
MAINTENANCE COURSE

FOR

3KW TACTICAL QUIET GENERATOR SET
MEP 831A (60 HZ) AND MEP 832A (400 HZ)

TRAINEE GUIDE

20 NOVEMBER 2001

PUBLISHED UNDER THE AUTHORITY OF THE DEPARTMENT OF THE ARMY

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

TRAINEE NAME PAGE

Trainee Guide

Name _____

Class No. _____

HAZARD AWARENESS NOTICE

All personnel involved with operation of the generator set must be thoroughly familiar with the equipment safety precautions contained in the Operator, Unit, Direct Support, and General Support Maintenance Manual for the Tactical Quiet Generator Set.

Pay extreme close attention to specific cautions and warnings throughout the technical manual during training exercises to prevent injury to personnel and damage to the equipment.

HIGH VOLTAGE is used in the operation of this equipment. DEATH or severe injury may result if personnel fail to observe safety precautions.

The generator set produces high voltages and emits deadly carbon monoxide gases when in operation. Extreme caution must be exercised when working with or near this equipment.

Servicing the generator set should not be accomplished alone. Unless under direct supervision of qualified person, no person shall operate or maintain equipment for which they are not qualified.

Servicing the generator set must be accomplished in well-ventilated spaces only ensuring that equipment is grounded. Under no circumstances will a person operate or service this equipment unless the spaces are ventilated and the equipment suitably grounded. Equipment must be grounded in accordance with procedures contained in Field Manual 20-31. Failure to adhere to this may cause death, personal injury, and equipment damage.

Report all hazards. if at any time you detect a hazard, it is your responsibility to report the hazard to the next person in your chain of command. This person should ensure that the hazard will be investigated, publicized, or corrected, as required.

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

TABLE OF CONTENTS

<u>Contents</u>	<u>Page</u>
FRONT MATTER	
Cover.....	i
Trainee Name Page & Hazard Awareness Notice.....	ii
Table of Contents.....	iii
How to Use Your Guide.....	v
1. INTRODUCTION, TECHNICAL DOCUMENTATION, GENERATOR SET DESCRIPTION, AND PRINCIPLES OF OPERATION	
1-1 Course Introduction and Technical Documentation	
Outline Sheet 1-1-1	1
Diagram Sheet 1-1-2	3
1-2 Generator Set Description and Principles of Operation	
Outline Sheet 1-2-1	4
Diagram Sheet 1-2-1	6
Diagram Sheet 1-2-2	7
Diagram Sheet 1-2-3	8
Diagram Sheet 1-2-4	9
Diagram Sheet 1-2-5.....	10
Diagram Sheet 1-2-6.....	11
Diagram Sheet 1-2-7.....	12
Diagram Sheet 1-2-8.....	13
Diagram Sheet 1-2-9.....	14
Diagram Sheet 1-2-10.....	15
2. PMCS AND OPERATION	
2-1 PMCS	
Outline Sheet 2-1-1	16
2-2 Operation	
Outline Sheet 2-2-1	17
Job Sheet 2-2-1.....	18

TABLE OF CONTENTS

<u>Contents</u>	<u>Page</u>
3. TROUBLESHOOTING	

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

3-1	Generator Set Troubleshooting Procedures	
	Outline Sheet 3-1-1	22
	Job Sheet 3-1-1.....	23
3-2	Engine Troubleshooting Procedures	
	Outline Sheet 3-2-1	25
	Job Sheet 3-2-1.....	26
4.	DIESEL ENGINE MAINTENANCE	
4-1	Fuel System	
	Outline Sheet 4-1-1	28
4-2	Lubrication System	
	Outline Sheet 4-2-1	29
4-3	Air Intake and Exhaust System	
	Outline Sheet 4-3-1	30
5.	GENERATOR SET MAINTENANCE	
5-1	Fuel System	
	Outline Sheet 5-1-1	31
5-2	Controls and Indicators	
	Outline Sheet 5-2-1	32
5-3	Enclosure Assembly	
	Outline Sheet 5-3-1	34

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

SAFETY PRECAUTIONS

During maintenance, ensure that all safety precautions are understood and followed. If a warning or caution is not understood, stop and ask the instructor for clarification. General hazards are listed in the front matter of this document under “Hazard Awareness Notice”.

SECURITY

The contents of this Trainee Guide are unclassified.

In the event that classified information is added to this Trainee Guide as a result of your notes, the Trainee Guide shall be marked and handled in accordance with the regulations of the latest edition of the Department of the Army Supplement to the DoD Information Security Program.

HOW TO USE YOUR TRAINEE GUIDE

TRAINEE GUIDE

This Trainee Guide is intended for your use in maintaining the 3KW Tactical Quiet Generator Set. Feel free to take notes on the pages in this Trainee Guide. Before returning to your command, it is recommended that you retain this Trainee Guide for further reference.

OTHER PUBLICATIONS

1. TM 9-6115-639-13 Operation, Unit and Direct Support Maintenance Manual, 3KW Tactical Quiet Generator Set
2. TM 9-2815-257-24 Unit, Direct Support, and General Support Maintenance Manual, Diesel Engine
3. TM 9-6115-639-24P Repair Parts and Special Tools List (RPSTL), Generator Set
4. TM 9-2815-257-24P Repair Parts and Special Tools List (RPSTL), Diesel Engine

PRESENTATION OF COURSE MATERIAL

Course content includes both classroom and practical application training. The course contains Sections and Topics. Each Section contains information on maintenance, and is presented in a logical sequence.

WRITTEN AND PERFORMANCE TESTS

The written test will be in the form of a multiple choice exam and will cover topics presented in the course.

**MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG
OUTLINE SHEET 1-1-1**

COURSE INTRODUCTION

1. Introduction
 - a. This topic provides an introduction to the maintenance course and describes how the course will be presented. You should take notes as desired. Retain this information for future use.
2. Outline
 - a. Course Title
 - b. Course Content
 - (1) Reference Documentation
 - (2) Trainee Guide
 - (3) Testing
 - c. Class Schedule
 - d. Course Objective

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

TECHNICAL DOCUMENTATION

1. Introduction
 - a. This topic provides an introduction to the generator set and diesel engine technical manuals. It provides information on the format, content, and use of the manuals to better enable you to operate and maintain the unit.

2. Topic Learning Objectives

3. Technical Documentation
 - a. Operator, Unit and Direct Support Maintenance Manual, Generator Set, TM 9-6115-639-13

 - b. Unit, Direct Support, and General Support Maintenance Manual, Diesel Engine, TM 9-2815-257-24

 - c. Repair Parts and Special Tools List (RPSTL), Generator Set

 - d. Repair Parts and Special Tools List (RPSTL), Diesel Engine

 - e. Organization

 - f. Content

 - g. Use

 - h. Safety

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

DIAGRAM SHEET 1-1-2

COURSE OBJECTIVE

UPON SUCCESSFUL COMPLETION OF THIS COURSE, THE TRAINEE WILL HAVE SUFFICIENT KNOWLEDGE TO OPERATE AND PERFORM UNIT AND DIRECT SUPPORT MAINTENANCE ON THE 3KW TACTICAL QUIET GENERATOR SET AND DIESEL ENGINE.

THE TRAINEE WILL BE ABLE TO:

IDENTIFY AND DESCRIBE GENERATOR SET SYSTEM AND COMPONENTS

DESCRIBE THE FUNCTION AND LOCATION OF ELECTRIC, FUEL, OIL, AND COOLING SYSTEM COMPONENTS

PERFORM PMCS PROCEDURES ON THE GENERATOR SET

PERFORM STARTUP AND SHUTDOWN OF THE GENERATOR SET IN USUAL AND UNUSUAL CONDITIONS

PERFORM UNIT AND DIRECT SUPPORT LEVEL TROUBLESHOOTING OF THE GENERATOR SET AND DIESEL ENGINE

PERFORM CORRECTIVE MAINTENANCE OF THE GENERATOR SET AND DIESEL ENGINE AT THE UNIT AND DIRECT SUPPORT LEVELS

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 1-2-1

GENERATOR SET DESCRIPTION AND PRINCIPLES OF OPERATION

1. Introduction
 - a. This topic provides a description of the generator set and describes the principles of operation for the generator set, its major systems, and the generator set diesel engine.
2. Topic Learning Objectives
3. Generator Set Description
 - a. Size
 - b. Features
 - c. Basic Components
 - (1) Skid Base
 - (2) Enclosure
 - (3) Engine
 - (4) Permanent Magnet Generator
 - (5) Control Box Assembly
 - (6) Output / Load Connections

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 1-2-1 (continued)

GENERATOR SET DESCRIPTION AND PRINCIPLES OF OPERATION

4. Major Systems and Principles of Operation
 - a. Generator Set Starting System
 - b. Fuel System
 - c. Generator Set / Engine Cooling Systems
 - d. Engine Lubrication System
 - e. Air Intake and Exhaust System
 - f. Governor Control System
 - g. AC Electrical System
 - h. DC Electrical System

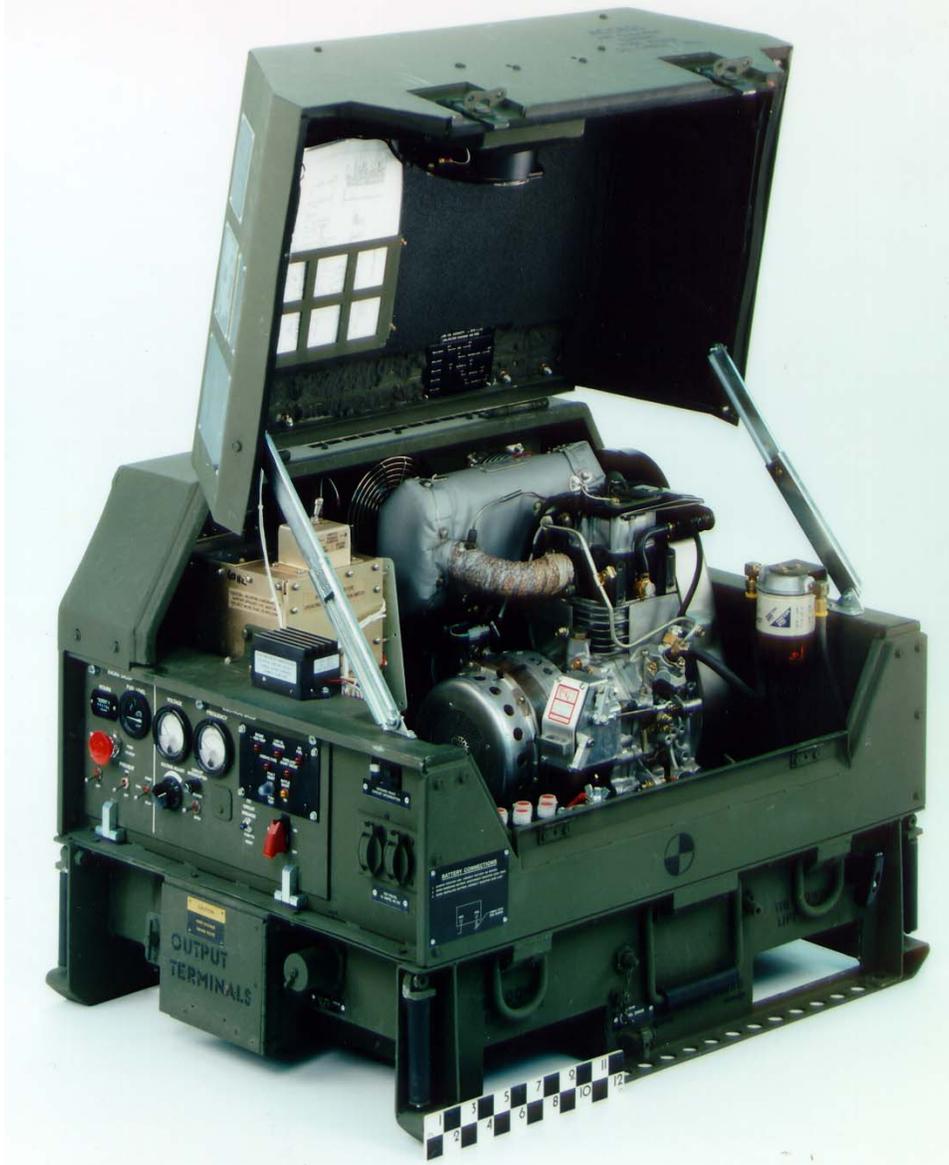
GENERATOR SET DESCRIPTION



Size

Features

BASIC COMPONENTS



Skid Base

Enclosure

Engine

Permanent Magnet Generator

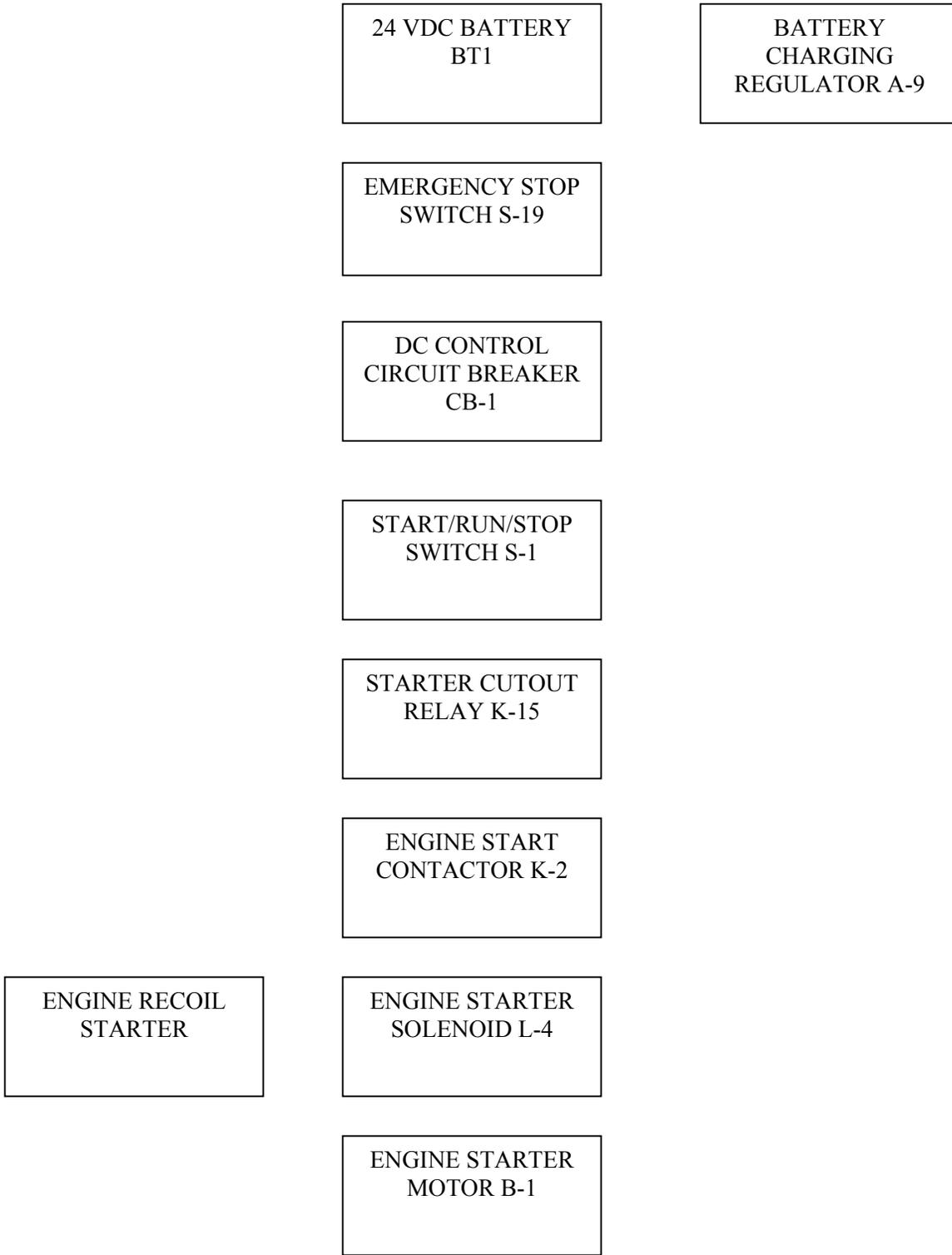
Control Box Assembly

Output Terminals

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

1-2-3

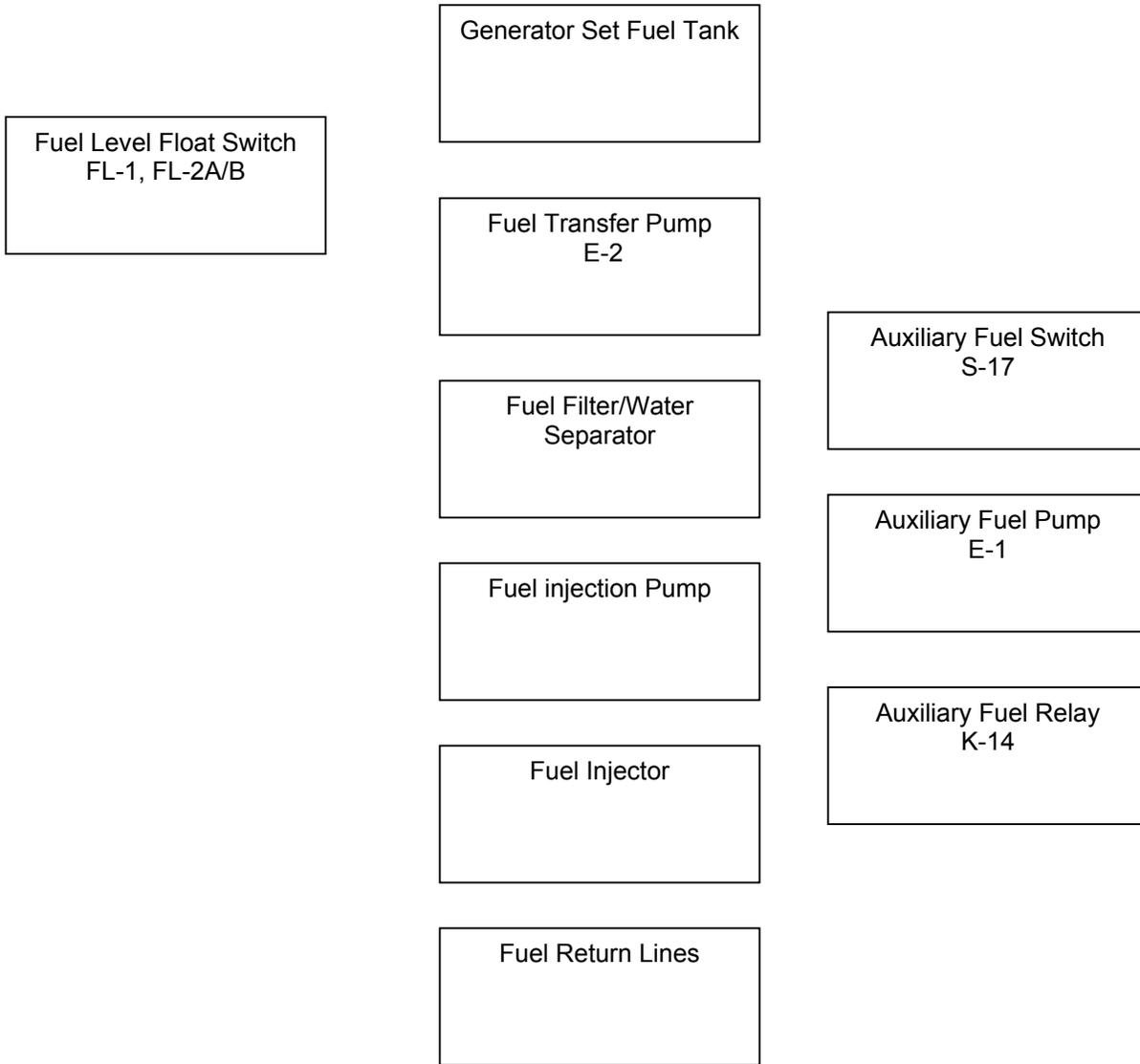
GENERATOR SET STARTING SYSTEM



MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

1-2-4

FUEL SYSTEM



1-2-5

GENERATOR SET COOLING SYSTEM

AC Cooling Fans 60 Hz
B-2/3

DC Cooling Fans 400 Hz
B-2/3

Engine Flywheel Fan

1-2-6

ENGINE LUBRICATION SYSTEM

Crankshaft Driven Oil Pump

Crankcase Oil Sump

Oil Filter System

Low Oil Pressure Switch
OP

High Temperature Switch
HT

1-2-7

AIR INTAKE AND EXHAUST SYSTEM

Air Cleaner Assembly

Exhaust Tube

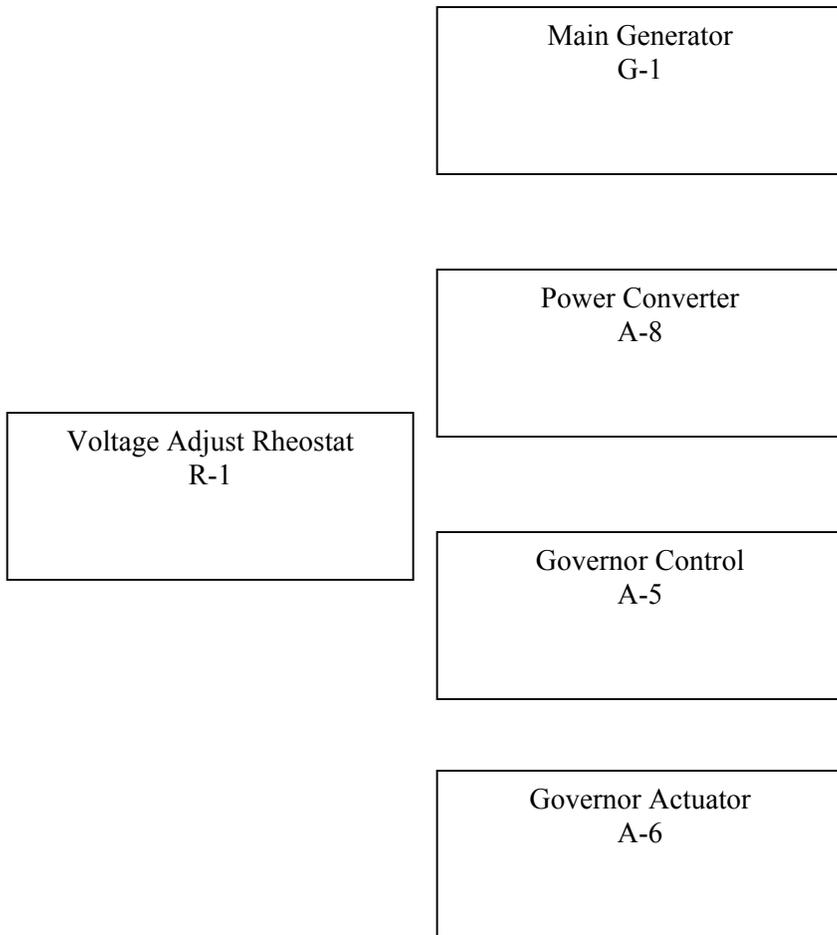
Engine Pre-Heat System
Switch S-18

Engine Pre-Heat Contactor
K-13

Air Heaters H-1/2

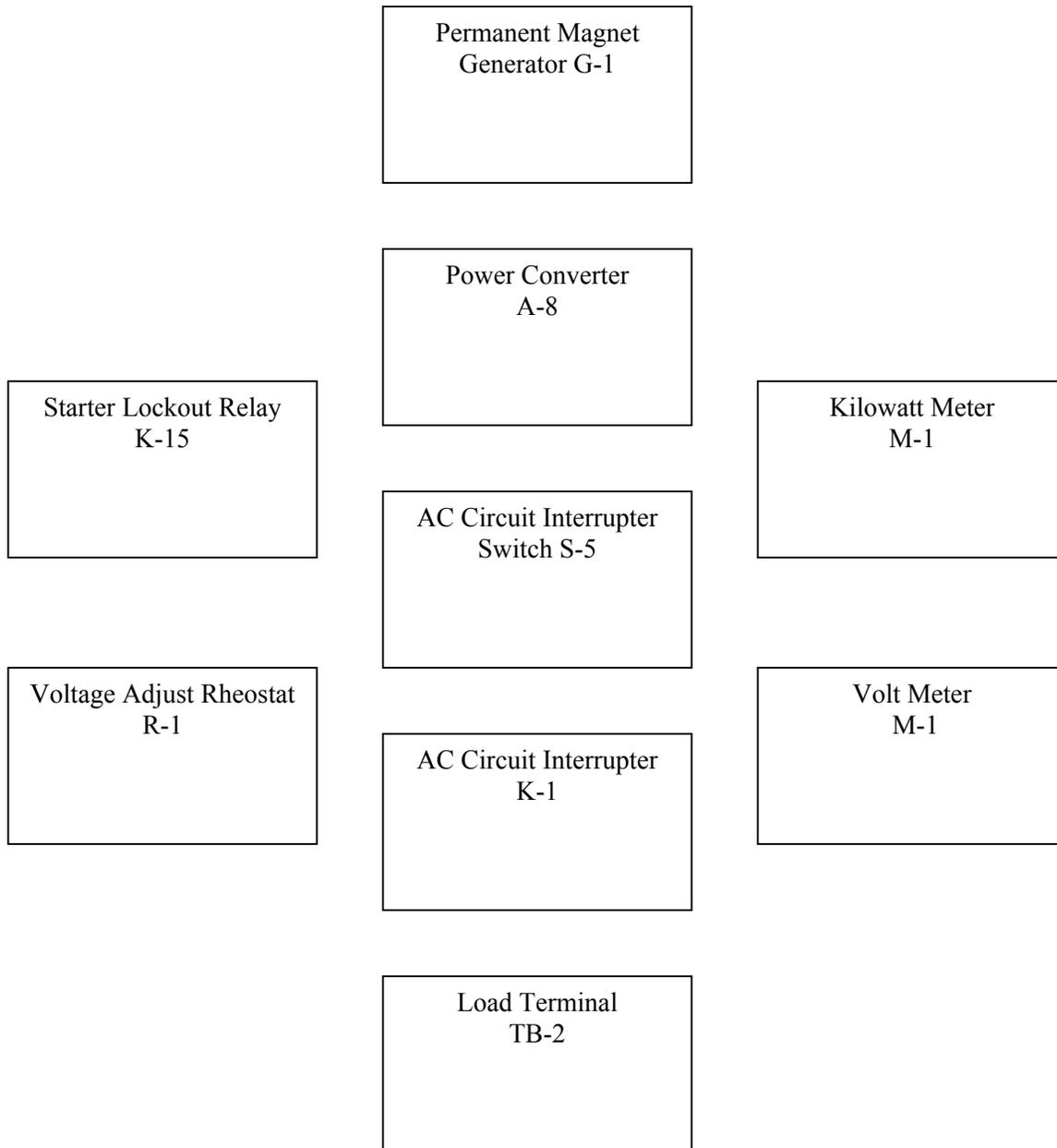
1-2-8

GOVERNOR CONTROL SYSTEM



1-2-9

AC ELECTRICAL SYSTEM



MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

1-2-10

DC ELECTRICAL SYSTEM

24 VDC Battery
BT1

Battery Charging
Regulator
A-9

Start/Run/Stop Switch
S-1

Protective Devices:

High Temperature Switch HT

Low Oil Pressure switch OP

Fault Lockout Relay K-12

Over Voltage Relay K-3

Short Circuit Relay K-6

Overload Short Circuit Relay K-8

Ground Fault Circuit Interrupter CB3

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 2-1-1

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

1. Introduction
 - a. This topic provides information on the preventive maintenance checks and services required at the unit maintenance level to ensure that the generator set and diesel engine remain in proper operating order.

2. Topic Learning Objectives

3. Preventive Maintenance Checks and Services
 - a. Purpose

 - b. PMCS Table, Generator Set

 - c. PMCS Table, Diesel Engine

 - d. PMCS Intervals and Requirements

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 2-2-1

OPERATION

1. Introduction
 - a. This topic will describe the procedures required to setup and operate the generator set under both usual (normal) and unusual (emergency) operating conditions.
2. Topic Learning Objectives
3. Operation Sequence
 - a. Preparation for use
 - b. Initial adjustments and checks
 - c. Startup
 - d. Normal operation
 - e. Unusual (emergency) operation
4. Shutdown
5. Physical Operating Procedures

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

JOB SHEET 2-2-1

OPERATION OF THE GENERATOR SET

1. Introduction
 - a. This job sheet will help you become proficient in setting up and operating the generator set using the technical manual.

2. Equipment
 - a. 3KW Tactical Quiet Generator Set

3. Reference Materials
 - a. TM 9-6115-639-13

4. Job Steps

STEP 1 - ASSEMBLY AND PREPARATION FOR USE

- a. What paragraph in the technical manual address preparation for use:

- b. A ground cable must be connected to which terminal on the generator set. Where is it located:

- c. Tell which color battery terminal is connected to the positive battery post:

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

JOB SHEET 2-2-1 (continued)

OPERATION OF THE GENERATOR SET

STEP 2 - PREVENTIVE MAINTENANCE CHECKS AND SERVICES

- a. What paragraph in the technical manual addresses operator PMCS procedures:

- b. Prior to operating the generator set, which PMCS tasks must be performed:

- c. Perform the PMCS procedures identified above and record the results:

STEP 3 - OPERATION

- a. What paragraph in the technical manual addresses operation under usual conditions:

- b. At what temperature should the generator set preheat system be activated:

- c. How long must you wait between attempted starts of the unit to prevent damage to the starter:

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

JOB SHEET 2-2-1 (continued)

OPERATION OF THE GENERATOR SET

- d. When the generator set is operating, which PMCS tasks must be performed:

- e. Perform operating procedures and record the results:

- f. Perform PMCS intervals identified in step d and record the results:

STEP 4 - SHUTDOWN

- a. What paragraph in the technical manual addresses normal shutdown procedures:

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

JOB SHEET 2-2-1 (continued)

OPERATION OF THE GENERATOR SET

- b. Perform shutdown procedures and record the results:

- c. Having shutdown the generator set, which PMCS tasks must be performed:

STEP 5 - Return any materials used to their proper location and return generator set to normal condition.

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 3-1-1

GENERATOR SET TROUBLESHOOTING PROCEDURES

1. Introduction
 - a. This topic will describe the unit and direct support level troubleshooting procedures required to fault isolate the generator set and return it to service.
2. Topic Learning Objectives
3. Troubleshooting Procedures
 - a. Unit maintenance level
 - b. Direct support maintenance level
4. Troubleshooting the Generator Set

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

JOB SHEET 3-1-1

GENERATOR SET TROUBLESHOOTING PROCEDURES

1. Introduction
 - a. This job sheet will aid you in becoming proficient in performing unit level troubleshooting and fault isolation procedures using the technical manual.

2. Equipment
 - a. 3KW Tactical Quiet Generator Set

3. Reference Materials
 - a. TM 9-6115-639-13

4. Job Steps

When attempting to start the generator set, you discover that the engine cranks but will not start. Perform the following steps to identify and remedy the fault.

STEP 1 - LOCATE THE PROPER TROUBLESHOOTING PROCEDURES

- a. What paragraph in the technical manual contains unit level troubleshooting information:

- b. Which malfunction item number in Table 4-3 covers the noted trouble:

- c. Conduct the inspections required to fault isolate the trouble and record the results:

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

JOB SHEET 3-1-1 (continued)

GENERATOR SET TROUBLESHOOTING PROCEDURES

STEP 2 - TROUBLESHOOT THE GENERATOR SET

- a. Based on your analysis, troubleshoot and remedy the fault and record the results:

STEP 3 - Return the generator set to normal condition.

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 3-2-1

ENGINE TROUBLESHOOTING PROCEDURES

1. Introduction
 - a. This topic will describe the unit and direct support level troubleshooting procedures required to fault isolate the diesel engine and return it to service.
2. Topic Learning Objectives
3. Troubleshooting Procedures
 - a. Unit maintenance level
 - b. Direct support maintenance level
4. Troubleshooting the Engine

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

JOB SHEET 3-2-1

ENGINE TROUBLESHOOTING PROCEDURES

1. Introduction

- a. This job sheet will aid you in becoming proficient in performing unit level troubleshooting and fault isolation procedures using the technical manual.

2. Equipment

- a. 3KW Tactical Quiet Generator Set

3. Reference Materials

- a. TM 9-2815-257-24

4. Job Steps

While operating the generator set, you discover that the engine output drops. Perform the following steps to identify and remedy the fault.

STEP 1 - LOCATE THE PROPER TROUBLESHOOTING PROCEDURES

- a. What paragraph in the technical manual contains unit level troubleshooting information:

- b. Which malfunction item number in Table 3-1 covers the noted trouble:

- c. Conduct the inspections required to fault isolate the trouble and record the results:

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

JOB SHEET 3-2-1 (continued)

ENGINE TROUBLESHOOTING PROCEDURES

STEP 2 - TROUBLESHOOT THE ENGINE

- a. Based on your analysis, troubleshoot and remedy the fault and record the results:

STEP 3 - Return the generator set to normal condition.

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 4-1-1

DIESEL ENGINE FUEL SYSTEM MAINTENANCE

1. Introduction
 - a. This topic will describe unit and direct support level maintenance procedures for the diesel engine fuel system.
2. Topic Learning Objectives
3. Maintenance Task Description
 - a. Fuel injector nozzle
 - b. Fuel injection pump
 - c. Fuel pipes and lines
4. Maintenance Procedures

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 4-2-1

DIESEL ENGINE LUBRICATION SYSTEM MAINTENANCE

1. Introduction
 - a. This topic will describe unit and direct support level maintenance procedures for the diesel engine lubrication system.
2. Topic Learning Objectives
3. Maintenance Task Description
 - a. Oil fill cap
 - b. Oil filter
 - c. Oil pump
 - d. Oil drain hose and valve
4. Maintenance Procedures

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 4-3-1

DIESEL ENGINE AIR INTAKE AND EXHAUST SYSTEM MAINTENANCE

1. Introduction
 - a. This topic will describe unit and direct support level maintenance procedures for the diesel engine air intake and exhaust system.

2. Topic Learning Objectives

3. Maintenance Task Description
 - a. Air cleaner element

 - b. Air cleaner assembly

 - c. Exhaust pipe

4. Maintenance Procedures

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 5-1-1

GENERATOR SET FUEL SYSTEM MAINTENANCE

1. Introduction
 - a. This topic will describe unit and direct support level maintenance procedures for the generator set fuel system.
2. Topic Learning Objectives
3. Maintenance Task Description
 - a. Fuel tank
 - b. Fuel level float switch
 - c. Fuel gauge sender
 - d. Fuel level gauge
 - e. Fuel filter / water separator
 - f. Fuel pump assemblies
4. Maintenance Procedures

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 5-2-1

CONTROL AND INDICATOR MAINTENANCE

1. Introduction
 - a. This topic will describe unit and direct support level maintenance procedures for the generator set's controls and indicators.
2. Topic Learning Objectives
3. Maintenance Task Description
 - a. Control box assembly
 - b. Control panel assembly
 - c. Volt and frequency meters
 - d. Operator switches
 - e. Emergency stop switch
 - f. DC circuit breaker
 - g. Voltage adjust rheostat
 - h. Battery charging regulator
 - i. Ground fault circuit interrupter (GFCI)
 - j. NATO slave receptacle

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 5-2-1 (continued)

CONTROL AND INDICATOR MAINTENANCE

- k. Fault indicator module
 - l. Engine temperature switch
 - m. Engine oil pressure switch
4. Maintenance Procedures

MAINTENANCE COURSE TRAINEE GUIDE-PM-MEP-3KW MCTG

OUTLINE SHEET 5-3-1

ENCLOSURE ASSEMBLY MAINTENANCE

1. Introduction
 - a. This topic will describe unit and direct support level maintenance procedures for the generator set's enclosure assembly and its components.
2. Topic Learning Objectives
3. Maintenance Task Description
 - a. Maintenance access cover
 - b. Cover latches, hinge, and insulation
 - c. Enclosure cooling fans
 - d. Cooling fan temperature switches
4. Maintenance Procedures