procedure

1. Place AC CIRCUIT INTERRUPTER switch in OPEN position. Disconnect all cords from convenience receptacle.
2. Allow generator set to operate five minutes with no load applied.
3. Place MASTER SWITCH in OFF position.

4. Perform all AFTER OPERATION PMCS requirements in accordance withWP 0011, Table 1.
5. Place DEAD CRANK switch to OFF position.

END OF TASK

USE OF THE CONVENIENCE RECEPTACLE

WARNING

Power is available when the main contactor is open. Avoid accidental contact. Failure to comply with this warning can cause injury or death to personnel.

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 Starting Procedure.
2. Ensure the load does not exceed the maximum rating.
3. Reset the Ground Fault Circuit Interrupter.
4. Plug appropriate connector into convenience receptacle.

END OF TASK

DECALS AND INSTRUCTIONS PLATES

There are identification and instruction plates on the generator set.Figure 3throughFigure 21show the location and contents of each plate on the generator set.

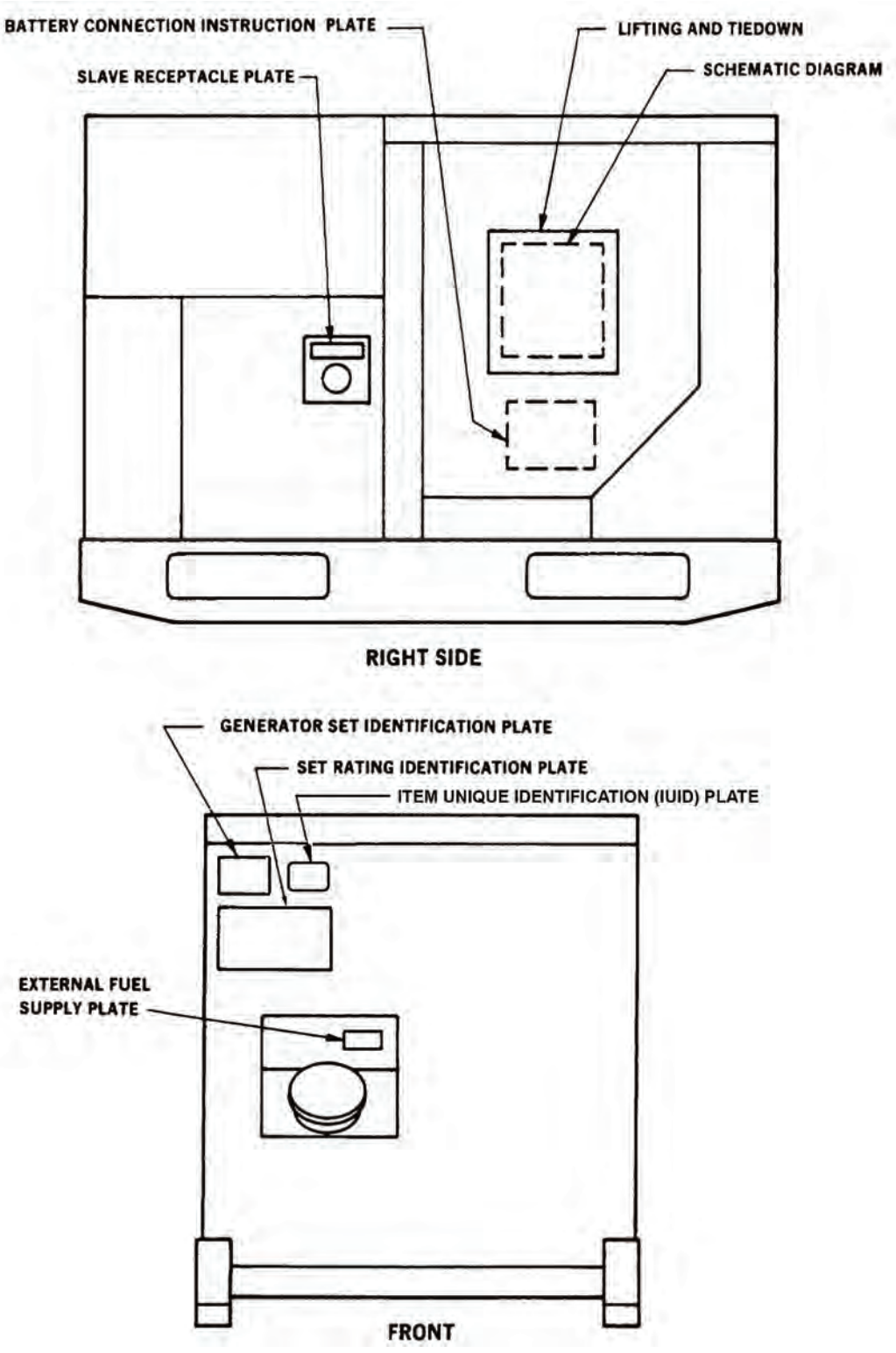


Figure 3. Operating Instructions Plates (Front and Right Side).

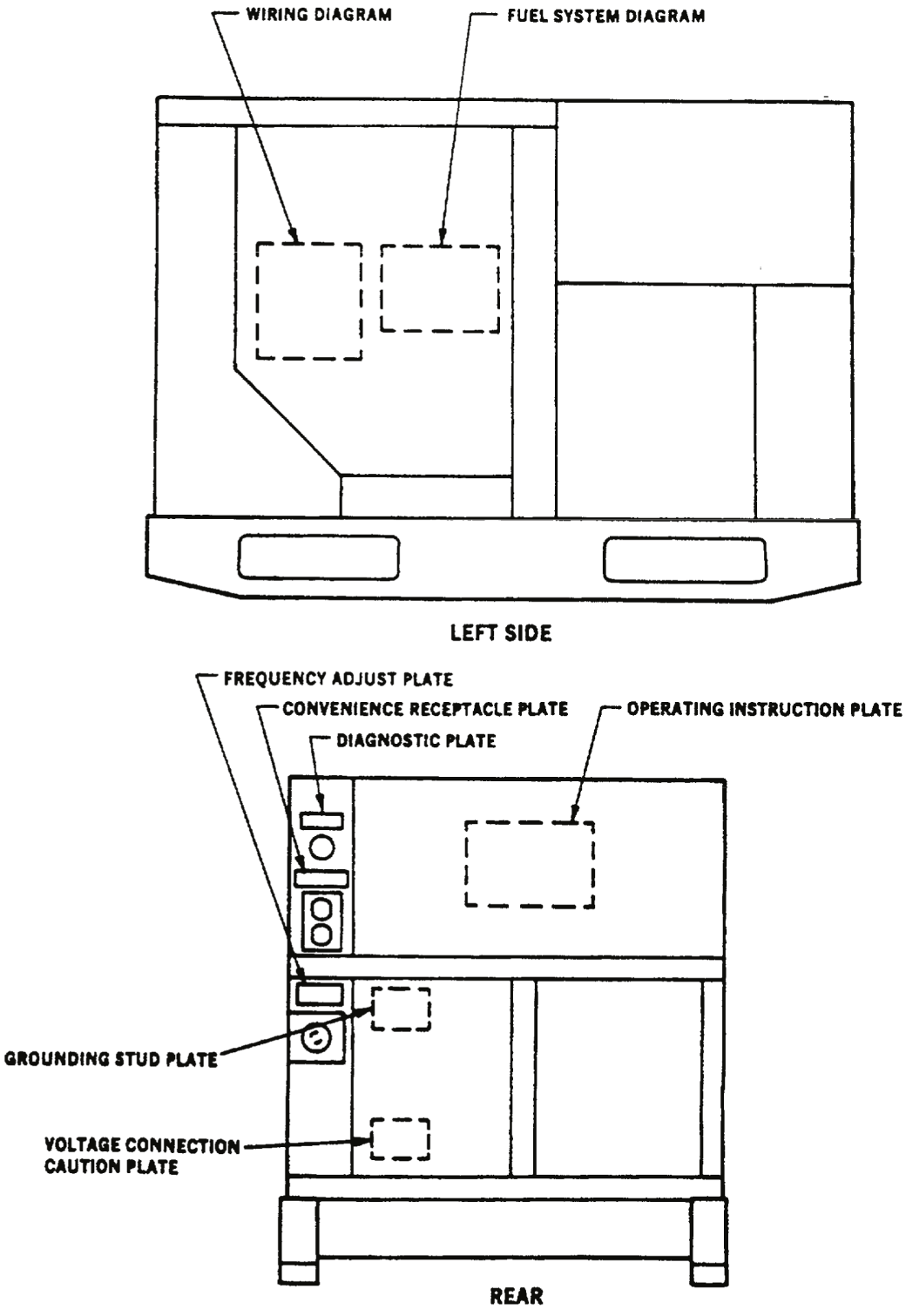


Figure 4. Operating Instructions Plates (Rear and Left Side).

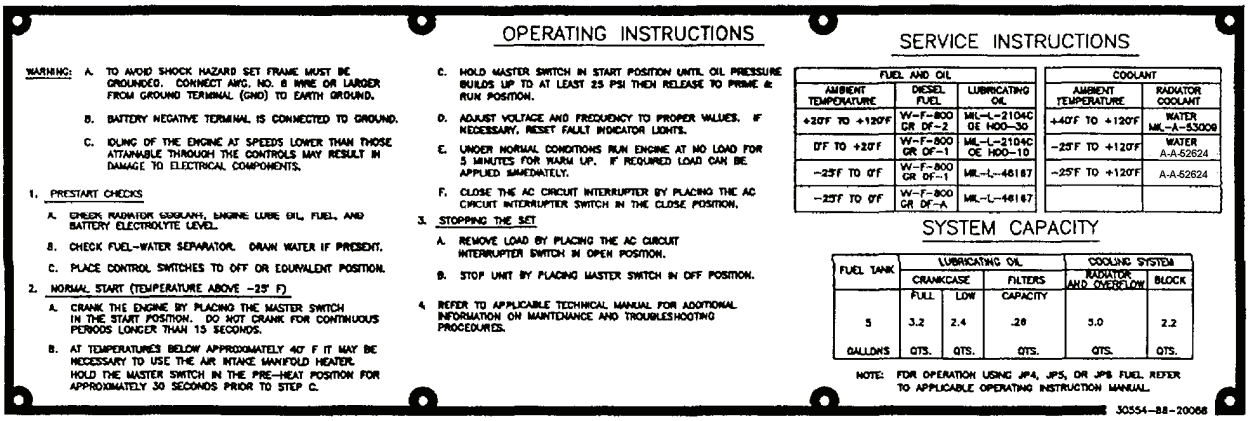
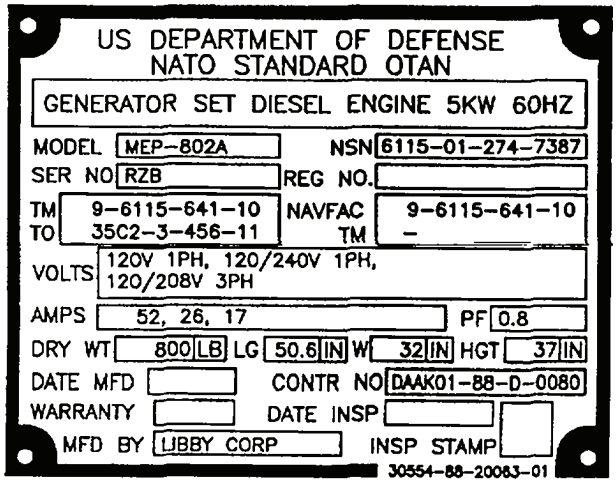


Figure 5. Operating Instructions Plate - Sample.



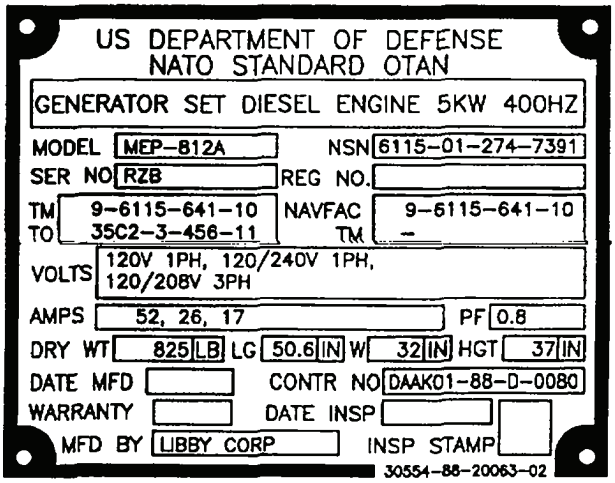
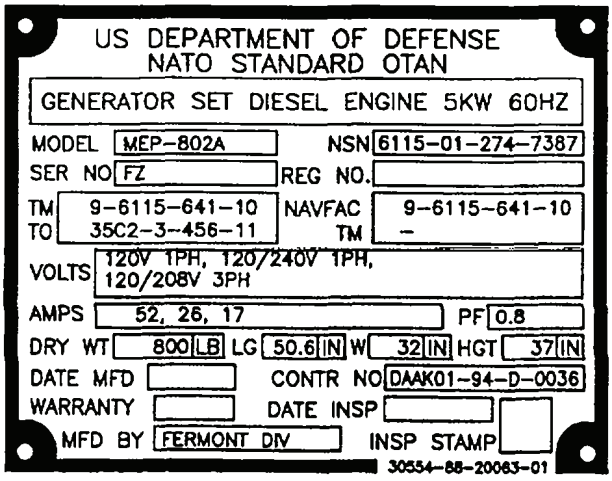


Figure 6. Generator Set Identification Plates (DAAK01-88-D-0080).



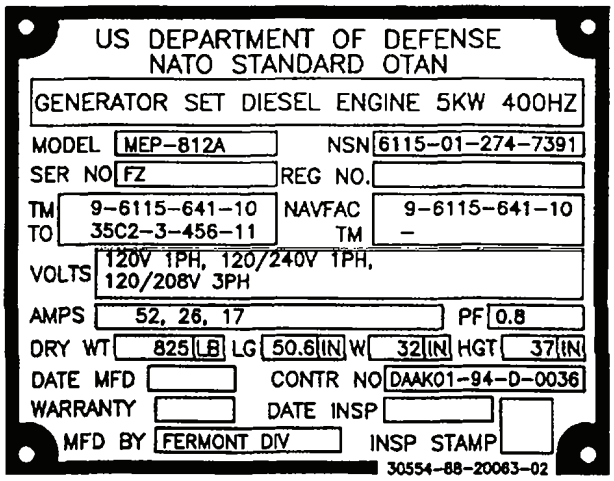


Figure 7. Generator Set Identification Plates (DAAK01-94-D-0036).

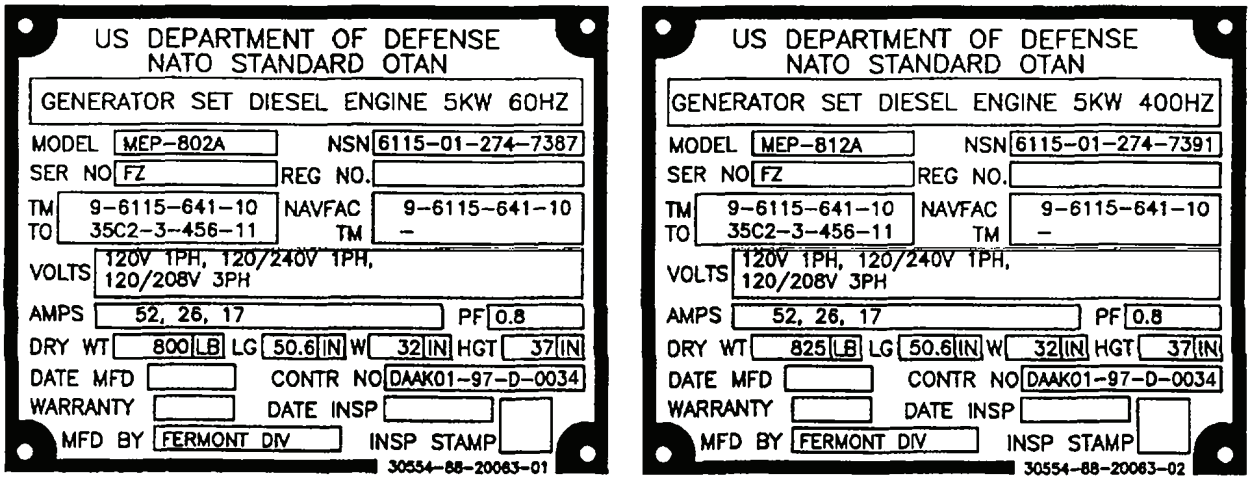


Figure 8. Generator Set Identification Plates (DAAK01-97-D-0034).

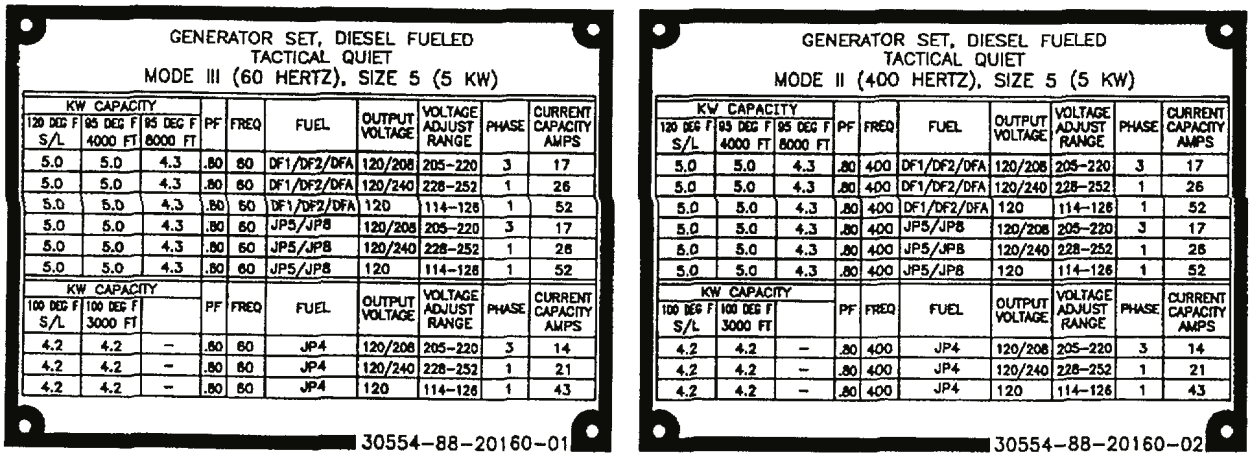


Figure 9. Set Rating Identification Plates - Sample.

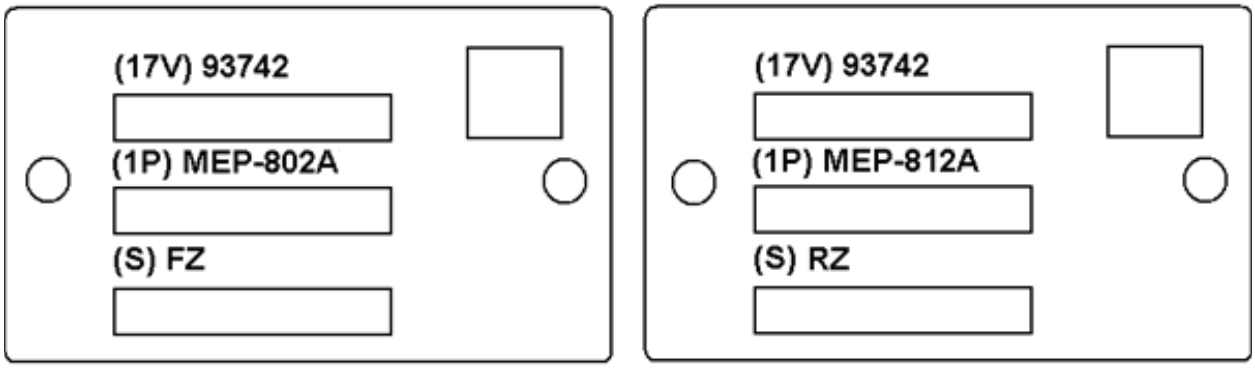


Figure 10. Item Unique Identification (IUID) Plates - Sample.

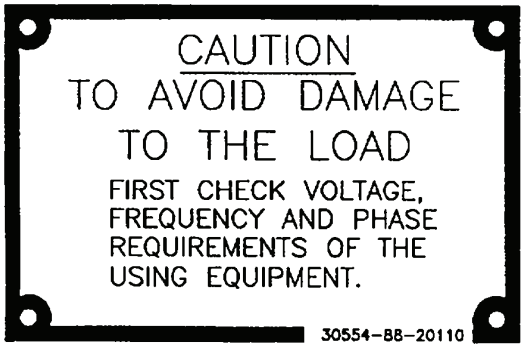


Figure 11. Voltage Connection Caution Plate.

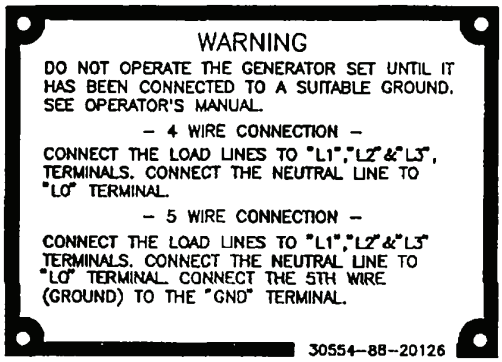


Figure 12. Grounding Stud Plate.

Figure 13. NATO Slave Receptacle Plate.

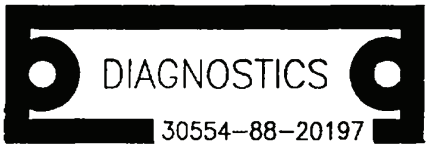


Figure 14. Diagnostics Plate.

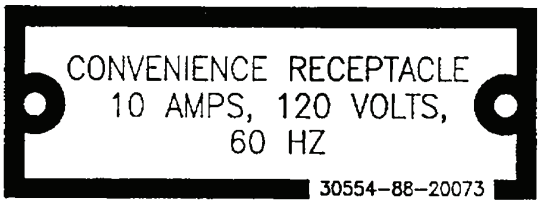


Figure 15. Convenience Receptacle Plate.

Figure 16. External Fuel Plate Supply.

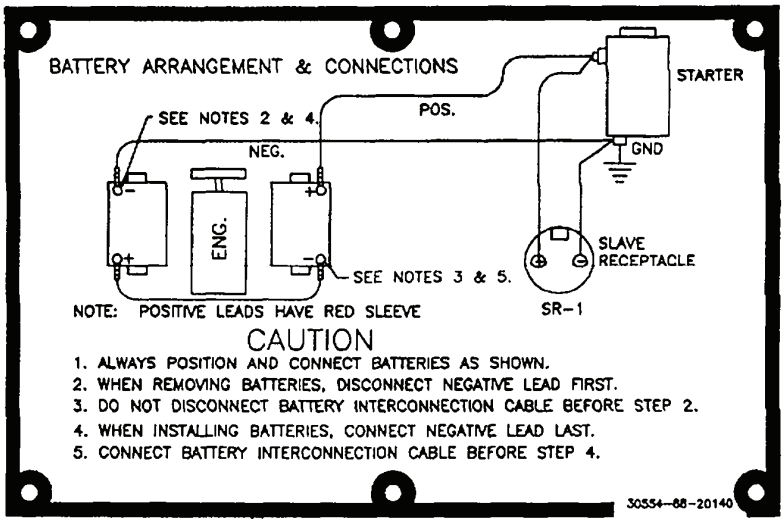


Figure 17. Battery Connection Instruction Plate.

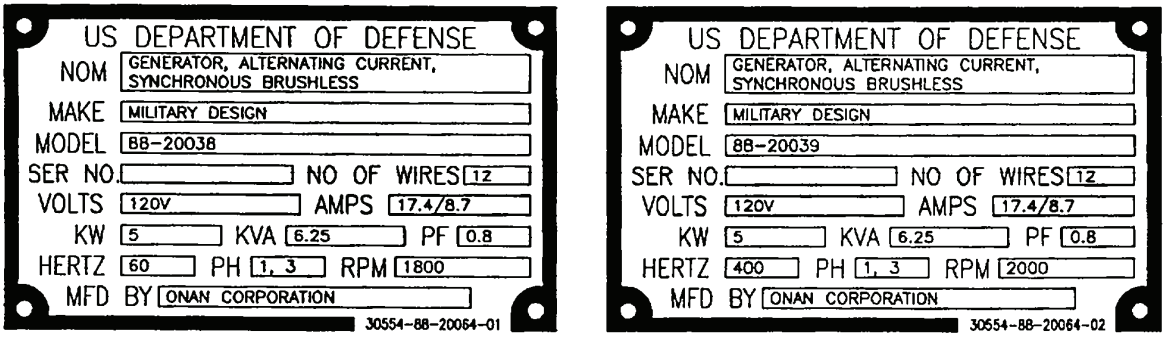


Figure 18. Generator Identification Plates.

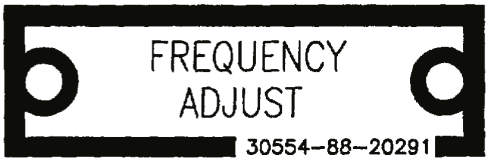


Figure 19. Frequency Adjust Plate.

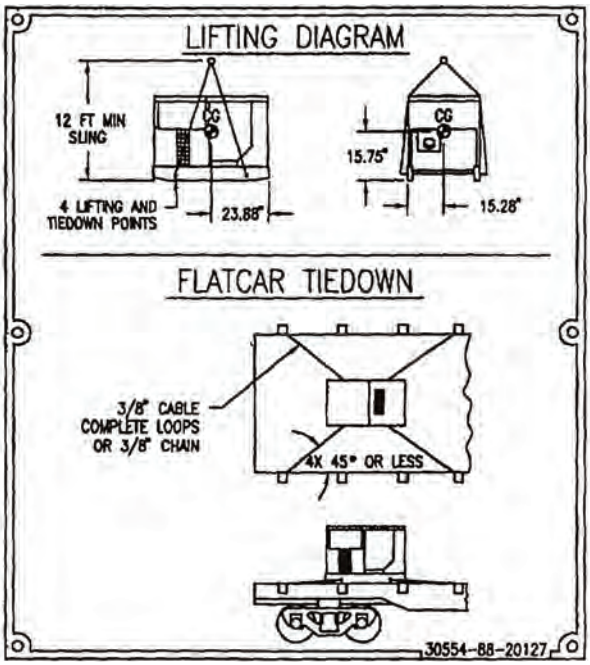


Figure 20. Lifting and Tiedown Diagram Plate.

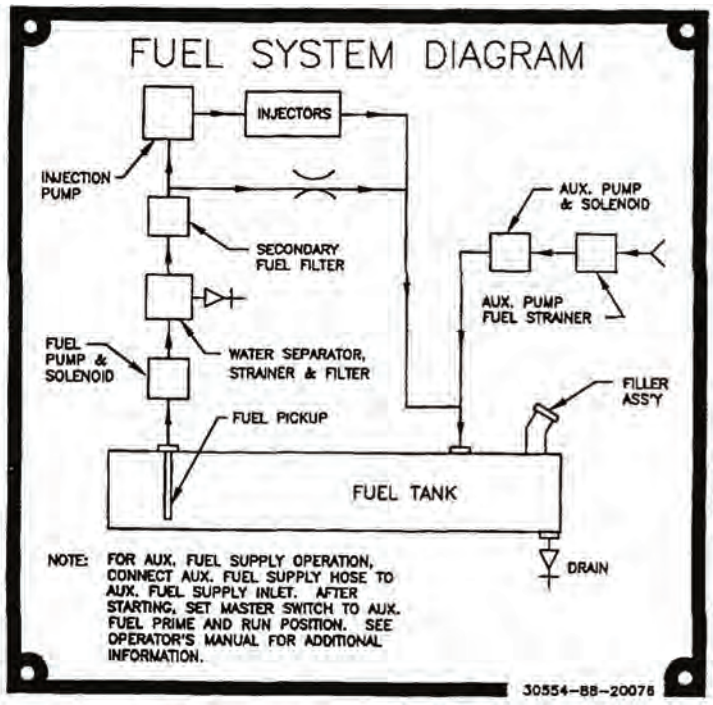


Figure 21. Fuel System Diagram Plate.

PREPARATION FOR MOVEMENT

1. Shut down generator set. Refer toStopping 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 Installation of Ground Rod for assembly and preparation for use.

END OF TASK

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

OPERATION UNDER UNUSUAL CONDITIONS

INITIAL SETUP:

Tools and Special Tools
None

Materials/Parts
Antifreeze Coolant

Personnel Required
1

References
N/A

Equipment Condition
Ready for Operation

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

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. DO NOT touch live voltage connections. Never attempt to connect or disconnect load cables while the generator set is running. Failure to comply with this warning can cause injury or death to personnel.

WARNING

In extreme cold weather, skin can stick to metal. Avoid contacting metal items with bare skin in extreme cold weather. Failure to comply with this warning can cause injury to personnel.

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.

END OF TASK

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.

END OF TASK

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.
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 toWP 0012, Service of Air Cleaner Assembly.
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.

END OF TASK

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

Dangerous voltage exists on live circuits. Always observe precautions and never work alone. 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 shutdown. Avoid grounding yourself when touching 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.

END OF TASK

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.
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 and wire insulation for signs of deterioration.

END OF TASK

Operation at High Altitudes

The generator set will operate at elevations up to 4000 feet (1219.1 meters) above sea level without special adjustment or reduction in load. At elevations greater than 4000 feet (1219.1 meters) above sea level, the kilowatt rating is reduced approximately 3.5 percent for each additional 1000 feet (304.8 meters).

END OF TASK

INTERIM NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION PROCEDURES

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 3-11.5, 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 3-11.5.
3. Continued decontamination of external generator set surfaces with super-tropical 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.
    g. Replacement 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 3-11.5. 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 3-11.3 and FM 3-11.4. Other services use applicable publications for NBC.

END OF TASK

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET EMERGENCY

INITIAL SETUP:

Tools and Special Tools
None

Materials/Parts
Coolant (WP 0016, Table 1, Item 8)
Oil (WP 0016, Table 1, Item 4)
Gloves
Cloth (WP 0016, Table 1, Item 7)
Fuel

Personnel Required
1

References
Generator Set Servicing and Inspection (WP 0012)
LO 9-6115-641-12
Operation Under Usual Conditions (WP 0005)
Troubleshooting Procedures (WP 0009)

NATO SLAVE RECEPTACLE START OPERATION

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. DO NOT touch live voltage connections. Never attempt to connect or disconnect load cables while the generator set is running. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Slave receptacle (NATO connector) is electrically live at all times and is unfused. The Battery Disconnect Switch does not remove power from the slave receptacle. NATO slave receptacle has 24 VDC even when Battery Disconnect Switch is set to OFF. This circuit is only dead when the batteries are fully disconnected. Disconnect the batteries before performing maintenance on the slave receptacle. Failure to comply with this warning can cause injury or death to personnel.

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. For generator set starting procedures, refer toWP 0005, Starting Procedure.
3. Remove NATO slave cable after generator set starts.

END OF TASK

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 the OFF position.

END OF TASK

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.

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

END OF TASK

END OF WORK PACKAGE

CHAPTER 3

OPERATOR TROUBLESHOOTING PROCEDURES

FOR

5 kW GENERATOR SET (60 Hz AND 400 Hz), SKID MOUNTED, TACTICAL QUIET

CHAPTER 3

OPERATOR TROUBLESHOOTING PROCEDURES

WORK PACKAGE INDEX

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

TROUBLESHOOTING INDEX

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Tools and Special Tools
NATO Slave Cable

Materials/Parts
None

Personnel Required
1

References
Operation Under Usual Conditions (WP 0005)

GENERAL

This WP 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 users may perform maintenance only as authorized.

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure generator set is completely shut down and free of any power source before attempting any repair or maintenance on the set, or when connecting or disconnecting load cables. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start the generator set unless it is properly grounded. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Shut down generator set before performing inspection of wiring. Failure to comply with this warning can cause injury or death to personnel.

ENGINE

SYMPTOM

Engine fails to crank.

MALFUNCTION

Check that DEAD CRANK switch is in the NORMAL position.

CORRECTIVE ACTION

Place switch in NORMAL position.

MALFUNCTION

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

CORRECTIVE ACTION

If DC CONTROL POWER circuit breaker is de-energized (out), go to next malfunction.

MALFUNCTION

Check that Emergency Stop Switch is out.

CORRECTIVE ACTION

Reset Emergency stop switch to Normal.

MALFUNCTION

Defect in Engine Starting/Electrical System.

CORRECTIVE ACTION

Check battery connections. If loose or corroded, notify next higher maintenance level.

SYMPTOM

Engine cranks but fails to start.

MALFUNCTION

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 toWP 0005, Starting Procedure.

MALFUNCTION

Check for dirty air cleaner element.

CORRECTIVE ACTION

Service air cleaner assembly. Refer toWP 0012, Service of Air Cleaner Assembly.

MALFUNCTION

Check for dirty fuel filter/water separator.

CORRECTIVE ACTION

Service fuel filter/water separator. Refer toWP 0012, Service of Air Cleaner Assembly. If engine still fails to start, notify next higher maintenance level.

SYMPTOM

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

MALFUNCTION

Check for proper starting procedure.

CORRECTIVE ACTION

Hold MASTER SWITCH in START position until 25 psi (172 kPa) is reached. Refer toWP 0005, Starting Procedure.

MALFUNCTION

Check to see if any FAULT INDICATOR lights are lit.

CORRECTIVE ACTION

NO FUEL light is lit. Refer toWP 0012, Inspection of Fuel Tank. If any other lights are lit, notify next higher maintenance level.

SYMPTOM

Engine stops suddenly.

MALFUNCTION

Check to see if any FAULT INDICATOR lights are lit.

CORRECTIVE ACTION

NO FUEL light is lit. Refer toWP 0012, Inspection of Fuel Tank. If any other lights are lit, go to next malfunction.

MALFUNCTION

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

CORRECTIVE ACTION

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

SYMPTOM

Engine runs erratically or misfires.

MALFUNCTION

Check for dirty air cleaner element.

CORRECTIVE ACTION

Service air cleaner assembly. Refer toWP 0012, Service of Air Cleaner Assembly.

MALFUNCTION

Check for contaminated fuel.

CORRECTIVE ACTION

Service fuel filter/water separator. Refer toWP 0012, Service of Air Cleaner Assembly.

MALFUNCTION

Check for improper type of fuel.

CORRECTIVE ACTION

If improper fuel is suspected, refer toWP 0012, Table 2, notify next higher maintenance level.

SYMPTOM

Engine does not develop full power.

MALFUNCTION

Check for dirty air cleaner element.

CORRECTIVE ACTION

Service air cleaner assembly. Refer toWP 0012, Service of Air Cleaner Assembly.

MALFUNCTION

Check for contaminated fuel.

CORRECTIVE ACTION

Service fuel filter/water separator. Refer toWP 0012, Service of Air Cleaner Assembly.

MALFUNCTION

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.

MALFUNCTION

Check for improper type of fuel.

CORRECTIVE ACTION

If improper type of fuel is suspected, refer toWP 0012, Table 2, notify next higher maintenance level.

SYMPTOM

Engine knocks.

MALFUNCTION

Check for low lubrication oil level.

CORRECTIVE ACTION

If necessary add oil, refer to LO 9-6115-641-12.

MALFUNCTION

Check for loose parts or foreign objects in engine compartment.

CORRECTIVE ACTION

If no loose parts or foreign objects are found, go to next malfunction.

MALFUNCTION

Check for improper type of fuel.

CORRECTIVE ACTION

If improper type of fuel is suspected, refer toWP 0012, Table 2, notify next higher maintenance level.

SYMPTOM

Blue or white exhaust smoke.

MALFUNCTION

Check for improper type of fuel.

CORRECTIVE ACTION

If improper type of fuel is suspected, refer toWP 0012, Table 2, notify next higher maintenance level.

SYMPTOM

Black exhaust smoke.

MALFUNCTION

Check for improper type of fuel.

CORRECTIVE ACTION

If improper type of fuel is suspected, refer toWP 0012, Table 2, notify next higher maintenance level.

MALFUNCTION

Check for dirty air cleaner element.

CORRECTIVE ACTION

Service air cleaner assembly. Refer toWP 0012, Service of Air Cleaner Assembly.

MALFUNCTION

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 toWP 0004, Figure 1. If unable to adjust, notify next higher maintenance level.

SYMPTOM

Low oil pressure.

MALFUNCTION

Check for low lubrication oil level.

CORRECTIVE ACTION

If necessary add oil. Refer to LO 9-6115-641-12.

MALFUNCTION

Check for high coolant temperature, above 200 °F (93 °C). Refer to WP 0004, Figure 1 .

CORRECTIVE ACTION

If coolant temperature is high, go to next malfunction.

MALFUNCTION

Check coolant level.

CORRECTIVE ACTION

If low, add coolant. Refer toWP 0012, Service of Cooling System. If full, go to next malfunction.

MALFUNCTION

Check for obstruction in air intake system.

CORRECTIVE ACTION

If obstructions are found, remove debris. If no obstructions are found, go to next malfunction.

MALFUNCTION

Check for loose fan belt.

CORRECTIVE ACTION

If loose, notify next higher maintenance level.

SYMPTOM

COOLANT TEMPERATURE indicator indicates engine overheating.

MALFUNCTION

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 toWP 0004, Figure 1. If unable to adjust, notify next higher maintenance level.

MALFUNCTION

Check coolant level.

CORRECTIVE ACTION

If low, add coolant. Refer toWP 0012, Service of Cooling System. If full, go to next malfunction.

MALFUNCTION

Check for low lubrication oil level.

CORRECTIVE ACTION

If necessary add oil. Refer to LO 9-6115-641-12. If full, go to next malfunction.

MALFUNCTION

Check for obstruction in air intake system.

CORRECTIVE ACTION

If obstructions are found, remove debris. If no obstructions are found, go to next malfunction.

MALFUNCTION

Check for loose fan belt.

CORRECTIVE ACTION

If loose, notify next higher maintenance level.

BATTERY

SYMPTOM

BATTERY CHARGE ammeter shows low or no charge.

MALFUNCTION

Check BATTERY CHARGER FUSE.

CORRECTIVE ACTION

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

MALFUNCTION

Check fan belt.

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

MALFUNCTION

Check for loose or broken wires.

CORRECTIVE ACTION

Check for loose or broken wires at the back of the battery charging alternator (WP 0002, Figure 1) and BATTERY CHARGE ammeter (WP 0004, Figure 1). If wires are loose or broken, notify next higher maintenance level.

SYMPTOM

BATTERY CHARGE ammeter shows excessive charging after prolonged operation.

MALFUNCTION

Check batteries for low electrolyte level.

CORRECTIVE ACTION

If low, refer toWP 0012, Service of Batteries.
If level is correct, go to next malfunction.

MALFUNCTION

Check battery connections.

CORRECTIVE ACTION
If loose or corroded, notify next higher maintenance level.

SYMPTOM

AC voltmeter (VOLTS AC) indicates low voltage.

MALFUNCTION

Check that VM-AM transfer switch position corresponds to readings on the AC voltmeter (VOLTS AC). Refer to WP 0005, Table 1 .

CORRECTIVE ACTION
Set VOLTAGE adjust potentiometer.

MALFUNCTION

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

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

SYMPTOM

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

MALFUNCTION

Check FREQUENCY adjust control.

CORRECTIVE ACTION
Set FREQUENCY adjust control.

MALFUNCTION

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

AC voltmeter (VOLTS AC) fluctuates.

MALFUNCTION

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

Frequency meter (HERTZ) fluctuates.

MALFUNCTION

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

CORRECTIVE ACTION

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

SYMPTOM

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

MALFUNCTION

Test AC CIRCUIT INTERRUPTER light by depressing.

CORRECTIVE ACTION

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

MALFUNCTION

Check load cables for proper connection.

CORRECTIVE ACTION

For proper connection of the load cables, refer toWP 0005, Installation of Load Cables. If correct, go to next malfunction.

MALFUNCTION

Ensure load does not exceed generator rating.

CORRECTIVE ACTION

If load is high, decrease load. If load is correct, refer to next higher maintenance level.

SYMPTOM

No voltage at the Convenience Receptacle.

MALFUNCTION

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 on generator sets, contract number DAAK01-88-D-0080.

MALFUNCTION

Check the Ground Fault Circuit Interrupter.

CORRECTIVE ACTION

If the indicator is BLACK, reset by pressing the reset button. If the indicator is ORANGE, refer to next higher maintenance level.

TROUBLESHOOTING PROCEDURES : Winterization

GENERAL

This section lists common malfunctions you may find during operation of the generator set with the Winterization Kit installed and the generator set is running. You should perform the tests/inspections and corrective actions in the order listed. The troubleshooting symptom index cannot list all faults that may occur, nor all the tests or inspections and corrective actions. If a malfunction is not listed or cannot be corrected by listed corrective actions, notify your supervisor.

Code Light Troubleshooting

The indicator light near the heater switch is designed to blink on codes sequences to signal malfunctions in the system. (Refer toWP 0009, Code Light Pulses).

Code Light Pulses

The indicator light near the heater ON-OFF switch will blink in different sequences of long and short to indicate malfunctions. A plate (Figure 1) mounted on the generator control panel access door lists the malfunctions and shows each sequence of pulses. If you see any of these series of pulses, notify the next-higher level of maintenance.

NOTE

Before performing troubleshooting procedures, turn off heater and attempt restart.

SYMPTOM INDEX, WINTERIZATION KIT

NOTE

When the heater is switched on, the light will perform one of the sequences of light pulses shown visually on the Function Codes Plate mounted inside the generator control panel cover (Figure 1). Before each symptom, this index lists in parentheses the light sequence associated with it.

(long dash, short dash, long dash) - Start, glow period

(continuous dash) - Normal Function

(long dash, long dash) - Purge Cycle and Restart

(dash, dash) - Heater Restart attempted During Purge Cycle

(dash, 5 dots, dash) - Warning: Power supply

(10 dots) -Overheating

(dot, dot) - Flame Sensor Short-circuit

(2 dots, 2 dots) - Flame Cutout-LOW

(3 dots, 3 dots) - Flame Cutout-HIGH

(4 dots, 4 dots) - Glow Plug Defect

(dash, dash) - Burner Motor Defect

(dash, dot, dash, dot) - Under voltage

(dash, 2 dots, dash, 2 dots) - Over voltage

(dash, 3 dots, dash, 3 dots) - Non-start

(2 dots, dash, 2 dots, dash) - Temperature Sensor Defective

(3 dots, dash, 3 dots, dash) - Fuel pump short circuit

(2 dots, dash, 3 dots, dash, dot) - Temperature switch defective

(4 dashes) - Control unit defective

(dot, dash, 3 dots, dash, 2 dots) - Connection error

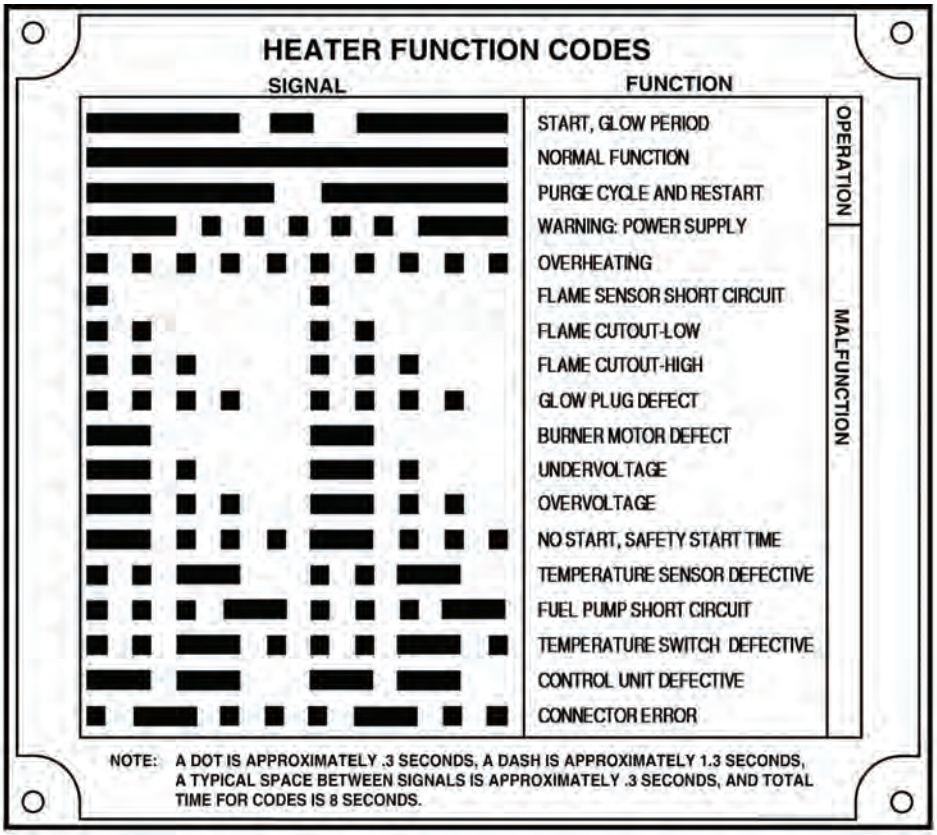


Figure 1. Heater Function Codes Plate.

END OF WORK PACKAGE

CHAPTER 4

OPERATOR MAINTENANCE INSTRUCTIONS

FOR

5 kW GENERATOR SET (60 Hz AND 400 Hz), SKID MOUNTED, TACTICAL QUIET

CHAPTER 4

OPERATOR MAINTENANCE INSTRUCTIONS

WORK PACKAGE INDEX

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

PMCS INTRODUCTION

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.

PMCS, BEFORE Operations

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

PMCS, DURING Operations

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

PMCS, AFTER Operations

Be sure to perform your AFTER PMCS.

If Your Equipment Fails to Operate

If your equipment does not perform as required, refer to Chapter 3 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 listed on WP 0011, Table 1 refer to Figure 1 and Figure 2 .

Purpose of PMCS Table

Preventive Maintenance Checks and Services,WP 0011, Table 1lists 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.

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), or DD Form 5988E, 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 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.

Location, Item to Check/Service Column

This column lists the location and the item to be checked or serviced.

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 generator set is ready or available for its intended mission or operation. You must do the procedure at the time stated in the interval column. If you do not have the tools, or if the procedures indicate, complete a DA Form 2404 and submit it to the next higher level of maintenance.

Not Fully Mission Capable if: Column

Information in this column tells you what faults will keep the generator set from being capable of performing its primary mission. If you make checks or services that show faults listed in this column, do not operate the generator set.

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.

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure generator set is completely shut down and free of any power source before attempting any repair or maintenance on the set, or when connecting or disconnecting load cables. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Solvent used to clean parts is potentially dangerous to personnel and property. Clean parts in a well-ventilated area. Avoid inhalation of solvent fumes. Wear goggles and rubber gloves to protect eyes and skin. Wash exposed skin thoroughly. Do not smoke or use near open flame or excessive heat. Failure to comply with this warning can cause injury to personnel, and damage to the equipment.

CAUTION

Keep cleaning solvents, fuels and lubricants away from rubber or soft plastic parts. They will deteriorate material.

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 services.
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.

END OF TASK

FLUID LEAKAGE

It is necessary for you to know how fluid leakage affects the status of the 5 kW Generator Set. Following are types/classes of leakage you need to know to be able to determine the status of the 5 kW Generator Set. Learn these leakage definitions and remember - when in doubt, notify your supervisor. Equipment operation is allowed with minor leakage (Class I or II). Consideration must be given to fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor.

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

Class III leaks should be reported immediately to your supervisor.

Leakage Definitions

Leakage Class	Leakage Definitions
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 checked/inspected.

Operation of Generator Set with Minor Leaks

CAUTION

Equipment operation is allowable with minor leakage (Class I or II) of any fluid except fuel. Fluid capacity must be considered before deciding to continue operation of the equipment with minor leaks. When operating with Class I or II leaks, fluid level must be checked more often than required by the PMCS table. Parts without fluid will stop working and/or cause equipment damage.

1. 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.
2. Check the fluid level more often than required in the PMCS Table. Add fluid as needed.
3. All leaks should be reported to the next higher level of maintenance.

END OF TASK

Removal of Assemblies/Equipment to Perform PMCS

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

Winterization Kit

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure the generator set is completely shut down and free of any power source before attempting any repair or maintenance on the set, or when connecting or disconnecting load cables. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Solvent used to clean parts is potentially dangerous to personnel and property. Clean parts in a well-ventilated area. Avoid inhalation of solvent fumes. Wear goggles and rubber gloves to protect eyes and skin. Wash exposed skin thoroughly. Do not smoke or use near open flame or excessive heat. Failure to comply with this warning can cause injury to personnel, and damage to the equipment.

WARNING

When running, winterization heater has hot metal surfaces that will burn flesh on contact. Shut down generator set and allow heater to cool before performing maintenance. Wear gloves and additional protective clothing as required. Failure to comply with this warning can cause injury or death to personnel.

CAUTION

Keep cleaning solvents, fuels and lubricants away from rubber or soft plastic parts. They will deteriorate material.

1. Keep it clean. Dirt, grease, and oil get in the way and may cover up a serious problem. Use cleaning solvents to clean metal services.
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 all with a tool, but look for chipped paint, bare metal, or rust around bolt heads. If you find one loose, tighten it or report it to the next-higher level of maintenance.
4. Inspect welds. Look 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. Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure wires are in good condition. 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.

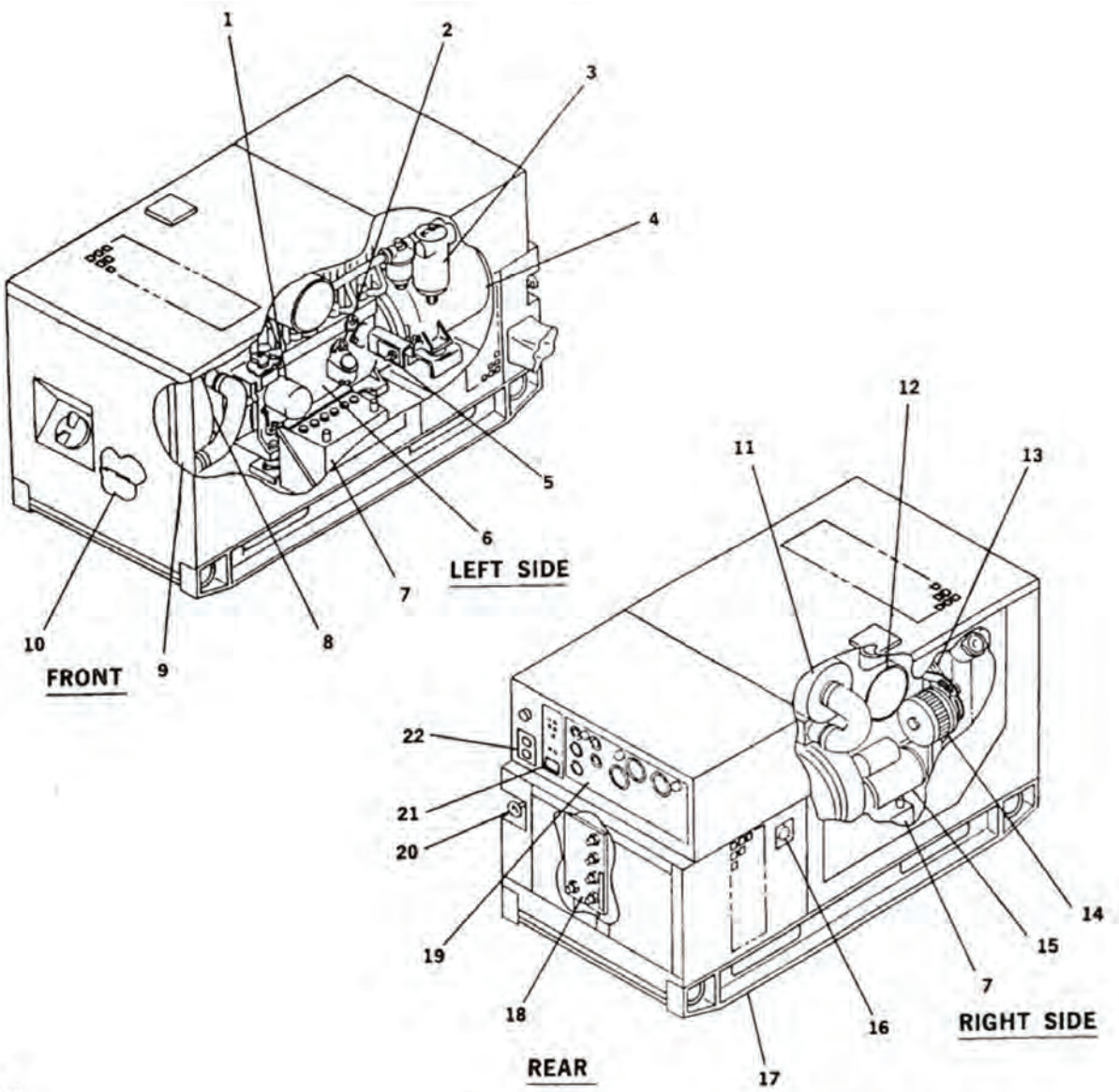
END OF TASK

Order in Which PMCS Will Be Done

Figure 3shows the order in which you are to perform your PMCS on the Winterization Kit.Figure 3shows a generator set to which a kit has been added. The number callouts onFigure 3do not match the Item No. inWP 0011, Table 1.

NOTE

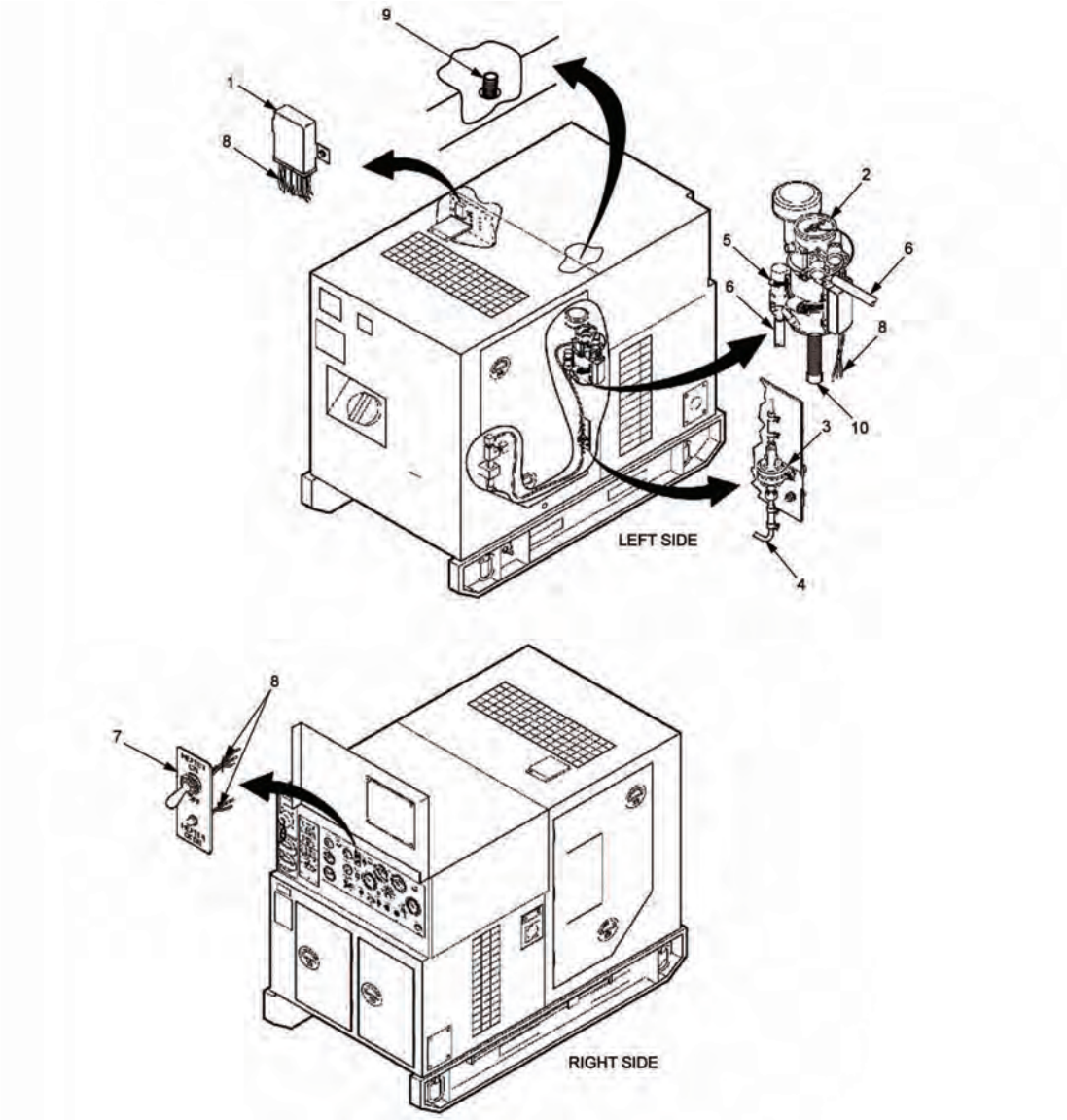
Be sure Generator Set PMCS is completed first in accordance with these procedures.



Legend

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

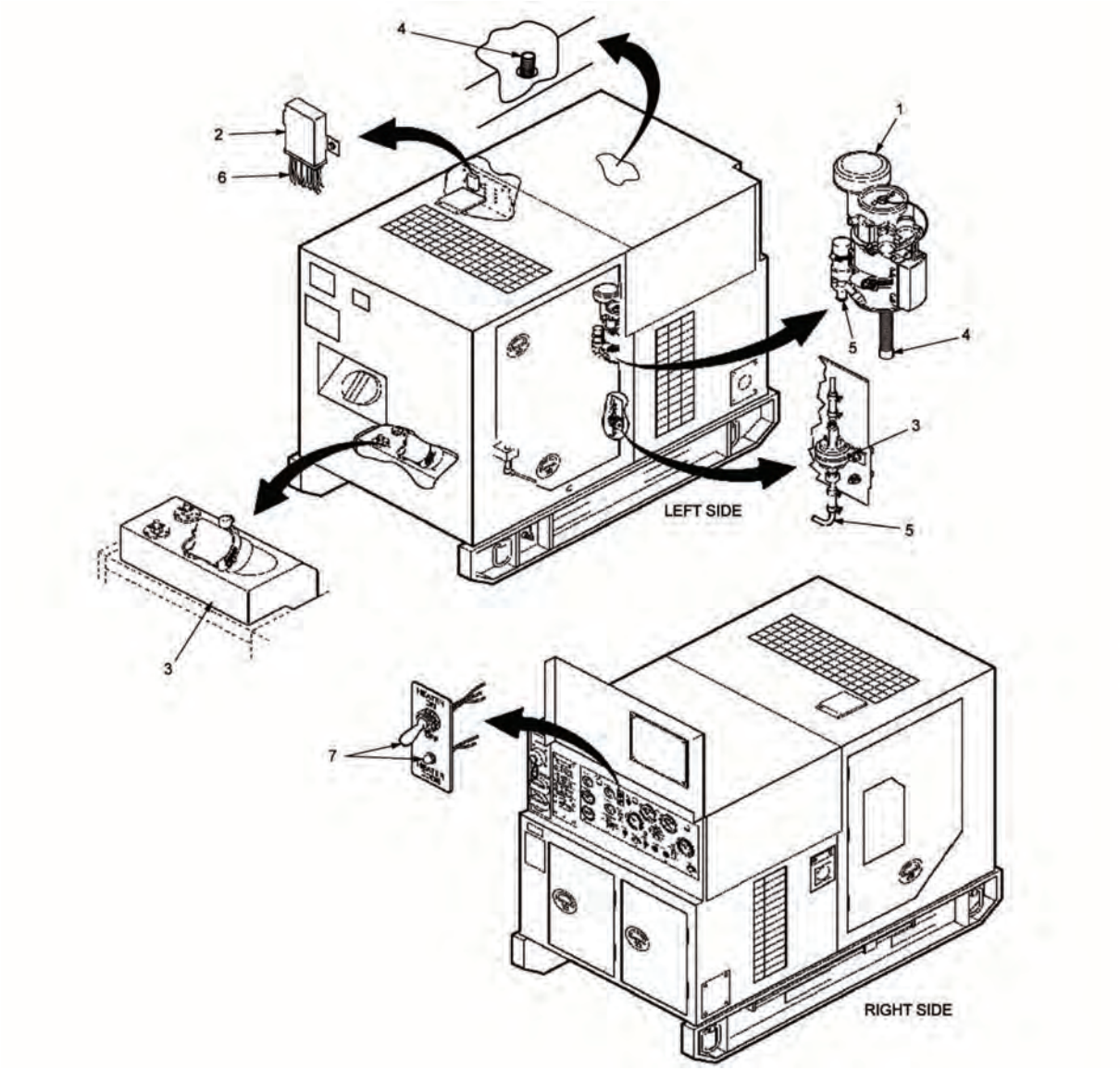
Figure 1. Generator Set Components.



LEGEND

1. Control Unit
2. Heater
3. Fuel Pump
4. Fuel Lines
5. Coolant Pump
6. Coolant Lines
7. Switch/Lamp
8. Wiring Harness
9. Exhaust Hose
10. Air Inlet Hose

Figure 2. Location of Major Winterization Kit Components.



LEGEND

1. Heater
2. Control Unit
3. Fuel Pump
4. Air Inlet Hose
5. Coolant Pump
6. Wiring Harness
7. Fuel Line
8. Switch/Lamp

Figure 3. Operator PMCS Routing Diagram for Winterization Kit.

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

PMCS, INCLUDING LUBRICATION INSTRUCTIONS

INITIAL SETUP:

Tools and Special Tools
None

Materials/Parts
Expendable and Durable Items List (WP 0016)

Personnel Required
1

Equipment Condition
Ready for Operation

LUBRICATION ORDER

Refer to Lubrication Order LO 9-6115-641-12 for lubrication information.

WARNING

In extreme cold weather, skin can stick to metal. Avoid contacting metal items with bare skin in extreme cold weather. Failure to comply with this warning can cause injury to personnel.

GENERATOR SET EXTERIOR

NOTE

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), an 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 and 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.

NOTE

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.

Table 1. Preventive Maintenance Checks and Service.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
1	BEFORE	HOUSING	a. Check door panels, hinges, and latches for damaged, loose, or corroded items. b. Inspect air intake and exhaust grills for debris.	Cannot secure door.
2	BEFORE	IDENTIFICATION PLATES	Check to ensure identification plates are secure.	
3	BEFORE	SKID BASE	Inspect skid base for cracks and/or corrosion.	Skid base is cracked or shows signs of structural damage.
4	BEFORE	ACOUSTICAL MATERIALS	Ensure that acoustical materials are free of damage and not missing.	
WARNING Operating the generator set exposes personnel to a high noise level. Hearing protection must be worn when operating or working near the generator set when the generator set is running. Failure to comply with this warning can cause hearing damage to personnel. **WARNING** Fuels used in the generator set are flammable. Do not smoke or use open flames when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.				
5	BEFORE	ENGINE ASSEMBLY	Inspect for loose, damaged, or missing hardware.	Any loose, damaged, or missing hardware.
6	BEFORE	FUEL SYSTEM	Inspect for leaks, damage, loose, or missing hardware.	Any fuel leaks, damage, loose or missing parts.
7	BEFORE	FUEL FILTER/ WATER SEPAR-ATOR	a. Inspect for leaks, cracks, damage, proper mounting, loose or missing parts. b. Drain water from fuel filter/water separator (WP 0012, Service of Air Cleaner Assembly).	Any fuel leaks. Water not drained.
NOTE Refer to Lube Order LO 9-6115-641-12.				
8	BEFORE	LUBRICATION SYSTEM	a. Inspect for leaks, damage, loose or missing parts. b. Inspect oil level. c. Inspect for contamination.	Class Ill leaks, damage, loose or missing parts. Oil level is low. Oil shows signs of contamination.

Table 1. Preventive Maintenance Checks and Service. - Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
			WARNING Cooling system operates at high temperature and pressure. Contact with high pressure steam and/or liquids can result in burns and scalding. Shut down generator set, and allow system to cool before performing checks, services and maintenance, or wear gloves and additional protective clothing and goggles as required. Failure to comply with this warning can cause injury or death to personnel.	
9	BEFORE	RADIATOR	Inspect for leaks, damage, loose or missing parts.	Class Ill leaks or missing radiator cap.
10	BEFORE	HOSES	Inspect for leaks, cracks, or missing parts.	Class Ill leaks or missing clamps or hoses.
11	BEFORE	COOLING FAN	a. Inspect for obstruction, damage, or looseness. b. Inspect for unusual noise in fan area.	Damaged or loose. Unusual noise from fan area.
11.1	BEFORE	WATER PUMP	Inspect for leaks.	Class III leaks or unusual noise from area.
12	BEFORE	FAN BELT	Inspect for cracks, fraying, or looseness.	Broken or missing belt.
13	BEFORE	OVERFLOW BOTTLE	Inspect for proper mounting, leaks, or missing hardware.	Class Ill leaks or missing hardware.
			WARNING Exhaust discharge contains deadly gases including carbon monoxide. DO NOT operate generator set in enclosed areas unless exhaust discharge is properly vented outside. Failure to comply with this warning can cause injury or death to personnel.	
14	BEFORE	EXHAUST SYSTEM	Inspect for leaks, corrosion, and missing parts.	Leaks, damaged, or missing parts.
15	BEFORE	AIR CLEANER ASSEMBLY	a. Inspect for loose, damaged, or missing parts. b. Inspect restriction indicator for clogged air cleaner element	Loose, damaged, or missing parts. Clogged air cleaner element.
			WARNING High voltage is produced when the generator set is in operation. Never attempt to start the generator set unless it is properly grounded. Failure to comply with this warning can cause injury or death to personnel. **WARNING** Ensure nuts on ground terminals are properly secured creating a good ground. Failure to comply with this warning can cause injury or death to personnel.	
16	BEFORE	GROUND ROD CABLE AND CONNECTIONS	Inspect for damage, corrosion, loose connections, and missing parts.	Damaged, corroded, loose connections, or missing parts.

Table 1. Preventive Maintenance Checks and Service. - Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
			WARNING Batteries give off a flammable gas. Do not smoke or use open flame when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.	
			WARNING Ensure nuts on ground terminals are properly secured creating a good ground. Failure to comply with this warning can cause injury or death to personnel.	
			WARNING Battery acid can cause burns to unprotected skin. Wear safety goggles and chemical gloves and avoid acid splash while working on batteries. Failure to comply with this warning can cause injury to personnel.	
			WARNING Dangerous voltage exists on live circuits. Always observe precautions and never work alone. Failure to comply with this warning can cause injury or death to personnel.	
17	BEFORE	BATTERIES	a. Inspect electrolyte level. b. Inspect for secure mounting.	Electrolyte is below battery plates. Broken or missing mounting hardware.
18	BEFORE	BATTERY CABLES	Inspect for corrosion, damage, loose connections, or missing parts.	Damaged, loose, or missing parts.
19	BEFORE	OUTPUT BOX ASSEMBLY	a. Inspect cables for damage or loose connections. b. Inspect output terminals for damage or missing hardware.	Damaged, loose, or missing parts. Damaged or missing hardware.
20	BEFORE	CONTROLS AND INDICATORS	Inspect for damage or missing parts.	Damaged or missing parts.
			WARNING High voltage is produced when this generator set is in operation. Make sure generator set is completely shut down and free of any power source before attempting any repair or maintenance on the set, or when connecting or disconnecting load cables. Failure to comply with this warning can cause injury or death to personnel.	
21	BEFORE	CONTROL BOX HARNESS	Inspect for damage and looseness.	Damaged or loose.
			WARNING Operating the generator set exposes personnel to a high noise level. Hearing protection must be worn when operating or working near the generator set when the generator set is running. Failure to comply with this warning can cause hearing damage to personnel.	

Table 1. Preventive Maintenance Checks and Service. - Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
			WARNING Fuels used in the generator set are flammable. Do not smoke or use open flames when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.	
			WARNING Top housing panels and exhaust system can get very hot. When performing DURING PMCS, wear gloves and additional protective clothing as required. Failure to comply with this warning can cause severe burns and injury to personnel.	
			WARNING Exercise extreme caution when performing DURING PMCS checks inside engine compartment. Avoid contact with moving or hot engine parts. Failure to comply with this warning can cause injury or death to personnel.	
			NOTE 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.	
22	DURING	HOUSING	Check door panels, hinges, and latches for damaged, loose, or corroded items.	Cannot secure door.
23	DURING	ENGINE ASSEMBLY	Inspect for loose, damaged, or missing hardware.	Any loose, damaged, or missing hardware.
24	DURING	FUEL SYSTEM	Inspect for leaks, damaged, loose, or missing hardware.	Any fuel leaks, damaged, loose, or missing parts.
			NOTE Refer to Lube Order LO 9-6115-641-12.	
25	DURING	LUBRICATION SYSTEM	a. Inspect for leaks, damage, loose or missing parts. b. Inspect oil level. c. Inspect for contamination.	Class III leaks, damage, loose or missing parts. Oil level is low. Oil shows signs of contamination.
26	DURING	COOLING FAN	a. Inspect for obstruction, damage, or looseness. b. Inspect for unusual noise in fan area.	Damaged or loose. Unusual noise from fan area.
27	DURING	OVERFLOW BOTTLE	Inspect for proper mounting, leaks, or missing hardware.	Class III leaks or missing hardware.
28	DURING	GROUND ROD CABLE AND CONNECTIONS	Inspect for damage, corrosion, loose connections, and missing parts.	Damaged, corroded, loose connections, or missing parts.

Table 1. Preventive Maintenance Checks and Service. - Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
			WARNING High voltage is produced when the generator set is in operation. DO NOT touch live voltage connections. Never attempt to connect or disconnect load cables while the generator set is running. Failure to comply with this warning can cause injury or death to personnel.	
29	DURING	CONTROLS AND INDICATORS	Inspect indicators are operating properly.	Indicators are not operating properly.
			WARNING Top housing panels and exhaust system can get very hot. Shut down generator set, and allow system to cool before performing checks, services and maintenance. Failure to comply with this warning can cause severe burns and injury to personnel. **NOTE** If the equipment must be kept in service continuous operation, check only those items that can be checked and serviced without disrupting operations. Complete all checks and services when equipment is shut down.	
30	AFTER	HOUSING	Check door panels, hinges, and latches for damaged, loose, or corroded items.	Cannot secure door.
31	AFTER	IDENTIFICATION PLATES	Check to ensure identification plates are secure.	
32	AFTER	SKID BASE	Inspect skid base for cracks and/or corrosion.	Skid base is cracked or shows signs of structural damage.
			WARNING Fuels used in the generator set are flammable. Do not smoke or use open flames when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set. **WARNING** Diesel fuel is flammable and toxic to eyes, skin, and respiratory tract. Skin and eye protection are required when working in contact with diesel fuel. Avoid repeated or prolonged contact. Provide adequate ventilation. Operators are to wash exposed skin and change chemical soaked clothing promptly if exposed to fuel. Failure to comply with this warning can cause injury or death to personnel.	
33	AFTER	ENGINE ASSEMBLY	Inspect for loose, damaged, or missing hardware.	Loose, damaged, or missing hardware.
34	AFTER	FUEL SYSTEM	Inspect for leaks, damage, loose, or missing hardware.	Any fuel leaks, damage, loose or missing parts.
35	AFTER	FUEL FILTER/ WATER SEPARATOR	a. Inspect for leaks, cracks, damage, proper mounting, loose or missing parts. b. Drain water.	Any fuel leaks. Water not drained.

Table 1. Preventive Maintenance Checks and Service. - Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
			NOTE Refer to Lube Order LO 9-6115-641-12.	
36	AFTER	LUBRICATION SYSTEM	a. Inspect for leaks, damage, loose or missing parts. b. Inspect oil level. c. Inspect for contamination.	Class Ill leaks, damage, loose or missing parts. Oil level is low. Oil shows signs of contamination.
			WARNING Cooling system operates at high temperature and pressure. Contact with high pressure steam and/or liquids can result in burns and scalding. Shut down generator set, and allow system to cool before performing checks, services and maintenance, or wear gloves and additional protective clothing and goggles as required. Failure to comply with this warning can cause injury or death to personnel.	
37	AFTER	RADIATOR	Inspect for leaks, damage, loose or missing parts.	Class III leaks or missing radiator cap.
38	AFTER	HOSES	Inspect for leaks, cracks, or missing parts.	Class III leaks or missing clamps or hoses.
39	AFTER	FAN BELT	Inspect for cracks, fraying, or looseness.	Broken or missing belt.
40	AFTER	CONTROLS AND INDICATORS	Inspect for damaged or missing parts.	Damaged or missing parts.
			WINTERIZATION KIT PMCS	
			NOTE Be sure Generator Set PMCS is completed first in accordance with WP 0010. **NOTE** For general location of the items to be inspected on winterization kit, refer to WP 0010, Figure 2.	
41	BEFORE	HEATER ASSEMBLY	Check for damage. Ensure that heater assembly is mounted securely.	Damage that renders equipment unsafe. Heater not mounted securely.
42	BEFORE	CONTROL UNIT	Check for loose or broken wires or damage.	Wires loose or broken or control unit damaged.
43	BEFORE	FUEL PUMP	Inspect fuel pump for leaks	Any fuel leak.
44	BEFORE	FUEL TANK	Check for sufficient fuel.	Insufficient fuel.
45	BEFORE	FUEL LINES	Inspect winterization kit fuel lines for kinks, leaks, loose or damaged clamps.	Fuel lines damaged; clamps missing.
46	BEFORE	HEATER	Inspect heater for signs of leaks.	Class III coolant or any class fuel leak is detected.

Table 1. Preventive Maintenance Checks and Service. - Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
47	BEFORE	EXHAUST HOSE	Inspect for obstruction, missing or damaged mounting clamp.	Hose obstructed; hose or clamp missing or damaged.
48	BEFORE	AIR INLET HOSE	Inspect for obstruction, missing or damaged mounting clamp.	Inlet hose obstructed.
			WARNING Cooling system operates at high temperatures and pressure. Contact with high pressure steam and/or liquids can result in burns and scalding. Shut down generator set, and allow system to cool before performing checks, services, and maintenance, or wear gloves and additional protective clothing and goggles as required. Failure to comply with this warning can cause injury or death to personnel.	
49	BEFORE	WINTERIZATION KIT COOLANT LINES	a. Inspect for loose, damaged, or missing clamps. b. Inspect for leaks.	Class III leaks or missing clamps or hoses. Class III leaks or missing clamps or hoses.
50	BEFORE	COOLANT PUMP	Inspect for leaks.	Class III leaks or missing clamps or hoses.
51	BEFORE	COOLANT LINES	Check on, around, and under equipment for coolant leaks.	Class III coolant leak is detected.
52	BEFORE	WIRE HARNESS	Inspect wiring for burned or frayed insulation or loose terminals.	Wiring is loose or damaged.
53	BEFORE	HEATER CONTROL AND SWITCH LAMP	a. Check that indicator light is on when heater is operating. b. Check Heater Function Code Plate.	Light blinks showing failure in accordance with Heater Function Code Plate.
54	DURING	HEATER ASSEMBLY	Check for leaks.	
55	DURING	ALL FUEL CONNECTIONS	Check for leaks.	Any class fuel leak detected.
56	DURING	ALL COOLANT CONNECTIONS	Inspect for leaks.	
57	AFTER	HEATER ASSEMBLY	Check for damage.	
58	AFTER	CONTROL UNIT	Loose or broken wires or damage.	
59	AFTER	ALL FUEL CONNECTIONS	Check for leaks.	
60	AFTER	FUELPUMP	Inspect fuel pump for leaks.	
61	AFTER	HEATER	Inspect heater for signs of leaks.	
62	AFTER	EXHAUST HOSE	Inspect for obstruction, missing or damaged mounting clamp.	

Table 1. Preventive Maintenance Checks and Service. - Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
63	AFTER	AIR INLET HOSE	Inspect for obstruction, missing or damaged mounting clamp.	
64	AFTER	ALL COOLANT CONNECTIONS	Check for leaks.	
65	AFTER	WIRE HARNESS	Inspect wiring for burned or frayed insulation or loose terminals.	

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

GENERATOR SET SERVICING AND INSPECTION

INITIAL SETUP:

Tools and Special Tools
None

Personnel Required
1

Equipment Condition
Ready for Operation

Materials/Parts
Coolant, Oil, Air Filters, Fuel

References
Operation Under Usual Conditions (WP 0005, Stopping and Starting Procedures)

INTRODUCTION

This WP 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.

SERVICING

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Battery acid can cause burns to unprotected skin. Wear safety goggles and chemical gloves and avoid acid splash while working on batteries. Failure to comply with this warning can cause injury to personnel.

WARNING

Batteries give off a flammable gas. Do not smoke or use open flame when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

WARNING

High voltage is produced when this generator set is in operation. Ensure engine control and DEAD CRANK switches are set to OFF, negative battery cable is disconnected, and unit is completely shut down and free of any power source before attempting any troubleshooting or maintenance on unit. Failure to comply may cause injury or death to personnel.

INSPECTION OF INSTALLED ITEMS

Inspection of Batteries

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

WARNING

Batteries give off a flammable gas. Do not smoke or use open flame when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

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

END OF TASK

SERVICING

Service of Batteries

1. Shut down generator set. Refer toWP 0005, Stopping Procedure.
2. Open battery access door.

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

WARNING

Batteries give off a flammable gas. Do not smoke or use open flame when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

WARNING

High voltage is produced when this generator set is in operation. Ensure engine control and DEAD CRANK switches are set to OFF, negative battery cable is disconnected, and unit is completely shut down and free of any power source before attempting any troubleshooting or maintenance on unit. Failure to comply may cause injury or death to personnel.

3. Remove battery caps.

NOTE

Electrolyte level should be at bottom of each cap cylinder.

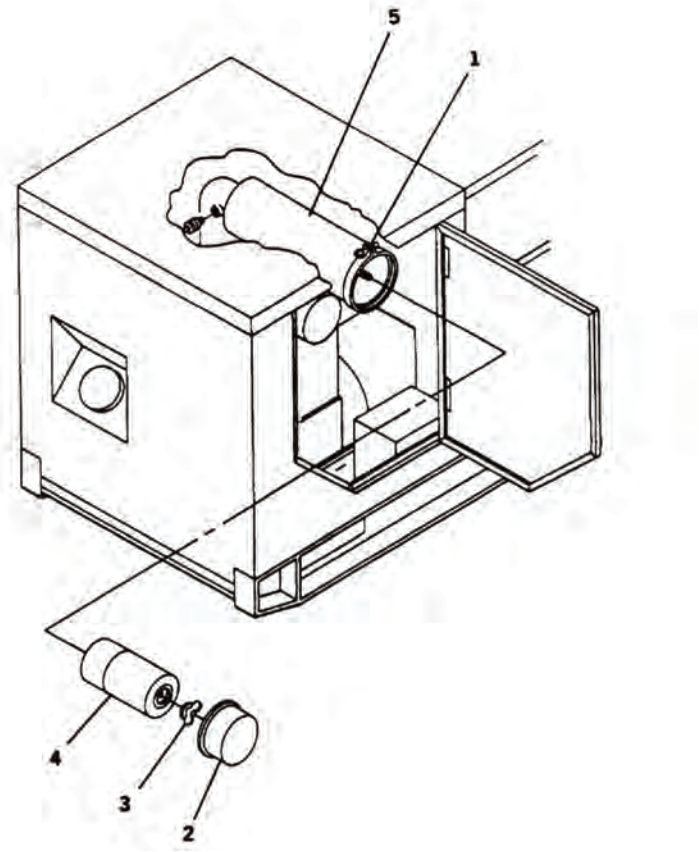
4. Add distilled water to each battery cell as required.
5. Replace battery caps.
6. Close battery access door.
7. If necessary contact next higher maintenance level to clean or replace batteries or battery terminals.

END OF TASK

INSPECTION OF INSTALLED ITEMS

Inspection of Air Cleaner Assembly

1. Shut down generator set. Refer toWP 0005, Stopping Procedure.
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 left side engine access door.



LEGEND

1. Clamp, Loop
2. Cup Assembly
3. Nut, Plain, Wing
4. Filter Element, Intake
5. Canister, Air

Figure 1. Air Cleaner Element Replacement.

END OF TASK

SERVICING

Service of Air Cleaner Assembly

1. Shut down generator set. Refer toWP 0005, Stopping Procedure.
2. Open left side engine access door.
3. Loosen Loop Clamp (Figure 1, Item 1) remove Cup Assembly (Figure 1, Item 2), on Air Canister (Figure 1, Item 5).
4. Remove wing nut (3) and air cleaner element (4). If fouled, discard air cleaner element.
5. Inspect inside of Air Canister (Figure 1, Item 5) for debris. Wipe Air Canister interior with clean lint-free cloth.

6. Install air cleaner element (4), wing nut (3), Cup Assembly (Figure 1, Item 2) and tighten Loop Clamp (Figure 1, Item 1).
7. Close left side engine access door.

END OF TASK

INSPECTION OF INSTALLED ITEMS

Inspection of Cooling System

WARNING

All metal jewelry can conduct electricity and become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply with this warning can cause injury or death to personnel.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply with this warning can cause injury or death to personnel.

1. Shut down generator set. Refer toWP 0005, Stopping Procedure.
2. Open both engine access doors.

WARNING

Cooling system operates at high temperature and pressure. Contact with high pressure steam and/or liquids can result in burns and scalding. Shut down generator set, and allow system to cool before performing checks, services and maintenance, or wear gloves and additional protective clothing and goggles as required. Failure to comply with this warning can cause injury or death to personnel.

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 both engine access doors.

END OF TASK

SERVICING

Service of Cooling System

WARNING

Cooling system operates at high temperature and pressure. Contact with high pressure steam and/or liquids can result in burns and scalding. Shut down generator set, and allow system to cool before performing checks, services and maintenance, or wear gloves and additional protective clothing and goggles as required. Failure to comply with this warning can cause injury or death to personnel.

1. Shut down generator set. Refer toWP 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 withTable 1.
5. Install coolant recovery (overflow) bottle cap. Close right side engine access door.

Table 1. Coolant.

COOLANT		
AMBIENT TEMPERATURE	RADIATOR	RATIO
+40 °F TO +120 °F (+4 °C TO +49 °C)	Water: MIL-A-53009 (1) INHIBITOR, CORROSION	35:1
-25 °F TO +120 °F (-32 °C TO +49 °C)	Water: A-A-52624-X-A ANTIFREEZE (100%)	1:1
-50 °F TO +120 °F (-46 °C TO +49 °C)	A-A-52624-X-B ANTIFREEZE (60/40)	NA

END OF TASK

INSPECTION OF INSTALLED ITEMS

Inspection of Fuel Tank

WARNING

Fuels used in the generator set are flammable. Do not smoke or use open flames when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

1. Place MASTER SWITCH in PRIME & RUN or PRIME & RUN AUX FUEL position. Refer toWP 0005, Starting Procedure.
2. Check fuel level by observing FUEL LEVEL indicator.

3. Remove fuel cap and ensure strainer is free of dirt and other foreign material.

END OF TASK

SERVICING

Service of Fuel Tank

WARNING

Fuels used in the generator set are flammable. Do not smoke or use open flames when performing maintenance. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

WARNING

Fuels used in the generator set are flammable. When filling the fuel tank, maintain metal-to-metal contact between filler nozzle and fuel tank opening to eliminate static electrical discharge. Failure to comply with this warning can cause injury or death to personnel, and damage to the generator set.

CAUTION

Use only specific diesel fuel to service the fuel tank, refer to Table 2 . Otherwise, equipment damage could result, if improper fuel is used.

Table 2. Diesel Fuel.

FUEL	
AMBIENT TEMPERATURE	DIESEL FUEL
+20 °F TO +120 °F (-7 °C TO +49 °C)	A-A-52557, GRADE 2-D MIL-DTL-83133, JP-8
-25 °F TO +20 °F (-32 °C TO +7 °C)	A-A-52557, GRADE 1-D MIL-DTL-5624, JP-5

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

NOTE

Fuel tank holds 5 gallons (18.9 liters).

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

END OF TASK

INSPECTION OF INSTALLED ITEMS

Inspection of Fuel Filter/Water Separator

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

END OF TASK

SERVICING

Service of Fuel Filter/Water Separator

1. Shut down generator set. Refer toWP 0005, Stopping Procedure.
2. Rotate MASTER SWITCH to PRIME & RUN.
3. Open left side engine access door.
4. Open fuel drain cock (Figure 2, Item 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.

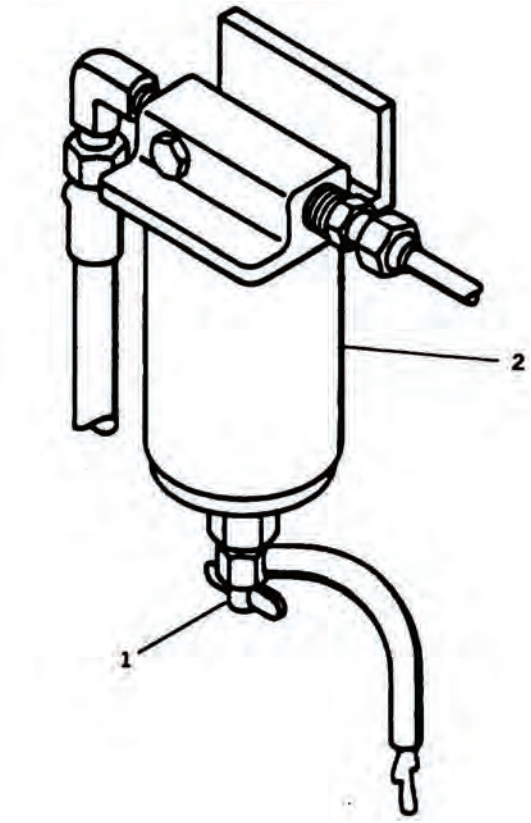


Figure 2. Draining Fuel Filter/Water Separator.

END OF TASK

INSPECTION OF INSTALLED ITEMS

Inspection of Lubrication System

1. Shut down generator set. Refer toWP 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 9-6115-641-12.
6. Close both engine access doors.

END OF TASK

SERVICING

Service of Lubrication System

1. Shut down generator set. Refer toWP 0005, Stopping Procedure.
2. Open left engine access door.
3. Remove oil filler cap.
4. Add oil to engine crank case. Refer to LO 9-6115-641-12.
5. Install oil filler cap.
6. Close left engine access door.

END OF TASK

END OF WORK PACKAGE

CHAPTER 5

SUPPORTING INFORMATION

FOR

5 kW GENERATOR SET (60 Hz AND 400 Hz), SKID MOUNTED, TACTICAL QUIET

CHAPTER 5

SUPPORTING INFORMATION

WORK PACKAGE INDEX

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

REFERENCES

SCOPE

This work package lists all forms, regulations, pamphlets, specifications, standards, technical manuals, technical bulletins, lubrication orders, field manuals, and miscellaneous publications referenced in this TM.

FORMS

DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Form 2407	Maintenance Request
DA Form 2408	Equipment Log Assembly (Records)
DA Form 2408-9	Equipment Control Record
DA Form 5988-E	Equipment Inspection and Maintenance Worksheet
DD Form 314	Preventive Maintenance Schedule and Record
SF Form 364	Report of Discrepancy
SF Form 368	Product Quality Deficiency Report

ARMY REGULATIONS

AR 310-25	Dictionary of United States Army Terms

DEPARTMENT OF THE ARMY PAMPHLETS

DA PAM 750-8	The Army Maintenance Management System (TAMMS)

MILITARY SPECIFICATIONS

MIL-A-53009(1)	Additive, Antifreeze Extender, Liquid Cooling Systems
MIL-DTL-5624	Turbine Fuel, Aviation, Grades JP-4, JP-5, and JP-5/JP-8 ST
MIL-DTL-83133	Turbine Fuels, Aviation, Kerosene Types, NATO F-34 (JP-8), NATO F-35 and JP-8+100

COMMERCIAL ITEM DESCRIPTIONS

A-A-52557	Fuel Oil, Diesel; for Posts, Camps, and Stations
A-A-52624	Antifreeze, Multi Engine Type
ASME-Y14.38M	Abbreviations for Use on Drawings, and in Specifications, Standards and Technical Documents

MILITARY STANDARDS

None

TECHNICAL MANUALS

TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Command)

TECHNICAL BULLETINS

TB 43-0125	Installation of Communications Electronic Equipment: Hookup of Electrical Cables to Mobile Generator Sets on Fielded Equipment to Meet Electrical Safety Standards
TB 9-6115-641-24	Generator Set, Tactical Quiet 5kW, 60 Hz, MEP-802A and 400 Hz MEP-812A

LUBE ORDERS

LO 9-6115-641-12	Generator Set, Skid Mounted, Tactical Quiet 5 kW, 60 and 400 Hz MEP-802A, Tactical Quiet, 60Hz, NSN 6115-01-274-7387 MEP-812A, Tactical Quiet, 400Hz, NSN 6115-01-274-7391

FIELD MANUALS

FM 1-02	Operational Terms and Graphics
FM 20–31	Electric Power Generation in the Field
FM 3-11	Multiservice Tactics, Techniques and Procedures for Nuclear, Biological and Chemical Defense Operations
FM 3-11.3	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Avoidance
FM 3-11.4	Multiservice Tactics, Techniques and Procedures for Nuclear, Biological and Chemical (NBC) Protection
FM 3-11.5	Multiservice Tactics, Techniques and Procedures for Chemical, Biological, Radiological and Nuclear Contamination
FM 31-70	Basic Cold Weather Manual
FM 31-71	Northern Operations
FM 3-97.6	Mountain Operations
FM 4-25.11	First Aid
FM 5-424	Theater of Operations, Electrical Systems
FM 7-1	Battle Focused Training
FM 9-207	Operation and Maintenance of Ordnance Materiel in Cold Weather (0° to 65°)

MISCELLANEOUS PUBLICATIONS

AFR 66-1	Air Force Maintenance Forms and Records
AR 700-138	Army Logistics Readiness and Sustainability
AR 735-11-2	Reporting of Supply Discrepancies
AR 750-1	Army Materiel Maintenance Policy and Retail Maintenance Operations
CTA 50-970	Expendable Items (Except Medical Class V, Repair Parts, and Heraldic Items)
CTA 8-100	Army Medical Department Expendable/Durable Items
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

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

INTRODUCTION

Scope

This work package lists COEI and BII for the 5 kW 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 (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (3) Description, Part Number/(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 part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (4) Usable On Code. When applicable, 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 (U/I) indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2).

Column (6) Qty Rqr. Indicates the quantity required.

COMPONENTS OF END ITEM

Not applicable.

Table 1. Components of End Item List.

(1) Illus Number	(2) National Stock Number (NSN)	(3) Description, Part Number / (CAGEC)	(4) Usable On Code	(5) U/I	(6) Qty Rqr
		Not applicable.			NA

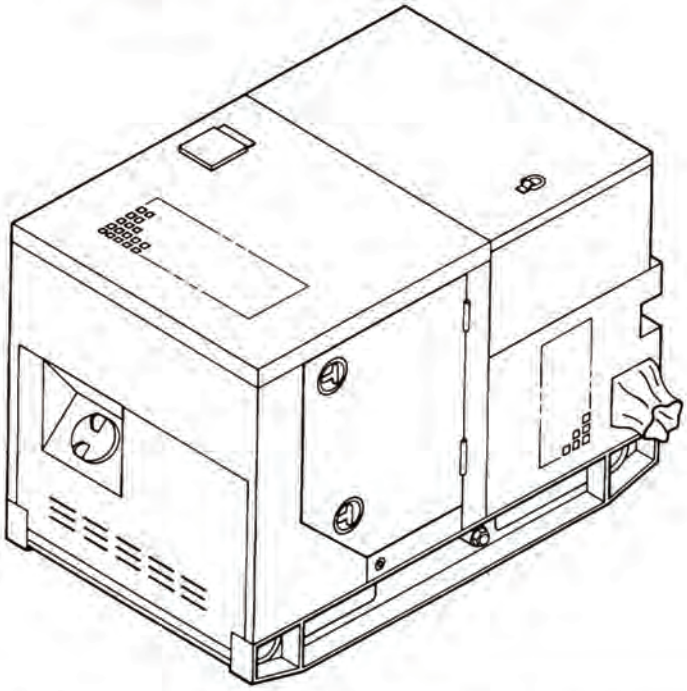
*ARMY TM 9-6115-641-10
AIR FORCE TO 35C2-3-456-11

TECHNICAL MANUAL

OPERATOR'S MANUAL
FOR

GENERATOR SET, SKID MOUNTED, TACTICAL QUIET,
5 kW, 60 Hz, MEP-802A
(NSN: 6115-01-274-7387) (EIC: VG2)

GENERATOR SET, SKID MOUNTED, TACTICAL QUIET,
5 kW, 400 Hz, MEP-812A
(NSN: 6115-01-274-7391) (EIC: VN2)



*SUPERSEDURE NOTICE - TM 9-6115-641-10 supersedes TM 9-6115-641-10 dated 30 December 1992, including all changes.

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

HEADQUARTERS, DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
15 OCTOBER 2009

Figure 1. Technical Manual TM 9-6115-641-10.

LUBRICATION ORDER
1 JUNE 2009

ARMY LO 9-6115-641-12
AIR FORCE TO 35C2-3-456-11-1
MARINE CORPS LO 9-6115-641-12
(Superseding LO 9-6115-641-12, 30 October 1996)

GENERATOR SET, SKID MOUNTED TACTICAL QUIET 5KW

60 Hz NSN: 6115-01-274-7387
PART NUMBER: MEP-802A
CAGEC: 30554
EIC: VG2

References: ARMY TM 9-6115-641-10, AIR FORCE TO 35C2-3-456-11

REPORTING OF ERRORS

You can help improve this LO. 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 Life Cycle Management Command (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 732-532-1556, DSN 992-1556. Our e-mail address is 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 NAVMC 10772. It may also be submitted by electronic mail to 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.

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

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

Figure 2. Lubrication Order LO 9-6115-641-12.

Table 2. Basic Issue Items List.

(1) Illus Number	(2) National Stock Number (NSN)	(3) Description, Part Number / (CAGEC)	(4) Usable On Code	(5) U/I	(6) Qty Rqr
1		TECHNICAL MANUAL, TM 9-6115-641-10		EA	1
2		LUBRICATION ORDER, L0 9-6115-641-12		EA	1
2	5975-00-878-3791	GROUNDING ROD		EA	1
2	4720-00-021-3201	AUXILIARY FUEL LINES		EA	1

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

ADDITIONAL AUTHORIZATION LIST (AAL)

ADDITIONAL AUTHORIZATION LIST (AAL) 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 Columns 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.

EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name. If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description. If item required differs for different models of this equipment, the models are shown under the "Usable on Code" heading in the description column.

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
5342-00-066-1235	ADAPTER, CONTAINER 13211E7541 (97403)		EA	1
7240-01-337-5269	FUEL CAN		EA	1
4210-01-361-6921	EXTINGUISHER, FIRE, CARBON DIOXIDE, 5 LB 322 (54905)		EA	1
5120-01-013-1676	HAMMER, SLIDE, GROUND 0116-1810 (93742)		EA	1

Table 1. Additional Authorization List. - Continued

(1) National Stock Number (NSN)	(2) Description, Part Number / (CAGEC)	(3) Usable On Code	(4) U/I	(5) Qty Recm
7240-00-177-6154	FLEXIBLE SPOUT MIL-S-1285 (81349)		EA	1
5975–00–878–3791/ 5975–00–952–1791	ROD, GROUND A-A055804-III-B (58536)		EA	1

END OF WORK PACKAGE

OPERATOR MAINTENANCE

5 KW GENERATOR SET (60 HZ AND 400 HZ), SKID MOUNTED, TACTICAL QUIET

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 (F = Maintainer or ASB).

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
6	F	8040-00-664-4318	Adhesive 9995460 (18876)	EA
8	F	6850-01-464-9125	Antifreeze A-A-52624 (58536)	GL
1	F	6850-01-331-3349	Cleaning compound solvent P-D-680 (81348)	EA
2	F	6850-01-331-3350	Cleaning compound solvent P-D-680 (81348)	EA
7	F	7920-01-338-3329	Cloth Cleaning	EA
3	F	9150-01-197-7690	Grease Automotive/artillery GAA MIL-PRF-10924 (81349)	EA

Table 1. Expendable and Durable Items List. - Continued

(1) Item No.	(2) Level	(3) National Stock Number (NSN)	(4) Item Name, Description, Part Number / (CAGEC)	(5) U/I
4	F	9150-00-189-6727	Oil Lubrication OE/HDO-10 MIL-PRF-2104 (81349)	EA
5	F		Solder Sn60Pb40 (81348)	EA
9	F	6810-00-107-1510	Water Distilled	GL

END OF WORK PACKAGE

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RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS 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

TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*
Commander, US Army CECOM LCMC ATTN: AMSEL-LC-LEO-E-CM Fort Monmouth, NJ 07703-5006	Jane Q. Doe, SFC 1234 Any Street Anytown, AL 34565

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 11-1234-567-14	16 Sep 2001	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 col[illegible]hould identify a different WP number.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Jane Q. Doe, SFC	123-4567	

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED.

TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	**DATE**

PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

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

PART III - REMARKS *(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.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS 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
TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

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

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED.

TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	**DATE**

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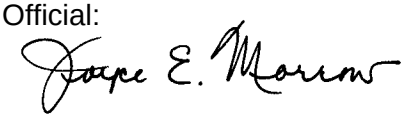
TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

By Order of the Secretary of the Army:

Official:



JOYCE E. MORROW
Administrative Assistant to the Secretary of the Army
0930301

GEORGE W. CASEY, JR
General, United States Army
Chief of Staff

By Order of the Secretary of the Air Force:

Official:

DONALD J. HOFFMAN
General, United States Air Force
Commander, AFMC

NORTON A. SWARTZ
General, United States Air Force
Chief of Staff

Army Distribution:

To be distributed in accordance with the initial distribution number (IDN) 255241 requirements for TM 9-6115-641-10.

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

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

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

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

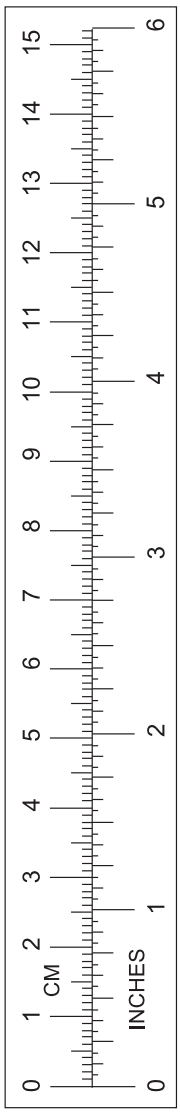
LIQUID MEASURE
1 Millimeter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Millimeters = 32.82 Fluid Ounces

TEMPERATURE
5/9 (°F - 32) = °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 °C + 32 = °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	DIVIDE 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



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