# TM 9-2350-261-34

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This manual supersedes TM 9-2350-261-34 dated July 1985, including all changes.

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**Remove Pages** 8-39 (8-40 blank) thru 9-8 10-7 and 10-8 None C-1 thru C-3/(C-4 blank Index 1 thru Index 6 DA 2028-2 (Sample) and DA 2028-2 (Sample Reverse) DA 2028-2 and DA 2026-2 (Reverse) DA 2026-2 and DA 2026-2 (Reverse) DA 2028-2 and DA 2028-2 (Reverse) Metric Chart Inside Beck Cover Cover 1 and 2

**Insert** Pages 8-39 (8-40 blank)(9-1 thru 9-8 deleted) 10-7 and 10-8 21.1-1 thru 21.1-65 (21.1-66 blank) C-1 thru C-3/C-4 blank) Index 1 thru Index 6 DA 2028-2 (Sample) and DA 2028-2 (Sample Reverse) DA 2028-2 and DA 2028-2 (Reverse) DA 2028-2 and DA 2028-2 (Reverse) DA 2028-2 and DA 2028-2 (Reverse) Metric Chart Inside Back Cover Cover 1 and 2

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CARRIER, PERSONNEL, FULL TRACKED, ARMORED, M113A2 2350-01-068-4077 CARRIER, COMMAND POST, LIGHT TRACKED, M577A2 2350-01-068-4089 CARRIER, MORTAR, 107-MM, M30; SELF-PROPELLED, M106A2 2350-01-069-6931 CARRIER, MORTAR, 81-MM, M29A1; SELF-PROPELLED, M125A2 2350-01-068-4087 CARRIER, MORTAR, 120-MM, M121; SELF-PROPELLED, M1064 2350-01-338-3116 CARRIER, STANDARDIZED INTEGRATED COMMAND POST SYSTEM, M1068 2350-01-354-5657 CHASSIS, GUN, ANTI-AIRCRAFT ARTILLERY, M741A1 2350-01-099-8929 CARRIER, SMOKE GENERATOR, FULL TRACKED, M1059 2350-01-203-0188 COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901A1 2350-01-103-5641

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MILTON H. HAMILTON Administrative Assistant to the Secretary of the Army 00053

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B-1 and B-2	B-1 and B-2
C-1 and C-2	C-1 and C-2
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# SUMMARY OF WARNINGS

# WARNING

This list summarizes critical WARNINGS in this manual. They are repeated here to let you know how important they are. Study these WARNINGS carefully; they can save your life and the lives of personnel with whom you work.

#### WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breath vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breath fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

### WARNING

Chemical Agent Resistance Coatings (CARC) are toxic. Use a respirator when spraying or brushing CARC. To identify the needed respirator and detailed safety information, consult your environmental or safety office before using CARC. Protect your hands and wrists with rubber gloves. Wear coveralls. Keep your eyes protected with splash goggles or face shield. Never mix paint or use thinner near an open flame during painting and for at least four to six hours afterward. Make sure the temperature of the surface to be painted is not less than 60°F and no more than 100°F. One person is not to use more than one quart of CARC a day. Two people will not paint an item at the same time.

# WARNING

Magnesuim may catch on fire if welded on or if exposed to high temperatures. Do not weld on magnesium castings or expose them to high temperature.



#### WARNING

Fine particles of magnesium can catch fire and bum You. Be careful when filing or grinding on magnesium. Use grinding equipment marked FOR MAGNESIUM GRINDING ONLY. Keep a Class D fire extinguisher nearby.

WARNING Water and foam-type fire extinguishers will cause magnesium fires to flare up. Use a Class D fire extinguisher or a sodium chloride base dry powder to fight magnesium fires.





Improper disposal of magnesium can cause a fire or explosion. Do not expose magnesium to high temperatures. Let magnesium dry before placing in sealed metal containers. Label containers and ship to a Class 1 hazardous waste disposal site.

# WARNING



Fuel fumes can explode and bum you. Drain all fuel before welding. Disconnect and cap all fuel and vent lines. Purge fuel residue and fumes by steam cleaning. Purge air from fuel tank with C02.



### WARNING

Do not weld on plastic molding material (foam filled) parts. Welding on plastic molding material (foam filled) parts creates toxic fumes. Fumes are hazardous to your health and can result in death.



WARNING

You could get hurt if power plant is not blocked to prevent sudden movement of a component. Block power plant as shown before you attempt any disassembly.



**WARNING** Transmission is heavy. Use a lifting device.



**WARNING** 200 amp generator weighs approximately 80 pounds. Have helper assist when removing 200 amp generator.



**WARNING** Engine is heavy. Use a lifting device.

Fumes from welding cadmium plated fuel filter bracket are toxic and can poison you. Make sure respirator is worn, and use in a well-ventilated area to protect you against fume poisoning.

#### WARNING

Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.



WARNING Radiator can burst if over pressurized. Do not exceed 25 psi (172 kPa) air pressure. Ensure radiator is submerged before applying air pressure. Always wear safety goggles.



WARNING

Do not exceed 20 psi (137 kPa) pressure while testing auxiliary tank. Ensure auxiliary tank is submerged before applying air pressure. Do not direct pressurized air at yourself or others. Always wear goggles.



#### WARNING

High voltage in the M19 periscope can cause serious injury or death. Voltage could exceed 16,000 volts. To avoid accidents, observe the following Always connect power cable to periscope before turning MASTER SWITCH and infrared (I.R.) POWER switch to ON. Before disconnecting power cable from M 19 periscope, always wait at least two minutes after turning infrared (I. R.) POWER switch and MASTER SWITCH OFF. Do not disconnect power cable until image disappears from periscope screen. Never touch end of power cable, or allow it to contact metal surfaces.

#### WARNING



Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment. Keep hands out of engine compartment while differential is being removed or installed.

#### WARNING

Metal chips and grinding dust can cause eye injury. Wear goggles and gloves.



Polyurethane foam tends to expand with heat and age. This post expansion can cause flotation pods to bulge or foam to protrude from pod. This condition could cause the pod(s) to crack and break away during water operation. If pod(s) break away during water operation, carrier may sink and soldiers could be killed. It is very important to inspect for post expanded foam and trim off any excess that causes pod(s) to bulge when installed on carrier.

# WARNING



The carrier can sink if excessive amounts of flotation foam is missing from pod(s). Soldiers could be killed.



WARNING

Adhesive is flammable and can injure you. Keep it away from heat, sparks, and open flame. Avoid repeated or prolonged breathing of vapors. Avoid contact with your skin.



WARNING

Compound is flammable. Keep it away from open flame. Keep compound off your skin. Wash well after handling. Use solvent spray precautions.



WARNING

Door could fall and injure you. Make sure door is held by a lifting device before removing hinge screws.



# WARNING

Mechanical damage, evidence of welding or corrosion constitute a potential personnel hazard. Use extreme caution when handling fire extinguishers in this condition. Replace if necessary.



# WARNING

A cartridge can be punctured if the lever does not work freely. Do not install the cartridge before you make sure the puncture lever works freely



Do not install cartridge without hose in place behind puncture lever. Cartridge will discharge if lever is pushed.

#### WARNING



Fire resistant hydraulic (FRH) fluid may contain Tricresyl Phosphate which, if taken internally, can produce paralysis. Hydraulic fluid maybe absorbed through the skin. Wear long sleeves, gloves, goggles, and face shield. If FRH gets in eyes, wash them immediately and get medical aid immediately. If FRH gets on your skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

#### WARNING



Power cable connections should not be attempted until grounding system and signal/data cabling have been completed.

System ground must be completed prior to making any power connections. Failure to do so may result in personal injury and/or damage to the equipment.

Improper or loose connection between the surface wire grounding systems and ground lugs could cause a short in the system, which may cause personal injury.

#### WARNING



HIGH VOLTAGE is used in the operation of this equipment.

DEATH ON CONTACT may result if personnel fail to observe safety precautions.

NEVER work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be competent in giving first aid. When an operator helps a technician, that operator must be warned about dangerous areas.

SHUT OFF POWER supply to equipment before beginning work When working inside equipment with power off, take special care to ground every capacitor likely to hold a dangerous potential.

BE CAREFUL not to contact high-voltage Connections when installing or operating this equipment.

KEEP one hand away from the equipment to reduce the hazard of current flowing through life-sustaining organs of the body.

For artificial respiration and first aid, see FM 21-11.

HEADQUARTERS

DEPARTMENT OF THE ARMY

Washington, D.C., 10 Aug 1990

Technical Manual No. 9-2350-261-34

# **TECHNICAL MANUAL**

# DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

CARRIER, PERSONNEL, FULL TRACKED, ARMORED, M113A2 2350-01-068-4077

CARRIER, COMMAND POST, LIGHT TRACKED, M577A2 2350-01-068-4089

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CARRIER, SMOKE GENERATOR, FULL TRACKED, M1069 2350-01-203-0188

COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901A1 2350-01-103-5641

CARRIER, STANDARDIZED INTEGRATED COMMAND POST SYSTEM, M106S 2350-01-354-5657

# **REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes, or if you know a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual, directly to: Commander, U.S Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL61201-9948 A reply will be furnished to you.

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# HOW TO USE THIS MANUAL

This manual tells you how to perform direct and general support maintenance for the M113A2, M577A2, M106A2, M1064, M125A2, M741A1, M1068, M1059, and M901A1 carriers.

Before starting a task or procedure, read HOW TO USE THIS MANUAL and CHAPTER 2, GENERAL MAINTENANCE PROCEDURES.

#### WHAT'S IN THE MANUAL - FRONT TO BACK

FRONT COVER INDEX list6 the information you need most often.

WARNINGS in front of the manual are a summary of the warnings in this manual. The warnings cover hazards that could hurt or kill personnel. Shorter versions of the warnings may appear in the task.

TABLE OF CONTENTS tells you where each chapter, section, and appendix starts. Information located in blocks on the Front Cover Index corresponds with the Table of Contents.

## USING YOUR MANUAL ON THE JOB

The best way to learn about this manual is to practice using it. Knowing how to use this manual will save both time and energy.

#### MAINTENANCE TASKS

How do you find the correct task?

Pick a keyword from the carrier part or system to be used during the task. Look in the ALPHABETICAL INDEX for this keyword or the name of the action you will perform. Turn to the page indicated.

The ALPHABETICAL INDEX lists each task under one or more headings. The task, INSTALL ENGINE COOLANT HEATER KIT, could be found:

```
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Coolant Heater
Kit, engine, install 14-2
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```

# HOW DO YOU READ MAINTENANCE TASKS?

Be sure to read all warnings, cautions, and notes. These are in all types of tasks. They help you avoid harm to yourself. other personnel and equipment. They also tell you things you should know about the task.

Before starting, get all tools, supplies, and personnel listed on the setup page needed to do the task. Be sure to read the task before performing the maintenance. If any other tasks are referenced, you must go to the setup page for each of those tasks to find out what tools, parts. and materials will be needed.

Start with step 1 and do each step in given order.

Look at the drawings. These show you what to look for when reading a maintenance task.

# MAINTENANCE TASKS

Doing maintenance tasks will keep the carrier operating properly. Maintenance tasks are used to present maintenance instructions. Each maintenance task details steps which you need to perform. If the carrier and parts need maintenance that is not included in any task in the manual, report this to your supervisor.

# SAMPLE OF SETUP ITEMS

The sample on the next page shows the DESCRIPTION and INITIAL SETUP sections on the first page of a task. Items to watch for are listed in the legend. Match them with the sample.



Legend to Sample



3	TOOLS	These are the tools and equipment you will need to do the task.
4	MATERIALS/ PARTS	These are supplies you will need to do the task If more than one part is needed, the quantity will be in parenthesis following the name of the part. The only parts listed are those you must replace every time the task is performed. Use the Repair Parts and Special Tools List (RPSTL), TM 9–2350–261–24P, to order parts you need for the task.
5	PERSONNEL REQUIRED	These are the personnel needed to do the task.
6	REFERENCES	These are the other technical publications you will need to do the task.
7	EQUIPMENT CONDITIONS	These are the conditions the equipment must be in before you start the task. You will be referred to the task or technical publication needed to meet each equipment condition. This reference will be given in parenthesis after each equipment condition.

Some tasks will include all of the items above. Others will only include some of the above items.

Read the INITIAL SETUP section carefully before you start each task. Get the tools and supplies listed and the personnel needed. Be sure the equipment is in the condition required.

# SAMPLE OF TASK STEPS

The sample below shows you some of the signs to watch for when you are performing a task. Read all the steps, warnings, cautions and notes before starting each task. Some items to watch for are listed in the legend. Match them with the sample.



Legend to Sample Above

1	WARNING	This describes possible injury to personnel.
2	CAUTION	This describes possible damage to equipment.
3	STEP	This tells you what to do and how to do it.
4	LOCATOR	This helps you locate equipment on the carrier or major compo- nents. An arrow will lead you from the locator to the closeup. If the arrow is dotted, it means that the item is located behind something.
5	CLOSEUP	This shows you a closeup of the equipment.

# WARNINGS, CAUTIONS, AND NOTES

Be sure to read all warnings and cautions in the task. Ignoring a warning could cause death or injury to yourself or other personnel. Ignoring a caution could cause damage to equipment. Notes contain facts to make the task easier. Warnings, cautions. and notes always appear just above the task step to which they apply.

WARNINGS: Call attention to the things that could injure personnel.

CAUTIONS: Call attention to the actions or materials that could damage equipment.

#### WARNING



Engine support could fall and injure you. Make sure to secure engine support to the main frame before towing, lifting or transporting engine stand.

### CAUTION

Engine stand jack screw could be damaged if the two screws and nuts attaching jack screw to main frame are not removed. Remove screws and nuts before towing, lifting or transporting an empty engine stand.

# NOTE

Both front and rear trim vane pods are repaired the same way.

NOTES: Contain information you should know.

# HELPER

Helpers are needed in tasks that require more than one person such as to help lift heavy objects. A helper may also be needed to act as an outside observer, drive the carrier, or do similar tasks.

If a helper is needed to perform a task, the INITIAL SETUP will tell you:

Example: Personnel required: Track Vehicle Repairer 63H10 Helper (H)

# LOCATIONAL TERMS

The terms FRONT, REAR, LEFT and RIGHT are used to describe where items are located. THE POINT OF REFERENCE FOR THESE TERMS IS DIFFERENT FOR CARRIER ITEMS AND POWER UNIT ITEMS. (Carrier items are items which are not on the power unit. Power unit items are items on the engine or transmission.)

If you are working with carrier items, use this point of reference. Think of the location as if you were sitting in the driver's seat looking out the hatch.

If  $\underline{Y}$ ou are working with power unit items, use this point of reference. Think of the locations as if you were standing at the transmission end of the power unit-and facing the flywheel. This rule applies whether the power unit is IN OR OUT of the carrier.



# REFERENCES

References within a task refer to a different manual or to another task in the same manual. A step in one task may be a complete task someplace else. Below is an example of a reference step from the task: INSTALL ENGINE COOLANT HEATER KIT.

# Example: Lower power plant grille assembly (see your -20).

The tools needed to do the task will be listed in that task.

# MATERIAL/PARTS

For all tasks. the following comments apply:

Parts which are listed on the setup page will be referred to as "new" in the task steps when installed.

Examples are: locknuts lockwashers cotter pins some gaskets

These and other new parts are listed under MATERI.ALS/PARTS in the initial setup.

# **GENERAL MAINTENANCE**

Cleaning, inspecting, checking for leaks, and similar procedures which apply to most tasks are found in CHAPTER 2, GENERAL MAINTENANCE PROCEDURES. Use these steps to clean and inspect any part being removed, repaired or installed. Special cleaning will be covered in the task step. Below is a step that would require general cleaning.

23. Remove two screws (1), key washers (2), oil cooler elbow (3) and gasket (4) from engine. Discard gasket and key washers.



After doing this step, you would clean the mating surface with cleaning solvent and a wiping rag according to the general cleaning procedures. In other tasks, hoses or rubber hatch seals will need to be checked for leaks. Refer to CHAPTER 2 for general procedures.

# HOW TO USE THE REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) WITH THIS MANUAL

The RPSTL (TM 9–2350–261–24P) gives the National Stock Number (NSN) required to order parts used in the maintenance tasks. To use the RPSTL to identify and order a part, do the following:

- 1. In this manual, turn to the first page of the task to be performed.
- 2. Find Materials/Parts under INITIAL SETUP, and read the part(s) that need replacement. If required, find the illustrated part in the task steps.
- 3. Go to the RPSTL and find the same illustrated part. That part will have an item number assigned to it. Look this item number up in the listing for that figure. The NSN can be found in the National Stock Number and Part Number Index in the back of the RPSTL.
- If you inspect an item and find that it is damaged, go to the RPSTL and find the SMR code for the item. If the SMR code does not authorize you to repair the item, reassemble it and send it to the authorized level of maintenance.

# CHAPTER 1 INTRODUCTION

# Section I. GENERAL INFORMATION

# SCOPE

Type of Manual: Direct and General Support Maintenance.

Model Number and Equipment Name:

M113A2 - Carrier, Personnel, Full Tracked, Armored
M577A2 - Carrier, Command Post, Light Tracked
M106A2 - Carrier, Mortar, 107-mm M30; Self-Propelled
M125A2 - Carrier, Mortar, 81-mm, M29A1; Self-Propelled
M741A1 - Chassis, Gun, Anti-Aircraft Artillery
M1059 - Carrier, Smoke Generator, Full Tracked
M901A1 - Combat Vehicle, Anti-Tank, Improved Tow Vehicle
M1064 - Carrier, Mortar, 120-mm, Self-Propelled
M1068 - Carrier, Standardized Integrated Command Post System

# MAINTENANCE FORMS, RECORDS, AND REPORTS

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

# DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

See the following technical manuals for information on destruction of Army materiel:

ТМ	750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use.
ТМ	750-244-2-5-1	Procedures for Destruction of Conventional Ammunition and Improved Conventional Munitions to Prevent Enemy Use.
TM	750-244-6	Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use.
ТМ	750-244-7	Procedures for Destruction of Equipment in Federal Supply Classifica- tions 1000, 1005, 1010, 1520, 2530, 5590, 5595 to Prevent Enemy Use.

# PREPARATION FOR STORAGE OR SHIPMENT

For information about administrative storage or shipment, see the following documents:

<b>Specification</b>	Applicable Carriers
MIL-C-45360G(AT)	M113A2, M106A2, M125A2, M1064, & M1059
MIL-C-46746DC(AT)	M577A2 & M1068
MIL-C-62074C(AT)	M741A1
MIL-C-62327A(AT)	M901A1 TOW Vehicle (Less TOW Weapon)

# NOMENCLATURE CROSS REFERENCE LIST

This listing includes nomenclature cross references used in this manual.

# **COMMON NAME**

### OFFICIAL NOMENCLATURE

Locknut
Lock screw
Lockwasher
Pressnut
Heat exchanger

Self-locking nut self-locking bolt Lockwasher Splined self-locking nut Battery plate

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

If your carrier need6 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. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, US Army Tank-automotive and Armament Command, Attn: AMSTA-TR-QCL, Warren MI. 48397-5000. A reply will be sent to you.

For warranty information on the M577A2, see TB 9-2350-265-38-1.

# Section II. EQUIPMENT DATA AND DESCRIPTION

For equipment characteristics, capabilities, features, and description of major components, see your -10.

# Section III. PRINCIPLES OF OPERATION

For a brief description of principles of operation and equipment, see your -10.

# **CHAPTER 2**

# **GENERAL MAINTENANCE PROCEDURES**

# Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

# COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, see the Modified Table of Organization and Equipment (MTOE) for your unit.

# SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools you need are listed in Repair Parts and Special Tools List (RPSTL), TM 9-2350-261-24P. Test Measurement and Diagnostic Equipment (TMDE) and special tools are listed in TM 9-2350-261-20. More than one model of multimeter is available to you in the system, and you may use any model available.

# FABRICATED TOOLS

These tools enable direct support and general support personnel to fabricate the tools locally. The tools are of particular value to organizations engaged in repairing a number of identical components. Fabicated tools are not available for issue. An accompanying list of materials required for fabrication of the tools is given on page 24, Fig 1, 2 and 3.

# **REPAIR PARTS**

Repair parts are listed and illustrated in the Repair Parts and Special Tools List (TM 9-2350-261-24P) covering direct and general support maintenance for this equipment. Maintenance and supply personnel can order them.

# Section II. SERVICE UPON RECEIPT

The following procedures tell you how to check and service the M113A2, M577A2, M106A2, M1064, M1068, M125A2, M741A1, M1059, and M901A1. These procedures will allow you to drive the carrier to the motor pool. Procedures are given for level B and level A reprocessing. Level B reprocessing is performed when the carrier has been in storage for less than ninety (90) days. Level A deprocessing is performed in addition to Level B reprocessing when the carrier has been in storage for more than ninety days (90) days.

SERVICE UPON RECEIPT — M113A2				
LOCATION	ITEM	ACTION REMARKS		
LEVEL B				
Hull	Driver's hatch	Remove welded nut/bolt from driver's hatch to gain vehicle entry.		
Engine	Engine air intake	a. Remove air restrictor plug from air duct at air filter.		
		b. Connect filter hose to air filter.		
		c. Remove warning tag.		
Engine	Fuel lines	a. Connect fuel lines at quick disconnect.		
		b. Connect fuel supply tubing.		
Engine	Crankcase	Remove shipping tape from breather crankcase breather.		
Engine	Oil level gage	Remove shipping tape from oil level gage rod opening.		
Engine	Oil filter cap	Remove shipping tape from oil falter cap.		
Engine	Caps and plugs	Remove caps and plugs from all open- ings to engine that vent to outside.		
Hull	Power plant access panels	Install power plant access panels.		
Hull	Carrier batteries	a. Remove shipping tape from filler caps.		
		<ul> <li>b. Add electrolyte and charge batteries.</li> <li>See TM 9-6140-200-14.</li> </ul>		
Hull	Battery cables	Install cables on battery. See TM 9-2350-261-20.		
Hull	Personnel heater/feed line	a. Remove shipping tape from heater external exhaust and intake elbows.		
		<ul> <li>Remove shipping tape from end of disconnected fuel feed line.</li> </ul>		
		c. Connect feed line to heater.		

SERVICE UPON RECEIPT - M113A2					
LOCATION	ITEM	ACTION	REMARKS		
Hull	Fuel system	Fill fuel tank			
Hull	Squad seats and back- rests	Remove shipping paper and tape.			
Hull	Commander's seat and post	Install commander's seat and post on carrier. See TM 9-2350-261-20.			
Hull	Periscopes	a.Remove plugs from periscope openings.			
		b.Remove periscopes from packages and install. See TM 9-2350-261-20.			
Hull	Fire Extinguishers	Check for intact seals on handles.			
Hull	Drain plugs	Close hull drain plugs.			
Hull	Closure kit	Remove and store closure kit.			
Hull	Engine air inlet grill	Remove shipping tape and intake and exhaust grill cover from exhaust and intake grill.			
Hull	Armor mounting inserts and screw holes	s Check for loose or missing plugs in in- serts and setscrews in hull screw holes			
LEVEL A					
For level A deprocessing, perform the following procedures in addition to all the procedures for level B deprocessing					
Power Plant Compartment	Engine	Change engine oil. See engine crank- case tag on filler neck and LO 9-2350-261-12.			
Power Plant Compartment	Transmission	Service transmission with operational lubricant. See transmission tag on filler necks and LO 9-2350-261-12.			
Hull	Final drives	Service final drives with operational lubricant. see Lo 9-2350-261-12.			

# CHECKING EQUIPMENT

Perform all operator and organizational PMCS. See TM 9-2350-261-10 and TM 9-2350-261-20.

Inspect the equipment for damage incurred during shipment. If the equipment has been damaged damage on form SF 368, Quality Deficiency Report.

# Section III. GENERAL MAINTENANCE INSTRUCTIONS

# SCOPE

This section contains safety warnings, guidelines and general maintenance instructions. They should be followed when doing maintenance procedures.

# PREPARATION FOR MAINTENANCE

- a. PERSONNEL SAFETY. Practice all shop safety procedures and read all warnings in this manual.
- b. PROPER EQUIPMENT.Get equipment before starting a maintenance task. See page 2-1, the RPSTL, TM 9-2350-261-24P, and the maintenance tasks for tools, equipment, parts, and materials.
- c. WHAT To DISCARD. Parts to discard, such as lock washers, locknuts, and gaskets are listed in the maintenance task. If the step does not say to discard a part, the part should be saved. It may be used later or be repaired.
- d. HANDLING TECHNIQUES.
  - (1) Avoid damage to parts during disassembly, cleaning, inspection, repair, and reassembly procedures. Nick, scratches, and dents caused by carelees handling could result in equipment failure.
  - (2) Dirt can damage parts and cause malfunctions. Make sure all air and fluid openings, lines, and hoses are capped or plugged during maintenance procedures.
- e. IDENTIFICATION.
  - (1) During disassembly, tag parts to ensure proper assembly.
  - (2) During disassembly, tag leads on electrical parts to ensure proper assembly. Tag each lead, as it is removed, with numbers from wiring diagrams and terminals.
- f. FABRICATED TOOLS. These steps enable direct support. and general support personnel to fabricate the tools locally. Accompanying illustrations below show materials required for fabrication of the tools.
  - (1) Lock Ring Tool for Stud Insert
    - (a) Make from round steel stock (1020 or 1040) or locally procure steel pipe.
    - **(b)** Remove all burrs.
    - (c) Do not break sharp edges.
    - (d) All dimensions are in inches.





7/16" DIA (MIN).

2-4/(2-5 and 2-6 deleted) Change 4

f(1). SPECIAL PURPOSE CABLE FOR POWER CONTROL ENCLOSURE Make a special electrical cable to plug in from a shop wall socket to the Power Control Enclosure for powering up the Power Control Enclosure while on a shop table, the purpose is to preform troubleshooting or testing after repairs have been made. Use a W3 harness (To be modified) Part Number 12383899, See TM 9-2350-261-24P.

# CAUTION

When installing wires into the plug, ensure polarity is correct, incorrect polarity can cause damage to equipment and harm personnel when electrical power is applied to the Power Control Enclosure.

MODIFYING W3 HARNESS FOR USING WITH POWER CONTROL ENCLOSURE Remove connector labeled W3P1 (A3J1) from W3 harness and replace with new plug Part Number WC596-13-3(81348) NSN 5935-01-005-3579. (USE WIRING DIAGRAM) The length of the special purpose cable is dependent upon the distance of the wall socket and the work bench the Power Control Enclosure will be on. A W3 cable is between 115 and 125 inches long.



# W3 CABLE - PART NUMBER 12383899

Figure f(1)a. Special Purpose Cable

g. TORQUING. Where needed, torque values are listed in the maintenance task. When torquing, use one of the star pattern sequences below unless otherwise stated in the maintenance task.







**6-HOLE PATTERN** 

**8-HOLE PATTERN** 

**10-HOLE PATTERN** 

**12-HOLE PATTERN** 





**17-HOLE PATTERN** 

#### h. TORQUE WRENCH ADAPTERS AND CONVERSION FORMULA.

- (1) Torque wrench adapters (extensions) are used to tighten screws and nuts to specific values that cannot be reached with a regular socket on the end of a torque wrench. This makes the dial or scale reading less than the actual torque applied to the screw or nut. When using an adapter, determine the dial or scale reading as follows:
- Step 1. Check your manual for specific torque value to which the screw or nut should be tightened.
- Step 2. Measure the length of your torque wrench from the center of the handle (point A) to the center of the socket (point B). Record this measurement.
- Step3. Multiply the above measurement by the desired torque. Record this product.
- Step 4. Measure length of adapter from socket end (point C) to screw or nut end (point D). Record this measurement.
- Step 5. Add length of adapter (step 4) to the length of torque wrench (step 2). Record this sum.
- Step 6. Divide the product recorded in step 3 by the sum found in step 5.
- Step 7. The value found in step 6 is your torque wrench setting. Set your dial.

#### NOTE

Setting the torque wrench dial at the reading found in step 7 will deliver the required torque at the end of your adapter.



Example: Metric equivalents deleted for clarity.

- step 1. 40 lb-ft required.
- step 2. 12 inches.
- step 3. 12 X 40 = 480 lb-ft.
- step 4 4 inches.
- step 5. 12 + 4 = 16 inches.
- Step 6. <u>480</u> = 30 lb-ft.
- 16
- Step 7. Torque wrench dial setting = 30.

# CLEANING

- a. GENERAL. Cleaning is very important. All parts must be cleaned well and kept clean during maintenance. Dirt or foreign matter can cause malfunctions and equipment failure. General cleaning procedures are detailed in steps b thru n. Special cleaning procedures are covered in the task relating to the specific part.
- b. CLEAN EVERY PART. Clean every part well after disassembly and before assembly or installation. Clean parts such as housings, covers, and dipsticks before disassembly. Avoid getting dirt and foreign matter in a system.
- c. HANDLE WITH CARE. Use care when handling parts during cleaning and maintenance. Nicks, scratches, dents, and burrs can prevent proper assembly or cause malfunctions after assembly.
- d. AVOID ABRASIVES. Except where specially called for in a task, donut use abrasives, files, wire brushes, or sharp tools. On some surfaces, finish is important to the operation of close-fitting parts.



# WARNING

Dry cleaning solvent P–D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

e. REMOVAL AGENTS. Remove gum or old grease deposits by soaking parts in cleaning solvent (Item 18, App C). Scrub with a brush. Use crocus cloth (Item 17, App C) to remove minor surface defects.

# WARNING



Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

# CAUTION

Lye or caustic mixtures will damage metal surfaces. Do not use lye or caustic mixtures to clean metal surfaces.

- f. STEAM CLEANING. If steam cleaning is used, dry clean parts at once with compressed air. Apply a thin film of clean oil to surfaces that are not painted to prevent rusting. Never use lye or caustic mixtures that will corrode or etch metal surfaces.
- g. LUBRICATION OF NEW BEARINGS. See TM 9-214 for cleaning and lubrication procedures. Bearings that have been in service should also be lubricated.

- h. CLEANING INSTRUCTIONS. Care is needed in all cleaning procedures. Dirt can damage parts and cause malfunctions. When you perform any cleaning procedure, do the following:
  - (1) Inspect and cap all air and fluid openings, lines, and hoses.



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- (2) Clean all parts before inspection, after repair, and before assembly. Use cleaning solvent (Item 18, App C) or approved Cleaner. Dry parts with wiping rag (Item 86, App C).
- (3) Keep hands free of grease; grease collects dirt.
- (4) After cleaning, cover or wrap parts to protect from dirt.
- i. CASTINGS.

# WARNING



Dry cleaning solvent P–D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

# WARNING



Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

- (1) Clean inner and outer surfaces of casting with cleaning solvent (Item 18, App C). Dry casting with compressed air.
- (2) Remove sludge and gum deposits with stiff brush.
- (3) Blow out all tapped holes with compressed air.
- j. BALL BEARINGS. Bearings require special cleaning techniques. See TM 9-214 for cleaning and maintenance procedures for ball bearings.
- k. OIL PASSAGES.
  - (1) Make sure oil passages are not clogged.
  - (2) Clean oil passages with brass wire probes to break up any sludge or gum deposits.

#### WARNING



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### WARNING

Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

(3) Flush oil passages with cleaning solvent (Item 18, App C). Dry parts with compressed air.

I. OIL SEALS, ELECTRICAL CABLES, AND FLEXIBLE HOSES.

CAUTION

Cleaning solvent causes leather, rubber, and synthetic materials to become brittle. Do not use cleaning solvent to clean seals, cables. and flexible hoses.

Clean seals, cables, and flexible hoses with detergent (Item 31, App C) and water. Dry parts with wiping rag (Item 86, App C).

m. INSERTS. Blow out insert holes with compressed air.



### WARNING

Dry cleaning solvent P–D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.



#### WARNING

Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

n. GASKETS. If gasket is being removed, scrape old gasket material and sealant off mating surface. Clean mating surface with cleaning solvent (Item 18, App C). Dry with wiping rag item 86, App C).

## INSPECTION

- All removed parts must be inspected with care. Replace parts if damage or wear exceeds allowable limits.
- a. GENERAL. Procedures for inspection will be the same for most parts. General inspection procedures are given in steps b thru q below. Special inspection procedures are covered in the task as needed.
- b. CASTINGS.
  - (1) Use magnetic particle inspection equipment to check ferrous castings for cracks. Use a magnifying glass and strong light to check nonferrous castings for cracks. Check areas next to studs, threaded inserts, sharp corners, and fillets.
  - (2) Inspect all castings and forgings for 'breaks, cracks, and wear or scoring that would impair function.
  - (3) Inspect machined surfaces for nicks, burrs, and raised metal. Mark damaged areas for repair.
  - (4) Use straightedge to check all mounting flanges on housings and supports for bends. Inspect mating flanges for stains which would indicate oil leakage.
  - (5) Inspect all threaded parts for damaged or stripped threads.
- c. ROLLER AND BALL BEARINGS. Inspect bearing races for wear and color changes due to heat. See TM 9-214 for inspection procedures for ball bearings.
- d. NEEDLE ROLLER BEARINGS. Inspect bearings for free and smooth rotation, and broken or missing rollers. Also look for tightness of fit in bearing bores. Inspect bearing races for wear and color changes due to heat. See TM 9–214 for inspection procedures.
- e. STUDS. Inspect all studs for stripped or damaged threads, bent or loose condition, and signs of stretching.
- f. GEARS.
  - (1) Use magnetic particle inspection equipment to check all gears for cracks.
  - (2) Inspect gears for burrs, wear, cracked or broken teeth, and pitting at tooth contact areas.
- g. BUSHINGS AND BUSHING-TYPE BEARINGS.
  - (1) Check all bushings and bushing-type bearings for secure fit in casting. Check for color changes which could mean overheating. Inspect for size, scoring, out-of-roundness, burrs, sharp edges, and signs of seizing.
  - (2) Check for dirt in oil holes and in bushing-type bearings. Oil holes and grooves must be clean and not damaged.

- h. OIL/GREASE SEALS.
  - (1) Inspect lip seals for cracks, wear. cuts, and brittleness. Inspect springs and seal shells for damage.
  - (2) Replace seals when there are signs of damage or oil leakage.

i. PREFORMED PACKINGS AND GASKETS.

- (1) Gaskets and seals on electrical parts maybe reused. Inspect gaskets and seals for wear, nicks, cuts, and torn or missing gasket material. Replace gasket if needed.
- (2) All other preformed packings and gaskets should be replaced when removed unless otherwise stated in the maintenance task.
- j. CORE HOLE PLUGS. Inspect core hole plugs for signs of leakage. Replace damaged core hole plugs.
- k. INSERTS.
  - (1) Inspect inserts for cracks and stripped or damaged threads.
  - (2) Check inserts for loose fit.
- I. SPLINED PARTS. Inspect splined parts for burrs, wear, and twisted, cracked, or broken splines.
- m. THREADED PARTS. Inspect all threaded parts for burrs and stripped or damaged threads.
- n. RETAINING RINGS. Inspect retaining rings for nicks, burrs, defects, loss of tension, or wear.
- o. SPRINGS. Inspect springs for wear, defects, breaks, and loss of tension or compression. Inspect springs using a spring tester.
- p. SHAFTS AND SPINDLES. Inspect shafts and spindles for excessive wear, binding, scores, cracks, burrs, and obstructed oil passages.
- q. ELECTRICAL PARTS.
  - (1) Inspect electrical parts before you install them. Look for mildew and corroded or burned parts.
  - (2) Inspect electrical parts for pinched or loose wires and for cracked or broken wires, circuit cards, relays, and connectors.
  - (3) Inspect insulation and heatshrink tubing for cracks, tears, burns, or missing material.

## REPAIR

- a. GENERAL. General repair procedures are given in steps b thru p below. Special repairs are covered in the task. After repair clean all parts well.
- b. CASTINGS.
  - (1) Replace all cracked or broken castings.
  - (2) Repair minor damage to machined surfaces of castings with crocus cloth (Item 17, App C). Replace any part with defects that cannot be corrected or which will impair function.
  - (3) Repair minor surface bends by working bent surface of casting across sheet of crocus cloth (Item 17, App C) on surface plate. Replace bent castings which would impair assembly or function.
  - (4) Repair damaged pipe or screw threads with correct tap or die.
- c. BALL BEARINGS. See TM 9-214 for inspection and maintenance of ball bearings.
- d. NEEDLE ROLLER BEARINGS. See TM 9-214 for inspection and maintenance of needle roller bearings.
- e. STUDS.
  - (1) Replace all bent or loose studs or studs which show signs of stretching.
  - (2) Repair minor thread damage with standard thread chaser.
  - (3) To remove studs, back out studs slowly with stud extractor to avoid heating and possible seizure. If studs are broken too short to use extractor, drill and extract studs with suitable remover, A short stud may be removed by welding nut to stud and removing with wrench.
  - (4) To replace studs, lightly apply antiseize compound to stud before you install it. Only standard studs are supplied for repair parts. If threaded hole is damaged beyond repair, drill and tap damaged hole. Install threaded insert in tapped hole.
- f. GEARS.
  - (1) Replace gears that have worn, pitted or gouged teeth.

### WARNING



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

(2) Remove sharp burrs from gear teeth with file and polish with crocus cloth (Item 17, App C) dipped in cleaning solvent (Item 18, App C).

- g. BUSHINGS AND BUSHING-TYPE BEARINGS.
  - (1) Replace bushings and bushing-t ype bearings if they are loose. scored, or have color change due to heat. When you replace bushings and bushing-type bearings, check nearby parts for damage or wear.

## CAUTION

Damaged housing bore can cause equipment failure. Do not damage housing bore when cutting bushings.

### NOTE

Do not remove bushings and bushing-type bearings unless replacement is necessary and authorized. Removal usually damages these parts.

- (2) Remove bushings and bushing-type bearings by pressing them out. Use a suitable arbor press or special tools. It may be necessary to remove bushings in blind holes with a saw or by using a narrow cap chisel.
- (3) Install bushings or bushing-type bearings by alining them in casting or retaining cage. Press bushing or bushing-type bearings into place with suitable arbor press or with special tools.
- h. OIL/GREASE SEALS. Seals must be replaced when seal lip shows signs of wear, brittleness, cracks or damage. Replace seal if tension spring or seal shell is damaged.
  - (1) Press damaged oil seal from casting. Be careful not to damage bore.



## WARNING

Dry cleaning solvent P–D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- (2) When seal bore is damaged so a lubricant-tight seal is impossible, replace casting or adapter. Remove slight nicks, burrs, and scratches with crocus cloth (Item 17, App C) dipped in cleaning solvent (Item 18, App C).
- (3) Install new seal in casting bore or adapter using suitable oil seal replacement tool.

i. PREFORMED PACKINGS AND GASKETS.

Preformed packings and gaskets should be replaced when removed unless otherwise stated in the maintenance task. They should not be reused.

- j. INSERTS. Replace insert when threads are stripped or when insert is cracked or loose.
  - (1) Drill and remove damaged insert from casting.
  - (2) Install new insert in casting using suitable replacement tool.

k. SPLINED PARTS.

- (1) Remove burrs from splined parts with a soft honing stone.
- (2) Replace parts that are worn or have twisted, cracked, or broken splines.

### **NOTE** Chase the threads with a used tap or die. A new tap may cut oversize, while a new die may cut undersize.

- I. THREADED PARTS. Repair all parts that have stripped or damaged threads by chasing threads with a used tap or die. Replace parts that cannot be repaired.
- m. RETAINING RINGS.
  - (1) Replace retaining rings that have defects.
  - (2) Some retaining rings are beveled on one side. When installing this type of ring, the beveled side must face the part to be retained.
- n. SPRINGS. Discard springs that have defects. Load and height inspection data, where needed, are given in maintenance procedures.
- o. SHAFTS AND SPINDLES.
  - (1) Replace shafts and spindles that show signs of wear, binding, scores, cracks, burrs, or clogged oil passages.
  - (2) Remove obstructions with compressed air or by probing with soft wire.
  - (3) Remove burrs and minor surface defects with a crocus cloth (Item 17, App C).

#### p. ELECTRICAL PARTS.

- (1) Replace corroded or burned parts and parts which show signs of mildew.
- (2) Tighten loose connections.
- (3) Replace cracked or broken wires, circuit cards, relays, and connectors.
- (4) Replace cracked, torn, or burned insulation and heat shrink tubing.

## WELDING INSTRUCTIONS

## SAFETY PRECAUTIONS

- a. Wear clothing such as leather or heavy denim. Do not wear clothing with loose pockets, trouser cuffs, or short or rolled up sleeves.
- b. Do not expose bare skin to welding arc.
- c. Do not look directly at welding arc unless you are wearing a welding hood.
- d. Wear flash goggles or tinted safety glasses (No. 2) in welding area.
- e. Disconnect power source before changing parts or making equipment repairs.
- f. Do not touch drive mechanism or any part of the electrode.
- g. Make sure welding area has plenty of fresh air without being drafty. Remove all toxic and combustible materials.
- h. hake sure all electrical and gas connections are tight.
- i. Do not touch any metal in welding area with bare hands. Aluminum does not change color when hot.
- j. Do not weld in the fuel compartment where sealing compound has been applied.
- k. Use a welding screen to protect personnel from arc flash.

## **GENERAL WELDING PROCEDURES**

See TM 9-237.

## FLUID LEAKS AND CHECKING FOR LEAKS

a. GENERAL. Fluid leaks in hoses and fluid lines affect the carrier parts operation. The types and classes of leaks are given below.

CLASS I Fluid seepage is not great enough to form drops, but is shown by wetness or color changes.

CLASS II Fluid leakage is not great enough to form drops. Drops do not drip from the item being checked or inspected.

CLASS III Fluid leakage is great enough to form drops that fall from the item being checked or inspected.

- b. CHECKING FOR LEAKS AFTER A MAINTENANCE TASK. After doing maintenance on a part which involves hoses or fluid lines, check for leaks. If leaks occur after you have done a replace or repair task, find the source of the leak. Correct the problem. Follow these procedures.
  - (1) Do visual inspections to find the source of the leak.
    - (a) Check for cracks on housing or cover.
    - (b) Check that screws and any connections are not loose or overtight.
  - (2) If you cannot see the source of the leak, repeat the maintenance task. Check the items listed below as you repeat the task.
    - (a) Check that preformed gasket is not bent, or pinched.
    - (b) Check machined surfaces for fit and cleanliness.
    - (c) Install new replacement parts.
  - (3) If the leak persists after you install a new part, report the problem to your supervisor.

## CHAPTER 2.1 TROUBLESHOOTING

# Section I. HOW TO USE TROUBLESHOOTING

## PURPOSE

The purpose of direct and general support maintenance level troubleshooting is to diagnose carrier problems which are reported to direct and general support maintenance. Troubleshooting tasks in this manual are common to all M113 FOV carriers except where indicated. You should not begin direct and general support maintenance troubleshooting until all operator and unit troubleshooting procedures have been completed. You will perform four actions in direct and general support maintenance troubleshooting:

- 1. Before starting a troubleshooting task, verify reported problem is present in carrier.
- 2. After verifying symptom, find part that is causing problem.
- 3. Replace or adjust that part.
- 4. Check to make sure problem no longer exists, and that there are no other problems.

## DEFINITIONS AND DESCRIPTIONS OF TROUBLESHOOTING PROCEDURES

Troubleshooting tasks always have a beginning and an end. You will use task steps, test procedures, indexes, maintenance tasks, and other technical manuals to troubleshoot. Troubleshooting uses the following terms that are not used in other kinds of tasks:

- 1. FAULT: The part that is not operating correctly and is causing problem.
- 2. **SYMPTOM:** The problem reported to direct and general support maintenance.
- 3. VERIFY NO FAULTS FOUND: After you have completed the corrective action, you must verify that no faults exist. If the fault condition still exists, then fault is not fixed or there is another fault. If this happens, start at beginning of troubleshooting procedure until you find and correct all faults. Always operate system and/or carrier to make sure that you have corrected the reported problem. If troubleshooting does not identify a faulty part, the earner is defective beyond the level of direct and general support maintenance.

## TROUBLESHOOTING BASICS

### **Troubleshooting Procedure**

.A troubleshooting procedure serves as a starting point for your troubleshooting work. You will branch in and out of procedures as you work to find a fault. Also, you will correct the fault, and check that the fault has been fixed. The parts of a troubleshooting procedure are given below.





(1)	TITLE	This is the name of procedure.
2	INTIAL SETUP	This tells you tools, materials/parts, personnel, references, and equipment conditions needed to do procedure.
3	TASK STEPS	These boxes give you step by-step instructions.
4	ILLUSTRATIONS	
5	QUESTIONS	This is the last step in YES blocks. The answer to this question will direct you to the next block.
6	REFERENCE LETTER	This will send you to the correct block to continue with trouble-shooting procedure.

### **TROUBLESHOOTING BASICS (cont)**

### Locating The Correct Troubleshooting Procedure

- 1. Component arrives at shop.
- 2. Read DA form 2404.
- 3. Verify that problem on DA form 2404 exists.
- 4. Look up carrier symptom in Troubleshooting Task Index, Section II, in this chapter, and go to that task.

### Perform The Troubleshooting Procedure

- 5. Make sure you have all items in INITIAL SETUP.
- 6. Perform required action(s) in Equipment Conditions.
- 7. Complete first block of task steps.
- 8. Refer to system schematic or diagram for system components, detail, and clarification.
- 9. Answer question at bottom of the first block.
- 10. Follow YES or NO arrows to the next block.
- Move from block to block. Answer questions and follow instructions. You may be directed to: do further checks and tests on parts; or go to another task.

### NOTE

After completing the actions called for on another page, return to the point in the troubleshooting procedure where you left off.

- 12. Locate fault and perform corrective action.
- 13. Check to make sure fault is corrected, and there are no new faults.
- 14. Button up by reinstalling items in Equipment Conditions after finishing troubleshooting task.

## TROUBLESHOOTING SAMPLE

The following sample takes you through a typical troubleshooting procedure.

## Finding The Right Troubleshooting Procedure

A component arrives at the shop. The DA form 2404 shows that the Patch Panel Box is not working. You look up Patch Panel Box Inoperative listed in Troubleshooting Task Index, Section II, in this chapter.

ТМ 9-2350-261-34							
Section II. TROUBLESHOOTING							
TASK INDEX							
<u>Task</u>	<u>Page</u>	<u>Task</u>	Page				
Vehicle Batteries Discharge W External AC Power Applied	ïth 2.1-9	Vehicle Will Not Accept E AC Power	xternal 2.1-44				
Patch Panel Box A10 Inoperati External Communication Box A Inoperative	ive 2.1-17 A11 2.1-35	No DC Output From DC F supply	Power 2.1-64				
2.1-8 Change 3							



### HOW TO USE TROUBLESHOOTING (cont)

This is the procedure you want.

Check title to make sure you are troubleshooting the correct system for the problem. Next, read the INITIAL SETUP carefully. Make sure you have all items listed in INITIAL SETUP. Some access steps in Equipment Conditions may not need to be performed depending on fault location. It's up to you to decide which are necessary for your particular problem.

TM 9-2350-261-34

### NO POWER FROM CURBSIDE AC POWER EXTENSION BOX A7

### **INITIAL SETUP**

Tools:

General Mechanic's Tool Kit (Item 35, App B) Digital multimeter (Item 62, App B)

Personnel Required:

Power-generation Equipment Repairer 52D10 Equipment Repairer 52D10

References:

See your -10 See your -20 TM 11-7010-256-12&P

Equipment Conditions: Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Now you're ready to begin troubleshooting. Look at the first block. Read step 1. If the answer to the question, "Has the bevel gear backlash been adjusted?" is YES, follow the YES arrow to the next box. Read step 1. If the answer to the question, "Has shaft gear bearing been adjusted?" is YES, follow the YES arrow to the next box. Follow the same procedure or each box. If you reach the last box on this page and the answer to the question, "IS bevel gear set undamaged?" is YES, follow the YES arrow to the reference letter



This is how (A) appears on the following page. Do steps 1 and 2. In this sample, if the answer to step 2 is NO, follow N arrow to next block.



### HOW TO USE TROUBLESHOOTING (cont)

The NO arrow takes you to this box. You have decided the drum brake is not serviceable. This box gives you the step to correct the fault. Do step 1. It tells you to go to another task in the manual. Go to the page shown and perform the task. Return to this box when you have completed task.



Step 2 in this box is "Verify no faults found." You must check to make sure you have correctly fixed the fault. After no faults found has been verified, return carrier to operation. This is the end of troubleshooting sample.

# Section II. TROUBLESHOOTING

## TASK INDEX

Task	Page	Task	Page
Vehicle Batteries Discharge With External AC Power Applied	.2.1-9	Vehicle Will Not Accept External AC Power	2.1-44
Patch Panel Box A10 Inoperative 2 External Communication Box All Inoperative	1-17 .1-35	No DC Output From DC Power Supply	2.1-64

# VEHICLE BATTERIES DISCHARGE WITH EXTERNAL AC POWER APPLIED

## **INITIAL SETUP**

### Tools:

General Mechanic's Tool Kit (Item 35, App B) Digital multimeter (Item 62, App B) Fabricated Tool (page 2-4 Sec III f(1))

### **Personnel Required:**

Power-Generation Equipment Repairer 52D10 Helper (H)

#### **References:**

See your -10 See your -20

### References (cont):

TM 11-7010-256-12&P See M1068 wiring diagram (see your -20, FO -9 thru -11)

#### **Equipment Conditions:**

Power control enclosure removed (see your -20) Power control enclosure power supply cover removed (see your -20) Unit Level troubleshooting completed (see your -20)

#### WARNING

HIGH VOLTAGE is used in the operation of this equipment.

DEATH ON CONTACT may result if personnel fail to observe safety precautions.

NEVER work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. SHUT OFF POWER supply to equipment before beginning work. Make sure all external power is off/disconnected. BE CAREFUL not to contact high-voltage connections when installing or operating this equipment.

GO TO NEXT PAGE





 Replace power supply PS1 (page 6-118).
Verify no faults found.

GO TO NEXT PAGE











## PATCH PANEL BOX A10 INOPERATIVE

## **INITIAL SETUP**

### Tools:

Electrical Tool Kit (Item 31, App B) Digital multimeter (Item 62, App B)

### **Personnel Required:**

Radio Repairer 29E10 Helper (H)

### **References:**

See your -10 See your -20 See M1068 wiring diagram (see your -20, FO -9 thru -11)

### **Equipment Conditions:**

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10)

#### WARNING



HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may

result if personnel fail to observe safety precautions.

NEVER work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. SHUT OFF POWER supply to equipment before beginning work. Make sure all external power is off/disconnected.

BE CAREFUL not to contact high-voltage connections when installing or operating this equipment.

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# INSTRUCTIONS FOR TESTING PATCH PANEL BOX A10

Insert patch cable (1) into post(s) to be checked on PATCH PANEL BOX A10 (2), use a multimeter (3) from jack J136 socket(s) (4) to other end of patch cable, at test point(s) (5), follow the Wiring Diagram (see page 2.1-21):



### WIRING DIAGRAM


















GO TO NEXT PAGE

(F1)
(Con't) Post 9 (Top) to socket 18 Post 10 (Bot) to socket 20 Post 11 (Bot) to socket 21 Post 11 (Top) to socket 22 Post 12 (Bot) to socket 23 Post 12 (Top) to socket 24 Post 13 (Bot) to socket 25 Post 13 (Top) to socket 26 Post 14 (Bot) to socket 27 Post 14 (Top) to socket 28 Post 15 (Bot) to socket 29 Post 15 (Bot) to socket 30 Post 16 (Bet) to socket 31 Post 16 (Bet) to socket 32 Post 17 (Bet) to socket 33 Post 17 (Top) to socket 34 Post 18 (Bet) to socket 35 Post 18 (Bet) to socket 37 Post 19 (Bot) to socket 38 Post 20 (Bot) to socket 38 Post 20 (Top) to socket 44 Post 21 (Bet) to socket 43 Post 22 (Top) to socket 44 Post 23 (Bet) to socket 43 Post 23 (Bet) to socket 44 Post 23 (Bet) to socket 44 Post 23 (Bet) to socket 45 Post 24 (Top) to socket 46 Post 25 (Bot) to socket 47 Post 26 (Top) to socket 48 Post 25 (Bot) to socket 49 Post 26 (Top) to socket 48 Post 25 (Bot) to socket 51 Post 26 (Top) to socket 51 Post 26 (Top) to socket 52
3. Does multimeter read 0 ohms for each measurement?





GO TO NEXT PAGE







# EXTERNAL COMMUNICATION BOX A11 INOPERATIVE

## **INITIAL SETUP**

### Tools:

Electrical Tool Kit (Item 31, App B) Digital multimeter (Item 62, App B)

#### **Personnel Required:**

Radio Repairer 29E10 Helper (H)

#### **References:**

See your -10 See your -20 See M1068 wiring diagram (see your -20, FO-9 thru -11)

#### **Equipment Conditions:**

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10)

# Ż

HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may result if personnel fail to

WARNING

NEVER work on equipment unless at

least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas. SHUT OFF POWER supply to equipment before beginning work. Make sure all external power is off/disconnected. BE CAREFUL not to contact high-voltage connections when installing or operating

this equipment.

GO TO NEXT PAGE











	Con't												
2	Pin Pin Pin Pin Pin Pin Pin Pin Pin Pin	13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	to t	Pin Pin Pin Pin Pin Pin Pin Pin Pin Pin	7A 7B 8A 9B 10A 10B 11A 11B 12A 13A 13B 14A 15B 16A 16B		Pin Pin Pin Pin Pin Pin Pin Pin Pin Pin	33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 9 50 51 2	to t	Pin Pin Pin Pin Pin Pin Pin Pin Pin Pin	17A 17B 18A 19B 20A 20B 21A 22B 22A 22B 23A 23B 24A 24B 25A 25B 26A 26B		
J. Does multimeter read o omnis for each measurement:													
								_					

YES E2

GO TO NEXT PAGE





1. Verify no faults found.

## VEHICLE WILL NOT ACCEPT EXTERNAL AC POWER

## **INITIAL SETUP**

#### Tools:

General Mechanic's Tool Kit (Item 35, App B) Digital multimeter (Item 62, App B)

#### **Personnel Required:**

Power-Generation Equipment Repairer 52D10 Helper (H)

#### **References:**

See your -10

#### References (cont):

See your -20 TM 11-7010-256-12&P See M1068 wiring diagram (see your -20, FO -9 thru -11)

#### **Equipment Conditions**

Power control enclosure removed (see your -20) Unit Level troubleshooting completed (see your -20)

#### WARNING



HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may

result if personnel fail to observe safety precautions.

NEVER work on equipment unless at least one other person familiar with the operation and hazards of the equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechcanic, that operator must be warned about dangerous areas.

SHUT OFF POWER supply to equipment before beginning work. Make sure all external power is off/disconnected. BE CAREFUL not to contact high-voltage connections when installing or operating

this equipment.

A YES















Change 3 2.1-51







10

1. Replace K1 relay (page 6-105).
2. Verify no faults found.







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GO TO NEXT PAGE



- Replace jumper lead 8E (page 6-99 and 6-105).
   Verify no faults found.



## GO TO NEXT PAGE





## NO DC OUTPUT FROM DC POWER SUPPLY

## INITIAL SETUP

### Tools:

General Mechanic's Tool Kit (Item 35, App B) Digital multimeter (Item 62, App B) Fabricated Tool (page 2-4 Sec III f(1))

#### **Personnel Required:**

Power-Generation Equipment Repairer 52D10 Helper (H)

#### **References:**

see your -10 See your -20 TM11-7010-256-12&P See M1068 wiring diagram (see your -20, FO -9 thru -11)

#### **Equipment Conditions:**

Power control enclosure removed (see your -20) Power control enclosure faceplate lowered and power supply cover removed (see your -20) Unit Level troubleshooting completed (see your -20)

#### WARNING



HIGH VOLTAGE is used in operation of this equipment.

DEATH ON CONTACT may result if personnel fail to observe safety precautions.

NEVER work on equipment unless at least one other person familiar with operation and hazards of equipment is nearby. That person should also be familiar with giving first aid. When an operator helps a mechanic, that operator must be warned about dangerous areas.

SHUT OFF POWER supply to equipment before beginning work. Make sure all external power is OFF/disconnected. BE CAREFUL not to touch high-voltage connections when installing or operating this equipment.












# CHAPTER 3 MAINTENANCE OF POWER PLANT

# TASK INDEX

Task	Page	Task	Page
BlockPowerPlant	3–2	Remove/Install Transfer Gearcase	3–18
Remove/Install Transmission	3-4	Replace Transfer Gearcase	. 3–25
Replace Transmission	3-14	Replace Engine	
Replace Transfer Gearcase Pulley (200 amp generator only)	3-16	Repair 100 Amp Generator Fuel Filter Mounting Bracket	. 3–52

# **BLOCK POWER PLANT**

### **INITIAL SETUP**

#### Tools:

Lifting Sling (Item 84. App B)

### Materials/Parts:

All blocks are made from surfaced dimensioned lumber. Dimensions are in inches with metric equivalents.

Lumber 4 x 6 x 18 (10 x 15 x 46 cm) (5) Lumber 4 x 6 x 10 (10 x 15 x 25 cm) Lumber 2 x 4 x 18 ( $5 \times 10 \times 46 \text{ cm}$ ) Lumber 2 x 4 x 10 ( $5 \times 10 \times 25 \text{ cm}$ ) Lumber 1 x 4 x 10 ( $3 \times 10 \times 25 \text{ cm}$ ) Wiping rag (Item 86, App C)

# **BLOCK POWER PLANT**



#### WARNING

You could get hurt if power plant is not blocked to prevent sudden movement of a component. Block power plant as shown before you attempt any





#### WARNING

Hanging loads could kill or injure you. Keep away horn hanging loads and overhead equipment. Keep hands out of engine compartment while power

unit is being removed or installed.

1. Use a lifting device of at least 2,500 lb (1, 135 kg) capacity and sling to lift power plant. Have helper (H) assist.

#### **Personnel Required:**

Track Vehicle Repairer 63H10 Helper (H)

#### **References:**

See your -20

#### Equipment Conditions:

Power plant removed from carrier (see your -20)

- On level ground, place two 4 x 6 x 18 inch (10 x 15 x 46 cm) blocks (1) under front of engine. Place blocks parallel to each other with 6 inch side down. Blocks should be about 18 inches (46 cm) apart from outside edges.
- Stack two 4 x 6 x 18 inch (10 x 15 x 46 cm) blocks (2) on top of each other. Place blocks (2) on top of blocks (1) at a 90 degree angle. Blocks will be about 10 1/2 inches (24 cm) high.



- 4. Stack a 4 x 6 x 10 inch (10 x 15 x 25 cm) block (1), a 2 x 4 x 10 inch (5 x 10 x 25 cm) block (2), and a 1 x 4 x 10 inch (3 x 10 x 25 cm) block (3) under transmission side of transfer gearcase. Blocks should be 8 inches (20 cm) high.
- 5. Stack a 4 x 6 x 18 inch (10 x 15 x 46 cm) block (4) and a 2 x 4 x 18 inch (5 x 10 x 46 cm) block (5) under rear of engine. Blocks should be about 7 inches (16 cm) high.
- 6. Lower power plant slowly down onto blocks. Check that power plant is firmly supported by the blocks.
- 7. Cover air inlet housing (6). Use wiping rag.



# FOLLOW-THROUGH STEPS

1. Install power plant in carrier (see your -20).

END OF TASK

# REMOVE/INSTALLTRANSMISSION

### DESCRIPTION

This task covers: Remove (page 34). Install (page 3-8).

### **INITIAL SETUP**

### Tools

General Mechanics Tool Kit (Item 35, App B) Torque Wrench (Item 112, App B) Torque Wrench (Item 117, App B) Transmission Hoisting Adapter (Item 1, App B)

#### Materials/Parts:

Antiseize compound (Item 8, App C) Container, 1 quart (1 liter) Key washer (5) Sealing compound (Item 70, App C) Sealing compound primer (Item 74, App C) Self-locking nut (2) Self-locking nut (8) Self-locking nut

#### **Personnel Required:**

Track Vehicle Repairer 63H10 Helper (H)

References:

See your LO See your -20

#### **Equipment Conditions:**

Power plant removed from carrier (see your -20) Power plant blocked (page 3–2)

# REMOVE

### NOTE

If you need to replace the engine, transmission, or transfer gearcase, drain the oil from each BEFORE power plant is removed from carrier.

Cap or cover openings where fuel, oil, or coolant lines or fittings have been removed.

- Remove two screws (1), locknuts (2), clamps

   (3), and power plant wiring harness (4) from cross-shaft bracket (5). Discard locknuts.
- 2. Remove screw (6), locknut (7) and governor lever (8) from bracket (9). Discard locknut.



- 3. Remove two locknuts (1) and screws (2). Remove throttle valve link (3) from throttle valve arm (4). Remove range selector control link (5) from range selector control arm (6). Discard locknuts.
- 4. Remove two oil cooler hoses (7) from two elbows (8).
- (11) and bracket (12) from transmission. Discard key washer.

6 Remove two screws (13), washers (14) and clamps (15) that secure two air box drain hoses (16) to transmission.



GO TO NEXT PAGE

- 7. Remove two screws (1) and access cover (2) from transfer gearcase. Release engine disconnect lever (3).
- 8. Turn transmission drive shaft and remove six locknuts (4) as they appear in the access opening. Discard locknuts.
- 9. Place a 1 quart (1 liter) container under filter assemblies (5 and 6).
- 10. Remove drain plugs (7 and 8) from filter assemblies (5 and 6), Allow oil to drain.
- 11. Disconnect two engine oil hoses (9) from two pipe to tube elbows (10) on engine oil filter (5).
- 12. Disconnect two differential oil hose6 (11) from two pipe to tube elbows (12) and adapter (13) on differential oil filter (6).
- 13. Remove dipstick (14) from filler tube (15).
- 14. Disconnect vent tube (16) from elbow (17).
- 15. Remove screw (18), key washer (19), and filler tube (15) from filter bracket (20). Discard key washer.
- 16. Loosen filler neck tube nut (21), Remove filler tube (15) from transmission.



3)

3-6

### NOTE

Be careful not to damage or lose washers. You will need them for assembly.

- 17. Remove three elbows (1) from engine oil filter (2).
- Remove two nuts (3), washers (4), clamps (5) and engine oil hose (6) from two filter mounting screws (7). Replace nuts and washers back on mounting screws.
- 19. Remove three screws (8), key washers (9) and filter bracket (10) with filters from transmission. Discard key washers.
- <sup>20.</sup> Remove two screws (11), washers (12) and engine disconnect handle bracket (13) from transmission.



21. Use four filter bracket mounting screws (1) to secure transmission hoisting adapter to transmission.



WARNING

Hanging loads can kill or injure you. Keep away from hanging loads and overhead equipment. Keep hands away from pinch points. Transmission is

heavy. Have helper (H) assist. Use a lifting device.

22. Attach a lifting device of at least 400 lb (182kg) capacity to transmission hoisting adapter. Have helper (H) assist.

### ΝΟΤΕ

Screws are different sizes. Tag or mark screws for different sizes when removing. Each screw has to be installed in the same place as it was removed.

 Remove 10 short screws (2), two long screws (3), and washers (4). Detach transmission and air box drain can bracket (5) from transfer gearcase. Have helper assist. "



# INSTALL

- 24. Use four filter bracket mounting screws (1) to secure transmission hoisting adapter to transmission.
- 25. Attach a lifting device of at least 400 lb (182 kg) capacity to transmission hoisting adapter. Have helper assist.
- 26. Position transmission on transfer gearcase. Turn transmission drive-shaft until transmission torque converter studs align with transfer gearcase drive plate holes. Have helper assist.
- 27. Apply a thin coat of antiseize compound to cleaned threads of 12 screws (2) and (3).

### NOTE

Screws are different sizes. Each screw has to be installed in the same place as it was removed.

 Align transmission and air box drain can bracket (5) with transfer gearcase. Secure with 10 short screws (2), two long *screws* (3), and washers (4). Have helper (H) assist. Tighten each screw to 252–300 in-lb (28–34 N.m) torque. Use torque wrench. Loosen and retighten to 21-25 lb-ft (28-34 N.m) torque. Use torque wrench.



29. Secure converter studs to drive plate with six new locknuts (1). Tighten nuts to 37–40 lb-ft (50–54 N.m) torque. Use torque wrench.



- 30. Remove four filter bracket screws (2) and transmission hoisting adapter from transmission.

- Install engine quick disconnect handle bracket (3) on transmission. Secure with two screws (4) and washers (5).
- 32. Apply a thin coat of antiseize compound to cleaned threads of three screws (2).
- 33. Install filter bracket (6) with filters on transmission. Secure with three new key washers (7) and screws (2).
- Connect two differential oil hoses (8) to pipe to tube elbow (3) and adapter (10) on differential oil filter (11).



- 35. Install filler tube (1) in transmission. Secure with nut (2).
- 36. Apply a thin coat of antiseize compound to cleaned threads of screw (3).
- 37. Secure filler tube (1) to filter bracket (4) with screw (3) and new tab washer (5).
- 38. Before installation, remove nuts (6) and washers (7) that were left on filter bracket mounting screws (8).
- 39. Install two clamps (9) and engine oil hose (10) on filter bracket mounting screws (8), secure with two washers (7) and nuts (6).

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- 40. Connect vent tube (11) to elbow (12) on filler tube (1).
- 41. Install dipstick (13) in filler tube (1).
- 42. Install three elbows (14) on engine oil filter (15).
- 43. Connect two differential hoses (16) to elbow (17) and adapter (18) on differential oil filter (19).
- 44. Connect two engine oil hoses (20) on elbow (15) on engine oil filter (15).
- 45. Apply a thin, even coat of primer and then sealing compound to cleaned external threads of drain plugs (21 and 22). Do not apply primer or sealing compound beyond small end of threads.
- 46, Install drain plugs (21 and 22) in filter assemblies (15 and 19).



- 47. Secure access cover (1) to transfer gearcase with two screws (2). Engage engine quick disconnect lever (3).
- Install two air box drain hoses (4) on transmission. Secure with two clamps (5), washers (6) and screws (7). Tighten screws to 180–216 in-lb (20–24 N.m) torque. Use torque wrench.



GO TO NEXT PAGE

- 49. Connect two oil cooler hoses (1) to two elbows (2).
- 50. Install clamp (3) and bracket (4) on transmission. Secure with screw (5) and new key washer (6).
- Install throttle valve link (7) on throttle valve arm (8). Install range selector control link (9) on range selector control arm (10). Secure with two screws (11) and new locknuts (12).



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- 52. Secure governor lever (1) to bracket (2) with 54. Fill transmission (see your LO). screw (3) and new locknut (4).
- 53. Install power plant wiring harness (5) on cross-shaft bracket (6). Secure with two screws (7), new locknuts (8) and clamps (9).

55. Check engine oil level (see your LO).

### ΝΟΤΕ

When you replace a transmission, make sure you record the serial number on DA form2408-10.



# FOLLOW-THROUGH STEPS

- 1. Install power plant in carrier (see your -20).
- Adjust engine power disconnect (see your -20).

END OF TASK

# **REPLACE TRANSMISSION**

# DESCRIPTION

This task rovers: Remove (page 3-14). Install (page 3-15).

## INITIAL SETUP

#### Took

General Mechanics Tool Kit (Item 35, App B) Adapter (Item 1, App B)

#### Materials/Park

Antiseize compound (Man 8, App C) Key wader (2) Packing (2) **Sealing compound** (item 70, App C) Sealing compound primer (Item 74, App C) self-locking nut

#### Personnel Required:

Track Vehicle Repairer 63H10

#### **References:**

See your LO see your -20

### **Equipment Conditions:**

Transmission oil drained **(see** your LO) Power plant removed (see your -20) Power plant blocked (page 3-2) Transmission removed from transfer gearcase (page 3-4)

# REMOVE

### CAUTION

Cap or cover openings where fuel, oil, or coolant lines or fittings have been removed.

- 1. Remove two elbows (1) and packings (2) from transmission. Discard packings.
- 2. Disconnect vent tube (3) from vent tube elbow (4).
- 3. Remove vent tube elbow (4) from transmission.
- Remove two screws (5), key washers (6), and cross-shaft bracket (7) from transmission. Discard key washers.
- 5. Remove locknut (8), screw (9), and throttle valve arm (10) from transmission shaft (11). Discard locknut.
- 6. Remove nut (12), screw (13), and range selector arm (14) from transmission shaft (11).



- INSTALL
- 7. Apply a thin coat of antiseize compound to cleaned t breads of two screws (1).
- 8. Install cross-shaft bracket (2) on transmission. Secure with two screws (1) and new key washers (3).
- 9.Apply a thin, even coat of primer and then sealing compound to cleaned external threads of vent tube elbow (4). Do not apply primer or sealing compound beyond small end of threads.
- 10. Install vent tube elbow (4) in transmission.
- 11. Connect vent tube (5) to vent tube elbow (4).

- Apply a thin, even coat of primer and then sealing compound to cleaned external threads of elbows (6). Do not apply primer or sealing compound beyond small end of threads.
- 13. Install two new packings (7) and elbows (6) in transmission.
- 14. Position range selector arm (8) on transmission shaft (9) with offset side of arm toward transmission and clamping screw hole aligned with flat on shaft. Secure with screw (10) and nut (11).
- 15. Position throttle valve arm (12) on transmission shaft (9) with offset side of arm away from transmission and clamping screw hole aligned with flat on shaft. Secure with screw (13) and new locknut (14).



- 1. Install transmission on transfer gearcase (page 3-4).
- 2. Install power plant in carrier (see your -20).
- 3. Fill transmission (see your LO).

5

END OF TASK

# REPLACE TRANSFER GEARCASE PULLEY (200 AMP GENERATOR ONLY)

# DESCRIPTION

This task covers: Remove (page 3-16). Install (page3-17).

# **INITIAL SETUP**

### Tools:

General Mechanics Tool Kit (Item 35, App B) Retaining Ring Pliers (Item 64, App B) Snap Ring Pliers (Item 69, App B) Torque Wrench (Item 117, App B)

#### Materials/Parts:

Key washer (1) Preformed packing seal

# REMOVE

- Remove four cap screws (1) and key washers (2) from drive pulley assembly and transfer gearcase (3). Separate drive pulley assembly from transfer gearcase. Discard key washers.
- 2. Remove shim (4) and preformed packing (5) from transfer gearcase (3). Discard packing.
- 3. Remove plug (6). drive pulley (7) and seal (8) from drive bearing plate (9). Discard seal.
- Remove snap ring (10), two retaining rings (11), bearings (12) and spacer (13) from drive bearing plate (9). Use retaining ring pliers and snap ring pliers.



Track Vehicle Repairer 63H10

### References:

See your -10 See your -20

# Equipment Conditions:

Generator drive belt removed (see your -20)



### INSTALL

- 5. Install new seal (1) on drive bearing plate (2).
- Install snap ring (3), two retaining rings (4), two bearings (5) and spacer (6) on drive bearing plate (2). Use retaining ring pliers and snap ring pliers.
- 7. Install plug (7) and drive pulley (8) on drive bearing plate (2).

CAUTION Align oil hole in housing with oil hole in case.

- 8. Install new preformed packing (9) and shim (10) in transfer gearcase (11).
- Align drive pulley assembly on transfer gearcase (11). Secure with four new key washers (12) and cap screws (13). Tighten screws to 252–300 lb-in (28-33 N.m) torque. Use torque wrench.



# FOLLOW-THROUGH STEPS

1. Install generator drive belt (see your -20).

END OF TASK

# REMOVE/INSTALL TRANSFER GEARCASE

# DESCRIPTION

This task covers: Remove (page 3-18). Install (page 3-21).

### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Torque Wrench (Item 117, App B)

#### Materials/Parts:

Antiseize compound (Item 8, App C) Cotter pin Key Washer (5) Packing (3)

### **Personnel Required:**

Track Vehicle Repairer 63H10

### REMOVE

### CAUTION

Cap or cover openings where fuel oil, coolant, or hydraulic lines or fittings have been removed.

#### NOTE

[f you need to replace the engine, transmission, or transfer gearcase, drain the oil from each BEFORE power plant is removed from earner.

- 1. Drain hydraulic system (see your LO).
- Remove screw ,1), key washer (2), and clamp (3) that secure hydraulic hose (4) to transfer gearcase. Liscard key washer.
- 3. Disconnect hydraulic hose (4) from pump adapter (5).
- 4. Disconnect hydraulic hose (6) from pump elbow (7).

### Personnel Required (cont):

Helper (H)

#### **References:**

See your LO See your -20

#### **Equipment Conditions:**

Power plant removed (see your -20) Power plant blocked (page 3-2) Transmission removed from transfer gearcase (page 3-4)



- 5. Remove screw (1) that secures clamp (2) and oil filler tube (3) to hydraulic tank (4).
- Remove four screws (5), key washers (6), and hydraulic tank (4) from transfer gearcase. Discard key washers.



- Remove cotter pin (7) and headed pin (8) that secure engine quick disconnect/connect handle (9) to disconnect arm (10). Discard cotter pin.
- Remove headless pin (11) securing disconnect arm (10) to shaft (12) on transfer gearcase. Remove arm.



- 9. Loosen locknut (1) on rod end (2).
- 10. Turn turnbuckle (3) to the left to loosen two generator drive belts (4).

### ΝΟΤΕ

There can be different generator components on transfer gearcase. Refer to TM 9-2350-261-20 for 200 amp generator maintenance components (M577A2 and M1068 only).

11. Remove two generator drive belts (4) from generator pulley (5) and transfer gearcase pulley (6).



12. Remove nut (7), screw (8), and turnbuckle (3) from idler arm bracket (9).

### ΝΟΤΕ

If pump is to be replaced, follow steps 13 thru 16.

- 13. Drain transfer gearcase (see your LO).
- 14. Disconnect differential oil hose (10) from elbow (11).
- 15. Remove quick disconnect half (12) and packing (13) from elbow (14). Discard packing.
- 16. Remove nut (15), elbow (14), retainer (16), and packing (17) from differential oil pump (18). Discard packing.
- 17. Remove elbow (11) and packing (19) from differential oil pump (18). Discard packing.



- **18.** Remove 9 screws (1) and washers (2) from engine and transfer gearcase.
- **19.** Remove one long screw (3) and washer(4).

NOTE One screw and washer is trapped in engine bell housing.

#### WARNING

Lifting or moving objects in excess of 70 pounds could injure you. Make sure to get an assistant and use a lifting device to move transfer gearcase or other heavy objects.

- 20. Attach a lifting device of at least 200 lb (91 kg) capacity to the transfer gearcase. Have helper assist.
- 21. Remove two screws (5) and washers (6). Detach transfer gearcase from engine. Have helper assist.

### **INSTALL**

- 22. Apply a thin coat of antiseize compound to cleaned threads of 12 screws removed (1, 3 and 5),
- 23. Attach a lifting device of at least 200 lb (91 kg) capacity to transfer gearcase. Have helper assist.
- 24. Align transfer gearcase with engine. Have helper assist.
- 25. Install two screws (5) and washers (6).
- 26. Install one long screw (3) and washer (4).
- n. Secure transfer gearcase to engine with 9 screws (1) and washers (2). Tighten all 12 screws to 252-300 in-lb 2S-34 N-m) torque. Use torque wrench. Loosen and retightento 252-30 in-lb (28-34 N-m torque.



### GO TO NEXT PAGE

NOTE If pump has been replaced, follow steps 28 thru 30.

- 28. Install new packing (1) and elbow (2) in differential oil pump (3).
- 29. Install nut (4) on elbow (5).
- 30. Install new packing (6), retainer (7), and elbow (5) in differential oil pump (3).
- 31. Install new packing (8) and quick disconnect half (9) on elbow (5).
- 32. Connect differential oil hose (10) to elbow (2).
- Install turnbuckle (11) on idler arm bracket (12). Secure with screw (13) and nut (14).

NOTE When replacing generator drive belts, replace in matched sets only. There can be different generator components on transfer gearcase. Refer to TM 9-2350-261-20 for 200 amp generator maintenance components (M577A2 and M1068 only).

34. Install two generator drive belts (15) on generator pulley (16) and transfer gearcase pulley (17).

### ΝΟΤΕ

Check alignment of generator pulley with transfer gearcase drive pulley. If necessary, position generator bracket until pulleys are alined within 1/8 inch (3 mm).

- 35. Turn tumbuckle (11) to the right until belt deflection at midspan is 1/2 to 5/8 inch (13 to 16 mm) when measured with machinist rule.
- 36. Tighten locknut (18) on rod end (19).





- 37. Install disconnect arm (1) to shaft (2) on transfer gearcase. Secure with headless pin (3).
- Install engine quick disconnect/connect handle (4) on disconnect arm (I). Secure with headed pin (5) and new cotter pin (6).



- 39. Apply a thin coat of antiseize compound to cleaned threads of four screws (7).
- 40. Install hydraulic tank (8) on transfer gearcase. Secure with four screws (7) and new key washers (9).
- 41. Secure clamp (10) and oil filler tube (11) to hydraulic tank (8) with screw (12).



- 42. Connect hydraulic hose (1) to pump elbow (2).
- 43. Connect hydraulic hose (3) to pump adapter (4).
- 44. Install clamp (5) and hydraulic hose (3) on transfer gearcase. Secure with screw (6) and new key washer (7). Tighten screw to 144 to 192 in-lb (16 to 22 N.m) torque. Use torque wrench.
- 45. Fill hydraulic system (see your LO).
- 46. Fill transfer gearcase (see your LO).



# FOLLOW-THROUGH STEPS

2. Install power plant in carrier (see your -10). 1. Install transmission on transfer gearcase (page 3-4).

END OF TASK

# REPLACE TRANSFER GEARCASE

### DESCRIPTION

This task covers: Remove (page 3–25). Install (Page 3–27).

# INITIAL SETUP

### Tools:

General Mechanics Tool Kit (Item 35, App B) Torque Wrench (Item 117, App B)

#### Materials/Parts:

Antiseize compound (Item 8, App C) Cotter pin (3) Gasket (2) Key washer (7) Lockwasher Preformed packing Spring pin

#### **Personnel Required:**

Track Vechicle Repairer 631-110 Helper (H)

#### REMOVE

#### CAUTION

Cap or cover openings where fuel, oil, or coolant lines or fittings have been removed.

#### ΝΟΤΕ

Carriers with a 200 amp generator have a different generator drive pulley than carriers with a 100 amp generator. Check that the new transfer gearcase has the proper generator drive pulley for your carrier. If not, remove generator drive pullev assembly from unserviceable transfer gearcase. Inspect drive assembly. If serviceable, install drive assembly in new transfer gearcase. If unserviceable, install new drive assembly in transfer gearcase. Install improper or unserviceable drive assembly in unserviceable transfer See gearcase. TM9-2520-238-34 and TM9-2520-238-34P.

#### **References:**

See your LO) See your -20 TM9-2520-238-34 TM9-2520-238-34P

#### **Equipment Conditions:**

Power plant removed (see your -20) Power plant blocked (page 3-2) Transmission removed from transfer gearcase (page 3-4) Transfer gearcase removed from engine (page 3-18)

- Remove three screws (1), two key washers (2) One lockwashers (3), one flat washer (4) and idler arm bracket (5) from transfer gearcase. Discard key washers and lockwasher.
- 2 Remove two cotter pins (6), straight pins (7) and two fan idler assemblies (8 and 9) with idler arm bracket (5) from transfer gear-case. Discard cotter pins.



GO) TO NEXT PAGE

- 3. Remove screw (1), washer (2), key (3) and fan drive pulley (4) from secondary intermediate gear (5).
- 4. Remove spring pin (6) and lever (7) from actuator (8). Discard spring pin.
- 5. Remove two screws (9), key washers (10), flange (11 ) and packing (12) from secondary pump drive gear (13). Discard key washers and packing.
- 6. Remove coupling (14) and retaining ring (15) from ramp pump (16).
- 7.. Remove four screws (17), ramp pump (16) and gasket (18) from flange (11). Discard gasket.

- 8. Remove cotter pin (19), nut (20) and washer (21) that secure differential oil pump (22) to secondary pump (drive Rear (23). Discard cotter pin.
- 9. Remove two screws (24) key washers (25) that secure differential pump (22) and gasket (26) to transfer gearcase. Discard gasket and key washers.
- 10. Remove differential oil pump (22), retaining ring (27) and key (28) from drive gear (23).

22

(25)



# INSTALL

- 11. Place new gasket (1) on differential oil pump (2).
- 12. Install differential pump (2) with key (3) and retaining ring (4) in secondary pump drive gear (5).
- 13. Apply a thin coat of antiseize compound to cleaned threads of two screws (6).
- Install differential oil pump (2) on transfer gearcase. Secure with two screws (6) and new key washers (7). Tighten screws to 420-480 in-lb (47–54 N.m) torque. Use torque wrench.
- 15. Install differential pump (2) on drive gear (5). secure with washer (8), nut (9) and new cotter pin (10).

- Install ramp pump (11) and new gasket
   (12) in flange (13). Secure with four screws
   (14), and retaining ring (15).
- 17. Install coupling (16) on secondary pump drive gear (17).
- 18. Place new packing (18) on flange (13).
- 19. Install ramp pump (11) shaft in coupling (16).
- Install flange (13) on transfer gearcase. Secure with two screws (19) and new key washers (20). Tighten screws to 144-180 in-lb (16–20 N.m) torque. Use torque wrench.
- 21. Secure lever (21) on actuator (22) with new spring pin (23).





#### ΝΟΤΕ

Carriers with a 200 amp generator have a different generator drive pulley than carriers with a 100 amp generator. Check that the new transfer gearcase has the proper generator drive pulley for your carrier. If not. remove generator drive pulley assembly from unserviceable transfer gearcase. Inspect drive assembly. If serviceable, install drive assembly in new transfer gearcase. If unserviceable, install new drive assembly in transfer gearcase. Install improper or unserviceable drive assembly in unserviceable transfer gearcase. See TM9-2520-238-34 and TM9-2520-238-34P.

- <sup>22.</sup> Install fan drive pulley (1) on secondary intermediate gear (2). Secure with screw (3), washer (4) and key (5).
- Install two fan idler assemblies (6 and 7) on transfer gearcase. Secure with two straight pins (8) and two new cotter pins (9).
- 24. Apply a thin coat of antiseize compound to cleaned threads of three screws (10).
- 25. Install idler arm bracket (11) and idler arm assemblies (6 and 7) on transfer gearcase. Secure with three screws (10), two new key washers (12), one new lock washer (13), and one flat washer (14).



# FOLLOW-THROUGH STEPS

- 1. Install transfer gearcase on engine (page 3-18).
- Install transmission on transfer gearcase (3-4).
- 3. Install power plant in carrier (see your -20).

END OF TASK

# REPIACE ENGINE

### DESCRIPTION

This task covers: Remove (page 3-29). Install (page 3-40).

# INITIAL SETUP

### Tools:

General Mechanics Tool Kit (Item 35, App B) Lifting Sling (Item 84, App B) Open End Box Wrench (Item 108, App B) Torque Wrench (Item 114, App B) Torque Wrench (Item 117, App B)

### Materials/Parts:

Antiseize compound (Item 8, App C) Sealing compound (Item 70, App C) Sealing compound (Item 71, App C) Sealing compound primer (Item 74, App C) Container, 1 gallon (4 liters) Fuel filter Gasket (4) Key washer (9) Lockwasher (7) Oil falter Self-locking nut (8)

#### **Personnel Required:**

Track Vehicle Repairer 63H10 Helper (H)

### **References:**

See your LO See your -20

#### **Equipment Conditions:**

Engine oil drained (see your LO) Power plant removed from carrier (see your -20) Power plant blocked (page 3-2) Transmission removed from transfer gearcase (page 3-4) Transfer gearcase removed from engine (page 3-18)

### REMOVE

### CAUTION

Cap or cover openings where fuel, oil, coolant, or hydraulic lines or fittings have been removed.

- 1. Disconnect clamp (1) and coolant tube (2) from deaeration elbow (3). Remove from engine.
- Remove two screws (4) and key washers (5) from thermostat housing cover (6). Remove deaeration elbow (3) with hose (7), clamp (8), elbow (9), and gasket (10) from cover (6). Discard key washers and gasket.



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- Remove two screws (1), key washers (2), oil cooler elbow (3), and gasket (4) from engine. Discard gasket and key washers.
- 4. Disconnect power plant wiring harness circuit 406 lead (5) from air box heater wiring harness connector (6).
- Remove screw (7), lockwasher (8), and three ground leads (9) from air box heater bracket (10). Discard lockwasher.
- Disconnect power plant wiring harness circuit
   33 lead (11) from coolant temperature sending unit (12).



- <sup>'</sup>i. Disconnect power plant wiring harness circuit 34 lead (1) from engine low oil pressure switch (2).
- Disconnect power plant wiring harness circuit 327 lead (3) from transmission oil temperature sending unit (4).





GO TO NEXT PAGE
- Disconnect power plant wiring harness circuits
   1A and 1B lead (1) from field switch (2) at secondary fuel filter ~ 3).
  - 11. Remove nut (8), (screw on Prestolite). two lockwashers (9), (Delco and Leece Neville only) and circuit 74.4 lead (10) from terminal on starter solenoid (7). Discard lockwashers. 12. Remove nut (11 ), lockwasher (12). and two ground leads (13 and 14) from starter (15). Discard lockwasher. 3 13. Remove screw (16). lockwasher (17), and ground lead (14) from engine block. Discard lockwasher. (1)10 12 (15) 13 11) Ø 14 PRESTOLITE 10 9 17 10 8 9) LEECE NEVILLE DELCO REMY

14. Disconnect cable (1) from generator (2).

NOTE Step 15 applies to M741A1 earners only.

- 15. Disconnect power plant wiring harness circuits 641E and 641F (3) from lockout solenoid (4).
  - 4 2

16. Remove nine screws (5), two washers (6), six nuts (7), five brackets (8), six clamps (9), strap (10), and power plant wiring harness (11) from power plant.



17. Remove engine low oil pressure switch (1) and bushing (2) from engine block.



 Place a 1 gallon (4 liter) can under two filters (3 and 4). Open two drain valves (5). Remove bleed plugs (6) from filter to drain.

- 19. Disconnect fuel supply hose (7) from primary fuel filter (3).
- 20. Disconnect fuel supply hose (8) from pump inlet elbow (9) and secondary fuel filter 14).
- 21. Disconnect fuel supply hose (10) from fuel pump outlet elbow (11) and primary fuel filter (3).
- 22. Disconnect and remove fuel supply hose (12) from tee (13) and secondary fuel filter (4).



6

# WARNING



200 amp generator weighs approximately 80 pounds. Have helper assist.

- Remove two screws (1), washers (2), locknuts (3), and generator (4) from generator mount bracket (5). Discard locknuts. Have helper assist.
- 24. Remove four screws (6) and locknuts (7) from fuel filter mounting bracket (8). Remove two filters (9 and 10) with tee (11) and neutral start switch (12) from bracket (8). Discard locknuts.
- 25. Remove four screws (13), washers (14), and bracket (8) with generator mount bracket (5) from engine.



- 26. Remove two elbows (1) from fuel pump (2).
- 27. Remove tachometer drive adapter (3) and gasket (4) from engine. Discard gasket.
- 28. Remove three screws (5), key washers (6), gasket (7), oil filler elbow (8), and hose (9) from engine. Discard gasket and key washers.
- 29. Disconnect and remove fuel return hose (10) from tee (11). Use open end box wrench.



- 30. Disconnect air box heater fuel hose (1) from tee (2).
- 31. Disconnect elbow (3) from tee (2).
- 32. Remove nut (4), screw (5), and governor control link (6) from throttle arm (7).
- 33. Remove two screws (8) and gage (9) from governor (10).



- Remove locknut (11) and screw (12) from bracket assembly (13). Use cross-tip screwdriver. Discard locknut.
- 34.1 Before removing screw (14), raise inner transfer shaft (15) high enough to tilt the outer transfer shaft (16).
- 34.2 Remove screw (14) and lockwasher (17) from bracket assembly (13). Discard lockwasher.
- 34.3 Remove two screws (18), lockwashers (19), nuts (20), and bracket assembly (13) from power plant. Discard lockwashers.
- 35. Remove screw (21) and clamp (22) from differential oil hose (23).
- 36. Disconnect and remove two differential oil hoses (23, 24) from elbows (25, 26).
- 37. Remove two elbows (25, 26) from engine oil cooler housing.



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- 38. Disconnect and remove two transmission oil hoses (1) from two elbows (2 and 3).
- 39. Remove elbow (2) from engine oil cooler housing.
- 40. Remove transmission oil temperature sending unit (4) from tee (5).
- 41. Remove tee (5) with elbow (3) from oil cooler nipple (6).
- 42. Remove oil cooler nipple (6) from engine oil cooler housing.
- 43. Disconnect and remove two engine oil filter hoses (7) from two elbows (8).
- 44. Remove two elbows (8) from engine block.

- 45. Disconnect two hoses (9 and 10) from air box drain tubes (11). Remove screw (12) and clamp (13) with hose (9) from engine oil pan.
- Remove spring clamp (14) and engine breather tube (15) from engine rocker arm cover. Remove screw (16), lockwasher (17), and clamp (18) from engine. Discard lockwasher.





- 47. Remove six screws (1), twelve washers (2), clamp (3), hose (4), bracket (5), air horn (6), and screen (7) from engine. Leave clamp (3) on hose (4).
- 48. Remove clamp (8) and hose (9) from thermostat housing elbow (10).
- 49. Remove thermostat elbow (10) from thermostat housing bushing (11).
- 50. Remove thermostat bushing (11) from thermostat housing (12).









WARNING Engine is heavy. Use a lifting device. Have helper (H) assist.

- 51. Use a lifting device of at least 2000 lb (908 kg) capacity and sling (1) to lift engine.
- 52. Remove two screws (2), key washers (3), cap (4), base (5), and rubber engine mount (6) from support (7). Discard key washers.

# ΝΟΤΕ

Remove and retain trunnion mounts for ■M125A2, M1064, and M106A2 carrier engines only.

**53.** Remove eight screws (8), washers (9), and trunnion mount (10) from engine.

1

# INSTALL

54. Use a lifting device of at least 2000 lb (908 kg) capacity and sling (1) to lift new engine from shipping container. Block rear end of engine on level ground (page 3–2).

#### CAUTION

Parts installed in steps 56 thru 118 are not supplied with new engine. These parts must be retained from the old engine.

# ΝΟΤΕ

Install retained trunnion mounts for M125A2, M1064, and M106A1 carrier angines only.

- 55. Apply a thin coat of antiseize compound to cleaned threads of two screws (2).
- 56. Install trunnion mount (10) on engine.
  Secure with eight screws (8) and washers (9). Tighten screws to 55-60 lb (75-81 N.m) torque. Use torque wrench (item 105).
- 57. Install base (5), rubber engine mount (6) and cap (4) on support (7). Secure with two screws (2) and new key washers (3). Tighten screws to 360-420 in-lb (41-47 N-m) torque. Use torque wrench (item 110).
- 58. Block front of engine mount (page 3-2) with Wood blocks.

10

- 59. Apply a thin, even coat of primer and then sealing compound (item 71) to cleaned external pipe threads of bushing (1) and elbow (2). Do not apply primer or sealant beyond small end of threads.
- 60. Install thermostat housing bushing (1) in thermostat housing (3).
- 61. Install thermostat housing elbow (2) in bushing (1).
- 62. Connect hose (4) with clamp (5) to thermostat elbow (2).





 Install screen (6), air horn (7), bracket (8), and hose (9) with clamp (10) on engine. Secure with six screws (11) and twelve washers (12). Tighten screws to 25-30 lb-ft (34-41 N.m) torque. Use torque wrench (item 105).



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- 64. Secure engine breather tube (1) with spring clamp (2) to engine rocker arm cover. Install clamp (3) with new lockwasher (4) and screw (5) on engine.
- 65. Connect two hoses (6 and 7) to air box drain tubes (8). Secure hose (6) with clamp (9) and screw (10) to engine.



- 66. Apply a thin, even coat of primer and then sealing compound (item 71) to cleaned external pipe threads of elbows (11), nipple (12), tee (13), elbow (14), and elbow (15). Do not apply primer or sealant beyond small end of threads.
- 67. Install two elbows (11) in engine block.
- 68. Connect two engine oil filter hoses (16) to two elbows (11).
- 69. Install oil cooler nipple (12) in engine oil cooler housing.
- 70. Connect tee (13) with elbow (14) to oil cooler housing nipple (12).
- Install transmission oil temperature sending unit (17) to tee (13). Tighten oil temperature sending unit to 240-300 in-lb (27-34 N.m) torque. Use torque wrench (item 110).
- 72. Install elbow (15) in engine oil coder housing.

73. Connect two transmission oil hoses (18) to two elbows (15 and 14).



- 74. Apply a thin, even coat of primer and then sealing compound (item 71) to cleaned external pipe threads of elbows (19). Do not apply primer or sealant beyond small end of threads.
- 75. Install two elbows (19) in engine cooler housing.
- 76. Connect two differential oil hoses
  (20 and 21) to two elbows (19). Secure hose
  (21) with clamp (22) and screw (23) to oil cooler housing.



#### NOTE

Lubricate rod end bearings before assembling. Use GM grease (see your LO).

- 77. Apply thin coat of antiseize compound to clean threads of three screws (1, 2).
- 77.1 Install bracket assembly (3) on power plant. Secure with two screws (1), new lockwashers (4), and nuts (5). Tighten screws to 300-324 lb-in (34-37 N.m) torque. Use torque wrench and socket wrench set.
- 77.2 Install screw (2) and new lockwasher (6) in bottom hole of bracket assembly (3).
  Tighten screw to 264-288 lb-in (30-33 N.m) torque. Use torque wrench and socket wrench set.
- 77.3 Position inner transfer shaft (7) and outer transfer shaft (8) in bracket assembly (3).
  Secure with screw (9) and new locknut (10). Use cross-tip screwdriver.

- 78. Attach gage (11) to governor (12) in adjusting position. Secure with two screws (13). Align hole in throttle arm (14) with hole in gage. Secure throttle arm.
- 79. Remove two screws (13) and gage (11) from governor (12). Install gage in operating position on governor. Secure with two screws.
- 80. Install governor control link (15) on throttle arm (14) with screw (16) and nut (17).
- 81. Connect elbow (18) to tee (19).
- 82. Connect air box heater fuel supply hose (20) to tee (19).



- 83. Connect fuel return hose (1) to tee (2). Use 86. Apply a thin, even coat of primer and then sealing compound (item 71) to cleaned
- 84. Install oil filler elbow (3), hose (4), and new gasket (5) on engine. Secure with three new key washers (6) and screws (7).
- 85. Install tachometer drive adapter (8) and new gasket (9) on engine.

Apply a thin, even coat of primer and then sealing compound (item 71) to cleaned external pipe threads of elbows (10). Do not apply primer or sealant beyond small end of threads.

87. Install two elbows (10) in fuel pump (11).



- 88. Apply a thin coat of antiseize compound to cleaned threads of four screws (1).
- 89. Install fuel filter mounting bracket (2) with generator mount (3) on engine. Secure with four screws (1) and washers (4). Tighten screws to 50-55 lb-ft (68-75 N.m) torque. Use torque wrench (item 105).
- 90. Install primary fuel filter (5) on bracket (2) at right side. Secure with two screws (6) and new locknuts (7).
- 91. Install secondary fuel filter (8) with tee (9) and neutral start switch assembly (10) on bracket (2) at left side. Secure with two screws (6) and new locknuts (7).
- 92, Install generator (11) on generator mount (3). Secure with two screws (12), washers (13), and new locknuts (14).



- 93. Connect fuel supply hose (1) to tee (2) and secondary fuel falter (3).
- 94. Connect fuel supply hose (4) to fuel pump outlet elbow (5) and primary fuel falter (6).
- 95. Connect fuel supply hose (7) to fuel pump inlet elbow (8) and secondary fuel falter (3).
- 96. Connect fuel supply hose (9) to primary fuel filter (6).
- 97. Service both fuel falters (see your -20).

- 98. Apply a thin, even coat of primer and then sealing compound (item 71) to cleaned external pipe threads of bushing (10). Do not apply primer or sealant beyond small end of threads.
- 99. Install engine low oil pressure switch bushing (10) and switch (11) on engine block.





100. Install power plant wiring harness (1) on engine. .Secure with strap (2). five brackets (3), six nuts (4), two washers (5), eleven screws (6). and six clamps (7).

# NOTE Step 101 applies to M741A1 carriers only.

- 101. Connect power plant wiring harness circuits 641E and 641F (8) to lockout solenoid (9).
- 102. Connect cable (10) to generator (11).





- 103. Install ground lead (1) on engine block. Secure with new lockwasher (2) and screw (3).
- 104. Install two ground leads (1and 4) on and nut (7).
- 105. Install two new lockwashers (8) (Delco and Leece Neville only) and circuit 74A lead (9) on terminal of starter solenoid (10). Secure with nut (11) ( screw on Prestolite).
- 106. Install circuit 6 lead (12) on terminal of starter solenoid (10). Secure with new lockwasher (13) and nut (14).

107. Connect power plant wiring harness circuits 1A and 1B lead (15) to field switch (16) at secondary fuel filter (17).



108. Connect power plant wiring harness circuit327 lead (1) to transmission oiltemperature sending unit (2).

109. Connect power plant wiring harness circuit 34 lead (3) to engine low oil pressure switch (4) .





GO TO NEXT PAGE

- 110. Connect power plant wiring harness circuit33 lead (1) to coolant temperature sending unit (2).
- 111. Connect three ground leads (3) to air box heater bracket (4). Secure with screw (5) and new lockwasher (6).
- 112. Connect power plant wiring harness circuit 406 lead (7) to air box heater wiring harness connector (8).
- 113. Apply a thin coat of sealant (item 70) to both sides of gasket (9) before assembly.
- 114. Apply a thin coat of antiseize compound to cleaned threads of screws (10).
- 115. Install new gasket (9) and oil cooler elbow (11) on engine. Secure with two screws (10) and new key washers (12).



- ■116, Apply a thin coat of sealant (item 70) to both sides of gasket (1) before assembly.
  - 117. Install deaeration elbow (2) with hose (3), clamp (4), elbow (5), and new gasket (1) on thermostat housing cover (6). Secure with two screws (7) and new key washers (8).
  - 118. Connect coolant tube (9) to deaeration elbow (2). Secure with clamp (10).



# FOLLOW-THROUGH STEPS

- 1. Install transfer gearcase on engine (page 3-18).
- 2. Install transmission on transfer gearcase (page 3-4).
- 3. Install power plant in carrier (see your -20).
- 4. Change engine oil and filter (see your LO).

- 5. Change fuel filters (see your -20).
- 6. Check belt tension (see your -20).
- Adjust engine power disconnect (see your -20).
- 8. Adjust governor linkage (see your -20).

END OF TASK

# REPAIR 100 AMP GENERATOR FUEL FILTER MOUNTING BRACKET

# INITIAL SETUP

#### Tools:

Metal Worker's Tool Kit (Item 61, App B) Welding Shop, Trailer-Mounted (Item 96, App B)

### Materials/Parts:

Anodic coating (Item 6, App C) Dry cleaning solvent (Item 18, App C) Steel sheet or plate, 3" x 1" x 3/16" Wiping rag (Item 86, App C)

# REPAIR

NOTE

This procedure is to be performed on cracked brackets only.



# WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 1. Clean fuel filter bracket (1) using dry cleaning solvent and wiping rag.
- 2. Fabricate reinforcement plate (2) for welding.
- 3. Clamp reinforcement plate (2) to bracket (1) in position as shown.

# **Personnel Required:**

Metal Worker 44B10

#### **References:**

See your -20 TM 43-0139

#### **Equipment Conditions:**

Fuel filter bracket removed (see your -20)





W A R N I N G Fumes from welding cadmi um plated fuel filter bracket are toxic and can poison you. Make sure to wear respirator and use in a well ventilated area to

protect you against fume poisoning.

- 4. Weld plate (1) to bracket (2) in accordance With TM 9–237. Yelding of crack(s) are not necessary.
- 5. Apply paint to repaired area (see TM 43–0139).



# FOLLOW-THROUGH STEPS

1. Install fuel filter bracket (see your -20).

END OF TASK

3-53 (3-54 blank)

# CHAPTER 4

# MAINTENANCE OF FUEL SYSTEM COMPONENTS

# TASK INDEX

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Reseal Fuel Compartment Weld Joints (M125A2, M106A2, and M741A1 only)4-6	M1068 only)4-14 Repair Fuel Bladder (M741A1 only)4-16
Weld Repair Fuel Compartment (M125A2, M106A2, and M741A1 only)4-9	

# REPAIR AIR CLEANER HOUSING

#### **INITIAL SETUP**

#### **Tools:**

General Mechanics Tool Kit (Item 35, App B)

#### **Materials/Parts:**

Rivet

#### See your -20

**References:** 

#### **Equipment Conditions:**

Air cleaner housing removed (see your -20)

### **Personnel Required:**

Track Vehicle Repairer 63H10

#### REMOVE

1. Remove rivet (1) and spring clip (2) from latching lever (3). Discard rivet.

# CLEAN, INSPECT, AND REPAIR

2. Inspect parts for corrosion, distortion, cracks, breaks, and loose or missing parts. Repair or replace damaged or missing parts.

# INSTALL

3. Install spring clip (2) in latching lever (3). Secure with new rivet (1).

#### NOTE

You will have one of two air cleaner configurations. Body and elements are not interchangeable except as sets.





# FOLLOW-THROUGH STEPS

1. Install air cleaner housing (see your -20).

# END OF TASK

# **REPAIR FUEL COMPARTMENT WELD JOINTS (M125A2, M106A2,** AND M741A1 ONLY)

# DESCRIPTION

This task covers: Clean (page 4–3). Repair (page 4-4).

# **INITLAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Electrical Gun Type Heater (Item 41, App B) Portable Electric Drill (Item 23, App B) Screw Threading Set (Item 94, App B) Tap and Die Set (Item 79, App B) Twist Drill Set (Item 98, App B) Torque Wrench (Item 117, App B)

#### Materials/Parts:

Non-electrical wire (Item 48, App C) Wiping rags (Item 86, App C) Fuel tank repair kit 2540-00-133-9593 Screw (8)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20

# CLEAN

- 1. Use a wire brush to lightly buff existing sealing compound surface on weld joints to be repaired on inside of fuel compartment.
- 2. Buff an area 1-1/2 inches (4 cm) wide on both sides of weld joint centerline to be repaired on outside of fuel compartment.

WARNING

Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear gog ales.



#### **Equipment Conditions:**

Ramp lowered (see your -10) Engine stopped (see your -10) Carrier blocked (see your -10) Fuel compartment drained (see your -20) Fuel Filler assembly removed (see your -20) Left taillight, leads, and guards removed (see vour -20) Left taillight wiring harness and guard removed (see your -20) Fuel quantity sending unit removed (see your -20) Fuel supply and return hoses and fittings removed (see your -20) Rear main wiring harness and guard removed (see your -20)

#### CAUTION

Do not expose sealed areas to steam for more than 15 minutes because existing seal will begin to deteriorate.

- 3. Steam clean inner and outer surfaces of fuel compartment.
- 4. Rinse fuel compartment with hot water. Use clean rags and 30 psi (207 kPa) compressed air to dry. CRACKED



#### REPAIR

#### WARNING

Fuel fumes can explode and bum you. Before welding: Drain all fuel. Disconnect and cap all fuel and vent lines. Purge fuel residue and fumes by steam

cleaning. Purge air from fuel tank with C02.

# ΝΟΤΕ

# Repair entire weld joint all around the fuel compartment.

- Drill and tap eight 3/8 x 16 UNC-2A (10 mm) deep holes on centerline of weld joint crack about 5–1/2 inches (14 cm) apart, regardless of crack length.
- 6. Install eight 3/8 x 16 UNC2A (10 mm) screws in tapped holes. Tighten screws to 144-180 in-lb (16-20 N.m) torque. Use torque wrench. Secure with lockwire.

#### CAUTION

Do not apply sealing compound in temperatures under 45°F (7°C). Compound will not set at low temperature.

- Apply one layer of sealing compound 1/8-1/4 inch (3-6 mm) thick. Extend seal about 1 inch (3 cm) on both sides of weld joint centerline and over screw threads.
- 8. While sealing compound is still tacky, lay a new rubber seal over centerline of inside and outside of fuel compartment weld joints.
- 9. Allow first layer of sealing compound to set for at least 4 hours before applying second layer.
- Apply second layer of sealing compound 1/8-1/2 inch (3-13 mm) thick. Extend seal 1/4-1/2 inch (6-13 mm) behind edges of first layer of sealing compound.
- 11. Allow second layer of sealing compound to set 40 hours at 72°F (22°C) if class B2 is used and 48 hours if class B4 is used.

#### ΝΟΤΕ

To speed sealant setting time, use an electrical gun type heater. Do not exceed 200°F (93°C).



# FOLLOW-THROUGH STEPS

- 1. Install fuel supply and return hoses and fittings (see your -20).
- Install fuel quantity sending unit (see your -20).
- 3. Install fuel filler assembly (see your -20).
- 4. Install rear main wiring harness and guard (see your -20).
- 5. Install left taillight, leads, and guards (see your -20).

- Install left taillight wiring harness and guard (see your -20).
- 7. Fill fuel compartment (see your -10).
- 8. Check for fuel leaks.
- 9. Raise and lock ramp (see your -10).
- 10. Stop engine (see your -10).

END OF TASK

# RESEAL FUEL COMPARTMENT WELD JOINTS (M125A2, M106A2, AND M741A1 ONLY)

# DESCRIPTION

This task covers: Clean (page 4-6), Reseal (page 4-7).

#### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item **35**, App B) Electrical Gun Type Heater (Item 41, App B)

#### Materials/Parts:

Wiping rags (Item 86, App C) Fuel tank repair kit 2540-00-133-9593

#### Personnel Required:

Track Vehicle Repairer 63H10

#### **References:**

See your -10 see your -20

### CLEAN



#### WARNING

Fuel fumes can explode and burn you. Before welding Drain all fuel. Disconnect and cap all fuel and vent lines. purge fuel residue and fumes by steam

cleaning. Purge air from fuel tank with C02.

- 1. Use a wire brush to lightly buff existing sealing compound on weld joints on inside of fuel compartment.
- Buff an area 1–1/2 inches (4cm) wide on both sides of weld joint centerline that is to be resealed on outside of fuel tank.



WARNING

Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

#### **Equipment Conditions:**

Ramp lowered (see your -10) Engine stopped (see your -10) Carrier blocked (see your -10) Fuel compartment drained (see your-20) Fuel filler assembly removed (see your-20) Left taillight, leads, and guards removed (see your -20) Left taillight wiring harness and guard removed (see your -20). Fuel quantity sending unit removed (see your -20) Fuel supply and return hoses and fittings removed (see your -20 ) Rear main wiring harness and guard removed (see your -20)

# CAUTION

Do not expose sealed areas to steam for more than 15 minutes because existing seal will begin to deteriorate.

- 3. Steam clean inner and outer surfaces of fuel compartment.
- 4. Rinse fuel compartment with hot water. Use clean rags and 30 psi (207 kPa) compressed air to dry.



# RESEAL

# CAUTION

Do not apply sealing compound in temperatures under 45°F (7°C). Compound will not set at low temperature.

- Apply a layer of sealing compound 1/8-1/4 inch (3-6 mm) thick. Extend seal about 1 inch (3cm) on both sides of weld joint centerlines.
- 6, While sealing compound is still tacky, lay a new rubber seal 60–1/2 inches (154 cm) long over centerline of inside and outside of sponson-to-fuel compartment weld joint. Run seal full length of weld joint around inside and outside bottom of fuel compartment.

- Lay a new rubber seal 66–1/2 inches 169 cm) long over centerline of inside and outside of hull roof-to-fuel compartment weld joint. Run seal full length of weld joint around top of fuel compartment.
- Lay a new rubber seal 31/-3/4 inches 82 cm long over centerline of weld joint at rear of fuel compartment inside fuel tank.
- 9. Trim seal, as needed, to butt against seals at top and bottom of fuel compartment.
- Lay a new rubber seal 31–3/4 inches (82 cm) long over centerline of inside and outside of left hull plate-to--fuel compartment weld joint.



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- Trim seal. as needed, to butt against seals at top and bottom of fuel compartment.
- Allow first layer of sealing compound to set at least 4 hours before applying second coat.

NOTE

Allow clearance for fuel filler assembly when applying second layer of sealing compound at top of fuel compartment.

- Apply second layer of sealing compound 1/8–1/4 inch (3–6cm) thick. Extend seal 1/4-1/2 inch (6-13 cm) behind edges of first layer of sealing compound.
- Allow second layer of sealing compound to set 40 hours at 72°F (22°C) if class B2 is used and 48 hours if class B4 is used.

#### NOTE

To speed sealant setting time, use an electrical gun type heater. Do not exceed 200° (93°C).



### FOLLOW-THROUGH STEPS

- Install fuel supply and return hoses and fittings (see your -20).
- Install fuel quantity sending unit (see your -20).
- 3. Install fuel filler assembly (see your -20).
- Install rear main wiring harness and guard (see your -20).
- Install left taillight, leads, and guards (see your -20).

- Install left taillight wiring harness and guard (see your -20).
- 7. Fill fuel compartment (see your 10
- 8. Check for fuel leaks.
- 9. Raise and lock ramp (see your -10).
- 10. Stop Engine (see your -10).

#### END OF TASK

# WELD REPAIR FUEL COMPARTMENT (M125A2, M106A2, AND M741A1 ONLY)

# DESCRIPTION

This task covers: Clean (page 4-9). Repair (page 4-10).

### INITIAL SETUP

Tools:

General Mechanics Tool Kit (Item 35, App B) Trailer-Mounted Welding Shop (Item 96, App B)

#### Materials/Parts:

Sealing compound (Item 73, App C) Wiping rags (Item 86, App C) Fuel tank repair kit 2540-00-133-9593

#### **Personnel Required:**

Metal Worker 44B10

#### **References:**

**See** your -10 See your -20 TM 9-237

#### CLEAN

#### WARNING



Fuel fumes can explode and bum you. Before welding Drain all fuel. Disconnect and cap all fuel and vent lines. Purge fuel residue and fumes by steam

cleaning. Purge air from fuel tank with C02.

- 1. Use a wire brush to remove paint and dirt from outer weld area.
- 2. Buff an area 1-1/2 inches (4 cm) wide on both sides of weld joint centerline that is to be repaired on outside of fuel compartment.

#### WARNING



Air pressure in excess of 30 psi (207 k.pa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

#### **Equipment Conditions:**

Ramp lowered (see your -10) Engine stopped (see your -10) Carrier blocked (see your -10) Fuel compartment drained (see your -20) Fuel filler assembly removed (see your -20) Left taillight, leads, and guards removed (see your -20) Left taillight wiring harness and guard removed (see your -20) Fuel quantity sending unit removed (see your -20) Fuel supply and return hoses and fittings removed (see your -20) Rear main wiring harness and guard removed (see your -20) Fuel bladder removed (M741A1 only) (see your -20)

#### CAUTION

Do not expose sealed areas to steam for more than 15 minutes, as existing seal will begin to deteriorate.

- 3. Steam clean inner and outer surfaces of fuel compartment.
- 4. Rinse fuel compartment with hot water. Use clean rags and 30 psi (207 kPa) compressed air to dry.



GO TO NEXT PAGE

 Direct carbon dioxide or argon gas into fuel compartment at 30-60 cubic feet (0.84–1 .68 cubic meters) per hour until gas escapes from fuel filler opening.

# REPAIR

- 6. Weld on outside of fuel compartment, if possible.
- 7. Choose type of repair, overlapping or fitted patch.
- 8. Resize hole in fuel compartment, to remove sharp edges or cracks, for type of patch Selected.
- 9. Prepare a piece of aluminum of the same alloy and thickness as the side of the fuel compartment.
- 10. Size patch to cover hole in fuel compartment.
- 11. Tack weld a small piece of aluminum upright to center of patch to hold patch for welding.





ORIGINAL

- 12. Weld patch to fuel compartment (see TM 9-237 and your -20).
- 13. Break support away from patch. Discard support.
- 14. Seal weld patch with sealing compound.



BEVEL EDGES

#### FOLLOW-THROUGHSTEPS

- 1. Install fuel supply and return hoses and fittings (see your-20).
- 2. Install fuel quantity sending unit (see your -20).
- 3. Install fuel filler assembly (see your -20).
- 4. Install rear main wiring harness and guard (see your -20).
- 5. Install left taillight, leads, and guards (see your -20).

- 6. Install left taillight wiring harness and guard (see your -20).
- 7. Install fuel bladder (M741A1 only) (see your -20).
- 8. Fill fuel compartment (see your -10).
- 9. Raise and lock ramp (see your -10).
- 10. Stop engine (see your -10).

END OF TASK

# REPAIR FUEL QUANTITY SENDING UNIT MOUNT SURFACE (M125A2, M106A2, AND M741A1 ONLY)

# DESCRIPTION

This task covers: Clean (page 4–12). Repair (page 4-13).

# **INITIAL SETUP**

#### **Tools:**

General Mechanics Tool Kit (Item 35, App B) Portable Electric Drill (Item 23, App B) Electrical Gun Type Heater (Item 41, App B) Screw Threading Set (Item 79, App B) Twist Drill Set (Item 98, App B) Torque Wrench (Item 117, App B)

#### Materials/Parts:

Non-electrical wire (Item 48, App C) Sealing compound (Item 73, App C) Wiping rags (Item 86, App C) Fuel tank repair kit 2540-00-133-9593 Screw (as required)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

# CLEAN

1. Use a wire brush to clean an area 1-1/2 inches (4 cm) wide on both sides of sending unit mount crack to be repaired.



#### WARNING

Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear goggles.

#### **References:**

see your -10 See your -20

#### Equipment Conditions:

Ramp lowered (see your -10) Engine stopped (see your -10) Carrier blocked (see your -10) Fuel compartment drained (see your -20) Fuel filler assembly removed (see your -20) Fuel quantity sending unit removed (see your -20) Fuel supply and return hoses and fittings removed (see your -20)

CAUTION Do not expose sealed areas to steam for more than 15 minutes, as existing seal will begin to deteriorate.

- 2 **Steam** clean inner and outer surfaces of fuel compartment.
- 3. Rinse fuel compartment with hot water. Use clean rags and 30 psi (207 kPa) compressed air to dry.



REPAIR

#### WARNING



Fuel fumes can explode and burn you. Before welding: Drain all fuel. Disconnect and cap all fuel and vent lines. Purge fuel residue and fumes by steam

**cleaning. Purge air from fuel tank with** CO2.

- 4. Drill and tap a 3/8 x 16 UNC-2A (10 mm) deep hole at each end of crack.
- 5. If crack is longer than 1-1/2 inches (4 cm), space holes about 1-1/2 inches (4 cm) apart along centerline of crack.
- 6. Install new 3/8 x 16 UNC-2A (10 mm) screws in drilled and tapped holes. Tighten screws to 144-180 in-lb (16-20 N-m) torque. Use torque wrench.

- 7. Secure screws with lockwire.
- Apply a layer of sealing compound 1/8-1/4 inch (3-6 mm) thick. Extend seal about 1 inch ( 3 cm) on both sides of crack and over screw heads.
- Allow sealing compound to set 40 hours at 72°F (22°C) if class B2 is used and 48 hours if class B4 is used.

#### NOTE

To speed sealant setting time, use an electrical gun type heater. Do not exceed  $200^{\circ}F$  (93°C).



# FOLLOW-THROUGH STEPS

- 1. Install fuel quantity sending unit (see your -20).
- 2. Install fuel filler assembly (see your -20).
- Install fuel supply and return hoses and fittings (see your -20).
- 4. Fill fuel compartment (see your -10).
- 5. Check for fuel leaks.
- 6. Raise and lock ramp (see your -10).
- 7. Stop engine (see your -10).

END OF TASK

# REPAIR FUEL TANK (M577A2 AND M1068 ONLY)

# DESCRIPTION

This task covers: Clean (page 4-14). Repair (page 4-15).

# **INITIAL SETUP**

#### Took

Metal Worker's Tool Kit (Item 61, App B) Trailer-Mounted Welding Shop (Item 96, App B)

#### Materials/Parts:

Sealing compound (Item 73, App C) wiping rag (Item 86, App C

#### **Personnel Required:**

Metal Worker 44B10

#### CLEAN



#### WARNING

Fuel fumes can explode and burn you. Before weding: Drain all fuel. Disconnect and cap all fuel and vent lines. Purge fuel residue and fumes by steam

cleaning. Purge air from fuel tank with C02.

1. Use a wire brush to remove paint and dirt from outer surface area to be welded.



WARNING

Air pressure in excess of 30 psi (207 kpa) can injure personnel Do not direct pressurized air at yourself or others. Always wear goggles.

#### **References:**

See your -10 See your -20 TM 9-237

#### **Equipment Conditions**

Fuel tank removed from carrier (see your -20) Fuel tank access cover removed (see your -20) Fuel quantity sending unit removed (see your -20) I

#### CAUTION

Do not expose sealed areas to steam for more than 15 minutes, as existing seal will begin to deteriorate.

- Steam clean inside of fuel tank (1). Use clean rags and 30 psi (207 kPa) compressed air to dry
- Direct carbon dioxide or argon gas into fuel tank (1) at 30-60 cubic feet (0.84-1.68 cubic meters) per hour until gas escapes from access cover openings.


### REPAIR

- 4. Plan to weld on outside of fuel tank, if possible.
- 5. Determine type of repair, overlapping or fitted patch.
- 6. Resize hole in fuel tank, to remove sharp edges or cracks, for type of patch selected.
- 7. Prepare a piece of aluminum of the same alloy and thickness as the fuel tank.
- 8. Size patch to cover hole in fuel tank.
- 9. Tack weld a small piece of aluminum upright to center of patch to hold patch for welding.

- 10. Weld patch to fuel tank (see TM 9–237 and your –20).
- 11. Break support away from patch. Discard support .
- 12. Seal weld patch with sealing compound.









### FOLLOW-THROUGH STEPS

1. Install fuel quantity sending unit (see your -20).

- 2. Install fuel tank access cover (see your -20).
- 3. Install fuel tank (see your -20).

### END OF TASK

### REPAIR FUEL BUDDER (M741A1 ONLY)

### INITIAL SETUP

### Tools:

General Mechanics Tool Kit (Item 35, App B) c-clamp

### Materials/Parts:

Cellophane (Item 12, App C) Dry cleaning solvent (Item 18, App C) Lacquer (Item 43, App C) Saddle soap (Item 68, App C) Wiping rag (Item 86, App C) ) Bladder Repair Kit 2910-00-937-9773 and 2910-00-937-9774

### INSPECT



WARNING

 Fuel fumes can explode and burn you. Before repairing:
 Drain all fuel. Clean up spilled fuel with wiping rags. Disconnect and cap all
 fuel and vent lines.

- 1. Check fuel bladder for damage.
- 2. Limit repair to cuts, punctures, blisters, abrasions and coating damage to 3 inches (8 cm) maximum.

### CLEAN



### WARNING

Dry cleaning solvent P-D6-80 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

### Personnel Required:

Track Vehicle Repairer 63H10

### References:

See your -10 See your -20 TM 43-0139

### **Equipment Conditions:**

Fuel bladder removed from carrier (see your -20)

- 3. Clean about 1 square foot (0.09 square meter) around damaged area with dry cleaning solvent.
- 4. Use clean wiping rags and dry cleaning solvent to clean dirt and sludge from bladder.

### REPAIR

5. Handle repair material as follows:

- a. Do not use cement that is grainy, lumpy, jellied, or thin. Do not use if cement has passed its shelf life of 6 months.
- b. Stir cement before and during use.
- c. Keep covers on all cement containers when not in use.
- d. Clean containers before using for cement, lacquer or solvent.
- e. Mark and identify cement and solvent containers.



- 6. Repair punctures, cuts and abrasions as follows:
  - a. Place bladder on table or bench with flat, smooth, clean surface.
  - Measure area to be repaired. Cut a repair patch 2 inches (5cm) larger than measured area.
  - c. Round off corners and taper edges of repair patch.
  - d. The dull or stock side goes next to the bladder.

### WARNING



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

e. Clean repair patch with a clean cloth and dry cleaning solvent.

### CAUTION

Place a sheet of cellophane on inside of bladder, under area to be repaired, to prevent bladder from being bonded together.

### ΝΟΤΕ

### Mix cement well before using.

 f. Mix 1 ounce (28 grams) of accelerator with 1/2 pint (0.236 liter) of cement in a clean container with at least 1 pint (0.473 liter) or more capacity.

### NOTE

Do not use cement mix over 25 minutes old. Mix a second batch, if needed.

- g. Apply an evenly brushed layer of cement to bladder and repair patch.
- h. Allow first layer of cement to dry for 20 minutes.
- i. Apply a second layer of cement. Position repair patch on repair area of bladder.
- J With stitcher supplied with repair kit, work from the center of repair patch to smooth out air bubbles.
- k. Cover the repair patch with cellophane.
- I. Place cloth backed foam rubber with cloth side up over cellophane.



A. CROSS SECTION OF FUEL CELL WALL



**B. TOP VIEW OF REPAIR PATCH** 



C. CROSS SECTION OF REPAIR PATCH

- m. Place aluminum plate over cloth backed foam rubber.
- n. For air cure, place C-clamp 8 inches (20 cm) or larger over aluminum plate and under table or bench.
- Center repair patch. Tighten C-clamp until cement is forced out around repair patch edges.
- p. Air cure repair patch for 72 hours.
- Repair can be heat cured by placing a curing iron between aluminum plate and C-clamp.
- r. Cure for two hours at 240°F (160°C). Allow iron to cool 15 to 20 minutes before removing.
- s. Remove C-clamp. curing iron (if used), aluminum plate. and cloth backed foam rubber from repair patch.
- t. Use a damp cloth or sponge to remove cellophane from repair patch.
- u. Check repair patch for poor bond or loose edges. Loose edge of up to 1/4 inch (6 mm) is allowed.
- v. Buff off repair patch loose edge, if not more than 1/4 inch (6 mm).
- w. If repair patch loose edge is more than 1/4 inch (6 mm), cement and cure edge again.
- 7. Repair blisters as follows:

### CAUTION

- Do not cut bladder fabric outer lining.
- a. Do not repair blister larger than 3 inches (8 cm).
- b. Carefully cut out section of inner liner that covers blister area.
- c. Cut patch to fill section of inner liner that was removed.

- d. Apply cement. Install repair patch in the same way as the repair of a puncture, cut or abrasion (page 4–17).
- e. Cut a cover patch that is 2 inches (5 cm) larger than the inner patch.
- f. Install cover patch in the same way as the repair of a puncture, cut or abrasion (page 4–17).



A. CROSS SECTION OF FUEL CELL WALL



B. TOP VIEW OF REPAIR PATCH



C. CROSS SECTION OF REPAIR PATCH

8. Repair scuff or coating damage as follows:

### NOTE

Do not use this repair if bladder has broken cords or fabric damage.

### WARNING



Dry cleaning solvent P-D680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- a. Clean about 1 square foot (0.09 square meter) around damaged area with dry cleaning solvent.
- b. Apply paint (see TM43-0139).



### WARNING

Air pressure in excess of 30 psi (207 kPa) can injure personnel. Do not direct pressurized air at yourself or others. Always wear gog-

- After.Mter the second coat of lacquer has dried, seal off bladder openings. Inflate Madder with 2–3 psi (14–21 kPa) compressed air.
- d. Apply a soap and water solution to repaired area. Look for bubbles that show leaks.
- e. Replace bladder that cannot be repaired.



A. CROSS SECTION OF FUEL CELL WALL



B. TOP VIEW OF REPAIR PATCH



### FOLLOW-THROUGH STEPS

1. Install Madder in carrier (see your -20).

END OF TASK

# CHAPTER 5 MAINTENANCE OF COOLING SYSTEM

### TASK INDEX

Task P	age	Task	Page
Repair Radiator	5–2	Repair Fan	5–6
Repair Radiator Auxiliary Tank	5–5		

### REPAIR RADIATOR

### DESCRIPTION

Test Radiator For Leaks (page 5-2). This task covers: Clean and Inspect (page 5-2). Flush Test Radiator For Flow (page 5-3). Repair (page 5-3). Radiator (page 5-3). Rodding (page 5-4).

### **INITIAL SETUP**

### **Tools:**

Metal Worker's Tool Kit (Item 61, App B) Industrial Goggles (Item 37, App B) Radiator Flow Test Machine (Item 34, App B) Radiator Test Plug Set (Item 75, App B) Radiator Test Stand (Item 91, App B) Scratch Wire Brush (Item 11, App B) Utility Apron (Item 5, App B)

### Materials/Parts:

Solder (Item 80, App C) Soldering flux (Item 77, App C)

### **CLEAN AND INSPECT**

- 1. Clean radiator. See TM 750-254. Use safety goggles, rubber gloves and rubber apron.
- 2. Inspect radiator. Check upper and lower tanks (1), side brackets (2), tubes and fins (3). If damage is minor, pressure test radiator. If damage is major, see repair instructions to determine if radiator can be repaired.



### **Personnel Required:**

Metal Worker 44B10

### **References:**

See your -20 TM 750-254 TB SIG 222 TM 9-237

Equipment Conditions:

Radiator removed from carrier (see your -20)

### TEST RADIATOR FOR LEAKS

### WARNING



Radiator can burst if over pressurized. Do not exceed 25 psi (172 kpa) air pressure. Ensure radiator is submerged before applying air pressure. Always wear

safety goggles.

- 3. Plug auxiliary tank connector opening (4). Use radiator test plug set.
- 4. Plug radiator outlet opening (5). Use radiator test plug set.
- 5. Connect regulated air supply from radiator test stand to inlet opening (6).
- 6. Submerge radiator in radiator test stand. Apply 20-25 psi (137-172 kPa) air pressure to radiator.
- 7. If air bubbles appear, repair radiator (see steps 16-21).

### FLUSH RADIATOR

- 8. Plug auxiliary tank connection opening (1). Use radiator test plug set.
- 9. Connect water supply to radiator outlet opening (2). Use radiator test stand.
- 10. Flush radiator until water from radiator inlet opening (3) runs clear.



### TEST RADIATOR FOR FLOW

- 11. Plug auxiliary tank connection opening (1). Use radiator test plug set.
- 12. Using radiator flow test machine, connect supply hose to radiator inlet (3).
- 13. Connect return hose of test machine to radiator outlet (2).
- Flow test radiator at 70–80 gallons (276–292 liters) per minute. See TM 750-254.
- If pressure drop is more than 4 psi (28 kPa), disassemble radiator and rod out radiator core (see steps 22–30).

### REPAIR

- 16. Resolder cracked solder joints and splice damaged tubes. If necessary to repair tube damage near end tanks, disassemble radiator (steps 22 and 23).
- 17. Tube splicing shall be limited to no more than two tubes adjacent to the core face on either side.
- 18.Removed areas of fin shall not exceed 6-1/2 square inches (42 sq cm) per side, per any tube repair. Length of tube splice shall not exceed 2 inches ( 5 cm). Tube blockage is not allowed.
- 19. Heat solder repair of the upper and lower tanks, side brackets, and inlet and outlet openings is allowed.
- 20. Heat soldering of a core shall not exceed a linear length of 8 inches (20 cm) for any one core assembly.
- 21. Fin straightening is allowed.



### GO TO NEXT PAGE

### RODDING

- 22. Heat melt and wire brush off the solder that secures two side brackets (1 and 2) to two end tanks (3 and 4).
- 23. Heat melt and wire brush off the solder that secures two end tanks (3 and 4) to core (5).
- 26. Insert a metal rod (7) long enough and slightly smaller in diameter than tubes (6) through tubes to remove blockage.
- 27. clear tubes (6) until water flows through freely.



- 28. Install end tanks (4 and 3) on Core (5). Secure with acid core solder.
- 29. Install two side brackets (2 and 1) on two end tanks (4 and 3). Secure with acid core solder.
- 30. Pressure test radiator (see steps 2-6).

- 24. Wire brush rust, scale, and sediment from core tube openings.
- 25. Locate plugged tubes (6) by directing water into tubes. Check for flow at opposite end.

### FOLLOW-THROUGH STEPS

1. Install radiator in earner (see your -20).

END OF TASK

### REPAIR RADIATOR AUXILIARY TANK

### **INITIAL SETUP**

### Tools:

Metal Worker's Tool Kit (Item 61, App B) Degreaser (Item 22, App B) Radiator Test Plug Set (Item 75, App B) Radiator Test Stand (Item 91, App B)

### **Personnel Required:**

Metal Worker 44B10

### REPAIR

1. Degrease tank (1). Use degreaser.

### WARNING Do not excee kPa) pressure auxiliary tan

Do not exceed 20 psi (137 kPa) pressure while testing auxiliary tank. Ensure auxiliary tank is submerged before applying air pressure. Do not direct pressurized

air at yourself or others. Always wear goggles.

2 Attach tank (1) to radiator test stand.

### NOTE

There are two ways to pressure test tank. If using water pressure, do step 3, then go to step 5. If using air pressure, go to step 4.

- Apply internal water pressure of 18–20 psi for minimum of 3 minutes. Check for water leaks.
- Submerge tank (1) in water and apply pressure of 18-20 psi for minimum of 3 minutes. Check for air leaks.

### FOLLOW-THROUGH STEPS

1. Install radiator auxiliary tank (see your -20).

### **References:**

See your -20 TM 43-0139 TM 9-237

### **Equipment Conditions:**

Radiator auxiliary tank removed from carrier (see your -20)

### NOTE

Mark areas of leaks and remove all plugs before welding.

- 5. Weld areas of leaks in accordance with TM 9–237. Weld all sizes to minimum requirement for lead repair.
- 6 Repeat step 3 or 4 after welding.
- 7. Refinish tank (1) in accordance with TM 43-0139.



### END OF TASK

### REPAIR FAN

### DESCRIPTION

This task covers: Remove (page 5-6). Install (page 5-8).

### INITIAL SETUP

### Tools:

General Mechanics Tool Kit (Item 35, App B) Mechanical Puller Kit (Item 59, App B) Torque Wrench (Item 112, App B) Torque Wrench (Item 117, App B) Retaining Ring Pliers (Item 64, App B)

### Materials/Parts:

Sealing compound (Item 71, App C) Flat washer (3) Key washer (3) Lockwasher (4) Preformed packing Self-locking nut (8)

### REMOVE

- Remove four screws (1), lockwashers (2), flat washers (3), and cover (4) from fan housing (5). Discard lockwashers.
- Remove six screws (6), two screws (7), 16 flat washers (8), eight locknuts (9), and fan housing (5) from support (10). Discard locknuts.

### Personnel Required:

Track Vehicle Repairer 63H10

### References

See your -20 TM 9-214 TM 9-2520-238-34

### **Equipment Conditions:**

Fan assembly removed from carrier (see your -20)

- Remove nut (11) and washer (12) that secure fan (13) to shaft (14) on gear box (15). Discard washer.
- 4. Use puller to remove fan (13) from gearbox (15).
- 5. Remove key (16) from shaft (14).



 Remove three screws (1) and key washers (2) that secure housing (3) to support (4). Discard key washers.

### NOTE

Refer to TM9-214 for bearing maintenance.

- 7. Remove housing (3), bearing (5), and drive shaft (6) from gearbox (7) and support (4).
- 8. Loosen setscrew (8). Remove collar (9) and drive shaft (6) from housing (3).
- 9. Remove bearing (5) from housing (3).

- Remove lockring (10) and packing (11) from drive shaft (6). Use retaining ring pliers. Discard packing.
- Remove four screws (12), nuts (13), eight washers (14), and gearbox (7) from support (4).

NOTE Refer to TM 9-2520-238-34 for the disassembly of gearbox.



### INSTALL

- Install gearbox (1) on support (2). Secure with four screws (3), eight washers (4), and four nuts (5).
- 13. Install new packing (6), lockring (7), and collar (8) on drive shaft (9). Use retaining ring pliers.
- 14. Install bearing (10) in housing (11).
- 15. Install housing (11) and bearing (10) on drive shaft (9) and collar (8) on bearing.
- 16. Position housing (11), bearing (10), and collar (8) against lockring (7). Tighten setscrew (12).

ΝΟΤΕ

# Make sure two pins (13) are installed in support (2) before doing step 17.

- 17. Install housing (11) and shaft (9) in gearbox (1).
- 18. Secure housing (11) to support (2) with three new key washers (14) and screws (15).

- Tighten three screws (15) to 252-300 in-lb (28-34 N.m) torque. Use torque wrench (item 117).
- 20. Install key (16) and fan (17) on shaft (18) of gearbox (1). Secure with new washer (19) and nut (20).
- 21. To set rotor and seal, tighten nut (20) to 70-75 lb-ft (95-102 N.m) torque. Then loosen nut. Use torque wrench (item 112).
- 22. Apply sealing compound to both sides of washer (19).
- 23. Tighten nut (20) to 324-384 in-lb (37-43 N.m) torque. Use torque wrench (item 117).
- 24. Bend one edge of washer (19) against nut (20) and on edge against fan (17).
- 25. Install fan housing (21) on support (2). Secure with six screws (22), two screws (23), 16 flat washers (24), and eight new locknuts (25).
- 26. Install cover (26) on fan housing (21). Secure with four screws (27), new lockwashers (28), and flat washers (29).



### FOLLOW-THROUGH STEPS

1. Install fan assembly in carrier (see your -20).

## CHAPTER 6 MAINTENANCE OF ELECTRICAL SYSTEM

### TASK INDEX

Task Pa	age	Task P	age
Replace Instrument Panel Gages and Switches Wiring Harness	6-2	Replace Front Main Wiring Harness (M741A1 Only)6	6-33
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### REPLACE INSTRUMENT PANEL GAGES AND SWITCHES WIRING HARNESS

### DESCRIPTION

This task covers: Remove (page 6-2). Install page 6-4).

### INITIAL SETUP

### **Tools:**

General Mechanics Tool Kit (Item 35, App B)

### **Materials/Parts:**

Lockwasher (2) Self-locking nut (2)

### **Personnel Required:**

Track Vehicle Repairer 63H10

### **References:**

see your -10

### REMOVE

- 1. Remove two locknuts (1), mounts (2 and 3), flat washers (4), and screws (6) that secure instrument panel (6) to two struts (7). Discard locknuts
- 2. Support panel (6). Remove two screws (8), flat washers (9), lockwashers (10), and ground lead (11) from two mounts (12) and upper support (13). Discard lockwashers.
- <sup>3</sup> Support panel (6) on two struts (7) to gain access to rear of panel.

### **References (cont):**

see your -20

### **Equipment Conditions:**

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Master switch turned OFF (see your -20) Battery ground lead disconnected (see your -20) Tachometer and speedometer disconnected from instrument panel gages (see your -20)



- 4. Disconnect circuit 38 lead (1) from instrument panel wiring harness (2).
- 5. Disconnect circuit 25A lead (3) from panel wiring harness (2).
- 6. Disconnect circuit 27F lead (4) from panel wiring harness (2).
- On M741A1 only, disconnect circuit 27F lead (4) and circuit 27H lead (5) from lockout indicator lead Y connector (6).
- 8. Disconnect circuit 27C lead (7) from air box heater switch (8).
- 9. Disconnect circuit 27B lead (9) from engine coolant temperature gage (10).

- 10. Disconnect circuit 27A lead (11) from fuel quantity gage (12).
- 11. Disconnect circuit 27 lead (13) from instrument panel circuit breaker (14).
- 12. Disconnect circuit 459 lead (15) from master switch ON indicator light (16).
- 13. Disconnect circuit 516 lead (17) from infrared (I–R) power selector switch (18).
- 14. Remove panel wiring harness (2) from instrument panel (19).



GO TO NEXT PAGE

### INSTALL

- 15. Install instrument panel wiring harness (1) on instrument panel (2).
- 16. Connect circuit 516 lead (3) to infrared (I-R) power selector switch (4).
- 17. Connect circuit 459 lead (5) to master switch ON indicator light (6).
- 18. Connect circuit 27 lead (7) to instrument panel circuit breaker {8).
- 19. Connect circuit 27A lead (9) to fuel quantity gage (10).
- 20. Connect circuit 27B lead (11) to engine coolant temperature gage (12).

- 21. Connect circuit 27C lead (13) to air box heater switch (14).
- 22. Connect circuit 27F lead (15) to panel wiring harness (1).
- 23. On M741A1 only, connect 27F lead (15) and circuit 27H lead (16) to lockout indicator lead Y connector (17).
- 24. Connect circuit 25A lead (18) to instrument panel wiring harness (1).
- 25. Connect circuit 38 lead (19) to panel wiring harness (1).



- 26. Install ground lead (1) and new lockwashers(2) on upper support (3).
- 27. Install instrument panel (4) with two mounts (5) on support (3). Secure with two screws (6) and flat washers (7).
- 28. Install panel (4) on two struts (8).with two new locknuts (9), mounts (1), flat washers (12), and screws



### FOLLOW-THROUGH STEPS

- 1. Connect speedometer and tachometer cables to instrument panel gages (see your -20).
- 2. Connect battery negative lead (see your -20).
- 3. Turn master switch ON (see your -20).
- 4. Drive earner to check that panel gages and lights operate properly (see Your -10)"
- 5. Stop/shutdown engine (see your -10).

END OF TASK

### REPLACE INSTRUMENT PANEL BATTERY AND GENERATOR GAGES WIRING HARNESS

### DESCRIPTION

Install (page 6-7) This task covers: Remove (page 6-6).

### INITIAL SETUP

### Tools:

**References:** 

General Mechanics Tool Kit (Item 35, App B)

### Material/Parts:

Lockwasher (2) Self-locking nut (8) Self-locking nut (2)

### **Personnel Required**

Track Vehicle Repairer 63H10

### REMOVE

- 1. Remove two locknuts (1), mounts (2 and 3), flat washers (4), and screws (5) that secure instrument panel (6) to two struts (7). Discard locknuts.
- 2. Support panel (6). Remove two screws (8), flat washers (9), lockwashers (10), and ground lead (11) from two mounts (12) and upper support (13). Discard lockwashers.
- 3. Support panel (6) on two struts (7) to gain access to rear of panel.



See your -10 See your -20

Equipment Conditions:

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Master switch turned OFF (see your -20) Battery ground lead disconnected (see your -20) Tachometer and speedometer disconnected from instrument 'panel gages (see your -20)

10

6

- 4. Disconnect circuit 15 lead (1) from instrument panel wiring harness (2).
- 5. Disconnect circuit 14 lead (3) from panel wiring harness (2),
- 6. Disconnect circuit 10 lead (4) from panel circuit breaker (5).
- 7. Disconnect circuit 27E lead (6) from battery generator gage (7).
- 8. Remove panel wiring harness (2) from instrument panel (8).
- 9. Remove eight locknuts (9), washers (10), and screws (11). Separate master switch panel (12) from distribution box (13). Discard locknuts.
- 10. Remove screw (14), circuit 450 lead (15), and harness lead (2) from bus bar (16).
- 11. Remove panel wiring harness (2) from distribution box (13).

### INSTALL

- 12. Install harness lead (2) through hole in top of distribution box (13). Secure harness lead and circuit 450 lead (15) to bus bar (16) with screw (14).
- Install master switch panel (12) on distribution box (13). Secure with eight screws (11), washers (10), and new locknuts (9).
- 14. Connect circuit 27E lead (6) to battery generator gage (7).
- 15. Connect circuit 10 lead (4) to instrument panel circuit breaker (5).
- 16. Connect circuit 14 lead (3) to instrument panel wiring harness (2).
- 17. Connect circuit 15 lead (1) to panel wiring harness (2).



- 18. Install ground lead (1) and new lockwashers (2) on upper support (3).
- 19. Install instrument panel (4) with two mounts (5) on support (3). Secure with two screws (6) and flat washers (7).
- 20. Install panel (4) on two struts (8). Secure with two new locknuts (9), mounts (10 and 11), flat washers (12), and screws (13).



### FOLLOW-THROUGH STEPS

- **1.** Connect speedometer and tachometer cables to instrument panel gages (see your -20).
- 2. Connect battery ground lead (see your -20).
- 3. Master switch turned ON (see your -20).
- 4. Drive earner to check that panel gages and lights operate properly (see your -10).
- 5. Stop/shutdown engine (see your -10).

END OF TASK

### REPLACE INFRARED POWER SUPPLY CABLE ASSEMBLY

### DESCRIPTION

This task covers: Remove (page 6-9). Install (page 6-10).

### INITIAL SETUP

### Tools:

General Mechanics Tool Kit (Item 35, App B)

### **Personnel Required:**

Track Vehicle Repairer 63H10

### **References:**

See your -10

### REMOVE



High voltage in the M19 periscope can cause serious injury or death. Voltage could exceed 16,000 volts. To avoid accidents, observe the following

Always connect power cable to periscope before turning MASTER SWITCH and infrared (I.R.) POWER switch to ON.

WARNING

Before disconnecting power cable from M19 periscope, always wait at least two minutes after turning infrared (I.R.) POWER switch and MASTER SWITCH OFF.

Do not disconnect power cable until image disappears from periscope screen.

Never touch end of power cable, or allow it to contact metal surfaces.

- If circuit 517 lead (1) is in stowed position, disconnect it from the top of power supply assembly (2) and master switch panel dummy connector (3).
- 2. If circuit 517 lead (1) is in operating position, disconnect it from the top of power supply assembly (2) and bottom of periscope (4).

### References (cent):

See your -20

### **Equipment Conditions:**

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Battery ground lead disconnected (see your-20)



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### INSTALL

- For stowed position, connect circuit 517 lead

   to the top of power supply assembly 2 and master switch panel dummy connector (3).
- 4. For operating position, connect circuit 517 lead (1) to top of power supply assembly (2) and bottom of periscope (4).



INFRARED POWER SUPPLY CABLE ASSEMBLY STOWED POSITION



INFRARED POWER SUPPLY CABLE ASSEMBLY OPERATING POSITION

### FOLLOW-THROUGH STEPS

1. Connect battery ground lead (see your -20).

END OF TASK

### REPLACE POWER PLANT WIRING HARNESS

### DESCRIPTION

This task covers: Remove (page 6-11). Install (page 6-14).

### INITIAL SETUP

Tools:

General Mechanics Tool Kit (Item 35, App B)

Materials/Parts:

Lockwasher (4)

Personnel Required:

Track Vehicle Repairer 63H10

### **References:**

See your -10 See your -20

### Equipment Conditions: Ramp lowered (see your -10)

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Battery ground lead disconnected (see your -20) Power plant rear access panel removed (see your -20) Hull bottom access cover removed (see your -20) Trim vane lowered and power plant front access door open (see your -10)

### REMOVE

1. Disconnect circuit IB lead (1) from generator field switch (2) on secondary fuel filter.



- 2. Disconnect circuit 34 lead (1) from engine low oil pressure switch (2).
- Remove nut (3), two lockwashers (4), and circuit 6 lead (5) from starter solenoid (6). Discard lockwashers.
- Remove nut (7), two lockwashers (8), and circuit 74A lead (9) from solenoid (6). Discard lockwashers.
- 5. Disconnect circuit 327 lead (10) from transmission high oil temperature switch (11).
- 6. Disconnect circuit 33 lead (12) from engine coolant temperature switch (13).
- 7. Disconnect three power plant wiring harness connectors (14) from main wiring harness at driver's compartment bulkhead.



- 8. Disconnect circuit 328 lead (1) from differential high oil temperature switch (2).
- 9. Disconnect circuit 406=406A lead (3) from air box heater wiring harness.
- 10. Disconnect connector (4) from generator (5).



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- 11. Disconnect circuit 641E and 641F leads(1 and 2) from suspension lockout solenoid(3) (M741A1 only).
- 12. Remove 11 screws (4), 8 clamps (5), 8 nuts (6), 3 straps ('7), and power plant wiring harness (8) from power plant.

### INSTALL

- 13. Install power plant wiring harness (8) on power plant. Secure with 3 straps ('7), 8 nuts (6), 8 clamps (5), and 11 screws (4).
- 14. Connect circuits 641F and 641E leads (1 and 2) to suspension lockout solenoid (3).



- 15. Connect circuit 1. 2, 3, and 3A lead (1) to generator (2).
- 16. Connect circuit 406-406A lead (3) to air box heater wiring harness.
- 17. Connect circuit 328 lead (4) to differential high oil temperature switch (5).



- Connect three power plant wiring harness connectors (1) to main wiring harness at driver's compartment bulkhead.
- 20. Connect circuit 327 lead (4) to transmission high oil temperature switch (5).



- 21. Install circuit 74A lead (1) and two new lockwashers (2) on starter solenoid (3). Secure with nut (4).
- 22. Install circuit 6 lead (5) and two new lockwashers (6) on solenoid (3). Secure with nut (7).
- PRESSURE SWITCH (9)
- 24. Connect circuit IB lead (10) to generator field switch (11) on secondary fuel filter.



### FOLLOW-THROUGH STEPS

- 1. Connect battery ground lead (see your -20).
- 2. Install power plant rear access panel (see your -20).
- 3. Start engine (see your -10). Check that power plant wiring harness works correctly.
- 4. Raise and lock ramp (see your -10).

- 5. Stop/shutdown engine (see your -10).
- 6. Close power plant front access door and raise trim vane (see your -10).
- 7. Install hull bottom access cover (see your -20).

END OF TASK

### REPLACE FRONT MAIN WIRING HARNESS (ALL EXCEPT M741A1)

### DESCRIPTION

This task covers: Remove (page 6-18). Install (page 6-25).

### INITIAL SETUP

### Tools:

General Mechanics Tool Kit (Item 35, App B)

### Material/Parts:

Grommet (3) Terminal (6) Lockwasher Lockwasher (8) Lockwasher (4) Lockwasher (2) Self-locking nut (2)

### Personnel Required: Track Vehicle Repairer 63H10 Helper (H)

### REMOVE

- 1. Remove two locknuts (1), mounts (2 and 3), flat washers (4), and screws (5) that secure panel (6) to two struts (7). Discard locknuts.
- 2. Support panel (6). Remove two screws (8), flat washers (9), one lockwasher (10), and ground lead (11) from two mounts (12) and upper support (13). Discard lockwasher.
- 3. Support instrument panel (6) on two struts (7) to gain access to rear of panel.

2

See your -20 Equipment Conditions: Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Battery ground lead disconnected (see your -20) Driver's power plant access cover removed (see your -20)

**References:** 

See your -10

Trim vane lowered and power plant front access door opened (see your -10)



- 4. Disconnect circuit 24, 23, 22, and 21 leads (1, 2, 3, and 4) from rear main wiring harness (5).
- 5. Disconnect connector (6) from light selector switch.
- 6. Disconnect circuit 452A lead (7) from bilge pump switch.
- 7. Disconnect circuit 452B lead (8) from bilge pump ON light.
- 8. Disconnect two circuit 40 leads (9) from instrument panel lights.



**NOTE** Step 8.1 applies to M1064 only.

8.1 Disconnect circuits 28 (9.1), 30 (9.2), and 31 (9.3) from fuel tank switch (9.4).



- 9. Disconnect circuit 19, 520, and 614-515 leads (10, 11, and 12) from infrared blackout (I.R. - B.O.) selector switch.
- 10. Disconnect circuit 15, 25A, 27F, and 14 leads (13, 14, 15, and 16) from instrument panel wiring harness.
- 11. Disconnect circuit 516A lead (17) from infrared (I.R.) power selector switch.
- 12. Disconnect circuit 74 and 14 plug (18) from starter switch.
- 13. Disconnect circuit 33 lead (19) from engine coolant temperature gage.
- 14. Disconnect circuit 406 lead (20) from air box heater switch.
- 15. Remove front wiring harness (21) from instrument panel.



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- 16. Remove eight nuts (1), washers (2), and screws (3). Separate master switch panel assembly (4) from distribution box (5).
- 16.1. Remove circuit 2A lead (13/19) and circuit 2 lead (16/18) from master switch panel assembly (see your -20).

### NOTE

# The distribution boxes shown below are M113A2 configuration. Your distribution box may have leads not shown here, Remove and install those leads as needed to do steps 17 thru 20 below.

17. Remove screw (6), lockwasher (7), and circuit 6 lead (8) from bus bar (9).
Remove circuit 6 lead and grommet (10) from distribution box (5). Discard grommet and lockwasher.

- On 100 amp generator system, remove screw (11), lockwasher (12), and circuit 3 lead (13) from circuit breaker (14). Remove circuit 3 lead and grommet (15) from distribution box (5). Discard grommet and lockwasher.
- On 100 amp generator system, remove circuit 2 lead (16) from master switch panel assembly (see your -20). Remove circuit 2 lead and grommet (17) from distribution box (5). Discard grommet.
- 20. On 200 amp generator system, remove circuit 2 lead (18) and circuit 2A lead (19) from master switch panel assembly (see your -20). Remove circuit 2 lead, circuit 2A lead, and two grommets (20 and 21) from distribution box (5). Discard grommets.



FOR 100 AMP GENERATOR SYSTEM

FOR 200 AMP GENERATOR SYSTEM

- 21. Remove three cradle clips (1) and front main wiring harness (2) from three cradles (3).
- 22. Remove three screws (4), washers (5), clamps (6), and harness (2) from three weldnuts (7).
- 23. Remove 16 screws (8), nuts (9), and four connectors (10) from driver's bulkhead.
- 24. Disconnect two connectors (11) from voltage regulator (12).

### ΝΟΤΕ

- If you need to remove voltage regulator, do step 25. Otherwise, go to step 26.
- 25. Remove four screws (13), eight lock washers (14), and regulator (12) from four weldnuts (15). Discard lock washers.
- 26. Remove two clips (1) and harness (2) from two cradles (3) inside driver's compartment.



INSIDE DRIVER'S COMPARTMENT INSIDE DRIVER'S COMPARTMENT 27. Inside driver's compartment, disconnect circuit 516A lead (1) from infrared power pack (2).



 From inside power plant compartment , disconnect right headlight wiring harness (3), voltage regulator lead (4), and two power plant harness leads (5) from driver's compartment\_bulkhead.



29. Disconnect circuit 452 lead (6) from front bilge pump (7).



- Disconnect circuit 75A and 75B leads
   (8 and 9) from stop light switch (10) inside power plant compartment.
- 31. Remove three cradle clips (11) and front main wiring harness (12) from three cradles (13).



- 32. Disconnect connector (1) from dimmer switch (2).
- Remove four screws (3) and cover (4) from four pressnuts (5) in driver's compartment bulkhead.
- 34. Remove two screws (6), lock washers (7), and clamps (8) that secure harness (9) to two weldnuts (10).
- 35. Pull harness (9) through bulkhead into driver's compartment.
- Disconnect circuit 74 lead (11) and circuit 74A lead (12) from range selector leads (13).
- 37. Remove cradle clip (14) and harness (9) from cradle (15),


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- Disconnect circuit 27K and 328 plug (1) from differential high oil temperature warning light on panel (2).
- 39. Disconnect circuit 27G and 327 plug (3) from transmission high oil temperature warning light on panel (2).
- 40. Disconnect circuit 27J and 34 plug (4) from engine low oil pressure warning light on panel (2).
- 41. Disconnect circuit 25 and 25A plug (5) from horn switch on panel (2).
- 42. Disconnect circuit 519 and 519A plug (6) from high beam indicator light on panel (2).

- 43. Remove two cradle clips (7) and front main wiring harness (8) from cradles (9).
- 44. Disconnect circuit 17 and 18 leads (10 and 11) from left service headlight (12).
- 45. Disconnect circuit 20 lead (13) from left blackout marker light (14).
- 46. Disconnect circuit 19 lead (15) from blackout headlight (16).
- 47, Disconnect circuit 514 and 515 leads (17 and 18) from left infrared service headlight (19).





- 48. Remove six terminals (1), insulators (2), and connectors (3) from leads that were disconnected in steps 44 thru 47. Discard terminals.
- 49. Remove two nuts (4), spring washers (5), retainers (6), and bushings (7) from six leads removed in steps 44 thru 47.
- 50. Pull these six leads on harness (8) through two bushings (9).
- 51. Remove four nuts (10), lockwashers (11), flat washers (12), two flat washers (13), and bushings (9) from front of hull. Discard lockwashers.



- 52. Remove three cradle clips (14) from three cradles (15) between distribution box (16) and instrument panel (17).
- 53. Remove screw (18), clamp (19), and harness(8) from weldnut (20) near panel.
- 54. Remove harness (8) from carrier.

# INSTALL

- 55. Install harness (8) on weldnut (20) near instrument panel (17). Secure with clamp (19) and screw (18).
- 56. Install harness (8) on three cradles (15) between distribution box (16) and panel (17]. Secure with three clips (14).



- 57. Install two bushings (1) on front of hull. Secure with two flat washers (2), four flat washers (3), new lockwashers (4), and nuts (5).
- 58. Install six leads on front main wiring harness (6) through two bushings (1) and bushings (7).
- 59. Install harness (6) on two bushings (7) and bushings (1). Secure with two retainers (8), spring washers (9), and nuts (10).
- Install six new terminals (11), insulators (12), and connectors (13) on the ends of six leads.

- 61. Connect circuit 514 and 515 leads (14 and 15) to left infrared service headlight 16).
- 62. Connect circuit 19 lead (17) to blackout headlight (18).
- 63. Connect circuit 20 lead (19) to left blackout marker light (20).
- 64. Connect circuit 17 and 18 leads (21 and 22) to left service headlight (23).





- 65. Connect circuit 27K and 328 plug (1) to differential high oil temperature warning light on panel (2).
- 66. Connect circuit 27G and 327 plug (3) to transmission high oil temperature warning light on panel (2).
- 67. Connect circuit 27J and 34 plug (4) to engine low oil pressure warning light on panel (2).
- 68. Connect circuit 25 and 25A plug (5) to horn switch on panel (2).
- 69. Connect circuit 519 and 519A plug (6) to high beam indicator light on panel (2).



- 70. Connect circuit 74 lead (7) and circuit 74A lead (8) to range selector leads (9).
- 71. Install harness (10) on cradle (11) above range selector. Secure with clip (12). Install harness on two cradles (13) behind warning light panel. Secure with clips (14).



- 72. Install harness (1) through driver's compartment bulkhead opening. Connect connector (2) to dimmer switch (3).
- 73. Secure cover (4) to bulkhead (5) with four Screws (6).
- 74. Install harness (1) on two weldnuts (7). Secure with two clamps (8), new lockwashers (9), and screws (10).



- 75. Install harness (1) on three cradles (11). Secure with three cradle clips (12).
- 76. Connect circuits 75A and 75B leads (13 and 14) to stop light switch (15) inside power plant compartment.



77. Connect circuit 452 lead (16) to front bilge pump (17).



7s. From inside power plant compartment, connect right headlight wiring harness (1), voltage regulator lead (2), and two power plant harness leads (3) to driver's compartment bulkhead.



80. Inside driver's compartment, install front main wiring harness (6) on two cradles (7). Secure with two cradle clips (S).

ΝΟΤΕ

If voltage regulator was removed in step 25, do step 81. Otherwise, go to step 82.

Install voltage regulator (9) on four weldnuts (10). Secure with eight new lockwashers (11) and four screws (12).

Connect two connectors (13) to regulator (9).

79. Inside driver's compartment, connect circuit 516A lead (4) to infrared power pack (5).



- 83. Install harness (1) on wall of driver's compartment. Secure to three weldnuts (2) and cradles (3) with three clamps (4), washers (5), screws (6), and clip (7).
- 84. Install four connectors (8) on driver's bulkhead. Secure with 16 nuts (9) and screws (10). Have helper assist.



INSIDE DRIVER'S COMPARTMENT

- 85. On 200 amp generator system, install two new grommets (11 and 12), circuit 2A lead (13), and circuit 2 lead (14) in distribution box (15).
- 86. On 100 amp generator system, install new grommet (16) and circuit 3 lead (17) in distribution box (15). Install circuit 3 lead on circuit breaker (18) and secure with new lockwasher (19) and screw (20).
- Install new grommet (21) and circuit 6 lead (22) in distribution box (15). Install circuit 6 lead on bus bar (23). Secure with new lockwasher (24) and screw (25).
- On 100 amp generator system, install new grommet (26) and circuit 2 lead (27) in distribution box (15). Install circuit 2 lead in master switch panel assembly (see your -20).

 On 200 amp generator system, install circuit 2A lead (13) and circuit 2 lead (14) in master switch panel assembly (see your -20).



FOR 200 AMP GENERATOR SYSTEM



FOR 100 AMP GENERATOR" SYSTEM

 Install master switch panel assembly (1) on distribution panel (2). Secure with eight nuts (3), washers (4), and screws (5).



91. Route front main wiring harness (6) up behind instrument panel. Follow steps 91 thru 101 to attach leads to panel.



- 92. Connect circuit 406 lead (7) to air box heater switch.
- 93. Connect circuit 33 lead (8) to engine coolant temperature gage.
- 94. Connect circuit 74 and 14 plug (9) to starter switch.
- 95. Connect circuit 516A lead (10) to infrared (1. R.) power selector switch.
- 96. Connect circuit 15, 25A, 27F, and 14 leads (11, 12, 13, and 14) to instrument panel wiring harness.
- 97. Connect circuit 19, 520, and 514-515 leads (15, 16, and 17) to infrared blackout (1.R. B. O.) switch.



NOTE Step 97.1 applies to M1064 only.

97.1 Install circuits 28 (18), 30 (19), and 31 (20) on fuel tank switch (21).

- 98. Connect two circuit 40 leads (1) to instrument panel lights.
- 99. Connect circuit 452B lead (2) to bilge pump ON light.
- 100. Connect circuit 452A lead (3) to bilge pump switch.
- 101. Connect connector (4) to light selector switch.
- 102. Connect circuit 24, 23, 22, and 21 leads (5, 6, 7, and 8) to rear main wiring harness (9).

- 103. Support instrument panel (10) on two struts (11).
- 104. Install ground lead (12), two screws (13), and flat washer (14) on upper support (15).
- 105. Install panel (10) with two mounts (16) on upper support (15). Secure with two screws (13).
- 106. Install panel (10) on two struts (11). Secure with two new locknuts (17), mounts (18 and 19), flat washers (20), and screws (21).



#### FOLLOW-THROUGH STEPS

- Install driver's power plant access cover (see your -20).
- 2. Close power plant front access door and raise trim vane (see your -10).
- 3. Connect battery ground lead (see your -20).
- 4. Start engine (see your -10). Check that master switch panel, instrument panel, and distribution box operate properly.
- 5. Check that lights operate properly (see you= -10).
- 6. Stop/shutdown engine. (see your -10).

END OF TASK

# REPLACE FRONT MAIN WIRING HARNESS (M741A1 ONLY)

#### DESCRIPTION

This task covers: Remove (page 6-33). Install (page 640).

## INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 35, App B)

#### Materials/Parts:

Gasket Grommet (3) Terminal (6) Lockwasher Lockwasher (2) Lockwasher (2) Lockwasher (2) Lockwasher (4) Self-locking nut (8) Self-locking nut (2)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### REMOVE

- 1. Remove two locknuts (1), mounts (2 and 3), flat washers (4), and screws (5) that secure panel (6) to two struts (7). Discard locknuts.
- 2. Support panel (6). Remove two screws (8), flat washers (9), one lockwasher (10), and ground lead (11) from two mounts (12) and upper support (13). Discard lockwasher.
- 3. Support instrument panel (6) on two struts (7) to gain access to rear of panel.

#### Personnel Required (cent):

Helper (H)

#### **References:**

See your -10 See your -20

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10) Battery ground lead disconnected (see your -20) Driver-s power plant access cover removed (see your -20) Trim vane lowered and power plant front access door opened (see your -10)



- 4. Disconnect circuit 24, 23, 22, and 21 leads [1, 2, 3, and 4) from rear main wiring harness (5).
- 5. Disconnect connector (6) from light selector switch.
- 6. Disconnect circuit 452A lead (7) from bilge pump switch.
- 7. Disconnect circuit 452B lead (8) from bilge pump ON light.
- 8. Disconnect two circuit 40 leads (9) from instrument panel lights.

- 9. Disconnect circuit 19, 520, and 514-515 leads (10, 11, and 12) from infrared blackout (1. R.B. O.) selector switch.
- 10. Disconnect circuit 15, 25A, 27F, and 14 leads (13, 14, 15, and 16) from instrument panel wiring harness.
- 11. Disconnect circuit 516A lead (17) from infrared (I.R.) power selector switch.
- 12. Disconnect circuit 74 and 74A plug (18) from starter.
- 13. Disconnect circuit 33 lead (19) from engine coolant temperature gage.
- 14. Disconnect circuit 406 lead (20) from air box heater switch.
- 15. Remove front wiring harness (21) from instrument panel.



- Remove eight locknuts (I), washers (2), and screws (3). Separate master switch panel assembly (4) from distribution box (5). Discard locknuts.
- Remove screw (6), lockwasher (7), and circuit 6 lead (8) from bus bar (9). Remove circuit 6 lead and grommet (10) from distribution box (5). Discard grommet and lockwasher.
- On 100 amp generator system, remove screw (11), lockwasher (12), and circuit 3 lead (13) from circuit breaker (14). Remove circuit 3 lead and grommet (15) from distribution box (5). Discard grommet.
- On 100 amp generator system, remove screw (16), lockwasher (17), and circuit 2 lead (18) from bus bar (9). Remove circuit 2 lead and grommet (19) from distribution box (5). Discard grommet and lockwasher.
- On 200 amp generator system, remove screw (16), lockwasher (17), circuit 2B lead (20), and circuit 2 lead (18) from bus bar (9). Remove circuit 2B lead, circuit 2 lead, and two grommets (19 and 21) from distribution box (5). Discard grommets and lockwasher.



FOR 100 AMP GENERATOR SYSTEM

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- 21. Remove three cradle clips (1) and front main wiring harness (2) from three cradles (3).
- 22. Remove three screws (4), washers (5), clamps (6), and harness (2) from three weldnuts (7).
- 23. Remove 16 screws (8), nuts (9), and four connectors (10) from driver's bulkhead.
- 24. Disconnect two connectors (11) from voltage regulator (12).

#### ΝΟΤΕ

# If you need to remove voltage regulator, do step 25. Otherwise, go to step 26.

- Remove four screws (13), eight lockwashers (14), and regulator (12) from four weldnuts (15). Discard lockwashers.
- 26. Remove two clips (1) and harness (2) from two cradles (3) inside driver's compartment.





INSIDE DRIVER'S COMPARTMENT INSIDE DRIVER'S COMPARTMENT 27. Inside driver's compartment, disconnect circuit 516A lead (1) from infrared power pack (2).



 From inside power plant compartment, disconnect right headlight wiring harness (3), voltage regulator lead (4), and two power plant harness leads (5) from driver's compartment bulkhead.



29. Disconnect circuit 452 lead (6) from front bilge pump (7).



- Disconnect circuit 75A and 75B leads
   (8 and 9) from stop light switch (10) inside power plant compartment.
- **31.** Remove three cradle clips (11) and front main wiring harness (2) from three cradles (13).



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- 32. Disconnect connector (1) from dimmer switch (2).
- 33. Remove four screws (3) and cover (4) from four locknuts (5) in driver's compartment bulkhead. Discard locknuts.
- 34. Remove two screws (6), lockwashers (7), and clamps (8) that secure harness (9) to two weldnuts (10). Discard lockwashers.
- 35. Pull harness (9) through bulkhead into driver"s compartment.

# NOTE

Do not disconnect circuit 641.F lead on range selector.

- 36. Disconnect circuit 14 lead (11) and circuit 14A lead (12) from range selector leads (13).
- 37. Remove cradle clip (14) and harness (9) from cradle (15).



- Disconnect circuit 27K and 328 plug (1) from differential high oil temperature warning light on panel (2).
- 39. Disconnect circuit 27G and 327 plug (3) from transmission high oil temperature warning light on panel (2).
- 40. Disconnect circuit 27J and 34 plug (4) from engine low oil pressure warning light on panel (2).
- 41. Disconnect circuit 25 and 25A plug (5) from horn switch on panel (2).
- 42. Disconnect circuit 519 and 519A plug (6) from high beam indicator light on panel (2).
- 43. Disconnect circuit 509 and 27H plug (7) from lockout indicator light under panel (2).
- 44. Remove two cradle clips (8) and front main wiring harness (9) from cradles (10).
  - wiring harness (9) from cradles (10).

- 45. Disconnect circuits 17 and 18 leads (11 and 12) from left service headlight (13).
- **46.** Disconnect circuit 20 lead (14) from left blackout marker light (15).
- 47. Disconnect circuit 19 lead (16) from blackout headlight (17).
- 48. Disconnect circuits 514 and 515 leads (18 and 19) from left infrared service head-light (20).



- 49. Remove six terminals (I), insulators (2), and connectors (3) from leads that were disconnected in steps 44 thru 47. Discard terminals.
- 50. Remove two nuts (4), spring washers (5), retainers (6), and bushings (7) from six leads removed in steps 44 thru 47.
- 51. Pull these six leads on harness (8) through two bushings (9).
- 52. Remove four nuts (10), lockwashers (11), flat washers (12), two flat washers (13), and bushings (9) from front of hull. Discard lockwashers.

- 53. Remove three cradle clips (14) from three cradles (15) between distribution box (16) and instrument panel (17).
- 54. Remove screw (18), clamp (19), and harness (8) from weldnut (20) near panel.
- 55. Remove harness (8) from earner.

#### INSTALL

- 56. Install harness (8) on weldnut (20) near instrument panel (17). Secure with clamp (19) and screw (18).
- 57. Install harness (8) on three cradles (15) between distribution box (16) and panel (17). Secure with three clips (14).





- Install two bushings (1) on front of hull. Secure with two flat washers (2), four flat washers (3), new lockwashers (4), and nuts (5).
- 59. Install six leads on front main wiring harness (6) through two bushings (1) and bushings (7).
- 60. Install harness (6) on two bushings (7) and bushings (1). Secure with two retainers (8), spring washers (9), and nuts (10).
- Install six new terminals (11), insulators (12), and connectors (13) on the ends of six leads.

- 62. Connect circuit 514 and 515 leads (14 and 15) to left infrared service headlight (16).
- 63. Connect circuit 19 lead (17) to blackout headlight (18).
- 64. Connect circuit 20 lead (19) to left blackout marker light (20).
- 65. Connect circuit 17 and 18 leads (21 and 22) to left service headlight (23).





- 66. Connect circuit 27K and 328 plug (1) to differential high oil temperature warning light on panel (2).
- 67. Connect circuit 27G and 327 plug (3) to transmission high oil temperature warning light on panel (2).
- 68. Connect circuit 27J and 34 plug (4) to engine low oil pressure warning light on panel (2).
- 69. Connect circuit 25 and 25A plug (5) to horn switch on panel (2).
- 70. Connect circuit 519 and 519A plug (6) to high beam indicator light on panel (2).
- 71. Connect circuit 509 and 27H plug (7) to lockout indicator light under panel (2).
- 72. Install front main wiring harness (S) on t~vo cradles (9) with two cradle clips (10).



- 73. Connect circuit 14 lead ,11) and circuit 14A lead (12) to range selector leads (13).
- 74. Install harness (14) on cradle (15) above range selector. Secure with clip (16).



- 75. Install harness (1) through driver's compartment bulkhead opening. Connect connector (2) to dimmer switch (3).
- 76. Secure cover (4) to four new locknuts (5) in bulkhead with four screws (6).
- 77. Install harness (1) on two weldnuts (7). Secure with two clamps (8), washers (9), and screws (10).



- 78. Install harness (1) on three cradles (11). Secure with three cradle clips (12).
- 79. Connect circuit 75A and 75B leads (13 and 14) to stop light switch (15) inside power plant compartment.



80. Connect circuit 452 lead (16) to front bilge pump (17).



81. From inside power plant compartment, connect right headlight wiring harness (I), voltage regulator lead (2), and two power plant harness leads (3) to driver's compartment bulkhead.



82. Inside driver's compartment, connect circuit 516A lead (4) to infrared power pack (5).

83. Inside driver's compartment, install front main wiring harness (6) on two cradles (7). Secure with two cradle clips (8).

# ΝΟΤΕ

# If voltage regulator was removed in step 25, do step 81. Otherwise. go to step 82.

- 84. Install voltage regulator (9) on four weldnuts (10). Secure with eight washers (11) and four screws (12).
- 85. Connect two connectors (13) to regulator (9).



INSIDE DRIVER'S COMPARTMENT



- Install harness (1) on wall of driver's compartment. Secure to three weldnuts (2) and cradles (3) with three clamps (4), washers (5), screws (6), and clips (7).
- Install four connectors (8) on driver's bulkhead. Secure with 16 nuts (9) and screws (10). Have helper assist.



INSIDE DRIVER'S COMPARTMENT

- On 200 amp generator system, install two new grommets (11 and 12), circuit 2B lead (13), and circuit 2 lead (14) in distribution box (15). Install circuit 2B lead and circuit 2 lead on bus bar (16). Secure with new lockwasher (17) and screw (18).
- On 100 amp generator system, install new grommet (12) and circuit 2 lead (14) in distribution box (15). Install circuit 2 lead on bus bar (16). Secure with new lockwasher (17) and screw (18).
- On 100 amp generator system, install new grommet (19) and circuit 3 lead (20) in distribution box (15). Install circuit 3 lead on circuit breaker (21). Secure with new lockwasher (22) and screw (23).
- Install new grommet (24) and circuit 6 lead (25) in distribution box (15). Install circuit 6 lead on bus bar (16). Secure with new lockwasher (26) and screw (27).

92. Install master switch panel assembly (2S) on distribution box (15). Secure with eight new locknuts (29), washers (30), and screws (31).



FOR 200 AMP GENERATOR SYSTEM



FOR 100 AMP GENERATOR SYSTEM

- Route front main wiring harness (1) up behind instrument panel. Follow steps 91 thru 101 to attach leads to panel.
- 94. Connect circuit 406 lead (2) to air box heater switch.
- 95. Connect circuit 33 lead (3) to engine coolant temperature gage.
- 96. Connect circuit 74 and 74A plug (4) to starter switch.
- 97. Connect circuit 516A lead (5) to infrared (1.R.) power selector switch.
- 98. Connect circuit 15, 25A, 27F, and 14 leads (6, 7, 8, and 9) to instrument panel wiring harness.
- 99. Connect circuit 19, 520, and 514-515 leads
  ( 10, 11, and 12) to infrared blackout
  (I. R. B. O.) switch.

- 100. Connect two circuit 40 leads (13) to instru ment panel lights.
- 101. Connect circuit 452B lead (14) to bilge pump ON light.
- 102. Connect circuit 452A lead (15) to bilge pump switch.
- 103. Connect connector (16) to light selector switch.
- 104. Connect circuit 24, 23, 22, and 21 leads (17, 18, 19, and 20) to rear main wiring harness (21).





- 105. Support instrument panel (1) on two struts (2).
- 106. Install ground lead (3) and new lockwasher(4) on upper support (5).
- 107. Install panel (1) with two mounts (6) on upper support (5). Secure with two screws (7) and flat washers (8).
- 108. Install panel on two struts (2). Secure with two new locknuts (9), mounts (10 and 11), flat washers (12), and screws (13).



# FOLLOW-THROUGH STEPS

- 1. Install driver's power plant access cover (see your -20).
- Close power plant front access door and raise trim vane (see your -10).
- 3. Connect battery ground lead (see your -20).
- 4. Start engine (see your -10). Check that master switch panel, instrument panel, and distribution box work correctly.
- 5. Check that lights work correctly (see your -10).
- 6. Stop/shutdown engine (see your -10).

# END OF TASK

#### REPLACE TURRET WIRING HARNESS (M741A1 ONLY)

#### DESCRIPTION

This task covers: Remove (page 6-48). Install (page 6–51).

#### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 35, App B)

#### Materials/Parts:

Gasket (2) Grommet (2 Lockwasher Lockwasher Self-locking nut (6) Self-locking nut (6) Self-locking nut (4)

#### **References:**

See your –10 See your -20

**Equipment Conditions:** 

Engine stopped (see your -10) Carrier blocked (see your -10) Ramp lowered (see your -10) Battery ground lead disconnected (see your -20) Personnel compartment floor plates removed (see your -20)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### REMOVE

- Remove six screws (1), locknuts (2), washers (3), cover (4) and gasket (5) from distribution box (6). Discard locknuts and gasket.
- Remove screw (7), lockwasher (8), circuit 2 lead (9) and grommet (10) from distribution bOX (6). Discard lockwasher and grommet.





- **3.** Disconnect circuit A9P6 connector (1) from radio.
- 4. Disconnect circuit .A0P4 connector (2) from antenna.
- 5. Disconnect circuits A9P1 and A9P3 antenna leads (3 and 4).
- 6. Remove four cradle clips (5) and turret wiring harness (6) from four cradles (7).

- 7. Disconnect circuit A9P7 connector (8) from turret slip ring.
- 8. Remove screw (9), lockwasher (10), nut (11) and circuit 7 ground lead (12) from hull. Discard lockwasher.
- 9. Remove six screws (13), six clamps (14) and wiring harness (6) from six weldnuts (15).



- Remove four screws (I), washers (2), locknuts (3) and circuit A9J2 connector 4 from bracket (5). Discard locknuts.
- Disconnect circuit A, B, C, and D leads (6, 7, 8 and 9) from circuit A9J1 connector (10).
- 12. Disconnect circuit antenna leads A9P5 and A9P2 (11 and 12).
- 13. Remove six screws (13), washers (14), locknuts (15), cover (16) and gasket (17 from distribution box (18). Discard locknuts and gasket.
- 14, Remove screw (19), lockwasher (20), circuit2 lead (21) and grommet (22) fromdistribution box (18). Discard lockwasher andgrommet.





- 15. Remove cover (1) from terminal block (2).
- 16. Remove two screws (3), circuit TB1-2 and TB1-4 leads (4 and 5) from terminal block (2).
- 17. Remove turret wiring harness (6) from carrier.

INSTALL

- 18. Install wiring harness (6) in carrier.
- 19. Install circuit leads TB1-4 and TB1-2 (5 and 4) on terminal block (2). Secure with two screws (3).
- 20. Install cover (1) on terminal block (2).

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- 21. Install circuit 2 lead (7) and new grommet (8) in distribution box (9). Secure lead with screw (10) and new lockwasher (11).
- 22. Install cover (12) and new gasket (13) on distribution box (9). Secure with six screws (14), washers (15) and new locknuts (16).



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- 23. Connect circuit A9P5 (1) to auxiliary receiver R442/VRC.
- 24. Connect circuit A9P2 (2) to receiver transmitter RT-524/RVC.
- 25. Connect circuit A, B, C and D leads (3, 4, 5, and 6) to leads A, B, C and D from A9J1 connector (7).
- 26. Install circuit A9J2 connector (8) on bracket (9). Secure with four screws (10), washers (11) and new locknuts (12).

- 27. Install turret wiring harness (13) on six weldnuts (14) with six screws (15) and clamps (16).
- 28. Install circuit 7 ground lead (17) and new lockwasher (18) on hull. Secure with screw (19) and nut (20).
- 29. Connect circuit A9P7 connector (21) on turret slip ring.



- 30. Install wiring harness (1) on four cradles (2). Secure with four cradle clips (3).
- 31. Connect circuits A9P1 and A9P3 antenna leads (4 and 5).
- 32. Connect A9P4 connector (6) to antenna.
- 33. Connect circuit A9P6 connector (7) to radio.
- 34. Install circuit 2 lead (8) and new grommet (9) in distribution box (10). Secure lead with screw (11) and new lockwasher (12).
- 35. Install cover (13) and new gasket (14) on distribution box (10). Secure with six screws (15), new locknuts (16) and washers (17).



# **FOLLOW-THROUGH STEPS**

- 1. Install personnel compartment floor plates (see your -20).
- 2. Connect battery ground lead (see your -20).
- 3. Raise and lock ramp (see your -10).
- 4. Turn MASTER SWITCH ON (see your -10). Check that turret operates properly.
- 5. Turn MASTER SWITCH OFF (see your -10).

END OF TASK

# REPLACE CHASSIS TURRET WIRING HARNESS (M901A1 ONLY)

8

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# DESCRIPTION

This task covers: Remove (page 6-54). Install (page 6-60).

# **INITIAL SETUP**

#### **Tools:**

General Mechanics Tool Kit (Item 35, App B)

# Materials/Parts:

Lockwasher (4) Lockwasher (4) Lockwasher (5) Lockwasher (8) Lockwasher (8) Lockwasher (8) Lockwasher (11) Safety wire, as required Self-locking nut (4) Self-locking nut (5)

# REMOVE

1. Disconnect right smoke grenade wiring harness connector (1) from connector (2).

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#### Personnel Required:

Track Vehicle Repairer 63H10 Helper

#### References:

See your-10 See your -20 TM 9-2350-259-34

#### **Equipment Conditions:**

Engine shutdown (see your -10) Carrier blocked (see your -10) Master switch panel removed (see your -20) Turret removed (see TM 9-2350-259-34) Power plant access door opened (see your -10) Driver's level indicator removed (see your -20)

- 2. Remove jamnut (3) from connector (1). Remove connector from plate (4). Have helper assist.
- Remove four screws (5), washers (6), gasket (7), plate (4) and locknuts (8). Discard locknuts. Have helper assist.

# K

WARNING To prevent injury to personnel, verify that all grenades have been removed from smoke grenade discharger before removing components.

- 4. Remove three screws (1) and washers (2) securing smoke grenade discharger (3) to mounting base (4). Pull away discharger (3) and disconnect wiring harness (5). Remove discharger (3).
- Remove four screws (6), lockwashers (7) and washers (8) securing brush guard (9) to hull. Remove brush guard. Discard lockwashers.

- 6. Remove three screws (10), washers (11) and mounting base (4) from hull.
- 7. Disconnect wiring harness (5) from hull connector (12). Remove wiring harness.
- 8. Remove jamnut (13) from connector (12) in hull. Let connector fall inside driver's compartment.
- Remove four screws (14), lockwashers (15), washers (16), mounting plate (17) and gasket (18). Discard lockwashers.



- Remove clip (1), three screws (2), lockwashers (3) and clamps (4) from wiring harness (5). Discard lockwashers.
- Remove screw (6), two washers (7), clamp (8), lockwasher (9) and nut (10). Discard lockwasher.

# NOTE Tag leads before removing.

- Remove two screws (11), lockwashers (12), four leads (13), grommet (14) and wiring harness (5) from distribution box (15). Discard lockwashers.
- 13. Disconnect wiring harness lead W8P4 (16) from driver's hatch proximity switch plug A5S2J1 (17).



DISTRIBUTION BOX

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- Remove three clips (1), screw (2), lockwasher (3), washer (4), clamp (5) and wiring harness (6) from left side of driver's compartment. Discard lockwasher.
- 15. Disconnect wiring harness lead W8P3 (7) from cargo hatch full open proximity switch plug A5S4J1 (8).
- Remove two screws (9) lockwashers (10), and guard (11) from fuel tank weldnuts. Discard lock washers.

- 17. Remove two screws (12), washers (13). locknuts (14), and guard (15) from guard (11). Discard locknuts.
- Remove three screws (16), locknuts (17) and clamps (18) from guard (11) and wiring harness (6). Discard locknuts.
- 19. Remove seven clips (1) and wiring harness(6) from front of fuel tank and left side of carrier.



- Remove four screws (1), lockwashers (2), washers (3), and cable guard (4) securing connector W8J1 (5) to floor near left bulkhead. Disconnect connector W8J1 from turret slip ring wiring harness connector. Discard lockwashers.
- 21. Cut safety wire securing connector W8J1 (5) to screw (6). Remove screw (6), three screws (7), four lockwashers (8), eight washers (9), four nuts (10) and connector W8J1 (5) from bracket (11). Discard lockwashers.
- 22. Remove two screws (12), lockwashers (13), washers (14), clamps (15) and wiring harness (16) from left bulkhead. Discard lockwashers.
- Remove screw (17), lockwasher (18), washer (19) and clamp (20) securing smoke grenade arming/fiting unit lead W8P1 (21) to rear engine compartment bulkhead. Discard lockwasher.
- 24. Disconnect wiring harness lead W8P1 (21) from smoke grenade arming/firing unit connector (22).



- Remove eight screws (1), lockwashers (2), washers (3), four protectors (4) from overhead. Discard lockwashers.
- 26. Disconnect wiring harness lead W8P5 (5) from cargo hatch closed proximity switch connector A5S3J1 (6).
- 27. Remove eleven screws (7), lockwashers (8), washers (9) and clamps (10) from weldnuts on overhead. Discard lockwashers.
- 28. Remove wiring harness (11) from carrier.




#### INSTALL

#### NOTE Layout wiring harness inside carrier.

- 29. Connect wiring harness lead W8P5 (1) to cargo hatch closed proximity switch A5S3J1 (2).
- 30. Connect wiring harness lead W8P1 (3) to arming/firing unit connector A5A1J1 (4).
- Connect wiring harness lead W8P3 (5) to cargo hatch full open proximity switch A5S4J1 (6).

- Position connector W8J1 (7), on bracket (8). Secure with screw (9), three screws (10). four new lockwashers (11), eight washers (12) and four nuts (13).
- 33. Safety wire connector W8J1 (7) to screw (9) per MS33540.
- 34. Connect turret slip ring wiring harness connector to connector W8J1 (7).
- 35. Install guard (14) with four screws (15), new lockwashers (16) and washers (17).



#### ΝΟΤΕ

Make sure to secure all wiring harness clamps loosened during removal procedure.

- Position guards (1 and 2) over rear section of wiring harness (3) near fuel tank. Secure guards with two screws (4), washers (5) and new locknuts (6).
- Take proper amount of slack out of wiring harness (3) and secure to guard (2) with three clamps (7), screws (8) and new locknuts (9).

- Attach guard (2) to fuel tank and weldnuts with two screws (10) and new lockwashers (11).
- 39. Attach wiring harness (3) to front of fuel tank and left bulkhead of carrier using seven clips (12).
- 40. Attach wiring harness (3) to bulkhead using two clamps (13), washers (14), new lock washers (15), and screws (16).
- 41. Secure wiring harness (3) to overhead with eleven clamps (17), screws (18), new lockwashers (19) and washers (20).



GO TO NEXT PAGE

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**B** 

- 42. Install four protectors (1) with eight screws (2), new lockwashers (3) and washers (4) to overhead.
- 43. Secure smoke grenade arming/firing unit lead (5) to rear engine compartment bulkhead with clamp (6), screw (7), new lockwasher (8) and washer (9).
- 44. Place grommet (10) on wiring harness (11).
  Feed wiring harness leads (12) into distribution box (13) and attach four leads (12) to bus bar (4). Secure leads with two screws (5) and new lockwashers (16) after positioning grommet in distribution box.



**DISTRIBUTION BOX** 

45. Position plate (1) and gasket (2) on hole on outside of hull. Secure with four screws (3), new lockwashers (4), and washers (5).



#### WARNING

To prevent injury to personnel, verify that all grenades have been removed from smoke grenade discharger before removing components.

46. Hold left smoke grenade wiring harness connector (6) up to plate (1) and secure with jamnut (7). Have helper assist.

- 47. Connect wiring harness (6) to hull connector (8).
- 48. Install mounting base (9) on hull. Pass the loose end of the wiring harness (6) through the opening in the base (9). Secure with three screws (10) and washers (11).
- 49, Install brush guard (12) on hull. Secure with four screws (13), new lockwashers (14) and washers (15).
- Position smoke grenade discharger (16) and connect wiring harness (6) to connector on discharger.
- 51. Install discharger (16) on mounting base (9) and secure with three washers (17) and screws (18).



- 52. Connect wiring harness lead W8P4 (1) to driver's hatch proximity switch plug A5S2J1 (2).
  - NOTE Make sure to secure all wiring harness clamps that were loosened or butterflied to the turret wiring harness.
- 53. Secure wiring harness (3) with clip (4), three clamps (5), screws (6) and new lockwashers (7).
- 54. Secure wiring harness (3) with three clips (8), clamp (9), screw (10), new lockwasher (11) and washer (12) to left side of driver's compartment.





- 55. Install gasket (1) and plate (2) on driver's bulkhead. Secure with four screws (3), washers (4) and new locknuts (5). Have helper assist.
- 56. Install connector (6) on plate (2) with jamnut (7).
- 57. Connect right smoke grenade wiring harness connector (6) to connector (8).



#### FOLLOW-THROUGH STEPS

- 1. Install driver's level indicator (see your -20).
- 3. Install turret (see TM 9-2350-259-34).
- 2. Install master switch panel (see your -20).
- 4. Close power plant access door (see your -20).

#### END OF TASK

#### **REPAIR MULTIPIN CONNECTORS**

#### DESCRIPTION

This task covers: Remove Receptacle (page 6-66). Install Receptacle (page 6-66). Remove Cable (page 6-67). Install Cable (page 6-67).

#### **INITIAL SETUP**

#### Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Electrical Tool Kit (Item 31, App B) Digital Multimeter (Item 62, App B) Soldering Gun (Item 38, App B)

#### Materials/Parts:

Insulation tape (Item 42, App C) Tin alloy solder (Item 80, App C)

#### **REMOVE RECEPTACLE**

#### ΝΟΤΕ

Use same procedure for repairing single or multiple lead, and male or female receptacle.

- 1. Loosen nut (1) from receptacle (2). Slide nut back on leads (3).
- 2. Remove grommet (4) with contacts (5) from rear of receptacle (2).
- Push leads (3) into grommet (4) until contacts (5) are fully exposed on other side of grommet. Clip or desolder leads from contacts. Discard contacts.
- 4. Remove grommet (4) and nut (1) from leads (3).

#### INSTALL RECEPTACLE

#### ΝΟΤΕ

If replacing lead, cut new wire from bulk supply. Measure original length, gage, and type of wire.

- 5. Strip insulation from leads (3) to uncover just enough wire to fill well in contact (5).
- 6. Slide nut (1) over leads (3).

#### Materials/Parts (cont):

AR - Contacts

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

#### **Equipment Conditions:**

Serviceable parts on workbench

7. Push leads (3) through grommet (4) and insert in new contacts (5).

#### NOTE Make sure leads pass through proper lettered hole in grommet.

- 8. Solder leads (3) in contacts (5) and press contacts into grommet (4). Check leads for continuity. Use multimeter.
- 9. Aline and install grommet (4) in receptacle (2). Secure with nut (1).



#### **REMOVE CABLE**

#### NOTE

Use same procedure for repairing single or multiple lead, and male or female cable connectors.

- 10. Loosen retaining nut (1) from plug (2). Slide nut back on cable (3).
- 11. Pull grommet (4) with contacts (5) from rear of plug (2).
- 12. Remove plug (2) and coupling nut (6) from cable (3).
- 13. Push leads of cable (3) into grommet (4) until contacts (5) are fully exposed on other side of grommet. Clip or desolder leads from contacts. Discard contacts.
- 14. Remove grommet (4) and retaining nut (1) from cable (3).

#### INSTALL CABLE

#### NOTE

If replacing lead, cut new wire from bulk supply. Measure original length, gage, and type of wire.

15. Strip insulation from leads of cable (3) to uncover just enough wire to fill well in contact (5).

- 16. Slide retaining nut (1) and coupling nut (6) on cable (3).
- 17. Push leads of cable (3) through grommet (4) and insert in new contacts (5).

#### NOTE

Make sure leads pass through proper lettered hole in grommet.

- 18. Solder leads in contacts (5) and press contacts into grommet (4). Check leads for resistance. Use multimeter.
- 19. Aline and install grommet (4) in plug (2). secure with retaining nut (1).



END OF TASK

#### CHAPTER 7 MAINTENANCE OF SUSPENSION SYSTEM

#### TASK INDEX

Task	<u>Page</u>	Task Page
Repair Track Idler Arm (all except M741A1)	7-2	Repair Track Tension
Repair Track Idler Arm (M741A1 only)	7-3	(M741A1 only)
Idler Arm, Road Wheel Arm, and Hubs Wear Limits	7-4	•

#### REPAIR TRACK IDLER ARM (ALL EXCEPT M741A1)

#### INITIAL SETUP

#### Tools:

#### References:

General Mechanics Tool Kit (Item 35, App B)

See your -20

**Equipment** Conditions:

(see your -20)

Track idler arm assembly removed

Hub assembly removed (see your -20)

#### Materials/Parts:

Packing Non-metallic seal

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### REMOVE

#### ΝΟΤΕ

To remove retaining ring, pry open with a screwdriver tip in slot of ring. Retaining ring pliers are not required.

- 1. Remove retaining ring (1), cover (2) and packing (3) from arm (4). Discard packing.
- Remove retaining ring (5), spacer (6), arm (4) and non-metallic seal (7) from spindle (8).
   Discard packing and seal.
- 3. Remove two bearings (9) from arm (4).

#### INSTALL

- 4. Install two bearings (9) in arm (4).
- 5. Install new non-metallic seal (7) and arm (4) on spindle (8). Secure with spacer (6) and retaining ring (5).
- 6. Install new packing (3) in arm (4).
- Secure cover (2) in arm (4) with retaining ring (1).

#### FOLLOW-THROUGH STEPS

1. Install track idler arm assembly (see your -20).

- 3. Lube track idler arm (see your LO).
- 2. Install hub assembly (see your -20).

arm (4) and (4) and (4)

#### REPAIR TRACK IDLER ARM (M741AI ONLY)

#### INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Hand Arbor Press (Item 72, App B)

#### Personnel Required:

Track Vehicle Repairer 63H10

#### **References:**

See your -20

#### **Equipment Conditions:**

Track idler arm assembly removed from carrier (see your -20) Hub assembly removed (see your -20) Idler arm removed from spindle (see your -20)

#### DISASSEMBLE

Press two sleeve bearings (1) and spacer (2) from idler arm (3). Use hand arbor press

#### ASSEMBLE

Press two bearings (1) and spacer (2) in arm (3). Use hand arbor press.



#### FOLLOW-THROUGH STEPS

- 1. Install track idler arm assembly on carrier (see your -20).
- 3. Install idler arm on spindle (see your -20).
- 4. Lube track idler arm (see your LO).
- 2. Install hub assembly (see your -20).
- END OF TASK

#### IDLER ARM, ROAD WHEEL ARM, AND HUBS WEAR LIMITS

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20 See your LO TM 9-214

# ż

#### WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

#### CLEAN, INSPECT, AND REPAIR

#### 1. See TM 9-214 to check bearings.



**IDLER ARM HUB** 

#### **Equipment Conditions:**

Track idler arm assembly removed from carrier (see your -20) Hub assembly removed (see your -20) Road wheel support arm disassembled (see your -20) Track idler arm disassembled (M741A1 only) (page 7-3)

- 2. Check parts shown in figures that have reference letters.
- 3. Check the parts dimensions with chart on next page to determine replacement.



ROAD WHEEL HUB





IDLER ARM HUB

ROAD WHEEL HUB

Reference Letter	Point of Measurement	Idler Hubs (All except M741A1)	Wear Limits	ldler Hubs (M741A1 Only)	Wear Limits	All Road Wheels	Wear Limits
A	Inside diameter of inner hub bearing	2.0625 to 2.0630	*	2.000 to 2.005	*	2.000 to 2.005	2.0010
В	Inside diameter of outer hub bearing	1.5625 to 1.5630	*	1.5000 to 1.5005	*		
С	Outside diameter of outer bearing cup	3.1562 to 3.1572	*	3.0000 to 3.0001	*		
D	Inside diameter of outer bearing hub surface	3.1527 to 3.1537	*	2.9965 to 2.9975	*	2.9965 to 2.9975	*
C-D	Fit of cup in hub	0.0025T to 0.0045T		0.0025T to 0.0045T			
E	Outside diameter of inner bearing cup	3.6250 to 3.6260	*	3.5000 to 3.5010	*	3.5000 to 3.5005	*
F	Inside diameter of inner bearing hub surface	3.621 to 3.622		3.496 to 3.497	*	3.4960 to 3.4970	*
E-F	Fit of cup in hub	0.003T to 0.005T		0.003T to 0.005T			
*Must be wit	hin new parts dimensions.	·				•	





IDLER ARM (M741A1 ONLY)

IDLER ARM (ALL EXCEPT M741A1)

			<u>,                                     </u>				
Reference Letter	Point of Measurement	Idler Hubs (All except M1741A1)	Wear Limits	ldler Hubs (M741A1 Only)	Wear Limits	A11 Road Wheels	Wear Limits
A	Inside diameter of arm bore	3.185 to 3.188	*	2.9955 to 2.9965	*		
В	Outside diameter of bearing	3.1885 to 3.1925	*	2.9980 to 2.9990	*		
С	Outside diameter of bearing	3.8135 to 3.8175	*				
D	Inside diameter of arm bore-inner	3.809 to 3.812	*				
A-B	Fit of bearing in arm bore	0.0005 to 0.0075		0.0015T to 0.0035T			
C-D	Fit of bearing in arm bore	0.0015T to 0.0085T					
E	Inside diameter of outer bearing	2.7805 to 2.7765					2.778**
		1					

IDLER ARMS



IDLER ARM (M741A1 ONLY)



#### **IDLER ARM (ALL EXCEPT M741A1)**

Reference Letter	Point of Measurement	Idler Hubs (All except M741A1)	Wear Limits	ldler Hubs (M741A1 Only)	Wear Limits	All Road wheels	Wear Limits
F	Outside diameter of outer spindle surface	2.750 to 2.752		2.750 to 2.752			See note
G	Inside diameter of bearings	3.3855 to 3.4015		2.7575 to 2.7590			3.403**
Н	Outside diameter of inner spindle surface	3.375 to 3.377					See note
G-F	Fit of bearing on spindle	0.001L to 0.026L		0.002L to 0.0075L			
G-H	Fit of bearing on spindle	0.000 to 0.025L					
I	Outside diameter of outer hub spindle	1.5618 to 1.5623	1.561	1.4993 to 1.4998	1.4980		
J	Outside diameter of inner hub spindle	2.0618 to 2.0623	2.061	1.9993 to 1.9998	1.9980		
К	Outside diameter at track adjuster sleeve	1.495 to 1.500		1.495 to 1.500			1.4850
*Must be wi	thin new parts dimensions.	** Measured in	assembly			•	•

#### IDLER ARMS (cont)

#### NOTE

A used idler spindle shall not be put back into service if the nickel plating (0.001 to 0.002 thick) is worn through. A used spindle can be switched to the opposite side of the earner, which places the load on an unused plated surface.

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Reference Letter	Point of Measurement	Idler Hubs All except M741A1)	Wear Limits	Idler Hubs (M741A1 Only)	Wear Limits	All Road Wheels	Wear Limits
Α	Inside diameter of support bearing					3.010 to 3.015	3.020**
В	Outside diameter of support bearing					3.753 to 3.758	*
с	Inside bore diameter of support					3.748 to 3.750	3.758
*Must be within new parts dimensions. **Measured in assembly.							

#### **ROAD WHEEL SUPPORT**



ROAD WHEEL SUPPORT

#### FOLLOW-THROUGH STEPS

- 1. Assemble track idler arm (M741A1 only) (page 7-3).
- 2. Assemble road wheel support arm (see your -20).
- 3. Install hub assembly (see your -20).

- 4. Install track idler arm assembly on carrier (see your -20).
- 5. Lube idler arm, road wheel support, and hubs (see your LO).

END OF TASK

#### REPAIR TRACK TENSION ADJUSTER

#### DESCRIPTION

This task covers: Disassemble (page 7-9). Clean, Inspect, and Repair (page 7-10). Assemble (page 7-10).

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Arbor Press (Item 72, App B) Inside Caliper, Micrometer Set (Item 16, App B) Outside Caliper, Micrometer Set (Item 17, App B) Screw Threading Set (Item 94, App B)

#### Materials/Parts:

Grease (Item 9, App C) Lubricating oil (Item 29, App C) Packing (6) Retaining ring (2)

#### DISASSEMBLE

- 1. Loosen bleeder valve (1). Push piston rod (2) in as far as it will go.
- 2. Maintain inward pressure on piston rod (2) and rotate counterclockwise until piston rod rotates freely.
- 3. Pull piston rod (2) from cylinder (3).
- 4. Remove retaining ring (4), wiper ring (5), and packing (6) from cylinder (3). Discard packing, wiper ring, and retaining ring.
- 5. Press bearing (7) about 1 inch (3 cm) in cylinder (3) to force retaining ring (8) from groove in cylinder.
- 6. Pull bearing (7) from cylinder (3). Discard bearing.
- Turn retaining ring (8) 90 degrees in cylinder (3). Remove ring from cylinder. Discard retaining ring.

#### Materials/Parts (cont):

Sleeve bushing (2) Wiper ring

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -20

#### Equipment Conditions:

Track tension adjuster removed from carrier (See your -20)

- Close bleeder valve (1). Force grease through lube fitting (9) until piston assembly (10) is forced from cylinder (3).
- 9. Use a clean cloth to remove excess grease from piston assembly (10) and cylinder (3).

#### NOTE Packing set may be a five or seven piece design.

10. Remove retaining ring (11), bearing (12), and five packings (13) from piston assembly (10). Discard packings, retaining ring, and bearing



GO TO NEXT PAGE

- 11. Remove bleeder valve (1) and lube fitting (2) from cylinder (3).
- 12. If damaged or worn, press sleeve bushing(4) from cylinder (3).
- 13. If damaged or worn, press sleeve bushing(5) from piston rod (6).
- 14. Discard sleeve bushings (4 and 5).

#### CLEAN, INSPECT, AND REPAIR

- 15. Check threads of plunger and piston. Chase damaged threads with a die. Replace parts as a matched set if the threads of either part are stripped or worn.
- 16. Check parts shown in figure on next page that have reference letters.
- 17. Check the parts dimensions with chart on next page to determine replacement.

#### ASSEMBLE

- If removed, press new sleeve bushing (4) in cylinder (3) from side opposite lube fitting (2). Use arbor press.
- 19. If removed, press new sleeve bushing (5) into piston rod (6). Use arbor press.

#### ΝΟΤΕ

# Install new packings (7) with sealing lips facing away from flange on piston (8). Lips face toward inside of cylinder (3).

20. Install five new packings (7), new bearing (9), and new retaining ring (10) on piston assembly (8).

- 21. Apply a light coat of lubricating oil to piston assembly (8) and to inside of cylinder (3).
- 22. Install piston assembly (8) in cylinder (3).
- 23. Install new retaining ring (11) in cylinder (3). Make sure it seats in groove.
- 24. Apply a light coat of lubricating oil to new bearing (12).
- 25. Install new bearing (12) in cylinder (3).

#### ΝΟΤΕ

Install new wiper ring (13) with grooved edge facing out of cylinder toward retaining ring.

- 26. Install new packing (14), new wiper ring (13), and new retaining ring (15) in cylinder (3).
- 27. Apply a light coat of lubricating oil to piston rod (6).
- 28. Install piston rod (6) in cylinder (3). Maintain inward pressure on piston rod and rotate clockwise until secure.
- 29. Install bleeder valve (1) and lube fitting (2) in cylinder (3).



Reference Letter	Point of Measurement	Sizes and Fits of New Parts	Wear Limits
A	Outside diameter of plunger	1.7580 to 1.7600	1.7560
В	Outside diameter of piston bearing	1.9940 to 1.9970	1.9930
с	Inside diameter of piston bearing	1.7620 to 1.7650	1.7670
D	Outside diameter of piston	1.4990 to 1.5010	1.4980
E	Outside diameter of sleeve bushing	1.8780 to 1.8830	*
F	Inside diameter of sleeve bushing	1.5200 to 1.5300	1.5450
G	Inside diameter of piston or plunger bearing bore	1.8740 to 1.8760	*
н	Inside diameter of piston bearing	1.5030 to 1.5060	1.5160
	Outside diameter of piston bearing	1.9940 to 1.9970	1.9930
J	Inside diameter of piston	1.9990 to 2.0010	2.0020

#### TRACK TENSION ADJUSTER

\*Must be within new parts dimensions.



#### FOLLOW-THROUGH STEPS

1. Install track tension adjuster (see your -20). 2. Adjust track tension (see your -20).

END OF TASK

#### REPAIR SUSPENSION LOCKOUT CYLINDER (M741A1 ONLY)

#### DESCRIPTION

This task covers: Disassemble (page 7-12). Clean, Inspect, and Repair (page 7-13). Assemble (page 7-15). Test Lockout Cylinder (page 7-15).

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Inside Caliper, Micrometer (Item 16, App B) Outside Caliper, Micrometer (Item 17, App B) Torque Wrench (Item 111, App B) Power Supply (Item 71, App B)

#### Materials/Parts:

FRH Hydraulic fluid (Item 33, App C) Non-electrical wire (Item 48, App C) Repair Kit 2350-00-878-5133

#### DISASSEMBLE

- 1. Remove lockwire (1) from retainers (2). Discard lockwire.
- 2. Remove two retainers (2) from cylinder (3).
- 3. Remove two wiper rings (4) from retainers (2). Discard wiper rings.

#### Personnel Required:

Track Vehicle Repairer 63H10

#### References:

See your -20

#### **Equipment Conditions:**

Suspension lockout cylinder removed from carrier (see your -20)

- 4. Remove two rams (5) with sleeves (6) from cylinder (3). Remove sleeves from rams.
- Remove two sleeve internal packings (7) and sleeve packings (8) from two sleeves (6). Discard packings.
- 6. Remove two packing retainers (9) and packings (10) from two rams (5). Discard packings and retainers.





- 7. Remove two bleeder plugs (1) and packings(2) from cylinder (3). Discard packings.
- 8. Remove two check valve plugs (4) with packings (5) from cylinder (3). Discard packings and check valve plugs.
- 9. Remove two valve springs (6), balls (7), and push rods (8) from cylinder (3). Discard springs and balls.
- 10. Remove valve plug (9) with packing (10) from cylinder (3). Discard packing and valve plug.
- 11. Remove sliding check and release valve (11) with packing (12) from cylinder (3). Discard packing and release valve.

#### CLEAN, INSPECT, AND REPAIR

#### WARNING



Fire resistant hydraulic (FRH) fluid may contain Tricresyl Phosphate which, if taken internally, can produce paralysis. Hydraulic fluid may be absorbed

through the skin. Wear long sleeves, gloves, goggles, and face shield. If FRH gets in eyes, wash them immediately and get medical aid immediately. If FRH gets on your skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

12. Flush all internal oil passages with hydraulic fluid.

- Check cylinder bores, valve ball and sliding valve seats, ram sleeves, and retainers. Remove burrs, grooves, and scratches. Replace parts that have deep grooves and scratches or are worn.
- 14. Check threaded parts. Remove burrs. Replace parts that have stripped threads.
- 15. Check parts shown in figure that have reference letters.
- 16. Check the parts dimensions with the chart to determine replacement. Use inside and outside calipers, micrometers (Items 16 and 17).





#### SUSPENSION LOCKOUT CYLINDER (M741A1 ONLY)

Reference Letter	Point of Measurement	Sizes and Fits of New Parts	Wear Limits
A	Inside diameter of ram sleeve	1.5010 to 1.5020	*
В	Outside diameter of ram sleeve	2.2390 to 2.2400	*
С	Diameter of cylinder bore	1.9950 to 1.9970	* **
D	Diameter at small end of cylinder	0.5510 to 0.5530	* **
E	Diameter of cylinder ram sleeve bore	2.2430 to 2.2450	* **
F	Diameter at small end of ram shaft	1.4960 to 1.4980	* **
G	Diameter at piston end of ram shaft	1.9900 to 1.9920	* **
*Must be within	new park dimensions. **No scoring is all	owed.	

#### ASSEMBLE

- 17. Install new packing (1) and new sliding check and release valve (2) in cylinder (3).
- 18. Install new packing (4) and new valve plug (5) in cylinder (3).
- 19. Install two push rods (6), new balls (7), and new valve springs (8) in cylinder (3).
- 20. Install two new check valve plugs (9) and new packings (10) in cylinder (3).
- 21. Install two new packings (11) and bleeder plugs (12) in cylinder (3).
- 22. Install new packings (13) and two new packing retainers (14) on two rams (15). Install rams in cylinder (3).
- 23. Install two new sleeve internal packings (16) and new sleeve packings (17) on two sleeves (18). Install sleeves in cylinder (3).
- 24. Install two new wiper rings (19) and retainers (20) in cylinder. Tighten retainers to 40 to 60 pound-feet (54 to 81 N·m) torque. Use torque wrench.
- 25. Secure two retainers (20) to each other with new lockwire (21).

#### **TEST LOCKOUT CYLINDER**

26. Connect high pressure hoses to extend port (22) and retract port (23).

#### WARNING



Fire resistant hydraulic (FRH) fluid may contain Tricresyl Phosphate which, if taken internally, can produce paralysis. Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, goggles, and face shield. If FRH

gets in eyes, wash them immediately and get medical aid immediately. If FRH gets on your skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

- 27. Fill cylinder (3) with hydraulic fluid. Apply 3000 to 3500 psi equally to each port. Use fabricated tools (see page 2-4, fig. 2 and 3). Cylinder shall not leak when pressure is held for 10 to 15 minutes.
- 28. Discontinue pressure. Disconnect high pressure hoses.
- 29. Drain cylinder (3) and apply rebuild date.



#### FOLLOW-THROUGH STEPS

1. Install suspension lockout cylinder on earner (see your -20).

1. Check fluid level. Lube cylinder (see your -LO).

END OF TASK

#### REPAIR SHOCK ABSORBER

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Arbor Press (Item 72, App B) Positioner (Item 70, App B) Staker (Item 90, App B)

#### Materials/Parts:

Bearing (2)

#### REMOVE

 Remove two self-aligning bearings (1) from shock absorber (2). Use a press (3), support (4), and positioner (5).

#### INSTALL

2. Install two self-aligning bearings (1) in shock absorber (2). Use press (3) and two positioners (5).



#### FOLLOW-THROUGH STEPS

1. Install shock absorber on carrier (see your -20).

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -20

#### **Equipment Conditions:**

Shock absorber removed (see your -20)



3. Stake two self-aligning bearings (1) into shock absorber (2). Use staker (6) and a positioner (5).



#### CHAPTER 8 MAINTENANCE OF HULL COMPONENTS

#### TASK INDEX

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#### REPLACE COMMANDER'S CUPOLA (M113A2, M106A2, M1064, M125A2, AND M1059 ONLY)

#### DESCRIPTION

This task covers: Remove (page 8-2). Install (page 8-3).

#### **INITIAL SETUP**

Tools:

General Mechanics Tool Kit (Item 35, App B) Lifting device with rated lift capability of at least 300 lb (136 kg) Sling (Item 83, App B) Torque Wrench, (Item 114, App B)

#### **Personnel Required:**

Track Vehicle Repairer 63H10 Helper (H)

#### REMOVE

- 1. Remove 12 screws (1) and washers (2) that hold commander's cupola (3) to earner top deck.
- Attach lifting device of at least 300 lb (136 kg) capacity to cupola (3). Lift cupola from earner. Have helper assist.
- 3. Repair commander's cupola (page 8-4).

References:

See your -10

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10) Ramp lowered (see your -10)

Quant



#### INSTALL

4. Align traverse lock pin with groove in cupola (1). Install commander's cupola on carrier top deck ring. Have helper assist.



#### NOTE

Rotation of cupola after installation should require no more than 150 in-lb (204 NŽm) torque.

5. Secure cupola (1) to deck with 12 washers (2) and screws (3). Tighten screws to 120 to 130 lb-ft (162 to 176 N•m) torque. Use torque wrench.



**END OF TASK** 

### REPAIR COMMANDER'S CUPOLA (M113A2, M106A2, M1064, M125A2, AND M1069 ONLY)

#### **INITIAL SETUP**

#### **Tools:**

General Mechanics Tool Kit (Item 35, App B) Torque Wrench, 1/2 inch drive (Item 114, App B)

#### **Materials/Parts:**

Lockwasher (18)

#### REMOVE



#### WARNING

Lifting or moving objects in excess of 70 pounds could injure you. Get an assistant or a lifting device to help move armor or other heavy objects.

1. Turn cupola over. Remove 18 socket head screws (1), lockwashers (2), and outer race (3) from hatch (4). Discard lockwashers. Have helper assist.

#### NOTE

Separators are like bearings except for size and color. Ball bearings are slightly larger than separators and are white or cream color. Separators may be any dark color.

Remove 140 ball bearings (5), 146 separators (6), and 6 bearing blocks (7) from inner race (8). Remove inner race from hatch (4).

#### INSTALL

#### NOTE

If one ball bearing or separator needs to be replaced, all ball bearings and separators must be replaced.

- 3. Install inner race (8) on hatch (4).
- 4. Install 140 ball bearings (5), 146 separators (6), and 6 bearing blocks (7) in groove of inner race (8).

#### **Personnel Required:**

Track Vehicle Repairer 63H10 Helper (H)

#### **Equipment Conditions:**

Commander's cupola removed (page 8-2)

#### CAUTION

Improper installation will cause binding resulting in bearing failure. Block (6) radius surface must face toward cupola center. Do not use talcum or other powder residue to reduce friction. When exposed to moisture a chalky substance is formed causing binding.

#### NOTE

Alternately, install 24 separators (6) and 23 ball bearings (5) between bearing blocks (7). One separator (6) is to be installed on each side of each bearing block (7). A maximum number of sets (one ball and one spacer per set) is needed between any two blocks. The number of sets in each space between blocks must not differ by more than one set.



15. Loosen locknut on elbow and transmission oil outlet hose (1) enough to loosen hoses on other side of power unit.



 Loosen hoses (2) to access self-locking bolts. Remove 10 self-locking bolts (3), 10 washers (4), two locknuts (5), three washers (6), and screw (7) that secure transmission to engine. Discard self-locking bolts and locknuts.

- 17. Remove two screws (8), washers (9), locknuts (10), and variable speed clutch return hose clamps (11) from brackets (12). Discard locknuts.
- 18. Remove two screws (13), washers (14). and brackets (12) from transmission.



- 19. Separate transmission (15) from engine (16).
- 20. Attach sling (17) to transmission.



GO TO NEXT PAGE

21. Remove transmission (1) from power plant stand and set on two blocks (2). Remove sling (3).



- 22. Disconnect transmission oil outlet hose (4) from elbow (5). Loosen jam nut (6) and remove elbow (5) from transmission.
- 23. Remove variable speed drive hose return elbow (7) from transmission end cover (8).

- 24. Disconnect variable speed drive clutch supply hose (9) from elbow (10) on transmission filter case.
- 25. Remove elbow (10) from transmission.



26. Remove four screws (11), dipstick tube adapter (12) and gasket (13) from



adapter (12), and gasket (13) from transmission. Discard gasket.



27. Remove two screws (1), washers (2), tow start control lever (3), and mounting bracket (4) from transmission.



- Remove four screws (5), washers (6), and wiring harness brackets (7) from transmission.
- 29. Disconnect front connector (8) and rear connector (9) on transmission and remove transmission wiring harness (10).
- 30. Remove six screws (11), washers (12), and end cover (13) from right rear of transmission.



#### INSTALL

 Remove transmission from shipping container (see TM 9-2520-272-34 & P). Set transmission on two blocks (14).



32, Install end cover (13) and secure with six screws (11) and washers (12) on transmission. Tighten six screws to 156-180 in-lb (18-20 N·m) torque.



- Install two variable speed clutch hose clamp brackets (15) on transmission. Secure with two screws (16) and washers (17).
- 34. Mount two variable speed hose clamps (18) on brackets (15) with two screws (19), washers (20), and new locknuts (21).



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- 35. Position wiring harness (1) on transmission and connect rear connector (2) and front connector (3).
- Install four wiring harness brackets (4) on transmission. Secure with four screws (5) and washers (6). Tighten screws to 13-15 ft-lb (18-20 N·m) torque.





- Install variable speed drive clutch supply hose elbow (7) on transmission falter case (8).
- 38. Install variable speed return hose elbow (9) on transmission end cover (10).



39. Secure adapter (11) and new gasket (12) to transmission with four screws (13). Tighten four screws to 27-32 lb-ft (36-44 N·m) torque.



40. Install tow start control lever (14) and bracket (15) on transmission. Secure with two screws (16) and washers (17).



- 41. Install elbow (18) on transmission. Tighten jam nut (19).
- 42. Install oil outlet hose (20) on elbow (18). Do not tighten.



43. Secure engine wiring harness (1) to oil inlet hose (2) with two new tiedown straps (3).



44. Remove transmission from blocks and place on power plant stand (4). Use sling (5) and suitable lifting device.



45. Connect transmission to engine and secure with 10 new self-locking bolts (6), 10 washers (7), screw (8), three washers (9), and two new locknuts (10). Tighten screw with locknut to 38-41 ft-1b (52-56 N•m) torque. Tighten oil outlet hose. Use adjustable wrench.



46. Connect variable speed drive clutch supply hose (11) to elbow (12) on transmission filter case (13).



47. Connect variable speed drive clutch return hose (14) to elbow (15) on end cover at rear of transmission.



- Install new preformed packing (16), transmission drain adapter (17), and nut (18) on transmission.
- 49. Slide drain tube (19) and secure to transmission adapter (17). Tighten drain tube mount clamp (20).



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- 50. Remove pipe plug (1) from tv modulator pressure port. Apply sealing compound to all male threads before installation. Install pipe plug in elbow (2). Install elbow in transmission in the 1:00 to 2:00 o'clock position.
- 51. Install TV modulator (3) on transmission. Secure with clamp (4) and new screw (5).



52. Install transmission oil inlet hose (6) on oil cooler outlet elbow (7).



53. Mount inlet hose clamp bracket (8) on transmission with screw (9) and washer (10).



54. Connect circuit 34 lead (11) to engine oil low pressure switch (12).



- 55. Connect transmission inlet" hose (6) to elbow (13).
- 56. Secure inlet hose (6) to bracket (8) with clamp (14), screw (15), two washers (16), and new locknut {17). Tighten screw to 27-32 lb-ft (36-44 NŽm) torque.



#### FOLLOW-THROUGH STEPS

- 1. Install ramp hydraulic pump (see your -20).
- 2. Install dipstick and filler tube (see your -20).
- 3. Install transmission oil sampling valve (see your -20).
- 4. Replace transmission oil (see your -12).

#### INSTALL

#### NOTE

**Make sure carrier** is **on** level ground. When installing driver's level indicator, make sure cable is not pinched against housinmg.

- 7. Install new plate nuts (1) with four new rivets (2) on indicator bracket (3).
- 8. Install nut (4), new lockwasher (5) terminal lug (6), ring spacer (7), lamp retainers (8), and lamp (9) on indicator bracket (3).
- 9. Install nut (10), new lockwasher (11) marker (12), and indicator switch (13), on indictors bracket (3).
- 10. Install two screws (14), new lockwashers (15), and level indicator (16), in plate nuts (1) on indicator bracket (3)

NOTE Make sure tags are removed from leads before installing.

- 11. Solder three tagged electrical leads (17) on indicator switch (13) on indictor bracket (3).
- 12. Install driver's level indicator bracket assembly (3) on bulkhead with four new lockwashers (18) and screws (19).

#### ADJUST

- 13. Set up clinometeron top deck to the right of turret, and adjuat to read side-to-side tilt.
- 14. Note the reading on the clinometer.
- 15. Loosen two adjustment screws (20) on 'driver's level indicator (21) adjust level indicator to read the same as the clinometer.
- 16. Tighten adjustment screws (20 them recheck driver's level indicator (21) with clinometer,







## REPAIR CARGO HATCH HINGES M113A2, M1059, AND M901Al ONLY)

#### DESCRIPTION

This task covers Remove (page (8-12). Install (page 8-13).

#### INITIAL SETUP

#### **Tools:**

Metal Worker's Tool Kit (Item 61, App B) Adapter (Item 2, App B) Electical Disc Sander (Item 77, App B) IndustialGoggles Item 3 App B Trailer MountedWelding Shop Item 96, App B) Welder's Gloves (Item 36, App B) Welder's Helmet (Item 42, App B)

#### Materials/Parts:

Hinge Welding electrode (Item 83, App C)

#### REMOVE



WARNING Metal chips and grinding dust can cause injury. Wear goggles and gloves.

- 1. Remove and discard broken hinge (1or2) from hatch (3).
- 2. Use a machinist's hammer and a cold chisel to chip off remaining part of bad hinge from cargo hatch.
- 3. Use a disc sander to sand chipped area smooth and remove any hard coating from weld area.

**Personnel Required:** Metal Worker 44B10

#### **References:**

See your -20 TM 43-0139 TM 9-237

#### Equipment Conditions:

Cargo hatch removed from carrier (see your -20) Battery ground disconnected (see your -20)


4. Remove rubber seal (1) on hinge edge of hatch (2).



INSTALL

## NOTE

All weld joints should be metal to metal fit. In no case should weld gap exceed 3/32 inch or one half the thickness of thinner member, whichever is less.

- 5. Clamp or tack weld new hinge (3 or 4) on hatch (2).
- 6. Make sure hinges are aligned and spaced as shown.
- 7. Weld hinge (3 or 4) to hatch in accordance with TM 9-237. Use electrode type 5356.
- Clean weld area and apply touch-up paint to repaired area (see TM 43-0139). Install rubber seal (1) along edge of hatch (2).

## FOLLOW-THROUGH STEPS

1. Install cargo hatch on carrier (see your -20).



2. Reconnect battery ground (see your -20).



# REPAIR COMMANDER'S CUPOLA COVER HINGES (M113A2, M106A2, M1064, M125A2, AND M1059 ONLY)

## DESCRIPTION

This task covers: Remove (page 8-14). Install (page 8-15).

## **INITIAL SETUP**

## Tools:

Metal Worker's Tool Kit (Item 61, App B) Adapter (Item 2, App B) Electrical Disc Sander (Item 77, App B) Industrial Goggles (Item 37, App B) Trailer Mounted Welding Shop (Item 96, App B) Welder's Gloves (Item 36, App B) Welder's Helmet (Item 42, App B)

## Materials/Parts:

Hinge Welding electrode (Item 83, App C)

## REMOVE

1. Remove and discard broken hinge part (1, 2, or 3) from cover (4).

## WARNING

Metal chips and grinding dust can cause eye injury. Wear goggles and gloves.

- 2. Use a machinist's hammer and a cold chisel to chip off remaining part of bad hinge from cover.
- 3. Use a disc sander to sand chipped area smooth and remove any hard coating from weld area.

## Personnel Required:

Metal Worker 44B10

#### **References:**

**See** your -20 TM 43-0139 TM 9-237

#### **Equipment Conditions:**

Commander's cupola cover removed (see your -20) Battery ground disconnected (see your -20)



- Clamp or tack weld new hinge(s) (1, 2, or 3) on cover (4). Set cover on commander's cupola. Check alignment of cover hinges with hinges on cupola.
- 5. Make sure hinges are aligned and spaced as shown.
- 6. Weld hinges to cover in accordance with TM 9-237. Use electrode type 5356.
- 7. If hinge (3) has been replaced, weld in a new torsion bar cover (5).
- 8. Clean the weld area and apply touch-up paint to repaired area (see TM 43-0139).



## FOLLOW-THROUGH STEPS

1. Install commander's cupola cover (see your -20).

2. Reconnect battery ground (see your -20).

– 1/4 (6 MM)

# REPAIR COMMANDER'S CUPOLA HINGES (M113A2, M106A2, M1064, M125A2, AND M1059 ONLY)

## DESCRIPTION

This task covers: Remove (page 8-16). Install (page 8-17).

## **INITIAL SETUP**

#### Tools:

Metal Worker's Tool Kit (Item 61, App B) Adapter (Item 2, App B) Electrical Disc Sander (Item 77, App B) Industrial Goggles (Item 37, App B) Trailer Mounted Welding Shop (Item 96, App B) Welder's Gloves (Item 36, App B) Welder's Helmet (Item 42, App B)

## Materials/Parts:

Hinge Welding electrode (Item 83, App C)

## REMOVE

1. Remove and discard broken hinge part (1, 2, or 3) from commander's cupola (4).



## WARNING

Metal chips and grinding dust can cause eye injury. Wear goggles and gloves.

## Personnel Required:

Metal Worker 44B10

#### **References:**

See your -20 TM 9-237 TM 43-0139

## **Equipment Conditions:**

Commander's cupola cover removed (see your -20) Battery ground disconnected (see your -20)

- 2. Use a machinist's hammer and a cold chisel to chip off remaining part of bad hinge from cupola.
- 3. Use a disc sander to sand chipped area smooth and remove any hard coating from weld area.



- Clamp or tack weld new hinge(s) parts (1, 2, or 3) on hatch (4). Set cover on commander's cupola. Check alignment of cover hinges with hinges on hull.
- 5. Make sure hinges are aligned and spaced as shown.
- 6. Weld hinges to hatch in accordance with TM 9-237. Use electrode type 5356.
- 7. Clean the weld area and apply touch-up paint to all bare metal (see TM 43-0139).





## FOLLOW-THROUGH STEPS

- 1. Install commander's cupola cover on carrier (see your -20).
- 2. Reconnect battery ground (see your -20).

## REPAIR COMMANDER'S HATCH COVER HINGES (M577A2 ONLY)

## DESCRIPTION

This task covers: Remove (page 8-18). Install (page 8-19).

## INITIAL SETUP

#### Tools:

Metal Worker's Tool Kit (Item 61, App B) Adapter (Item 2, App B) Electrical Disc Sander (Item 77, App B) Industrial Goggles (Item 37, App B) Trailer Mounted Welding Shop (Item 96, App B) Welder's Gloves (Item 36, App B) Welder's Helmet (Item 42, App B)

## Materials/Parts:

Hinge Welding Electrode (Item 83, App C)

## REMOVE

1. Remove and discard broken hinge part (1, 2, or 3) from hatch cover (4).



#### WARNING Metal chips and grinding

dust can cause injury. Wear goggles and gloves.

- 2. Use a machinist's hammer and a cold chisel to chip off remaining part of bad hinge from hatch.
- 3. Use a disc sander to sand chipped area smooth and remove any hard coating from weld area.



## Personnel Required:

Metal Worker 44B10

#### **References:**

See your -20 TM 43-0139 TM 9-237

#### **Equipment Conditions:**

Commander's hatch cover removed from carrier (see your -20) Battery ground disconnected (see your -20)

- 4. Clamp or tack weld new hinge part (1, 2, or 3) on cover (4).
- 5. Install cover (4) on hatch (see your -20).
- 6. Check alignment of hinges on cover with torsion bar shields and hinges on hull.
- Remove cover. Weld hinges to cover in accordance with TM 9-237. Use electrode type 5356.
- 8. Clean weld area and apply touch-up paint to repaired area (see TM 43-0139).





## FOLLOW-THROUGH STEPS

- 1. Install commander's hatch cover on carrier (see your -20).
- 2. Reconnect battery ground (see your -20).

## REPAIR COMMANDER'S HATCH COVER HULL HINGES

#### (M577A2 only

## DESCRIPTION

This task covers: Remove (page 8-20). Install (page 8-21).

## INITIAL SETUP

## Tools

Metal Worker's Tool Kit (Item 61, App B) Adapter (Item 2, App B) Electrical Disc Sander (Item 77, App B) Industrial Goggles (Item 37, App B) Trailer Mounted Welding Shop (Item 96, App B) Welder's Gloves (Item 36, App B) Welder's Helmet (Item 42, App B)

#### Materials/Parts:

Hinge Welding Electrode (Item 83, App C)

## REMOVE

1. Remove and discard broken hinge part (1, 2, or 3) from hull.



## WARNING

Metal chips and grinding dust can cause injury. Wear goggles and gloves.

#### Personnel Required:

Metal Worker 44B10

#### **References:**

see your -20 Tm 43-0139 TM 9-237

#### **Equipment Conditions:**

Commander's hatch cover removed from carrier (see your -20) Battery ground disconnected (see your -20)

- 2. Use a machinist's hammer and a cold chisel to chip off remaining part of bad hinge from hull.
- 3. Use a disc sander to sand chipped area smooth and remove any hard coating from weld area.



- 4. Clamp or tack weld new hinge on hull.
- 5. Install cover on hatch (see your -20).
- 6. Check alignment of hinges on cover with torsion bar shields and hinges on hull.
- Remove cover. Weld hinges to cover in accordance with TM 9-237. Use electrode type 5356.
- 8. Clean weld area and apply touch-up paint to repaired area (see TM 43-0139).





## FOLLOW-THROUGH STEPS

- 1. Install commander's hatch cover on carrier (see your -20).
- 2. Reconnect battery ground (see your -20).

## REPAIR TRIM VANE AND HULL SIDE FLOTATION PODS

## DESCRIPTION

This task covers: Inspect (page 8-22). Repair (page 8-24).

## **INITIAL SETUP**

#### Tools:

Metal Worker's Tool Kit (Item 61, App B) Electrical Disc Sander (Item 77, App B)

#### Materials/Parts

Metal dent filler (Item 30, App C) Plastic molding material (Item 62, App C)

## INSPECT



## WARNING

Polyurethane foam tends to expand with heat and age. This post expansion can cause flotation pods to

from pod. This condition could cause the pod(s) to crack and break away during water operation. If pod(s) break away during water operation, carrier may sink and soldiers could be killed. It is very important to inspect for post expanded foam and trim off any excess that causes pod(s) to bulge when installed on earner.

#### **Personnel Required**

Metal Worker 44B10

#### **Reference\***

See your -20

#### **Equipment Conditions:**

Trim vane or hull side flotation pods removed from carrier (see your -20)

## NOTE

Hull side flotation pods (items 3 and 4) M741A1 only.

1. Place flotation pods (1, 2, 3, and 4) on a flat surface. Visually inspect pods for punctures, cracks, deformation and bulging of metal shell, and for damage or deterioration of polyurethane foam filling. Also, look for post expanded foam.

## WARNING



The earner can sink if excessive amount of flotation foam is missing from pod(s). Soldiers could be killed.



2. Measure any voids in foam. Repair any single void larger than 8.0 square inches (52 sq cm) in area by 0.75 inch (19 mm) deep. If total volume of voids in both trim vane pods (1 and 2) exceeds 100 cubic inches (1639 cu cm), repair the foam. If total volume of voids in either set of three hull side pods (3 and 4) exceeds 140 cubic inches (2295 cu cm), repair the foam.

#### NOTE

Indentations in shell or foam caused by contact with carrier hardware during operation or during manufacturing procedures need not be repaired.

3. Inspect any previous repairs for conformance with repair criteria below.



**NOTE** Hull side flotation pods (items 3 and 4) M741A1 only.

## REPAIR



## WARNING

Welding on plastic molding material produces toxic fumes and can poison you. Do not weld on plastic molding material parts.

- 4. Repair sheet metal as follows:
  - a. Small dents, scrapes, and punctures may be repaired by filling defect with metal dent filler using instructions supplied with filler. Sand smooth when dry.
  - b. Cracks and holes may be repaired as follows: Drill a 0.187 inch (5 mm) hole at end of all cracks, if possible. Make a patch from 0.125 (3 mm) inch thick aluminum sheet. Patch should extend beyond the damaged area by at least 0.75 inch (19 mm) in all directions. Secure patch with rivets. Rivet holes should be approximately 1 inch (25 mm) apart, and be of appropriate size for either 0.094 inch (2 mm) or 0.125 inch (3 mm) diameter rivets. Patches shall not extend over more than 10% of the surface area of the pod.

## FOLLOW-THROUGH STEPS

1. Install trim vane or hull side flotation pods on carrier (see your -20).

- c. Large dents may be removed by pushing from either side, as required. Removal of foam for access is permissible. Replace foam, see foam repair below.
- Repaint repaired areas of sheet metal. Restencil warning on rear trim vane flotation pod, if damaged. See TM 43-0139 for paint requirements.
- 5. Repair polyurethane foam as follows:
  - a. When required, remove foam in area to be repaired with knife, chisel, saw, or similar tool.
  - b. Place pods on a flat surface and clamp to prevent bulging sheet metal. Fill voids with plastic molding material (foam). Trim off excess foam after it has cured. Foam that has expanded from heat and age should be trimmed off with saw or knife or replaced as required. Repaired or replaced foam should be flush within 0.06 inch (1. 5 mm) of edge of sheet metal shell.

## **REPLACE KEY-LOCKED SCREW THREAD INSERTS**

## DESCRIPTION

This task covers: Remove (page 8-25). Install (page 8-28).

## **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Extractor Screw Set (Item 32, App B) Portable Electric Drill (Item 24, App B) Screw Threading Set (Item 94, App B) Twist Drill Set (Item 98, App B)

## **Personnel Required:**

Track Vehicle Repairer 63H10

## REMOVE

## CAUTION

## Take care not to break keys.

1. Drill out insert to depth of keys. Use drill the same diameter as distance between keys.

#### **References:**

See your -10

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10)

3. With all keys broken off, remove insert. Use an extractor tool to screw out insert.



2. Bend keys in to unlock insert. Break off bent portions of keys.



Internal Thread Size	Part Number	National Stock Number	External Thread Size	Application
3/4-16UNF-2B	7771298-3 (19207)	5340-00111-7360	1 1/8-12 UNF-2A	SUSPENSION SYSTEM Lockout cylinder (M741A1) Torsion bar anchor mounting (M106A2, M1064, M125A2) Idler spindle mounting POWER PLANT COVER Lifting eye mounting pad
51-18UNF-2B	7771298-2(19207)	5340-00-016-0025	1-14UNS-2A	SUSPENSION SYSTEM Road wheel arm mounting Shock absorber bracket mounting Track tension adjuster bracket mounting POWER PLANT Power plant grill
1/2 2011NE 20	7771209 1 (10207)	5240 00 115 0420	2/4 1000024	POWER PLANT Access covers Auxiliary power unit (M577A2) POWER TRAIN
I/2-20UNF-2B	///1298-1 (19207)	5340-00-115-9420	3/4-10unc2A	binerential steering bracket Final drive mounting PERSONNEL COMPARTMENT Commander's platform Seat and post (M577A2, M106A2, M1064, M125A2) Floor plate mounting
3/8-16UNC-3B	7771298-6 (19207)	534&0&931-7253	9/16-12UNC-2A	HULL Covered extension (M577A2)

## STANDARD SIZE INSERT TECHNICAL DATA

Internal Thread Size	Part Number	National Stock Number	External Thread Size	Application
l/2-20UNF-2B	7771298-5 (19207	5340-00-178-0058	3/4-10UNC-2A	Fuel tank filler neck mounting (M106A2, M125A2)
				DRIVERS HATCHES AND PERISCOPES Driver's hatch support
1/4-20UNF-3B	MS51830-202L	5340-08-079-2066	3/8-16UNC-2A	assembly (M901A1) HULL Direct vision housing assembly, rear panel (M901A1)
				HULL Driver's hatch (M901A1)
5/16-24UNJF-3B	MS51830-203L	534040409-6878	7/16-2AUNC-2A	Stowage bracket (M901A1) Gunner's hatch (M901A1)
				HULL FLOORS AND SUB-FLOORS
I/2-2OUNJF4B	MS51830-206L	5340-00-403-6393	9/16-11UNC-2A	Interior floor (M901A1) Stowage bracket (M901A1)
				HULL
6/32UNCW-3B	MS5-1830-103L	5340-00-178-8116	12-28UNF-2A	Proximity switch housing (M901A1)

STANDARD SIZE INSERT TECHNICAL DATA (CONT)

1. Drill correct size hole for insert and tap threads.

## **CAUTION** Take care not to break keys.

3. Drive keys flush with surrounding surface.

KEYS

INSERT



2. Install insert. If insert cannot be turned flush to surface by hand, use pliers across keys.







## **REPLACE SERRATED LOCKRING SCREW THREAD INSERTS**

## DESCRIPTION

This task covers: Remove (page 8-29). Install Non-sealed Inserts (page 8-31). Install Sealed Inserts (M981 and M1064 Carrier, External Fuel Tanks Only) (page 8-31).

## **INITIAL SETUP**

## Tools:

General Mechanics Tool Kit (Item 35, App B) Extractor Screw Set (Item 32, App B) Portable Elecric Drill (Item 24, App B) Twist Drill Set (Item 98, App B)

#### Materials/Parts:

Grease (Item 9, App C) Sealing compound (Item 69, App C) Sealing compound primer (Item 74, App C)

## REMOVE

#### NOTE

Screw thread inserts used in the M981 carrier external fuel tanks (insert with packing, installed with thread sealant) are removed using the same method described here for non-sealed inserts, except extracting the insert may be more difficult due to sealant on the threads.

1. Drill out inside serrations of lockring. Use drill the same diameter as inside serrations.

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10

#### **Equipment Conditions:**

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10)





- 3. Drive in extractor tool to screw out insert. As insert comes out, it will push out lockring.
- 4. If lockring does not come out with insert, hit ring with a punch and hammer to collapse ring. Remove ring.





GO TO NEXT PAGE

## STANDARD AND OVERSIZE INSERT TECHNICAL DATA

Internal Thread Size	Part Number/ National Stock Number	Removal Drill Diameter/twist Drill Set	Inserter/Wrench	Application
3/4-16UNF-3B	CR313SB18L 5340-00-99%5627	1 1/32 Item 23, App B Item 84, App B	CR13W R213D	SUSPENSION SYSTEM Lockout cylinder (M741A1) Torsion bar anchor mounting (M106A2, M1064, M125A2) Idler spindle mounting POWER PLANT COVER Lifting eye mounting pad
5/8-18UNF-3B	CR312SB16L 5340-00-921-6094	57/64 Item 24, App B	CR12W R212D	SUSPENSION SYSTEM Road wheel arm mounting Shock absorber bracket mounting Track tension adjuster bracket mounting POWER PLANT Power plant grill
I/2-2OUNF-3B	CR210SB12L 5340-00-930-1618	11/16 Item 94, App B	CR10W R210D	POWER PLANT Access covers Auxiliary power unit HULL Fuel tank filler neck (M106A2, M125A2) POWER TRAIN Differential steering bracket Final drive mounting PERSONNEL COMPARTMENT Commander's platform Seat and post (M577A2, M106A2, M1064, M125A2) Floor plate mounting
3/8-16UNC-3B	CR108SB10L	29/64 Item 93, App B	CR08W R108D	HULL Covered extension (M577A2)
I/2-20UNF-3B	CR1210SB17 5340-00-93&1617	11/16 Item 94, App B	CR10W R210D	Fuel tank filler and neck mounting (M106A2, M125A2)
I/2-20UNF-3B	CR2410SB17 5340-01-074-5975	11/16 Item 94, App B	CR1OW R210D	Fuel tank cover (M981 and M1064)

## **INSTALL NON-SEALED INSERTS**

5. Install insert in threaded hole. Use a cap screw or bolt and a hex nut.





6. Install lockring. Use a hammer and a flat piece of steel. Drive straight into surface.

## NOTE

Lockring must be flush or no more than 1/32 inch (0.8 mm) below hull surface.

INSTALL SEALED INSERTS (M981 CARRIER, EXTERNAL FUEL TANKS ONLY)

- 7. Ensure that threaded hole is clean, dry, and not damaged.
- 8. Remove packing from insert.
- Apply light coat of grease to packing. Cover external threads of insert with paper or tape to protect them from the grease. Slide packing over paper or tape, and position packing against shoulder of insert. Remove protective paper or tape.
- 10. Apply a thin, even coat of primer and then sealing compound to external threads of insert. Do not apply primer or sealing compound beyond small end of threads.
- Using a cap screw or bolt and hex nut, screw insert into threaded hole until packing contacts counterbore. Turn insert 1/4 to 3/8 (0.6 to 0.9 cm) of a turn more to compress packing.
- 12. Install lockring. Use a hammer and a flat piece of steel to drive lockring in flush or no more than 1/100 inch (0.3 mm) below surface.



# REPLACE OVERSIZE SCREW THREAD INSERTS WITH LOCKRING

## INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Portable Electric Drill (Item 23, App B) Screw Threading Set (Item 94. App B) Thread Inserter Holder Kit (Item "93, App B) Twist Drill Set (Item 98, App B) Tool Set (Item 95, App B

## INSTALL

1. Align bushing hole of body (1) with existing insert hole in hull.

#### NOTE

Cap screw thread size must be the same size as inside thread of hull insert.

#### Personnel Required:

Track Vehicle Repairer 63H1O

#### **Equipment Conditions:**

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Road wheel support arm removed (see your -20)

- 2. Install body (1) on hull. Secure with cap screw (2) and flat washer (3). Screw cap screw into a serviceable thread insert or tapped hole.
- 3. Install correct size bushing (4) in body (1). Secure with set screw (5).





- 4. Use a hand drill and correct size counterbore drill (1) to drill through bushing (2) into hull to the depth of insert to be installed.
- 5. Counterbore to depth of lockring thickness plus 0.010 to 0.020 inch.



6. Hand tap correct size threads.

7. Use wrench (3) to install oversize insert (4) in threaded hole.



8. Install oversize lockring (5) flush with hull surface. Use drive tool (6) and hammer.

## **FOLLOW-THROUGH STEPS**

1. Install road wheel support arm (see- your -20).

## REPLACE LOCKED-IN STUDS (M577A2 AND M1068 ONLY)

## **INITIAL SETUP**

#### Tools:

**General Mechanics** Tool Kit (Item 35, App B) Extractor Screw Set (Item 32, App B) Hacksaw (Item 39, App B) Portable Electric Drill (Item 23, App B) Screw Threading Set (Item 94, App B) Twist Drill Set (Item 98, App B)

## REMOVE

- 1. Use a hacksaw to cut off broken stud as close to mounting surface as you can.
- 2. If a locked stud with serrated lockring is being removed, punch center of remaining stud. Drill a pilot hole.

#### NOTE

Key-locked studs have predrilled pilot holes.

3. Use an extractor to remove stud.

## INSTALL

- 4. Use correct size tap drill (see table on next page) to drill hole for stud.
- 5<sub>°</sub> Tap threads. See table on next page for correct thread size.
- 6. Install stud in threaded hole.

#### Personnel Required:

Track Vehicle Repairer 63H10

#### Equipment Conditions:

Engine stopped (see your -10) Carrier blocked (see your -10)

7. If stud cannot be turned by hand, lock two jamnuts on nut end of stud. Then turn with a wrench as shown in view A on next page.

## NOTE

See table on next page for correct nut thread size.

- 8. Remove jamnuts.
- 9. If stud with serrated lockring is to be installed, place lockring on stud.
- 10. Cut off a piece of heavy wailed pipe or tubing to fit over stud as shown in view B on next page. See Fabricated Tools, page 2-5.
- 11. Use a hammer to drive keys or lockring down to secure stud as shown in view B on next page.
- 12. Drive keys flush with mount surface.

## NOTE

Do not drive upper edge of lockring below upper edge of serrated part of stud. Drive straight down.

## LOCKED-IN STUDS

Nut and Thread Size	NSN or Part Number	Stud End	Application
3/8–24NF-3A	Stud- *5307-00-965-5686 10932377 (19207)	7/16-14UNC-2A (33/64 (13 mm) counterbore)	Covered extension (M577A2)
	lock- 5365-00-735-0196		
	or ** (NSN not assignd)		
	10947569 (19207)	I/2-13UNC-2A	

LOCKED-IN STUDS

\*Screw thread stud with serrated lockring. \*\*Key-locked screw thread stud.

NOTE

Installation of key-locked stud is similar to installation of stud with serrated lockring. Make sure fabricated pipe or tubing bears on keys. Drive straight down. Avoid breaking keys.





A. INSTALL STUD USING TWO JAMNUTS

B. PLACE TUBE ON LOCKRING AND DRIVE FLUSH WITH MOUNTING SURFACE

END OF TASK

# REPLACE FRONT SPLASH GUARDS OR REAR FENDERS ALL EXCEPT M741A1)

## **INITIAL SETUP**

## Tools:

Metal Worker's Tool Kit (Item 61, App B) Adapter (Item 2, App B) Arc Welding Machine (Item 102, App B) Electrical Disc Sander (Item 77, App B) Industrial Goggles (Item 37, App B) Trailer Mounted Welding Shop (Item 96, App B) Welder's Gloves (Item 36, App B) Welder's Helmet (Item 42, App B)

#### Materials/Parts:

Welding electrode (Item 83, App C) Front splash guard or rear fender

## REMOVE

## NOTE

If replacing front splash guard, remove drive sprocket from carrier (see your -20). If replacing rear fender, remove idler wheel (see your -20).

1. Remove and discard damaged splash guard or damaged fender from carrier.



## WARNING

Metal chips and grinding dust can cause injury. Wear goggles and gloves.

2. Use a hand grinder to grind area smooth.

## INSTALL

 Weld new splash guard or new fender as shown in illustrations and in accordance with TM 9-237. Personnel Required:

Metal Worker 44B10

#### **References:**

see your -10 see your -20 TM 9-237 TM 43-0139

#### **Equipment Conditions:**

Engine stopped/shutdown (see your -10) Track shroud and covers on damaged side removed (see your -20) Track disconnected (see your -10) Battery ground disconnected (see your -20)





#### LEFT FRONT SPLASH GUARD WELDMENT

## NOTE

Weld left front splash guard as shown. Right side is the opposite and is welded accordingly.



LEFT REAR FENDER WELDMENT (EXCEPT M106A2 AND M125A2)

## NOTE

Weld left rear fender as shown (except M106A2 and M125A2). Right side is the opposite and is welded accordingly.

## **FOLLOW-THROUGH STEPS**

- 1. Connect track and adjust tension (see your -10).
- Install track shroud and covers on carrier (See your -20).



LEft REAR FENDER WELDMENT (M106A2 AND M125A2 ONLY)

## NOTE

Weld left rear fender as shown (M106A2 and M125A2 Only).

4. Clean all bare metal and paint per TM 43-0139.

## NOTE

If front splash guard was replaced, install drive sprocket on earner (see your-20). If rear fender was replaced, install idler wheel (see your -20).

3. Reconnect battery ground (see your -20).

## REPAIR/REPLACE ACCELERATOR STOP SUPPORT ASSEMBLY

## DESCRIPTION

This task covers: Remove (page 8-38). Install (page 8-39).

## **INITIAL SETUP**

## Tools:

Metal Worker's Tool Kit (Item 61, App B) Adapter (Item 2, App B) Arc Welding Machine (Item 102, App B) Electrical Disc Sander (Item 77, App B) Industrial Goggles (Item 37, App B) Trailer Mounted Welding Shop (Item 96, App B) Welder's Gloves (Item 36, App B) Welder's Helmet (Item 42, App B)

## Materials/Parts:

Rivets Support assembly Welding electrode (Item 83, App C)

#### **Personnel Required:**

Metal Worker 44B10

## REMOVE

NOTE

To replace nut (1) only, go directly to step 2.

- 1. Remove screw (2) and nut (3) from support assembly (4).
- Use a machinists hammer and a cold chisel to remove two rivets (5) securing nut (1) to support. Remove nut.
- 3. Remove broken support assembly (4) from floor plate. Discard 'broken support assembly.



WARNING

Metal chips and grinding dust can cause eye injury. Wear goggles and gloves.

4. Use a machinist's hammer and a cold chisel to chip off remaining part of bad support assembly from floor plate.

## References:

See your -10 See your -20 TM 9-237

#### **Equipment Conditions:**

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Ramp lowered (see your -10) Driver's seat removed (see your -20) Upper accelerator pedal removed (see your -20) Lower accelerator pedal removed (see your -20) Battery ground disconnected (see your -20)

5. Use a disc sander to sand chipped area smooth and remove hard coating from weld



#### NOTE

To install nut (1) only, go directly to step 8.

- 6. Position support assembly (2) on floor plate.
- 7. Weld support assembly (2) to floor plate in accordance with TM 9-237. Use electrode type 5356.
- 8. Position nut (1) on support (2). Secure with two rivets (3).
- 9. Install nut (4) and screw (5) into support assembly (2).



## FOLLOW-THROUGH STEPS

- 1. Reconnect battery ground (see your -20).
- 2. Install lower accelerator pedal (see your -20).
- 3. Install upper accelerator pedal (see your -20).
- 4. Install driver's seat (see your -20).

- 5. Start engine (see your -10). Check that accelerator pedal operates properly.
- 6. Raise and lock ramp (see your -10).
- 7. Stop/shutdown engine (see your -10).

## CHAPTER 10 MAINTENANCE OF RAMP SYSTEM

## TASK INDEX

Task	<u> </u>	Page	Task	Page
Repair	Ramp Hydraulic Cylinder	10–2	Replace Ramp Hydraulic Cylinder	ı
Repair:	Ramp Access Door	10-4	Anchor (M106A2, M1064, and $M125A2$ only)	.10-6

## **REPAIR RAMP HYDRAULIC CYLINDER**

## DESCRIPTION

This task covers: Remove (page 10-2). Install (page 10-3).

## **INITIAL SETUP**

## Tools

General Mechanics Tool Kit (Item 35, App B) External Retaining Ring Pliers (Item 66, App B) Internal Retaining Ring Pliers (Item 64, App B

#### Materials/Parts

Automotive grease (Item 9, App C) FRH hydraulic fluid (Item 33, App C) Repair kit 2590-00-906-0147

## REMOVE



## WARNING

Fire resistant hydraulic (FRH) fluid is poisonous and can be absorbed through the skin. If FRH gets on your skin, thoroughly wash with soap and wa-

ter. Wash hands thoroughly prior to eating or smoking.

- Remove retaining ring (1) that holds spacer (2) in barrel (3). Push cylinder head (4) in barrel (3). Remove spacer (2). Discard retaining ring.
- Remove retaining ring (5) that holds cylinder head (4) in barrel (3). Remove piston rod (6), piston (7) and cylinder head (4) as an assembly from barrel (3). Discard retaining ring.
- 3. Remove two packing retainers- (8) and preformed packing (9) from piston (7). Discard packing retainers and preformed packing.
- 4. File piston end of rod (6) to remove staked metal.
- 5. Remove nut (10) from piston rod (6). Unscrew piston (7) from rod (6).

#### Personnel Required:

Track Vehicle Repairer 63H10

#### **References:**

see your -20 See your LO

#### **Equipment Conditions:**

Ramp hydraulic cylinder removed (see your -20)

- 6. Remove preformed packing (11) from rod (6). Discard preformed packing.
- 7. Remove cylinder head (4) from rod (6). Slide cylinder head off at piston end of rod.

## NOTE

Seal set consists of two rod wipers and a backup ring.

- 8. Remove retaining ring (12), backup ring (13), and two rod wipers (14) from cylinder head (4). Discard retaining ring, backup ring, and rod wipers.
- 9. Remove gasket (15) and preformed packing (16) from cylinder head (4). Discard backup gasket and preformed packing.
- 10. Remove preformed packing (17) from cylinder head (4). Discard preformed packing.



#### WARNING



Fire resistant **hydraulic** (FRH) fluid may contain Tricresyl Phosphate which, if taken internally, can produce paralysis. Hydraulic fluid may be choosed

duce paralysis. Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, goggles, and face shield. If FRH get3 in eyes, wash them immediately and get medical aid immediately. If FRH gets on your skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking,

INSTALL

## NOTE

Soak *new* gasket and packing **retainers** in hydraulic fluid 10 minutes minimum, then coat **gasket** and packing **retainers** with grease.

- 11. Install new preformed packing (1) on cylinder head (2).
- 12. In&all new preformed packing; (3) and new pm-soaked and greased gasket (4) in cylinder head (2).

#### NOTE

&al set consists of two rod wipers and a backup ring.

13. Install two new rod wipers (5), new backup ring (6), and new retaining ring (7) in cylinder head (2).

- 14. Install cylinder head (2) on piston end of rod (8).
- 15. Install new preformed packing (9) on rod (8).
- 16. Install piston (10) on rod (8). Secure with nut (11).
- 17. Stake piston end of rod (8) to retain nut (11).
- Install new pre-soaked packing retainers (12) and new preformed packing (13) on piston (10).
- 19. Install piston (10), rod (8), and cylinder head (2) in barrel (14). Secure cylinder head in barrel with new retaining ring (15).
- 20. Place spacer (16) on cylinder head (2). Secure with new retaining ring (17).



## FOLLOW-THROUGH STEPS

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1. Install ramp hydraulic cylinder (see your -20).

2. Check ramp hydraulic fluid level (see your LO).

## **REPAIR RAMP ACCESS DOOR**

## DESCRIPTION

Thie task covers: Remove (page 10-4). Install (page 10-5).

## **INITIAL SETUP**

## Tools:

General Mechanics Tool Kit (Item 35, App B)

#### Materials/Parts:

Lifting device with rated lift capability of at least 200 lbs (91 kg)

## Personnel Required:

Track Vehicle Repairer 63H10 Helper (H)

## REMOVE

# え

WARNING Door could fall and injure you. Make sure door is held by a lifting device before removing hinge screws.

- 1. Attach door to lifting device.
- 2. Remove two nuts (1), screws (2), and spacers (3) that secure ramp door (4) to four hinge parts (5) on ramp (6). Remove door from ramp. Have helper assist.

## References:

See your -10 see your -20

#### **Equipment Conditions:**

**Ramp** raised and locked (see your -10) 'Engine stopped/shutdown (see your -10) **Carrier blocked (see your -10)** 

- 3. Remove two shoulder bushings (7) from two hinges (8) on ramp door (4).
- Remove two bushings (9) from two upper hinge parts (5) on ramp (6). Remove two shoulder bushings (10) from two lower hinge parts (5).

NOTE

Shoulder bushings (7 and 10) provide clearance between spacer (3) and upper ramp hinge part (5). Replace bushings that do not provide 1/16 inch (2 mm) clearance.



- 5. Install two shoulder bushings (1) in two lower hinge parts (2) on ramp (3).
- 6. Install two bushings (4) in two upper hinge parts (2) on ramp (3).
- 7. Install two shoulder bushings (5) in two hinges (6) on ramp door (7).
- 8. Place door (7) in ramp (3). Secure with two spacers (8), screws (9), and nuts (10).



## **FOLLOW-THROUGH STEPS**

1. Adjust handle (see your -20).

# REPLACE RAMP HYDRAULIC CYLINDER ANCHOR (M106A2, M1064, AND M125A2 ONLY)

## DESCRIPTION

This task covers: Remove (page 10-6). Modify (page 10-7). Install (page 10-8).

## **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Torque Wrench (Item 112, App B) Electrical Disc Sander (Item 76, App B) Pneumatic Hammer (Item 40, App B) Portable Electric Drill (Item 23, App B) Twist Drill, 7/16 (Item 25, App B)

#### Materials/Parts:

Primer paint (Item 74, App C) Anchor Cotter pin Screw Washer Screw

## Materials/Parts (cont):

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20 TM 9-1015-232-35 TM 43-0139

#### **Equipment** Conditions:

Engine stopped (see your -10) Carrier blocked (see your -10) Ramp lowered (see your -10) Mortar removed (see your -10) Mortar turntable and ring gear removed (TM 9-1015-232-35)

## REMOVE

- 1. Remove cotter pin (1). Discard pin.
- 2. Remove headed pin (2). Retain pin.

- 3. Remove cylinder (3) from anchor (4).
- 4. Remove anchor (4) and all weld material from hull bottom plate. Discard anchor (4). Use pneumatic hammer.



## MODIFY

- 5. Grind weld area level and smooth. Use disc sander.
- 6. Locate center of first hole as shown.

#### NOTE

Drill all holes straight and at right angles to hull bottom plate.

- Drill first hole with 7/16 inch (11 mm) diameter drill. Bottom plate is 1-1/8 inches (3 cm) thick. Do not break through. Use portable electric drill.
- 8. Tap first hole with a 1/2-13UNC tap to a minimum thread depth of 7/8 inch (22 mm). Use twist drill.

- 9. Position new anchor (1) 32 degrees from reference line as shown, with centerline of anchor and bottom centerline of ramp pulley in alignment.
- 10. Secure anchor (1) with one washer (2) and one screw (3).
- 11. Use new anchor (1) as template. Locate center of remaining two holes. Remove anchor. Drill and tap holes same way as first hole (steps 7 and 8).
- 12. Clean surface with wire brush.
- 13. Paint any exposed metal surfaces (see TM 43-0139).



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## INSTALL

- 14. Install anchor (1) with three washers (2) and screws (3).
- 15. Tighten screws to 54-59 lb-ft (73-80 N•m) torque. Use torque wrench. Use primer paint as lubricant on threads and under screw heads.
- 16. Install cylinder (4) on anchor (1) with headed pin (5). Secure with new cotter pin (6).



## **FOLLOW-THROUGH STEPS**

- 1. Install mortar turntable and ring gear (see TM 9-1015-232-35).
- 2. Install mortar in carrier (see your -10).
- 3. Raise and lock ramp (see your -10).
- 4. Stop engine (see your -10).

## CHAPTER 11 MAINTENANCE OF PERSONNEL HEATER KIT

## TASK INDEX

Task	Page	Task	Page
Install Personnel Heater Kit (M113A2, M741A1, and M1059 only)	.11-2	Install Personnel Heater Kit (M106A2, M1064, and M125A2 only)	11-15
# INSTALL PERSONNEL HEATER KIT (M113A2, M741A1, AND M1059 ONLY)

## **INITIAL SETUP**

### Tools:

General Mechanics Tool Kit (Item 35, App B)

### Materials/Parts

Dry cleaning solvent (Item 18, App C) Sealing compound (Item 70, App C) Sealing compound primer (Item 74, App C) Kit P/N 12349702 (19207)

### **Personnel Required:**

Track Vehicle Repairer 63H10

### **References:**

See your -10 See your -20

# INSTALL

# NOTE

Fuel hoses used on the personnel heater installation are the flareless type. If it is necessary to replace hose, the connection fittings must also be replaced.

- 1. Remove six screws (I), two cover plates (2), and two gaskets (3) from top of carrier. Discard cover plates and gaskets.
- 2. Remove nut (4) and screw (5) from transverse beam. Discard nut and screw.
- Remove nut (6) and screw (7) from engine compartment bulkhead. Discard nut and screw.
- 4. Remove four nuts (8) and screws (9) from engine compartment bulkhead. Retain four nuts and screws.
- Remove four nuts (10), screws (11), cover (12) and gasket (13) from engine compartment bulkhead. Retain four nuts. Discard screws, cover, and gasket.

# **Equipment Conditions:**

Ramp lowered (see your -10) Engine stopped (see your -10) Carrier blocked (see your -10) Battery ground lead disconnected (see your -20) Power plant rear access panel removed (see your -20) Floor plates removed (see your -20) Fuel compartment drained (see your -20)

6. Remove two nuts (14), screws (15), retainer (16), cover (17), and gasket (18) from engine compartment bulkhead. Discard nuts, screws, retainer, cover, and gasket.



- 7. Remove and discard cradle clip (1), move battery lead (2) aside.
- 8. Remove screw (3) and cradle (4) from weldnut (5). Discard screw and cradle.



- 9. Install grommet (6) in power plant bulkhead.
- 10. Install exhaust pipe (7) in grommet (6).
- 11. Install exhaust pipe (8) on exhaust pipe (7).
- 12. Secure two exhaust pipes (8 and 9) and two gaskets (10) to power plant bulkhead with four screws (11) and retained nuts (12).
- 13. Install gasket (13) on exhaust elbow (14) and insert elbow through top deck into exhaust pipe (9).

- 14. Install gasket (15) on intake elbow (16) and position elbow through top deck opening.
- 15. Secure exhaust and intake elbows (14 and 16) to top deck with six screws (17).
- 16, Secure exhaust pipe (9) to elbow (14) with U-bolt (18), clamp (19), and two nuts (20).



17. Secure plenum (1) to heater (2) with four lockwashers (3) and screws (4).

# ΝΟΤΕ

Four nuts and screws were previously removed and retained. However, on the M113A2 carrier, screw that secures strap is supplied in the personnel heater kit.

- Secure two saddles (5) to power plant bulkhead with four retained screws (6), three lockwashers (7), ground strap (8) and four retained nuts (9).
- 19. Install two clamps (10) in two saddles (5).
- 20. Position clamp (11) on heater intake pipe (12) and place clamp (13) on heater exhaust pipe (14). Do not tighten.

- 21. Install elbow (15) in heater intake pipe (12) and intake elbow (16).
- Align inlet elbow (15) with intake elbow (16), and align exhaust pipe (14) with exhaust pipe in carrier. Place heater (2) and shield (17) (M113A2 only) against saddles (5).
- While still supporting heater, double check for proper mating of heater exhaust port (14) and exhaust pipe in earner. Tighten two saddle clamps (10).
- 24. Position ground strap (8) on heater (2) and secure with (one M113A2) (two M741A1) lockwasher(s) (18) and screw (19) (741A1 use existing screw) (M113A2 discard existing screw and use kit screw).
- 25. Tighten clamp (13) on heater exhaust pipe (14) and exhaust pipe in carrier.
- 26. Tighten clamp (11) on heater intake pipe (12).



Secure fuel pump (1) to threaded bracket (2) with four lockwashers (3), two flat washers (4) and screw (5).

## CAUTION

Shielded lead can damage pump. Shielded lead must not contact pump body or other surfaces.

 Secure shielded lead (6) to weldnut (7) with washer (8), two lockwashers (9), and screw (10).



#### WARNING



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 29. Clean external pipe threads of fittings with dry cleaning solvent.
- 30. Apply a thin, even coat of primer and then sealing compound to cleaned external pipe threads of fittings. Do not apply primer or sealing compound beyond small end of threads.

NOTE Steps 31 thru 34 are for M113A2 and M1059 with inside fuel tank, and M741A1.

- 31. Remove plug (1) from elbow (2).
- 32. Install shutoff cock (3) on elbow (2).

- 33. Install adapter (4) on shutoff cock (3).
- 34. Install personnel heater fuel hose (5) on adapter (4).



- 35. Install adapter (1) and elbow (2) on fuel pump (3) (M113A2).
- 36. Install two elbows (4) on fuel pump (3) (M741A1).
- 37. Secure personnel heater fuel hose (5) to elbow (2) (M113A2) (4) (M741A1) with sleeve (6) and nut (7).
- Secure personnel heater fuel hose (8) to adapter (1) (M113A2), elbow (4) (M741A1) with sleeve (9) and nut (10).

- 39. Remove nut (11) and screw (12) from crossmember (M113A2). Discard screw and nut.
- 40. Secure adapter body (13) to crossmember with nut (14).
- 41. Secure personnel heater fuel hose (8) to adapter body (13) with sleeve (15) and nut (16).



- 42. Remove five screws (1) from weldnuts (2) (M113A2).
- Secure personnel heater fuel hose (3) to eight weldnuts (2) with five screws, three kit screws (1), and eight clamps (4) (M113A2).
- 44. Remove one screw (1) from one weldnut (2) (M741A1).
- Secure personnel heater fuel hose (3) to three weldnuts (2) with one screw, two kit screws (1), and three clamps (4) (M741A1).
- 46. Secure personnel heater fuel hose (3) to hydraulic tube (5) with strap (6) (M741A1).

### WARNING



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 47. Clean external threads of fittings with dry cleaning solvent.
- 48. Apply a thin, even coat of primer and then sealing compound to cleaned external pipe threads of fittings. Do not apply primer or sealing compound beyond small end of threads.



- 49. Secure adapter body (1) to power plant bulkhead with nut (2).
- 50. Secure tube (3) to adapter bodies (4 and 1) with two sleeves (5) and nuts (6).
- 51. Secure tube (3) to weldnut (7) with clamp (8) and screw (9).

- 52. Install elbow (10) on personnel heater (11).
- 53. Install adapter (12) on elbow (10).
- 54. Secure hose (13) to adapter body (1) and adapter (12) with two sleeves (14) and nuts (15).



### ΝΟΤΕ

Steps 55 thru 60 are for M113A2 carrier only.

- 55. If required, use a hacksaw to trim ends of personnel seat (1) and seat back (2), so heater hose maybe installed.
- 56. Secure left and right floor plates (3) to hull crossmembers with seven screws (4) and washers (5).
- 57. Align heater duct (6), blanket (7) and shield (8) with front three holes in floor plates (3). Secure with three new screws (9) and washers (10) from kit.
- 58. Secure one nipple (11) to plenum (12) with latch (13).
- 59. Secure one nipple (11) to duct (6) with latch (13).
- 60. Secure hose (14) to two nipples (11) with two clamps (15).





15)

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# NOTE Steps 61 thru 65 are for M741A1 carrier only.

- 61. Secure left and right floor plates (1) to hull crossmembers with eight screws (2) and washers (3).
- 62. Secure distribution duct (4) to three brackets (5) with three screws (6), six washers (7), and three nuts (8).
- 63. Align distribution duct (9) with three front holes in floor plates (1). Secure with three new screws (10) and washers (11) from kit.
- 64. Position hose (12) on distribution ducts (4 and 9) and secure with two clamps (13).
- 65. Secure heater hose (14) to distribution duct (9) and plenum (15) with two latches (16).

(16

(10)

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- 66. Remove two screws (1) and control box (2) from control box case (3).
- 67. Remove two screws, nuts, and washers supplied with control box case (3). Discard screws, nuts, and washers.
- 68. Secure control box case (3) to two weldnuts (4) with two lockwashers (5) and screws (6).
- 69. Secure control box (2) to control box case (3) with two screws (1).
- Clean small area on hull support next to control box (2) and apply warning decal (see your -20).



- 71. Thread personnel heater wiring harness (1) through transverse beam from driver's compartment into personnel compartment.
- 72. Connect personnel heater wiring harness (1) to control box (2).
- 73. Connect personnel heater wiring harness (1) to personnel heater (3).
- 74. Install shell (4) and washer (5) on control box lead (6).
- 75. Connect circuit 400 lead (7) of rear main wiring harness (8) to control box lead (6).

(13)

- 76. Connect circuit 402 lead (9) of rear main wiring harness (8) to fuel pump lead (10) and to connector (11) of personnel heater wiring harness (1).
- 77. Remove clip (12) securing battery cable (13) and radio cable (14) to cradle (15). Discard clip.
- 78. Remove screw (16) and cradle (15) from weldnut (17). Discard cradle.
- 79. Install clamp (18) on battery cable (13), radio cable (14), and personnel heater wiring harness (1).
- 80. Secure personnel heater wiring harness ground lead (19) and clamp (18) to weldnut (17) with retained screw (16), lockwasher (20) and flat washer (21).

(17)



# FOLLOW-THROUGH STEPS

- 1. Fill fuel compartment (see your -10).
- Open fuel shutoff cock and check for leaks (see your -10).
- 3. Connect battery negative lead (see your -20). 8. Raise and lock ramp (see your -10).
- 4. Start personnel heater, and check personnel heater installation for proper operation and leaks (see your -10).
- 9. Stop engine (see your -10).

(see your -20).

5. Turn personnel heater OFF (see your -10).

6. Install power plant rear access panel

7. Install rear floor plate (see your -20).

END OF TASK

# INSTALL PERSONNEL HEATER KIT (M106A2, M1064 AND M125A2 ONLY)

# **INITIAL SETUP**

## Tools:

General Mechanics Tool Kit (Item 35, App B)

### Materials/Parts:

Dry cleaning solvent (Item 18, App C) Sealing compound (Item 70, App C) Sealing compound primer (Item 74, App C) Kit P/N 12268857 (19207)

# **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20

# INSTALL

- 1. Remove six screws (1), two plates (2), and gaskets (3) from top of carrier. Discard screws, plates, and gaskets.
- 2. Remove nut (4) and screw (5) from transverse beam. Discard nut and screw.
- 3. Remove nut (6) and screw (7) from power plant compartment bulkhead. Discard nut and screw.

### **Equipment Conditions:**

Ramp lowered (see your -10) Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Fuze rack removed (M106A2) (see your -20) Fire extinguisher removed (M106A2 and M125A2) (see your -20) Battery ground lead disconnected (see you -20) Power plant rear access panel removed (see your -20) Floor plates removed (see your -20) Front horizontal ammunition racks and supports removed (M106A2 and M125A2) (see your -20) Fuel compartment drained (M106A2 and M125A2) (see your -20)



- 4. Discard front three screws (1) and washers (2) removed with floor plates.
- 5. Install gasket (3) on exhaust elbow (4), and insert elbow through top deck into exhaust pipe (5).
- 6. Install gasket (6) on intake elbow (7), and position elbow through top deck opening.
- 7. Secure exhaust and intake elbows (4 and 7) to top deck with six screws (8).
- 8. Secure exhaust pipe (5) to elbow (4) with U-bolt (9), clamp (10), and two nuts (11).



- 9. Secure plenum (1) to personnel heater (2) with four lockwashers (3) and screws (4).
- 10. Secure two saddles (5) to two brackets (6) with four screws (7), three washers (8), ground strap (9), and four nuts (10).
- 11. Install two clamps (11) on two saddles (5).
- 12. Position clamp (12) on heater intake pipe (13) and clamp (14) on heater exhaust pipe (15).
- 13. Install elbow (16) on heater intake pipe (13) and intake elbow (17).
- 14. Position heater (2) and shield (18) on two mounts (5), and secure with two clamps (11).

(28)

(26)

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(10)

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[11]

9

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1

- 15. Secure ground strap (9) to heater (2) with two lockwashers (19) and existing screw (20).
- 16. Tighten clamp (14) on heater exhaust pipe (15) and exhaust pipe in earner.
- 17. Tighten clamp (12) on heater intake pipe (13).
- Secure fuel pump (21) to hull bracket (22) with four lockwashers (23) and two screws (24).
- 19. Secure pump lead (25) to hull bracket (22) with two lockwashers (26), screws (27), and nuts (28).

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WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area;

avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using slovent; the flash point for type I dry cleaning solvent is 100°F (38°C) and for type II is 138°F (50°C). Failure to do so may result in injury or death to personnel.

- 20. Clean external pipe threads of fittings with dry cleaning solvent.
- 21. Apply a light coat of sealing compound to clean external pipe threads of fittings.

NOTE Do steps 22 thru 25 on M106A2 and M125A2 only

- 22. Remove plug (1) from elbow (2). Discard plug.
- 23. Install shutoff cock (3) on elbow (2).

- 24. Install adapter (4) on shutoff cock (3).
- 25. Install personnel heater fuel hose (5) on adapter body (4).

# NOTE

# Do steps 25.1 thru 25.5 on M1064 only.

- 25.1 Close heater fuel shutoff valve (6).
- 25.2 Remove plug (7) from shutoff valve (6). Discard plug.
- 25.3 Install adapter (8) on shutoff valve (6).
- 25.4 Install ebow (9) on adapter (8).
- 25.5 Install personnel heater fuel hose (10) on elbow (9).

R

### ΝΟΤΕ

Do steps 26 thru 32 on M106A2, M1064, and M125A2 only.

- Remove three screws (1), washers (2), and six clamps (3) from three weldnuts (4). Retain three screws and washers; discard six clamps.
- 27. Remove two screws (5), washers (6), and guard (7) from hull crossmember.
- 28. Secure heater fuel hose (8) and heater fuel tube (9) to nipple body (10) with two sleeves (11) and nuts (12).
- 29. Secure heater fuel tube (9) and heater fuel hose (13) to elbow (14) with two sleeves (15) and nuts (16).
- 30. Install tee (17) and cap (18) on fuel pump (19).
- 31. Secure heater fuel hose (13) to elbow (17) with sleeve (20) and nut (21).

Secure heater fuel hose (8), heater fuel tube (9), and engine fuel hoses to three weldnuts (4) with three new clamps (22), screws (1), and washers (2).

# ΝΟΤΕ

## Do steps 32.1 thru 32.3 on M1064 only.

- 32.1 Remove two screws (5), washers (6), and guard (7) from hull crossmember.
- 32.2 Install tee (17) and cap (18) on fuel pump (19).

3

32.3 Secure heater fuel hose (13) to tee (17) with sleeve (20) and nut (21).

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33. Secure guard (7) to hull crossmember with two screws (5) and washers (6).



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- 34. Install elbow body (1) on fuel pump (2).
- 35. Secure heater fuel hose (3) to elbow body (1) with sleeve (4) and nut (5).
- 36. Secure nipple body (6) to hull with locknut (7).
- 37. Secure fuel hose (8) to nipple body (6) with sleeve (9) and nuts (7) and (10).
- 38. Secure fuel hose (8) to engine fuel hoses with four straps (11).
- 39. Secure fuel hose (8) to weldnut (12) with clamp (13) and screw (14).



- 40. Secure elbow (1) to power plant bulkhead with locknut (2).
- 41. Secure tube (3) to elbow (1) and nipple body (4) with two sleeves (5) and nuts (6).
- <sup>42.</sup> Secure tube (3) to weldnut (7) with clamp (8) and screw (9).

- 43. Install nipple (10) in personnel heater (11).
- 44. Install elbow (12) on nipple (10).
- 45. Secure reducer (13) to elbow (1) with sleeve (14) and nut (15).
- 46. Secure fuel hose (16) to reducer (13) and elbow (12) with two sleeves (17) and nuts (18).



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47. Secure left and right front floor plates (1) to hull crossmembers with five eyebolts (2), one screw (3), and six washers (4).

2

- Align heater duct (5), blanket (6), and shield (7) with three front holes in front floor plates (1). Secure with three new screws (8) and washers (9) from kit.
- 49. Install nipple (10) on heater plenum (11), and nipple (10) on heater duct (5). Secure with two latches (12).
- 50. Secure hose (13) to two nipples (10) with two clamps (14).



- 51. Remove two screws (1) and control box (2) from control box case (3).
- 52. Remove two screws, nuts, and washers supplied with control box case (3). Discard screws, nuts, and washers.
- 53. Secure control box case (3) to two weldnuts (4) with two lockwashers (5) and screws (6).
- 54. Secure control box (2) to control box case (3) with two screws (1).
- 55. Clean small area on transverse beam next to control box (2) and apply warning decal (see your -20).





- 56. Thread personnel heater wiring harness (1) through transverse beam from driver's compartment into personnel compartment.
- 57. Connect wiring harness (1) to personnel heater (2).
- 58. Connect circuit 400 lead (3) of rear main wiring harness (4) to control box lead (5).
- 59. Connect circuit 402 lead (6) to fuel pump lead (7) and to connector (8) of heater wiring harness (1).

- 60. Secure circuit 402 lead (6) to cradle (9) with cradle clip (10).
- Secure circuit 402 lead (6) to four weldnuts (11) with four clamps (12), screws (13), and one strap (14).
- 62. Remove screw (15) securing clamp (16), and dome light lead (17) from weldnut (18).
- 63. Secure heater wiring harness (1), ground lead (19), clamp (16), and domelight lead (17) to weldnut (18) with screw (15) and two washers (20).



# FOLLOW-THROUGH STEPS

- 1. Fill fuel compartment (M106A2 and M125A2) (see your -10).
- 2. Open fuel shutoff cock (see your -10) and check for leaks.
- 3. Connect battery ground lead (see your -20).
- 4. Start personnel heater (see your -10) and check personnel heater installations for proper operation and leaks.
- 5. Turn personnel heater OFF (see your -10).
- 6. Install fuze rack (M106A2) (see your -20).

- Install fire extinguisher (M106A2 and M125A2) (see your -20).
- Install front horizontal ammunition racks and supports (M106A2 and M125A2) (see your -20).
- 9. Install floor plates (see your -20).
- 10. Install power plant rear access panel (see your -20).
- 11. Raise and lock ramp (see your -10).
- 12. Stop engine (see your -10).

END OF TASK

# CHAPTER 12 MAINTENANCE OF AUXILIARY POWER UNIT COVER

# REPAIR AUXILIARY POWER UNIT COVER (M577A2 ONLY)

# DESCRIPTION

This task covers: Inspect (page 12-1). Repair (page 12-2).

## **INITIAL SETUP**

### Tools:

Sewing Machine (Item 82, App B)

### Materials/Parts:

Adhesive sealant (Item 2, App C) Vinyl coated nylon cloth (Item 15, App C)

### **Personnel Required:**

Track Vehicle Repairer 43M10

# INSPECT

- Check fabric. Weak or torn areas may be repaired by a cement patch or machined patch. All material used to repair the cover must be the same as the original material.
- Check strength of fabric. Grasp a small fold of fabric between thumb and forefinger of each hand, gripping it closely so tips of forefingers touch. Tug material several times. If it does not rip, it is reparable. If it tears on first tug, test several areas for extent of wear. Weak sections must be replaced.
- Check for spots and stains. Nonwear spots and stains are all right if fabric has been brushed clean. Repair fabric where fabric strength has been weakened by mildew, sap, or dirt stains.
- 4. Check fabric. Repair opened seams, runoff stitching, and broken threads. Restitch worn stitching.
- 5. Check webbing straps. Repair or replace worn, frayed, or torn straps.
- 6. Check buckles. Replace buckles that are bent, broken, or missing.

# **References:**

See your -10 FM 10-16

# **Equipment Conditions:**

Cover removed from carrier (see your -10)

- Check for slide fasteners (zippers). Replace zippers that are rusted or do not work correctly.
- 8. Check eyelets, washers, and studs. Replace parts that are bent, broken, or missing.



### REPAIR

# ΝΟΤΕ

The materials used to make a cement patch are adhesive, round patch of vinyl coated nylon cloth, roller, board, wire brush, and soft bristle brush.

- 9. Select a patch that overlaps damaged area with a margin of at least 3/4 inch (19 mm) on all sides.
- 10. Place board under damaged area for a flat working surface.
- 11. Buff patch and damaged area of fabric with wire brush.



### WARNING

Adhesive is flammable and can injure you. Keep it away from heat, sparks, and open flame. Avoid repeated or prolonged breathing of vapors. Avoid contact

with your skin.

- 12. Center patch over damaged area. Apply adhesive to patch and batch edge, making a circle on fabric with soft bristle brush.
- 13. Lift patch and apply adhesive to area of fabric inside adhesive circle.
- 14. Allow adhesive to dry until tacky (about 10 minutes).
- 15. Press cemented surfaces together firmly with roller while tacky.
- 16. Seal by wiping edge of batch with soft bristle brush.
- 17. Repair webbing using machine stitching as shown below. Install webbing in a square pattern with diagonal stitches from corner to corner.

 Repair hardware as shown in the following figure. See FM 10-16 for installation of eyelets and studs with washers.



### ΝΟΤΕ

Use lock stitching when you install patches, flaps, and straps or repair open seams. Use a polyester thread and smallest needle you can to make weatherproof seams. Allow 5 to 7 stitches per inch (3 cm). Backstitch all thread breaks at least 1 inch (3 cm). Backstitch all ends at least 1 inch (3 cm), except where ends are turned under in a hem or seam or held down by other stitching. Maintain thread tension so stitching is tight and lock is fixed firmly in center of material. Trim all ends. Take care when restitching to make a new stitch line.

- 19. Repair extensive damage between seams (steps 20 thru 30).
- 20. Open seam 2 inches (5 cm) beyond damaged area on both sides.
- 21. Square off damaged area from seam to seam.
- Cut patch from material 2 inches (5 cm) wider than squared-off section. Allow for 3/4 inch (19 mm) turnunder on sides.
- 23. Center patch over cutaway section, turning sides under, and reform double-felled seams at top and bottom.
- Finish by stitching patch in place. Secure patch to cover with a second row of stitching. Place second row 3/8–1/2 inch (10–13 mm) from first.

### ΝΟΤΕ

The watershed patch is a patch with the top edge angled off to give a roof effect. Because the roof type patch sheds water, the patch lasts longer than a square patch.

- 25. Use watershed patches, as needed.
- Cut patch large enough to overlap 2 inches (5 cm) on all sides of area to be repaired. Allow for 3/4 inch (19 mm) turnunder of edge.
- 27. Fold patch in half lengthwise. Cut from open edges to folded edge at 22–1/2 degree angle as shown in illustration.
- Center patch over damaged area. Turn under patch edges and stitch in place with a row of stitching no more than 1/8 inch (3 mm) from edge.
- Secure patch to cover with a second row of stitching. Place second row 3/8–1/2 inch (10–13 mm) from first.
- 30. Turn material over. Cut away damaged area, notch corners, and turn edges in. Stitch turned-in edges to patch with a row of stitching no more than 1/8 inch (3 mm) from edge.



# FOLLOW-THROUGH STEPS

1. Stow or install cover on carrier.

# CHAPTER 13

# MAINTENANCE OF ELECTRONIC EQUIPMENT HEATER KIT

# INSTALL ELECTRONIC EQUIPMENT HEATER KIT (M577A2 ONLY)

# **INITIAL SETUP**

### Tools:

General Mechanics Tool Kit (Item 35, App B)

### Materials/Parts:

Adhesive silicone sealant (Item 3, App C) Dry cleaning solvent (Item 18, App C) Sealing compound (Item 70, App C) Sealing compound (Item 72, App C) Sealing compound primer (Item 74, App C) Silicone compound (Item 76, App C)

### Personnel Required:

Track Vehicle Repairer 63H10

# INSTALL

 Nut (1) is located on longest support link (2). If nut is on inside of radio mount platform (3), remove nut and screw (4). Install screw from inside of platform and nut on outside of link.

#### **References:**

See your-10 See your-20

### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10) Ramp lowered (see your -10) Battery ground lead disconnected (see your -20) Floor plates removed (see your -20) Carrier fuel shutoff valve closed (see your -10)



- 2. Place bracket (1) under platform (2). Secure with two screws (3) and nuts (4).
- 3. Remove nut (5), screw (6), and two washers (7) from platform (2).
- Place bracket (8) on the end of platform (2). Secure with screw (6), nut (5), and two washers (7) that were removed in step 3 above. Secure other end of bracket with screw (9) and nut (10).
- 5. Place saddle (11) and ground lead (12) under bracket (8). Secure with screw (13), nut (14), and three washers (15). Secure other end of saddle (11) with screw (13) and nut (14).
- 6. Install one clamp (16) in saddle (11) and one clamp (16) in bracket (1).



- Apply a thin, even coat of primer and then sealing compound (item 68) to external tapered pipe threads of heater fuel inlet nipple (1) and adapter (2). Do not apply primer or sealing compound beyond small end of threads.
- 8. Install inlet nipple (1), elbow (3), and adapter (2) in heater assembly.

(10)

- 9. Install sleeve (4) and nut (5) on heater fuel inlet hose (6).
- 10. Connect fuel inlet hose (6) to adapter (2) on heater assembly (7).

### ΝΟΤΕ

Before you secure heater assembly clamps, make sure there is at least 1 inch (3 cm) clearance between hull side wall and rear of heater assembly.

- 11. Place heater assembly (7) in clamps (8). Tighten clamps (8).
- 12. Install two clamps (9) on fuel inlet hose (6). Secure to hull with two screws (10).
- Place heater elbow (11) and ground lead (12) on heater assembly (7). Secure with screw (13) and two washers (14). Install three other screws (13) and washers (14).



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- 14. Remove and discard six screws (1), two cover plates (2), and plate gaskets (3) from top of carrier.
- Place two new gaskets (3), exhaust elbow (4), and intake elbow (5) on top of carrier. Secure with six new screws (1).



WARNING Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 16. Clean inside surface of intake hose (6) at one end only. Use dry cleaning solvent.
- 17. Apply silicone adhesive sealant to cleaned inside surface of intake hose (6).
- Insert a 1 inch (3 cm) silicone rubber hose (7) into intake hose (6) until end of hose (7) is flush with end of intake hose (6).
- Place a 30 inch (76 cm) intake hose (6) with large end on intake elbow (5) and reduced end on heater intake duct (8). Secure both ends with two clamps (9).
- 20. Place exhaust duct (10) on exhaust elbow (4) and heater assembly exhaust outlet (11).
- 21. Install duct (10) in elbow (4) and exhaust outlet (11). Secure with two U-bolts (12), saddles (13), four washers (14), and four nuts (15).



# NOTE

If fuel supply adapter kit is not installed, follow steps 22 thru 36.

- 22. Disconnect personnel heater-to-fuel shutoff cock flexible hose (1) from personnel heater fuel pump (2).
- Apply a thin, even coat of primer and then sealing compound (item 68) to external pipe threads of nipples (3 and 4), tee (5), plug (6), shutoff cock (7), and elbow (8). Do not apply primer or sealing compound beyond small end of threads.
- 24. Remove tube adapter (9) from fuel pump (2). Install adapter on fuel tube tee (5).
- 25. Connect flexible hose (1) to adapter (9).
- 26. Install plug (6) and nipple (3) in tee (5).

- 27. Install nipple (4) in tee (10) and cock (7).
- 28. Install tee (10) on nipple (3).
- 29. Install adapter (11) on cock (7).
- 30. Install coupler (12) in fuel pump (2).
- 31. Install elbow (8) in coupler (12).
- 32. Connect hose (13) between elbow (8) and adapter (11).
- Install bracket (14) on hull bracket (15).
  Secure with two screws (16) and nuts (17).



- 34. Apply a thin, even coat of primer and then sealing compound (item 68) to external tapered threads of nipple (1) and shutoff cock (2). Do not apply primer or sealing compound beyond small end of threads.
- 35. Install nipple (1), fuel shutoff cock (2), and fuel pump inlet hose adapter (3) in tee (4).
- Install clamp (5) on nipple (1). Secure clamp (5) to bracket (6) with screw (7) and nut (8).
- Place electronic equipment heater fuel pump (9) on center floor support beam near rear of carrier. Secure with four washers (10), two screws (11), and two nuts (12).
- 38. Apply a thin, even coat of primer and then sealing compound (item 68) to external pipe threads of adapter (13). Do not apply primer or sealing compound beyond small end of threads.
- 39. Install outlet elbow (14) and outlet adapter (13) on fuel pump (9).

- 40. Install fuel pump inlet adapter (15) on fuel pump (9).
- 41. Connect inlet hose (16) to inlet hose adapter (3) and inlet adapter (15).
- 42. Install clamp (17) on inlet hose (16).
- Place fuel pump capacitor (18), fuel hose clamp (17), wiring harness clamp (19), and two washers (20) on hull weldnut (21). Secure with new screw (22).
- 44. Lubricate rubber to rubber mating surfaces with silicone paste.
- 45. Connect circuit 402A lead (23) to capacitor lead (24).
- 46. Install clamp (25) on inlet hose (16).
- 47. Place fuel hose clamp (25) and wiring harness clamp (26) on hull weldnut (27). Secure with screw (28).



- 48. Apply a thin, even coat of primer and then sealing compound (item 68) to external pipe threads of engine bulkhead elbow (1) and transverse beam nipple (2). Do not apply primer or sealing compound beyond small end of threads.
- 49. Secure elbow (1) to power plant bulkhead with nut (3).
- 50. Install sleeve (4) and nut (5) on heater fuel inlet hose (6).
- 51. Connect fuel inlet hose (6) to elbow (1).
- 52. Disassemble bulkhead side of beam nipple (2). Install nipple inl transverse engine compartment beam with nut (7).
- 53. Install sleeves (8 and 9) and nuts (10 and 11) on fuel hose (12).

- 54. Connect fuel hose (12) to elbow (1) and beam nipple (2).
- 55. Install fuel hose (12) on personnel compartment heater fuel line (13). Secure with two strap assemblies (14).
- 56. Connect fuel line (15) to beam nipple (2) and fuel pump adapter (16).
- 57. Install fuel line (15) on personnel compartment heater fuel line (17) and engine coolant heater fuel line (18), if installed. Secure with nine strap assemblies (14).



- 58. Open fuel shutoff valves (1 and 2). Check for fuel leaks.
- 59. Remove two screws (3). Remove panel (4) from heater control box case (5).
- 60. Remove and discard two nuts furnished with control box case (5). Retain two washers (6) and screws (7).
- 61. Place control box case (5) on bracket (8). Secure with two new washers (6), retained screws (7), retained washers (6), and new nuts (9).

- 62. Place panel (4) in case (5). Secure with two screws (3).
- 63. Connect wiring harness (10) to connector on control box panel (4).
- 64. Install shell (11) and washer (12) on pin contact of heater control box lead (13).
- 65. Connect circuit 400A lead (14) to control box lead (13).



- 66. Apply a light coat of silicone paste to mating surfaces of rear main wiring harness circuit 402A lead (1).
- 67. Place circuit 402A lead (1) on rear main wiring harness clamps (2).
- Install circuit 402A lead (1) along rear main wiring harness (3) up to forward hull grommet. Secure with nine cradles (4) and cradle clips (5).
- Install six clamps (2) on circuit 402A lead (1). Secure clamps to power plant compartment bulkhead weldnuts (6) with six screws (7).

- 70. Connect capacitor (8) lead (9) to fuel pump (10).
- 71. Connect capacitor (8) lead (11) to circuit 402A lead (1).
- 72. Connect electrical equipment heater wiring harness (12) to connector (13) on heater assembly (14).


#### TM 9-2350-261-34

- Install grommet (1) on circuit 400A lead (2).
   Feed lead into battery box (3). Install grommet in battery box hole.
- 74. Remove nut (4) that holds circuit 6 lead (5) to battery positive terminal (6).
- 75. Place circuit 400A lead (2) on battery terminal bolt (7). Secure with nut (4).
- 76. Place circuit 6 lead (5) and circuit 400A lead (2) on two strap assemblies (8). Secure strap assemblies.
- 77. Remove two screws (9), circuit 59 lead (10), and two clamps (11) from hull to relocate.

- 78. Install two clamps (12) on circuit 400A lead (2).
- 79. Install two clamps (11), circuit 59 lead (10), two clamps (12), and circuit 400A lead (2) on two weldnuts (13). Secure with two screws (9).
- 80. Install clamp (14) on circuit 400A lead (2).
- Place circuit 59 lead clamp (15), wiring harness ground lead (16), and circuit 400A lead clamp (14) on weldnut (17). Secure with three washers (18) and screws (19).
- 82. Connect circuit 402A leads (20 and 21).



# FOLLOW-THROUGH STEPS

- 1. Connect battery ground negative lead (see your -20).
- 2. Open heater fuel shutoff valve (see your-10).
- 3. Start heater. Check that it is properly installed. Turn heater OFF (see your -10).
- 4. Install floor plates (see your -20).
- 5. Raise and lock ramp (see your -10).
- 6. stop engine (see your -10).

END OF TASK

# CHAPTER 14 MAINTENANCE OF ENGINE COOLANT HEATER KIT

# TASK INDEX

	Task	Page	Task Pa	age
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	Install Engine Coolant Heater Kit (M577A2 and M1068 Only)	14-17	Replace Burner Packing and Gasket 14·	-57
	Install Engine Coolant Heater		Replace Diode and Motor Resistor14	-58
	Kit (M106A2, M1064, and M125A2 only)	14-33	Replace Blower Motor	1-60
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	Replace Restriction Thermostat	14-51	Final Test-Coolant Heater	4-63

# INSTALL ENGINE COOLANT HEATER KIT (M113A2, M741A1, M901A1, AND M1059 ONLY)

# **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B)

#### Materials/Parts:

Dry cleaning solvent (Item 18, App C) Kit P/N 12349820 (19207) Lockwasher Lockwashers (4) Lockwashers (8) Methyl isobutyl ketone (Item 46, App C) Sealing compound (Item 70, App C) Sealing compound (Item 71, App C) Sealing compound primer (Item 74, App C) Tape, glass, insulation (Item 78, App C)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20

# INSTALL

#### ΝΟΤΕ

Fuel hoses used on the engine coolant heater installation are the flareless type. If it is necessary to replace hose, the connection fittings must also be replaced.

 Install mounting bracket (1) on right front sponson. Secure with four screws (2), washers (3), and lockwashers (4).



#### References (cont):

TM 9-6140-200-14

#### **Equipment Conditions**

Engine stopped/shutdown (see your -10) Carrier blocked (see your -10) Ramp lowered (see your -10) Battery ground lead disconnected (see your -20) Driver's power plant access panel removed (see your -20) Power plant rear access panel removed (see your -20) Trim vane lowered and power plant front access door opened (see your -10) Rear and right front floor plates removed (see your -20) Power plant grill raised (see your -20) Carrier cooling system drained (see your -20) Personnel heater kit installed (page 14-2) Personnel heater removed (see your -20)

Install coolant pump (5) and ground lead (6) for wiring harness (7) on mounting bracket (1). Secure with clamp (8), two screws (9), three washers (10), one lockwasher (11), and two nuts (12).



- Install two mounting saddles (1) on mounting bracket (2). Secure with four screws (3), washers (4), and nuts (5).
- 4. Install two clamps (6) on two mounting saddles (1).
- 5. Install coolant heater (7) on two mounting saddles (1). Secure with two clamps (6).





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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

 Clean external tapered pipe threads of tee (8), two shutoff cocks (9 and 10), three bushings (11, 12, and 13), and four elbows (14, 15, 16, and 17) with dry cleaning solvent.

- Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external tapered pipe threads of tee (8), two shutoff cocks (9 and 10), three bushings (11, 12, and 13), and four elbows (14, 15, 16, and 17). Do not apply primer or sealing compound beyond small end of tapered threads.
- 8. Install bushing (11), shutoff cock (9), and elbow (14) in coolant pump (18).
- 9. Install elbow (15) on control valve (19).
- 10. Install tee (8) in coolant heater (7).
- 11. Install bushing (12) in tee (8).
- 12. Install shutoff cock (10) in bushing (12).
- 13. Install bushing (13) in tee (8).
- 14. Install elbow (16) in bushing (13).
- 15. Install hose (20) and clamp (21) on elbow (14).
- 16. Install elbow (17) in coolant heater (7).



- 17. Install hose (1) and clamp (2) on elbow (3). Tighten clamp.
- 18. Install hose (4) and clamp (5) on elbow (6). Tighten clamp.
- 19. Install hose (7) and clamp (8) on shutoff cock (9). Tighten clamp.



- 20. Install exhaust pipe (10) on lower tube (11). Secure With clamp (12). Do not tighten clamp.
- Install lower tube (11) in coolant heater (13). Secure with clamp (14). Do not tighten clamp.
- 22. Tighten two clamps (12 and 14).



- 23. Remove two screws (15), two washers (16), plate (17), and gasket (18) from engine right side. Discard plate and gasket.
- 24. Install elbow (19) and draincock (20) in mount (21).
- 25. Apply a thin coat of sealing compound (Item 71) to both sides of gasket (22) before assembly.
- 26. Install mount (21) and gasket (22) on engine right side opening. Secure with two screws (15) and washers (16).
- 27. Install hose (23) on elbow (19). Secure with clamp (24).



- 28. Install insulation tube (1) on hose (2). Secure with tape.
- 29. Install hose (2) on two weldnuts (3). Secure with two screws (4) and clamps (5).



30. Make sure heater fuel valve (6) is closed.

- 31. Install coolant heater fuel pump (7) on bracket (8). Secure with two screws (9), four lockwashers (10), two washers (11), and two nuts (12).
- 32. Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external tapered pipe threads of adapter (13) and elbow (14). Do not apply primer or sealing compound beyond small end of tapered threads.
- 33. Install adapter (13) on coolant heater fuel pump (7).
- 34. Install fuel hose (15) on adapter (13).
- 35. Install elbow (14) on coolant heater fuel pump (7).
- 36. Install fuel hose (16) on elbow (14).



- 37. Disconnect fuel hose (1) from existing elbow(2) on personnel heater fuel pump (3).
- 38. Remove and discard elbow (2) from personnel heater fuel pump (3).
- 39. Install tee (4) on personnel heater fuel pump (3).
- 40. Secure fuel hose (1) on tee (4). Secure with sleeve (5) and nut (6).
- 41. Install fuel hose (7) on tee (4). Secure with sleeve (8) and nut (9).

- 42. Install coolant heater fuel pump lead (10) on weldnut (11). Secure with screw (12), flat washer (13), and two lockwashers (14).
- 43. Connect circuit 402A lead (15) to coolant heater fuel pump lead (10).





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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 44. Clean external pipe threads of two elbows (1 and 2) with dry cleaning solvent.
- 45. Apply a thin. even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of mounting ends on two elbows (1 and 2). Do not apply primer or sealing compound beyond small end of threads.

- 46. Install elbow (1) in control valve (3).
- 47. Install elbow (2) in transverse beam (4) and secure with nut (5).
- 48. Install fuel hose (6) in elbow (1) and adapter body (7). Secure with two sleeves (8) and nuts (9).
- 49. Secure fuel hose (6) to weldnut (10) with screw (11) and clamp (12).
- 50. Install fuel hose (13) in elbow (2) and adapter body (7). Secure with two sleeves (14) and nuts (15).
- 51. Install fuel hose (13) on three weldnuts (16). Secure with three screws (17) and clamps (18).
- 52. Place coolant heater fuel hose (19) next to personnel heater fuel hose (20).

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- 53. Install coolant heater fuel hose (1) on elbow (2). Secure with sleeve (3) and nut (4).
- 54. On M113A2 only, install coolant heater fuel hose (1) on five weldnuts (5). Secure with five clamps (6) and screws (7).
- 55. On M741A1 only, install coolant heater fuel hose (1) on two weldnuts (5). Secure with two clamps (6) and screws (7).
- On M113A2 only, remove three screws (8) and clamps (9) that secure hydraulic line (10) to three weldnuts (11). Discard clamps,
- 57. On M113A2 only, install coolant neater fuel hose (1) and hydraulic line (10) on three weldnuts (11). Secure with three clamps (12) and screws (8).

- 58. Remove four screws (13), clamps (14), and personnel heater fuel hose (15) from four weldnuts (16).
- Install personnel heater fuel hose (15) and coolant heater fuel hose (1) on four weldnuts (16). Secure with four clamps (14), one clamp (17), and four screws (13).
- 60. Secure coolant heater fuel hose (1) to adapter body (18) with sleeve (19) and nut (20).
- 61. On M741A1 only, install coolant heater fuel hose (1) on hydraulic tube (21) and weldnut (22). Secure with two straps (23), one screw (24), and two clamps (25).





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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 62. Remove batteries and retainers from battery box (see your -20). Clean battery box and battery box cover (see TM 9-6140-200-14).
- 63. Clean battery box with dry cleaning solvent.
- 64. Renew adhesive backing on insulation sheets with dry cleaning solvent. Wait 10 to 20 seconds until adhesive becomes tacky.
- 65. Install insulation sheets (1, 2, 3, 4, and 5) and strip (6) in battery box (7).

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- 66. Install insulation sheet (8) on battery box cover (9).
- 67. Install two clamps (10) on heat exchanger (11).
- 68. Install two grommets (12) and heat exchanger (11) in battery box (7).
- 69. Remove two blank grommets from power plant compartment. Discard grommets.
- 70. Install two grommets (13) in power plant compartment bulkhead.
- 71. Connect coolant pump hose (14) and engine hose (15) to heat exchanger (11). Hoses must go through grommets (13).
- 72. Pull two hoses (14 and 15) through two grommets (13) in personnel compartment until hoses reach battery box (7).
- Install two insulation tubes (16) on two hoses (14 and 15) at rear of power plant compartment.



- 74. On M113A2 only, install two hoses (1 and 2) through four brackets (3) on right sponson.
- 75. Install two insulation tubes (4) on two hoses (1 and 2) on forward side of power plant compartment rear bulkhead.
- Install two insulation tubes (4) and two hoses (1 and 2) on power plant compartment. Secure with three clamps (5) and screws (6).
- 77. Secure ends of all insulation tubes (4) to two hoses (1 and 2) with tape.
- 78. Secure two hoses (1 and 2) to heat exchanger (7) with two clamps (8).

- 79. On M741A1 only, install two short hoses (9) on heat exchanger (7). Secure with two clamps (8).
- On M741A1 only, install two elbows (10) on two short hoses (9). Secure with two clamps (11).
- 81. On M741A1 only, secure hoses (1 and 2) to two elbows (10) with two clamps (12).
- 82. Install batteries in battery box (see your -20). Install battery box cover (13) on battery box (14).



- 83. Install hose (1) on shutoff cock (2). Secure with clamp (3).
- 84. Install hose (4) on sponson. Secure with screw (5) and clamp (6).
- 85. Install hose (4) on weldnut (7). Secure with screw (8) and clamp (9).
- 86. Remove two screws (10), nuts (11), and clamps (12) that secure power plant wiring harness to two brackets (13). Discard clamps.
- 87. Install hose (4) and power plant wiring harness on two brackets (13). Secure with two screws (10), nuts (11), and clamps (12).
- 88. Remove screw (14) from oil cooler housing.
- 89. Install hose (4) on oil cooler housing. Secure with screw (14) and clamp (15).



90. Remove plug (1) from oil cooler elbow (2). Discard plug.



WARNING

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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 91. Clean external pipe threads of elbow (3) and adapter (4) with dry cleaning solvent.
- 92. Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of elbow (3) and adapter (4). Do not apply primer or sealing compound beyond small end of threads.
- 93. Install elbow (3) in elbow (2).
- 94. Install adapter (4) in elbow (3).
- 95. Install insulation tube (5) on hose (6) and secure with tape.
- 96. Install hose (6) on adapter (4). Secure with clamp (7).

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**ENGINE BLOCK (LEFT SIDE)** 

- 97. Secure ground lead (8) to coolant pump terminal (9) with nut (10).
- 98. Secure circuit 402B lead (11) to coolant pump terminal (12) with nut (13).
- 99. Secure circuit 402B lead (11) to terminal no. 4 (14) of terminal strip (15) with screw (16).



- 100. Remove four screws (1), four washers (2), and plate (3) from driver's compartment bulkhead. Discard plate.
- 101. Thread terminal ground lead (4) and coolant heater connector (5) of wiring harness (6) through driver's compartment bulkhead opening.





102. Connect coolant heater connector (5) of wiring harness (6) to coolant heater receptacle (7).



103. Install wiring harness (6) and terminal ground lead (8) to mounting bracket (9). Secure with two screws (10), nuts (11), clamps (12), and lockwashers (13).



104. Install wiring harness plate (1) to driver's compartment bulkhead. Secure with four screws (2) and washers (3).



- 105. Remove two screws (4) and control panel (5) from control box case (6).
- 106. Remove and discard two screws, nuts, and washers supplied with control box case (6).
- 107. Install control box case (6) on hull bracket(7). Secure with two screws (8).
- 108. Install control panel (5) to control box case(6). Secure with two screws (4).
- 109. Connect circuit 400A lead (9) to control box lead (10).



- 110. Connect control box connector (11) of wiring harness (12) to control box receptacle (13).
- 111. Connect main wiring harness 402A lead (14) to coolant heater wiring harness lead (15). Secure wiring harness (12) to front main wiring harness (16) with eight straps (17).



112. Install wiring harness (12) on mounting bracket. Secure with screw (18) and clamp (19).



- 113. Install wiring harness (1) on two weldnuts (2). Secure with two clamps (3) and screws (4).
- 114. Remove three screws (5) and clamps (6) that secure fuel control cable (7) to three weldnuts (8).
- 115. Install wiring harness (1) and fuel control cable (7) on three weldnuts (8). Secure with three screws (5), clamps (6), and clamps (9).

- 116. Lower power plant grill assembly (see your -20).
- 117. Remove four screws (10), washers (11), and plate from grill. Discard plate.
- 118. Install upper tube (12) on exhaust pipe (13). Secure with clamp (14). Do not tighten.
- 119. Position upper tube 12) and gasket (15) on grill.
- 120. Secure upper tube (12) to grill with four screws (10) and washers (11).
- 121. Tighten clamp (14).





- 122. Cut auxiliary tank hose (1) and secure to tee (2) with two clamps (3).
- 123. Secure hose (4) to tee (2) with clamp (5).
- 124. Replace standard generator belts with kit belts (see your -20).
- 125. Replace standard fan drive belts with kit belts (see your -20).
- 126. Open fuel tank shutoff valve (6).



# FOLLOW-THROUGH STEPS

- 1. Install personnel heater (see your -20).
- 2. Fill carrier cooling system (see your -20).
- 3. Connect battery ground lead (see your -20).
- 4. Bleed coolant heater fuel line (see your -20).
- 5. Start coolant heater (see your -10). Check that heater operates properly and does not leak. Turn coolant heater off.
- 6. Install rear and right front floor plates (see your -20).

- Install driver's power plant access panel (see your -20).
- Install power plant rear access panel (see your -20).
- 9. Close power plant front access panel (see your -20).
- 10. Raise trim vane (see your -10).
- 11. Raise and lock ramp (see your -10).
- 12. Stop/shutdown engine (see your -10).

END OF TASK

# INSTALL ENGINE COOLANT HEATER KIT (M577A2 AND M1068 ONLY)

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B)

#### Materials/Parts:

Dry cleaning solvent (Item 18, App C) Kit P/N 12269197 (19207) Lockwasher (2) Lockwasher (5) Lockwasher (8) Methyl isobutyl ketone (Item 46, App C) Sealing compound (Item 70, App C) Sealing compound (Item 71, App C) Sealing compound primer (Item 74, App C) Tape, glass, insulation (Item 78, App C)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20

# INSTALL

1. Install mounting bracket (1) on right front sponson. Secure with four screws (2), flat washers (3), and lockwashers (4).

#### References (cont):

TM 9-6140-200-14

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10) Ramp lowered (see your -10) Battery ground lead disconnected (see your -20) Power plant rear access panel removed (see your -20) Generator set removed (see your -10) Trim vane lowered and power plant front access door open (see your -10) Carrier cooling system drained (see your -20) Rear and right front floor plates removed (see your -20) Personnel heater removed (see your -20) Driver's power plant access panel removed (see your -20) Power plant grill raised (see your -20)

Install coolant pump (5) and ground lead (6) from wiring harness (7) on mounting bracket (1). Secure with clamp (8), two screws (9), three flat washers (10), one lockwasher (11), and two nuts (12).





Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

3. Clean external pipe threads of bushing (1), shutoff cock (2), elbow (3), and elbow (4) with dry cleaning solvent.

- Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of bushing (1), shutoff cock (2), elbow (3), and elbow (4). Do not apply primer or sealing compound beyond small end of threads.
- 5. Install bushing (1), shutoff cock (2), and elbow (3) in coolant pump (5).
- Install two mounting saddles (6) on mounting bracket (7). Secure with four screws (8), washers (9), and nuts (10).
- 7. Install two clamps (11) in two mounting saddles (6).
- 8. Install coolant heater (12) in two mounting saddles (6). Secure with two clamps (11).
- 9. Install elbow (4) in control valve (13).







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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

Clean external pipe threads of tee (1), bushing (2). shutoff cock (3), bushing (4), elbow (5), and elbow (6) with dry cleaning solvent.



- Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned outside pipe threads of tee (1), bushing (2), shutoff cock (3), bushing (4), elbow (5), and elbow (6). Do not apply primer or sealing compound beyond small end of threads.
- 12. Install tee (1) in coolant heater (7).
- 13. Install bushing (2) in tee (1).
- 14. Install shutoff cock (3) in bushing (2).
- 15. Install bushing (4) in tee (1).
- 16. Install elbow (5) in bushing (4).
- 17. Install elbow (6) in coolant heater (7).
- 18. Install hose (8) on elbow (9) and elbow (6). Secure with two clamps (10).



- 19. Remove four screws (1), washers (2), and plate (3) from power plant compartment wall. Discard plate.
- 20. Install exhaust pipe (4) on lower elbow (5) and upper elbow (6). Secure with two clamps (7). Do not tighten clamps.
- Install lower elbow (5) on coolant heater (8). Secure with clamp (7). Do not tighten clamp.
- 22. Install upper elbow (6) and gasket (9) on power plant compartment wall opening. Secure with four screws (1) and washers (2).
- 23. Tighten three clamps (7).
- 24. Raise and secure map table (10).
- 25. Remove three wing nuts (11) and battery box cover (12) from battery box (13).
- 26. Remove batteries from battery box (13) (see your -20). Clean battery box and battery box cover (12) (see TM 9-6140-200-14).



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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

27. Clean battery box (13) and battery box cover (12) with dry cleaning solvent.

# WARNING

Vapors from methyl isobutyl ketone are harmful. Use only with good ventilation. Avoid prolonged breathing of vapors and contact with skin.

 Renew adhesive backing on all insulation isobutyl ketone. Wait 10 adhesive becomes tacky.



- 29. Install bottom insulation sheet (1), left insulation sheet (2), right insulation sheet (3), rear insulation sheet (4), and front insulation sheet (5) in battery box (6).
- 30. Install insulation sheet (7) on battery box cover (8).
- 31. Install two grommets (9) in battery box (6).
- 32. Place two clamps (10) on heat exchanger (11).
- 33. Install heat exchanger (11) in battery box (6).
- 34. Install two short hoses (12) on heat exchanger (11). Secure with two clamps (10).

- 35. Install two elbows (13) in two short hoses (12). Secure with two clamps (14).
- 36. Remove and discard two blank grommets from power plant bulkhead.
- 37. Install two grommets (15) in power plant compartment bulkhead.
- 38. Thread hose (16) and hose (17) through two grommets (15) in power plant compartment.
- Pull two hoses (16 and 17) through two grommets (15) into personnel compartment to battery box (6).
- 40. Install two insulation tubes (18) on two hoses (16 and 17) at rear of power plant compartment. Secure with tape.



- Install two insulation tubes (1) on two hoses (2 and 3) on forward side of power plant compartment rear bulkhead.
- 42. Install two insulation tubes (1) and two hoses (2 and 3) in power plant compartment. Secure with three clamps (4) and screws (5).
- 43. Install ends of insulation tubes (1) on two hoses (2 and 3). Secure with tape.
- 44. Install hoses (2 and 3) on two elbows (6). Secure with two clamps (7).
- Install batteries (see your -20) and battery box cover (8) in battery box (9). Secure cover to battery box with three wing nuts (10).





- 46. Cut auxiliary tank hose (11). Secure to tee (12) with two clamps (13).
- 47. Secure hose (14) to tee (12) with clamp (15).



48. Install hose (14) on elbow (16). Secure with clamp (17).





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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 49. Clean external pipe threads of elbow (1) and draincock (2) with dry cleaning solvent.
- Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of elbow (1) and draincock (2). Do not apply primer or sealing compound beyond small end of threads.

#### **ENGINE BLOCK (RIGHT SIDE)**

- Remove two screws (3), washers (4), plate (5), and gasket (6) from engine right side. Discard plate and gasket. Retain screws and washers.
- 52. Install elbow (1) and draincock (2) in mount (7).
- Apply a thin coat of sealing compound (Item 71) to both sides of gasket (8) before assembly.
- 54. Install mount (7) and gasket (8) over engine right side opening. Secure with two screws (3) and washers (4).
- 55. Install hose (9) on elbow (1). Secure with clamp (10).
- 56. Install insulation tube (11) on hose (9). Secure with tape.
- 57. Install hose (9) on shutoff cock (12). Secure with clamp (13).
- 58. Install hose (9) on two weldnuts (14). Secure with two screws (15) and clamps (16).









59. Remove plug (1) from oil cooler elbow (2). Discard plug.



WARNING

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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 60. Clean external pipe threads of elbow (3) and adapter (4) with dry cleaning solvent.
- Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of elbow (3) and adapter (4). Do not apply primer or sealing compound beyond small end of threads.
- 62. Install elbow (3) in elbow (2).
- 63. Install adapter (4) in elbow (3).
- 64. Install insulation tube (5) on hose (6). Secure with tape.
- 65. Install hose (6) on adapter (4). Secure with clamp (7).

(6

ENGINE BLOCK (LEFT SIDE)

- 66. Install hose (8) on shutoff cock (9). Secure with clamp (10).
- 67. Install hose (6) on sponson. Secure with screw (11) and clamp (12).
- 68. Install hose (6) on weldnut (13). Secure with screw (14) and clamp (15).



14-24

2

- 69. Remove two screws (1), nuts (2), and clamps (3), that secure power plant wiring harness to two brackets (4). Discard clamps.
- 70. Install hose (5) and power plant wiring harness in two brackets (4). Secure with two screws (1), nuts (2), and two clamps (3).
- 71. Remove screw (6) from oil cooler housing.

- 73. Make sure heater fuel valve (8) is closed.
- 74. Install coolant heater fuel pump (9) on bracket (10). Secure with two screws (11), four lockwashers (12), and two flat washers (13).





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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 75. Clean external pipe threads of all fittings with dry cleaning solvent.
- 76. Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of all fittings. Do not apply primer or sealing compound beyond small end of threads.
- 77. Install adapter body (1) on coolant heater fuel pump (2).

- 78. Install fuel hose 13) in adapter body (1). Secure with sleeve (4) and nut (5).
- 79. Install elbow (6) on coolant heater fuel pump (2).
- 80. Install fuel hose (7) in elbow (6). Secure with sleeve (8) and nut (9).

#### ΝΟΤΕ

Parts (10) through (17) are already installed if the electronic equipment heater has been installed.

- 81. Disconnect fuel hose (10) from adapter body (11) on personnel heater fuel pump (12).
- 82. Remove and retain adapter body (11) from personnel heater fuel pump (12).
- 83. Install adapter body (13) on personnel heater fuel pump (12).
- 84. Secure elbow (14) to adapter (13).
- 85. Install fuel hose (15) in elbow (14). Secure with sleeve (16) and nut (17).



#### ΝΟΤΕ

Parts (1) through (15) and (29, 30, and 31) are already installed if the electronic equipment heater has been installed.

- 86. Install nipple (1) in tee (2).
- 87. Install shutoff cock (3) on nipple (1).
- 88. Install adapter (4) in shutoff cock (3).
- 89. Install fuel hose (5) in adapter body (4). Secure with sleeve (6) and nut (7).
- 90. Install nipple (8) in tee (2).
- 91. Install tee (9) on nipple (8).
- 92. Install plug (10) in tee (9).
- 93. Install bracket (11) on fuel hose guard (12). Secure with two screws (13) and nuts (14).
- 94. Install adapter (15) in tee (2).
- 95. Install coolant heater fuel shutoff cock (16) on adapter (15).

- 96. Install adapter body (17) on coolant heater fuel shutoff cock (16).
- 97. Install fuel hose (18) in adapter body (17). Secure with sleeve (19) and nut (20).
- 98. Install adapter body (21) in tee (9).
- 99. Connect fuel hose (22) to adapter body (21).
- 100. Remove screw (23), lockwasher (24), and personnel heater fuel pump lead (25) from weldnut (26).
- 101. Install coolant heater fuel pump lead (27) and personnel heater fuel pump lead (25) on weldnut (26). Secure with screw (23) and three lockwashers (24).
- 102. Connect circuit 400C lead (28) to coolant heater fuel pump lead (27).
- 103. Install adapter (15) on bracket (11). Secure with screw (29), clamp (30), and nut (31).



# R

WARNING

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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 104. Clean external pipe threads of elbow (1) with dry cleaning solvent.
- 105. Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of elbow (1). Do not apply primer or sealing compound beyond small end of threads.

- 106. Install elbow (1) in transverse beam (2). Secure with nut (3).
- 107. Install fuel hose (4) in control valve elbow(5) and adapter body (6). Secure with two sleeves (7) and nuts (8).
- 108. Install fuel hose (4) on weldnut (9). Secure with screw (10) and clamp (11).
- 109. Install fuel tube (12) in elbow (1) and adapter (6). Secure with two sleeves (13) and nuts (14).
- 110. Install fuel tube (12) on three weldnuts (15). Secure with three screws (16) and clamps (17).
- 111. Install fuel hose (18) in elbow (1). Secure with sleeve (19) and nut (20).



- 112. Place fuel hose (1) next to personnel heater fuel hose (2).
- 113. Install fuel hose (1) on personnel heater fuel hose (2). Secure with 10 straps (3).



- 114. Install ground lead (4) on coolant pump terminal (5). Secure with nut (6).
- 115. Install circuit 402B lead (7) on coolant pump terminal (8). Secure with nut (9).
- 116. Secure circuit 402B lead (7) to terminal 4 (10) on terminal strip (11) with screw (12).

- 117. Remove four screws (13), washers (14), and plate (15) from driver's compartment bulkhead. Discard plate.
- 118. Thread terminal ground lead (16), coolant heater connector (17), and wiring harness (18) through new wiring harness plate (19) and driver's compartment bulkhead opening.
- 119. Install wiring harness plate (19) on driver's compartment bulkhead. Secure with four screws (13) and washers (14).
- 120. Connect coolant heater connector (17) of wiring harness (18) to coolant heater receptacle (20).
- 121. Install wiring harness (18) and terminal ground lead (16) on mounting bracket (21). Secure with two screws (22), nuts (23), clamps (24), and lockwashers (25).
- 122. Connect control box connector (26) of wiring harness (18) to control box receptacle (27).
- 123. Connect main wiring harness circuit 400C lead (28) to coolant heater wiring harness lead (29).
- 124. Install wiring harness (18) on front main wiring harness (30). Secure with eight straps (31).



125. Install blowtorch (1) on two brackets (2). Secure with strap (3).



- 126. Remove two screws (4) and control panel (5) from control box case (6).
- 127. Remove and discard two screws, nuts, and washers supplied with control box case (6).
- 128. Install control box case (6) on hull bracket(7). Secure with two screws (8).
- 129. Install control panel (5) in control box case(6). Secure with two screws (4).
- 130. Connect circuit 400C lead (9) to control box lead (10).

(1)

10

- 131. Lower power plant grill assembly (see your -20).
- 132. Remove four screws (11), washers (12), and plate (13) from grill. Discard plate.
- 133. Install upper tube (14) on exhaust pipe (15). Secure with clamp (16). Do not tighten.
- 134. Position upper tube (14) and gasket (17) on grill.
- 135. Secure with four screws (11) and washers (12).
- 136. Tighten clamp (16).



(6)

8

9

- 137. Install wiring harness (1) on mounting bracket (2) left side. Secure with screw (3) and clamp (4).
- 138. Install wiring harness (1) on two weldnuts (5). Secure with two clamps (6) and screws (7).
- 139. Remove three screws (8) that secure fuel control cable (9) and three clamps (10) to three weldnuts (11).
- 140. Install wiring harness (1) and fuel control cable (9) to three weldnuts (11). Secure with three screws (8), clamps (10), and clamps (12).
- 141. Replace standard generator belts with kit belts (see your -20).
- 142. Replace standard fan drive belts with kit belts (see your -20).



143. Open coolant heater fuel valve (13).



# **FOLLOW-THROUGH STEPS**

- 1. Install personnel heater see your -20).
- 2. Lower power plant grill see your -20).
- 3. Fill carrier cooling system (see your -20).
- 4. Fill coolant heater cooling system (see your -20).
- 5. Connect battery ground lead (see your -20).
- 6. Bleed coolant heater fuel line (see your -20).
- <sup>7.</sup> Start coolant heater (see your -10). Check for leaks and that heater operates properly. Turn heater off.

- Install rear and right front floor plates (see your -20).
- Install driver's power plant access panel (see your -20).
- 10. Install power plant rear access panel (see your -20).
- 11. Close power plant front access door and raise trim vane (see your -10).
- 12. Raise and lock ramp (see your -10).
- 13. Stop engine (see your -10).
- 14. Install generator set (see your -10).



# INSTALL ENGINE COOLANT HEATER KIT (M106A2, M1064, AND M125A2 ONLY)

# INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 35, App B)

#### Materials/Parts:

Dry cleaning solvent (Item 18, App C) Kit P/N 12269225 (19207) Lockwasher Lockwashers (4) Lockwashers (5) Methyl isobutyl ketone (Item 46, App C) Sealing compound (Item 70, App C) Sealing compound (Item 71, App C) Sealing compound primer (Item 74, App C) Tape, glass, insulation (Item 78, App C)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20

# INSTALL

1. Install mounting bracket (1) on right front sponson. Secure with four screws (2), flat washers (3), and lockwashers (4).

#### References (cont):

TM 9-6140-200-14

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10) Ramp lowered (see your -10) Battery ground lead disconnected (see your -20) Driver's power plant access panel removed (see your -20) Power plant rear access panel removed (see your -20) Trim vane lowered and power plant front access door open (see your -10) Front floor plates removed (see your -20) Power plant grill raised (see your -20) Carrier cooling system drained (see your -20) Personnel heater kit installed (page 14-2) Personnel heater removed (see your -20)

2. Install coolant pump (5) and ground lead (6) for wiring harness (7) to mounting bracket (1). Secure with clamp (8), two screws (9), three flat washers (10), one lockwasher (11), and two nuts (12).





Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin,

eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using slovent; the flash point for type I dry cleaning solvent is 100°F (38°C) and for type II is 138°F (50 ° C). Failure to do so may result in injury or death to personnel.

3. Clean external pipe threads of bushing (1), shutoff cock (2), elbow (3), and elbow (4) with dry cleaning solvent.

- Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of bushing (1), shutoff cock (2), elbow (3), and elbow (4). Do not apply primer or sealing compound beyond small end of threads.
- 5. Install bushing (1), shutoff cock (2), and elbow (3) in coolant pump (5).
- Install two mounting saddles (6) on mounting bracket (7). Secure with four screws (8), washers (9), and nuts (10).
- 7. Install two clamps (11) in two mounting saddles (6).
- 8. Install coolant heater (12) to two mounting saddles (6). Secure with two clamps (11).
- 9. Install elbow (4) in control valve (13).


#### WARNING



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

Clean external pipe threads of tee (1), bushing (2), shutoff cock (3), bushing (4), elbow (5), and elbow (6) with dry cleaning solvent.

- Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of tee (1), bushing (2), shutoff cock (3), bushing (4), and two elbows (5 and 6). Do not apply primer or sealing compound beyond small end of threads.
- 12. Install tee (1) in coolant heater (7).
- 13. Install bushing (2) in tee (1).
- 14. Install shutoff cock (3) in bushing (2).
- 15. Install bushing (4) in tee (1).
- 16. Install elbow (5) in bushing (4).
- 17. Install elbow (6) in coolant heater (7).
- 18. Install hose (8) on elbow (9) and elbow (6) with two clamps (10).
- Install exhaust pipe (11) on lower tube (12). Secure with clamp (13). Do not tighten clamp.
- Install lower tube (12) in coolant heater (7). Secure with clamp (14). Do not tighten clamp.



#### WARNING



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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

#### ΝΟΤΕ

Lower the left crew seat backrest before you open the battery drawer.

22. Open battery drawer (1) and remove batteries (see your -20). Clean battery drawer (see TM 9-6140-200-14). Clean batteries with dry cleaning solvent.



WARNING

Vapors from methyl isobutyl ketone are harmful. Use only with good ventilation. Avoid prolonged breathing of vapors and contact with skin.

- 23. Renew adhesive backing on insulation sheets(2) with methyl isobutyl ketone. Wait 10 to20 seconds until adhesive becomes tacky.
- 24. Install two insulation sheets (2) and two strips (3) on battery drawer (1) front. Install bottom insulation sheet (4) in battery drawer (1).
- 25. Install left insulation sheet (5), right insulation sheet (6), and top insulation sheet (7) in battery drawer shield (8). Install rear insulation sheet (9) in rear of battery drawer compartment.
- 26. Place heat exchanger (10) in battery drawer (1).



- 27. Install two short hoses (1) in heat exchanger (2). Secure with two clamps 13).
- 28. Install two elbows (4) on two short hoses (1). Secure with two clamps (5).
- 29. Install two hoses (1) in battery drawer (6). Secure with two brackets (7), four screws (8), washers (9), and nuts (10).
- 30. Install two hoses (11) to two elbows (4). Secure with two clamps (12).
- drawer (6).

- 32. Cut auxiliary tank hose (13). Install tee (14) and secure with two clamps (15).
- 33. Install hose (16) on tee (14). Secure with clamp (17).



#### WARNING



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goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 34. Clean external pipe threads of tee (1), bushing (2), elbow (3), bushing (4), shutoff cock (5), elbow (6), and draincock (7) with dry cleaning solvent.
- 35. Apply a thin, even coat of primer and then sealing compound (item 68) to cleaned external pipe threads of tee (1), bushing (2), elbow (3), bushing (4), shutoff cock (5), elbow (6), and draincock (7). Do not apply primer or sealing compound beyond small end of threads.
- 36. Install tee (1) in coolant heater (8).
- 37. Install bushing (2) in tee (1).
- 38. Install elbow (3) in bushing (2).
- 39. Install bushing (4) in tee (1).

COOLANT HEATER

- 40. Install shutoff cock (5) in bushing (4).
- 41. Install hose (9) on elbow (3). Secure with clamp (10).

- 42. Remove two screws (11), washers (12), plate (13), and gasket (14) from engine block right side. Discard plate and gasket.
- 43. Install elbow (6) and draincock (7) in mount (15).
- 44. Apply a thin coat of sealing compound (Item 71, App C) to both sides of gasket (16) before assembly.
- 45. Install mount (15) and gasket (16) on engine block opening. Secure with two screws (11) and washers (12).
- 46, Install hose (17) on elbow (6). Secure with clamp (18).

# 16 15 12 17 13

### **ENGINE BLOCK (RIGHT SIDE)**

- 47. Install insulation tube (1) on hose (2) and secure with tape.
- 48. Install hose (2) on shutoff cock (3). Secure with clamp (4).
- 49. Install hose (2) on two weldnuts (5). Secure with two screws (6) and clamps (7),
- 50. Install two elbows (8) to power plant compartment bulkhead. Secure with two nuts (9).
- 51. Install two hoses (10) on two elbows (8). Secure with two clamps (11).

- 52. Remove two screws (12) that secure personnel heater duct to floor plate.
- 53. Install two hoses (10), clamps (13) and heater duct on floor plate. Secure with two screws (12).
- 54. Install insulation tubing (14) on hose (15). Secure with insulation tape.
- 55. Install two hoses (15 and 16) on two elbows (8). Secure with two clamps (17).
- 56. Install hose (16) on side of sponson. Secure with three clamps (18) and screws (19).



POWER PLANT BULKHEAD

- 57. Install hose (1) on shutoff cock (2). Secure with clamp (3).
- 58. Install hose (1) on top of sponson. Secure with five screws (4) and clamps (5).

# 3

COOLANT PUMP



#### WARNING



solvent cleaning Dry and P-D-680 is toxic flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 59. Clean external pipe threads of elbow (6) and adapter (7) with dry cleaning solvent.
- 60. Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of elbow (6) and adapter (7). Do not apply primer or sealing compound beyond small end of threads.
- 61. Remove existing plug (8) from oil cooler elbow (9). Discard plug.
- 62. Install elbow (6) in elbow (9).
- 63. Install adapter (7) in elbow (6).
- 64. Install hose (10) on adapter (7). Secure with clamp (11).



### **ENGINE BLOCK (LEFT SIDE)**

- 65. Remove two screws (1), nuts (2), and clamps (3) that secure power plant wiring harness to two brackets (4). Discard clamps.
- 66. Install hose (5) and power plant wiring harness on two brackets (4). Secure with two screws (1), nuts (2), and new clamps (3).
- 67. Remove screw (6) from oil cooler housing.
- 68. Install hose (5) on oil cooler housing. Secure with screw (6) and clamp (7).

FRONT OF ENGINE



ENGINE OIL COOLER

69. Make sure heater fuel valve (8) is closed.



- 70. Install coolant heater fuel pump lead (1) on hull mount. Secure with two lockwashers (2), screw (3), and nut (4).
- 71. Install coolant heater fuel pump (5) on hull bracket. Secure with four lockwashers (6) and two screws (7).

# WARNING



(P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only well-ventilated area; avoid contact with skin,

solvent

eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 138°F (50°C). Failure to do so may result in injury or death to personnel.

- 72. Clean external pipe threads of fuel pump (5) with dry cleaning solvent.
- 73. Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of fuel pump (5). Do not apply primer or sealing compound beyond small end of threads.
- 74. Remove cap (8) from tee (9). Discard cap.
- 75. Install fuel hose (10) on tee (9). Secure with sleeve (11) and nut (12).
- 76. Install adapter body (13) on coolant heater fuel pump (5).
- 77. Secure fuel hose (10) to adapter body (13) with sleeve (14) and nut (15).
- 78. Install elbow body (16) on coolant heater fuel pump (5).
- 79. Install fuel hose (17) on elbow body (16). Secure with sleeve (18) and nut (19).
- 80. Connect circuit 402A lead (20) to coolant heater fuel pump lead (1).



#### WARNING



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat, or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes, and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 81. Clean external pipe threads of two elbows (1 and 2) with dry cleaning solvent.
- 82. Apply a thin, even coat of primer and then sealing compound (Item 70) to cleaned external pipe threads of elbows (1 and 2). Do not apply primer or sealing compound beyond small end of threads.

- 83. Install elbow (1) in control valve (3).
- 84. Install elbow (2) in transverse beam (4). Secure with nut (5).
- 85. Install fuel hose (6) on control valve elbow (1) and adapter body (7). Secure with two sleeves (8) and nuts (9).
- 86. Install fuel hose (6) on weldnut (10). Secure with screw (11) and clamp (12).
- 87. Install fuel tube (13) on elbow (2) and adapter (7). Secure with two sleeves (14) and nuts (15).
- 88. Install fuel hose (16) on elbow (2). Secure with sleeve (17) and nut (18).
- 89. Position fuel hose (16) next to personnel heater fuel hose (19).
- 90. Install fuel hose (16) to personnel heater fuel hose (19) with 10 straps (20).



- 91. Install ground lead (1) on coolant pump terminal (2). Secure with nut (3).
- 92. Install circuit 402B lead (4) on coolant pump terminal (5). Secure with nut (6).
- 93. Install circuit 402B (4) on terminal 4 (7) on terminal strip (8) with screw (9).
- 94. Remove four screws (10), washers (11), and plate (12) from driver's compartment bulkhead. Discard plate.
- 95. Thread terminal ground lead (13) and coolant heater connector (14) through driver's compartment bulkhead opening.
- 96. Connect coolant heater connector (14) of wiring harness (15) to coolant heater receptacle (16).

- 97. Connect control box connector (17) of wiring harness (15) to control box receptacle (18).
- 98. Connect main wiring harness 402A lead (19) to coolant heater wiring harness lead (20).
- 99. Install wiring harness (15) on front main wiring harness (21). Secure with eight straps (22).
- 100. Install wiring harness plate (23) on driver's compartment bulkhead. Secure with four screws (10) and washers (11).
- 101. Install wiring harness (15) and terminal ground lead (13) on mounting bracket (24). Secure with two screws (25), nuts (26), clamps (27), and lockwashers (28).



- 102. Remove two screws (1) and control panel(2) from control box case (3).
- 103. Remove and discard two screws, nuts, and washers supplied with control box case (3).
- 104. Install control box case (3) on hull bracket(4). Secure with two new screws (5).
- 105. Install control panel (2) in control box case(3). Secure with two screws (1).
- 106. Connect circuit 402A lead (6) to control box lead (7).
- 107. Lower power plant grill assembly (see your -20).

- 108. Remove four screws (8), washers (9), and plate (10) from grill. Discard plate.
- 109. Install upper tube (11) on exhaust pipe (12). Secure with clamp (13). Do not tighten.
- 110. Position upper tube (11) and gasket (14) on grill.
- 111. Secure with four screws (8) and washers (9).
- 112. Tighten clamp (13).





- 113. Secure wiring harness (1) to mounting bracket (2) with screw (3) and clamp (4).
- 114. Secure wiring harness (1) to two weldnuts(5) with two clamps (6) and screws (7).
- 115. Remove three screws (8) and three clamps(9) that secure fuel control cable (10) to three weldnuts (11).
- 116. Install wiring harness (1) and fuel control cable (10) on three weldnuts (11). Secure with three screws (8), three clamps (9), and three clamps (12).
- 117. Replace standard generator belts with kit belts (see your -20).
- 118. Replace standard fan drive belts with kit belts (see your -20).
- 119. Adjust belts (see your -20).



# FOLLOW-THROUGH STEPS

- 1. Install personnel heater (see your -20).
- 2. Lower power plant grill (see your -20).
- 3. Fill carrier cooling system (see your -20).
- 4. Connect battery ground lead (see your -20).
- 5. Bleed coolant heater fuel line (see your -20).
- 6. Start coolant heater (see your -10). Check for leaks and proper operation. Turn coolant heater off.

- 7. Install front floor plate (see your -20).
- 8. Install driver's power plant access panel (see your -20).
- 9. Install power plant rear access panel (see your -20).
- 10. Close power plant front access door and raise trim vane (see your -10).
- 11. Raise and lock ramp (see your -10).
- 12. Stop engine (see your -10).
- END OF TASK

# **REPLACE FUEL CONTROL VALVE**

# DESCRIPTION

This task covers: Remove (page 14-48). Fuel Flow Test (page 14-49). Leak Test (page 14-49). Install (page 14-50).

# **INITIAL SETUP**

#### Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Calibrated cubic centimeter container Overflow receptacle Watch 24 V Power Supply (Assembled Batteries)

#### Materials/Parts:

Insulating varnish (Item 36, App C)

# REMOVE

- 1. Remove nut (1) from union (2) beneath fuel control valve (3).
- Remove two screws (4) and fuel control valve (3) from bracket (5) and fuel tube (6).



- 3. Remove four screws (7) and guard (8) from coolant heater (9).
- 4. Disconnect two fuel control valve leads (10 and 11) from overheat thermostat (12).

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

#### **References:**

See your -20

#### **Equipment Conditions:**

Engine coolant heater removed from carrier (see your -20)

5. Disconnect fuel control valve lead (13) from terminal strip (14).



# FUEL FLOW TEST

- Connect fuel control valve to coolant heater fuel hose. Fuel pressure must be 3 to 15 psi (21 to 103 kPa), when fuel valve is open.
- 7. Place fuel control valve outlet over calibrated and overflow containers.
- 8. Make sure the body of fuel valve is grounded.
- Energize fuel valve solenoids. Connect two solenoid leads to a 24 V dc power source. Solenoids are now open for high heat fuel flow.

# WARNING



Sparks from static electricity could cause a tire or explosion. Make sure to ground the coolant heater before you open fuel supply valve.

- 10. Open coolant heater fuel supply valve (page 14-16, 14–31, or 14-47). Bleed fuel hose in a suitable container.
- 11. After fuel flow is stable, place calibrated container under fuel control valve.
- Allow fuel to flow for exactly 1 minute then close coolant heater fuel supply valve. Container should contain 14 <u>+</u>2 cubic centimeters of fuel.
- Repeat steps 1 thru 7 with shutoff solenoid side only of fuel control valve energized with 24 V dc.
- 14. Calibrated cubic centimeter glass container should now contain  $8.5 \pm 2$  cubic centimeters of fuel.
- 15. If fuel flow rates are not within limits, adjust flow. Turn adjusting screw to right to increase and to left to decrease. Adjust high heat flow first, then low heat flow.

- 16. After fuel flow is adjusted within limits, seal adjusting screw with insulating varnish.
- 17. If fuel flow cannot be adjusted within limits, replace fuel control valve.



# LEAK TEST

- Repeat high heat fuel flow test. Disconnect both solenoid leads from 24 V dc power source.
- 19. One or two drops of fuel may form after solenoid leads are disconnected from power source. Further leakage is not acceptable.
- 20. Replace fuel control valve that leaks.

# INSTALL

- 21. Connect fuel control valve lead (1) to terminal strap (2).
- 22. Connect two fuel control valve leads (3 and 4) to overheat thermostat (5).
- 23. Install guard (6) on coolant heater (7). Secure with four screws (8).

6

 $\widehat{\mathbf{D}}$ 

- 24. Install fuel control valve (9) on bracket (10). Secure with two screws (11).
- 25. Install fuel control valve (9) on fuel tube (12). Tighten nut (13) on union (14) beneath fuel control valve.



# FOLLOW-THROUGH STEPS

1. Install engine coolant heater in earner (see your -20).

2

END OF TASK

5

1

# **REPLACE RESTRICTION THERMOSTAT**

# DESCRIPTION

This task covers: Remove (page 14-51). Install (page 14-52).

#### INITIAL SETUP

#### Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Wrench Kit (Item 106, App B)

#### Materials/Parts:

Restriction thermostat

# REMOVE

- 1. Remove four screws (1) and guard (2) from coolant heater (3).
- Remove nut (4), and combustion tube assembly (5) from coolant heater (3) and blower assembly (6).

5

Personnel Required:

Fuel and Elec Sys Rep

#### **References:**

See your -20

#### **Equipment Conditions:**

Engine coolant heater removed from carrier (see your -20)

- 3. Disconnect blower assembly lead (7) from terminal number 6 of terminal strap (8).
- 4. Loosen four nuts (9), turn blower assembly (6) counterclockwise to remove blower assembly from coolant heater (3).
- 5. Disconnect two leads (10) from restriction thermostat (11).
- Remove two nuts (12), washers (13), restriction thermostat (11), and two spacers (14) from heater (3).



GO TO NEXT PAGE

3

# INSTALL

- Place two spacers (1) and restriction thermostat (2) on studs of coolant heater (3). Secure with two washers (4) and nuts (5).
- 8. Connect two leads (6) to restriction thermostat (2).

- 10. Connect blower assembly lead (9) to terminal number 6 of terminal strap (10).
- 11. Place combustion tube assembly (11) on coolant heater (3) and blower assembly (7). Secure with nut (12).
- 12. Install guard (13) on coolant heater (3). Secure with four screws (14).



 Install blower assembly (7) on coolant heater
(3) and turn clockwise. Secure with four nuts (8).

# FOLLOW-THROUGH STEPS

1. Install engine coolant heater in carrier (see your -20).

Install (page

# **REPLACE THERMOSTATIC SWITCH**

# DESCRIPTION

This task covers: Remove (page 14-53). 14-54).

# **INITIAL SETUP**

# Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Multimeter (Item 62, App B)

#### Materials/Parts:

Lockwasher Preformed packing Thermostatic switch

#### REMOVE

1. Remove four screws (1) and guard (2) from coolant heater (3).

Personnel Required:

Clean, Inspect, and Replace (page 14-54).

Fuel and Elec Sys Rep 63G10

#### References:

See your -10 See your -20

#### **Equipment Conditions:**

Engine coolant heater removed from carrier (see your -20)

- 2. Disconnect two leads (4) from thermostatic switch (5).
- 3. Remove thermostatic switch (5) and packing (6) from coolant heater (3). Discard packing.



# CLEAN, INSPECT, AND REPLACE

- 4. Clean thermostatic switch with clean, dry cloth .
- 5. Use multimeter to check resistance through thermostatic switch.
- 6. Multimeter should read 0 ohms. If reading is infinity, replace thermostatic switch.

# INSTALL

- 7. Install new packing (1) and thermostatic switch (2) in coolant heater (3).
- 8. Connect two leads (4) to thermostatic switch (2).
- 9. Install guard (5) on heater (3). Secure with four screws (6).



# FOLLOW-THROUGH STEPS

1. Install engine coolant heater in carrier (see your -20).

END OF TASK

# REPLACE FIXED RESISTOR

# DESCRIPTION

This task covers: Remove (page 14-55). Install (page 14-56).

# **INITIAL SETUP**

#### Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Digital Multimeter (Item 62, App B) Wrench Kit (Item 106, App B)

#### Materials/Parts:

Sleeve

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

# REMOVE

- 1. Remove two screws (1) and fuel control valve bracket (2) from coolant heater (3).
- 2. Loosen four nuts (4), and remove end cover (5) from heater (3).
- 3. Remove two screws (6) that secure tapping plate (7), flange (8), and fuel tube (9) to heater (3).
- Remove nut (10), fixed resistor (11), flange (8), fuel tube (9), and sleeve (12) from heater (3).
- 5. Remove nut (13), screw (14), and electrical lead (15) from freed resistor (11).
- 6. Use multimeter. Check resistance from circuit 7 terminal end (16) to strap end (17) of freed resistor (11).
- 7. Multimeter should read 1.6 to 1.7 ohms. If reading is not in range, replace fixed resistor.

#### References:

See your -20

#### **Equipment Conditions:**

Engine coolant heater removed from carrier (see your -20) Fuel control valve removed from coolant

heater (page 14-48)





# INSTALL

- 8. If fixed resistor (1) is to be replaced, grind or cut sleeve off of fuel tube (2). Discard sleeve.
- 9. Install fixed resistor (1) and new sleeve (3) on fuel tube (2).
- 10. Secure electrical lead (4) to fixed resistor (1) with screw (5) and nut (6).
- 11. Secure fixed resistor (1) to heater (7) with nut (8).
- 12. Secure fuel tube (2), flange (9), and tapping plate (10) to heater (7) with two screws screws (11).
- 13. Install end cover (12) on heater (7). Tighten four nuts (13).
- 14. Secure fuel control valve bracket (14) to heater (7) with two screws (15).

# FOLLOW-THROUGH STEPS

- 1. Install fuel control valve on coolant heater (page 14-48).
- 2. Install engine coolant heater in carrier (see your -20).





# REPLACE BURNER PACKING AND GASKET

# **INITIAL SETUP**

## Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Wrench Kit (Item 106, App B)

#### Materials/Parts:

Gasket Preformed packing

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

# REMOVE

- 1. Remove screw (1), washer (2) and ground strap (3) from burner assembly (4).
- 2. Remove four nuts (5), bolts (6), clamps (7), and burner (4) from heater (8).
- Remove preformed packing (9) and gasket (10) from burner (4). Discard preformed packing and gasket.

# INSTALL

- 4. Install new preformed packing (9) and new gasket (10) in groove of burner (4).
- 5. Place burner (4) in heater (8). Secure with four nuts (5), bolts (6), and clamps (7).
- 6. Install ground strap (3) on burner (4). Secure with screw (1) and washer (2).

# FOLLOW-THROUGH STEPS

- 1. Install fixed resistor on heater (page 14-55).
- 2. Install fuel control valve on heater (page 14-48).

#### **References:**

See your -20

#### **Equipment Conditions:**

- Engine coolant heater removed from carrier (see your -20)
- Fixed resistor removed from heater (page 14-55)
- Fuel control valve removed from heater (page 14-48)



3. Install engine coolant heater in carrier (see your -20).

#### END OF TASK

# REPLACE DIODE AND MOTOR RESISTOR

# DESCRIPTION

This task covers: Remove (page 14-58). Install (page 14-59).

# **INITIAL SETUP**

#### Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Digital Multimeter (Item 62, App B) Wrench Kit (Item 106, App B)

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

# REMOVE

1. Remove four screws (1) and guard (2) from heater (3).

# **References:**

See your -20

# **Equipment Conditions:**

Engine coolant heater removed from carrier (see your -20)

## ΝΟΤΕ

Note direction of arrow on diode so it can be installed later.

- 2. Remove diode (4) from holder (5).
- 3. Remove motor resistor (6) leads from terminals No. 4 and No. 6 on terminal board (7).
- 4. Remove nut (8), screw (9), and motor resistor (6) from bracket (10).





5. Use multimeter to check diode. Set meter to above 200 mV scale. Place probes on each end of diode. Switch probes. Multimeter reading will be infinity or resistance in either position. One position must read infinity and the other resistance and vice versa for diode to operates properly.



- Use multimeter to check motor resistor. Place probes on resistor leads. Multimeter should read 0 ohms resistance. Replace resistor if reading is infinity.

# INSTALL

7. Install motor resistor (1) on bracket (2) with screw (3) and nut (4).

# FOLLOW-THROUGH STEPS

1. Install engine coolant heater in carrier (see your -20).

- Secure motor resistor (1) leads to terminals No. 4 and No. 6 of terminal board (5).
- 9. Install diode (6) in holder (7).



10. Install guard (8) on heater (9). Secure with four screws (10).



# **REPLACE BLOWER MOTOR**

# DESCRIPTION

This task covers: Remove (page 14-60). Install (page 14-61).

# **INITIAL SETUP**

#### Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Wrench Kit (Item 106, App B)

# **Personnel Required:**

Fuel and Elec Sys Rep 63G10

# REMOVE

- 1. Remove four screws (1) and guard (2) from coolant heater (3).
- Remove nut (4) and combustion tube assembly (5) from coolant heater (3) and blower assembly (6).
- 3. Disconnect blower assembly lead (7) from terminal strap (8) terminal No. 6.
- 4. Scribe a line on blower assembly (6) and on coolant heater (3) for proper alignment.
- 5. Loosen four nuts (9) and turn blower assembly (6) to the left and remove blower assembly from coolant heater (3).



# References:

See your -20

#### **Equipment Conditions:**

Engine coolant heater removed from carrier (see your -20)

- 6. Remove seven screws (10), speed nuts (11), and cover (12) from blower plate (13).
- 7. Loosen set screw (14) and remove fan vane (15) from motor (16).
- 8. Remove three screws (17), spacers (18), grommets (19), and motor (16) from blower plate (13).



# INSTALL

- 9. Install motor (1) in blower plate (2). Secure with three screws (3), spacers (4), and grommets (5).
- 10. Place fan vane (6) flush with end of motor shaft. Secure with set screw (7).
- Install cover (8) on blower plate (2). Secure with seven screws (9) and speed nuts (10). Turn fan vane (6) through combustion tube opening to make sure fan vane is clear.
- 12. Place blower assembly (11) on heater (12) and turn to the right. Secure with four nuts (13).
- 13. Connect blower assembly lead (14) to terminal strap (15) terminal No. 6.
- 14. Place combustion tube assembly (16) on coolant heater (12) and blower assembly (11). Secure with nut (17).
- 15. Install guard (18) on coolant heater (12). Secure with four screws (19).





# FOLLOW-THROUGH STEPS

1. Install coolant heater in carrier (see your -20).

END OF TASK

# COOLANT HEATER AND COOLANT PUMP DATA

# **INITIAL SETUP**

1. The engine coolant heater specifications are listed in the following tabular data list.

# EQUIPMENT DATA

Description	Characteristics	Metric Equivalents
Manufacturer Model Part Number Heat output:	Stewart Warner .939–J24 11601698	
Coolant: High heat Low heat	15,000 Btu/hr 8,000 Btu/hr	4.4 kw hr 2.3 kw hr
Operating temperature range (surrounding) Electrical requirements:	$-65^{\circ}$ to + 100°F	–54° to +38°C
Operating voltage range Amperes draw (maximum above) Start	20 to 28.5 V 70°F 12.0 amp	22°C
Run Amperes draw (maximum below) Start Run	1.5 amp 70°F 15.0 amp 3.5 amp	22°C
Performance: Fuel	grades DF-1, DF-2, DFA, CIE, and JP-4	
Fuel consumption: High heat (normal) Low heat (normal) Fuel pressure (at fuel	0.026 ± 0.005 lb/min 0.011 ± 0.003 lb/min 3 to 15 psi	0.013 ± 0.003 kg/min 0.006 ± 0.002 kg/min 21 to 103 kPa
valve inlet) Fuel pump output pressure Temperature settings:	3 to 6 psi	21 to 41 kPa
Overheat thermostat (opens) Restriction thermostat setting	245°F 160°F	118°C 71°C
Dimensions and weight: Height Length Width Weight	10 in. 15–5/16 in. 6–3/16 in. 15 lb	25 cm 39 cm 16 cm 7 kg
Coolant pump: Manufacturer Model Part number	MP Pumps, Inc. 12245 10946835	
Electrical requirements: Operating voltage range Ampere draw Output Weight (maximum)	20 to 28.5 V 2.0 amp 12 to 16 gpm 10 lb	45 to 61 liters/min 5 kg

# FINAL TEST - COOLANT HEATER

# **INITIAL SETUP**

# Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B) Digital Multimeter (Item 62, App B)

#### Materials/Parts:

24 V dc power source Suitable rack or cradle Control box Thermometer Suitable coolant container (5 gallon minimum) Suitable exhaust hose (10 foot maximum) Fuel filter Fuel pump Fuel source

#### Materials/Parts (cont):

Stopwatch

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

#### **References:**

See your -10 See your -20

#### **Equipment Conditions:**

Coolant heater removed from carrier (see your -20)

# **TEST SETUP**

#### CAUTION Test setup must be wired for negative ground.

1. After overhaul of coolant heater, conduct a final test before installation, to make sure heater will work right. The suggested typical test setup is shown.



# **COOLANT SYSTEM**

- 2. Do not use more than 5 gallons of coolant. Use same coolant as in earner. Do not use water.
- 3. Change coolant quickly. Allow coolant to cool between tests. The coolant system should have a shutoff valve (1).
- Vent the coolant container (2) for air. The coolant container may remain open or closed. Use of a therrno-syphon type flow is allowed. No pump is required.

# **ELECTRICAL WIRING**

CONNECT TO

POSITIVE LEAD

ON POWER SUPPLY

- 5. Wire the heater (3) (as shown on page 14–66), using the regular wiring harness. Connect a multimeter (4) across the circuit between the hot lead of the control box (5) and the power source (6).
- 6. Use a fully charged battery for the power source.

6

# EXHAUST COLLECTOR

7. Conduct the heater exhaust away from the test area. Use an exhaust extension made of flexible hose (7) not more than 10 feet long.

# TESTING

- 8. A complete test of the coolant heater consists of the following:
  - a. Fuel flow test (page 14-48).
  - b. Burn test.
  - c. Restriction thermostat test.
  - d. Thermostatic switch test.
  - e. Combustion air blower test.
- Obtaining equipment for the combustion air blower test may be difficult. Do not do this test if the heater burns properly and the igniter cavity does not show undue carbon deposits.
- Replace the blower if the heater goes out during test or smokes a lot and has heavy carbon deposits in the igniter cavity (page 14–60). Moderate carbon deposits are normal and do not indicate a bad blower.



# **BURN TEST**

- 11. Secure coolant heater to test stand (1) and coolant, fuel, electrical, and exhaust connections. Do not start the heater unless there is an ample supply of coolant.
- 12. Remove heater end cover (2) and check inside for coolant leakage before starting burn test. Replace heater if coolant has leaked.
- 13. Place heater control switch in START position and start timing heater immediately.
- Note multimeter reading. Amperage draw must not exceed 12.8 amps (15.3 amps below 70°F (21°C) ).
- 15. Heater should ignite within 40 seconds from time heater control switch is turned on.

- 16. The flame detector switch must transfer within 200 seconds. Transfer will be indicated by the pilot lamp and a drop in amperage draw. Move the heater control switch to RUN. Amperage draw must not exceed 1.5 amps (4 amps below 70°F (21°C)). While burner is igniting and prior to flame switch transfer, check burner seal for signs of fuel leakage. If leakage is present, replace packing gasket (page 14–57).
- 17. If the heater fails to ignite or is slow to set flame, clean the igniter cavity and install a new igniter (see your -20).
- If the flame detector switch does not transfer within the required time limits, the burner is bad. Replace heater if burner is bad.
- 19. Allow the heater to burn one minute on HI heat, then move heater control HI-LO switch to LO. Burning and blower speed should continue, but slow down. If the heater goes out, replace the fuel control valve (page 14-48) and heater end cover.



20. Turn the heater control switch to OFF. Fuel flow and burning should stop in about 30 seconds. Blower should continue to run from 1 to 3 minutes and then stop. If blower does not work within limits, readjust the flame detector switch (see your -20). If the blower still fails to work within limits, replace the flame detector switch (see your -20).

# TESTING RESTRICTION THERMOSTAT AND THERMOSTATIC SWITCH

- 21. Turn the heater on and run it until the coolant is hot enough to make the heater cycle from high to low heat. Leave the heater alone, then take the temperature of the coolant. The temperature should be between 140°F (60°C) and 170°F (76°C). If coolant temperature is not within limits, replace restriction thermostat (page 14–51).
- 22. After testing the restriction thermostat, close circuit across terminal board terminals No. 4 and No. 5, to make the heater stay on high heat. Heat the coolant until the heater burning stops. Check the temperature of the coolant, it should be not less than 220°F (104°C) or more than 250°F (21°C). If the coolant temperature is not within these limits, replace the thermostatic switch (page 14–53).

### ΝΟΤΕ

Thermostat shown in fuel control valve is set to open at  $70^{\circ}F$  (21°C) and to close at  $30^{\circ}F$  (-1°C). If temperature is below  $70^{\circ}F$ (21°C), the heating element in fuel control valve can be energized during any operational cycle.



# FOLLOW-THROUGH STEPS

 Install coolant heater in carrier (see your -20).

END OF TASK

# CHAPTER 15 MAINTENANCE OF TENT

# REPAIR TENT (M577A2 AND M1068 ONLY)

# DESCRIPTION

This task covers: Inspect (page 15-1). Repair (page 15-2).

# INITIAL SETUP

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Industrial Sewing Machine (Item 82, App B)

#### Materials/Parts:

Adhesive sealant (Item 2, App C) Cotton duck cloth (Item 16, App C) Dry cleaning solvent (Item 18, App C) Canvas preservative coating (Item 66, App C) Thread (Item 79, App C)

# INSPECT

- 1. Check tent. Mark defects to be repaired.
- Check framework, support leg, ridge, cave and bow poles, joints, adjusting pins and chains. Remove burs. Straighten bends and dents. Weld broken joints. Replace badly damaged parts.
- 3. Check tensile strength of fabric. Grasp a small fold of fabric between thumb and fore-finger of each hand, gripping it closely so tips of forefingers touch. Test material against threads that run the length of material. The weaker cross threads should not be used for testing tensile strength. Tug material several times. If it does not rip, it is reparable. If it tears on first tug, test several areas for extend of damage. Weak sections must be replaced.
- Check fabric. Repair sections that have been weakened by stains or that cannot be brushed cleaned. Repair or replace sections that are worn or torn or have a large number of patches.
- Check stitching. Repair runoffs and broken threads. Restitch weak stitching and open seams.

#### Personnel Required:

Fabric Repairman 43M20

#### **References:**

See your -10 FM 10-16 TM 10-5410-229-13&P (M1068 tent only)

- 6. Check webbing. Repair or replace tie tapes, guy lines, corner straps and web reinforcements that are frayed, worn or torn.
- 7. Check leather. Replace leather reinforcements that are cracked, worn or weak.
- 8. Check hardware. Replace parts that are broken, bent, corroded or missing.
- 9. Check toggles. Replace split, broken or missing toggles.
- 10. Check loops, guy lines, foot stops and mounting lines. Replace parts that have frayed or broken strands or raveled ends.
- 11. Check netting. Replace torn netting.



# REPAIR

# ΝΟΤΕ

To repair fabric, use 12-19/64 ounce (363 ml) per square cotton sateen or cotton duck and size FF polyester thread. The cloth and thread must be fire, water, weather and mildew resistant.

22 1/2°

12. Use lockstitching to install all patches, straps, flaps and side fasteners and to repair open seams. Use smallest needle size you can to make weatherproof seams. Allow 5 to 7 stitches per 1 inch (3 cm). Backstitch all thread breaks at least 1 inch (3 cm). Backstitch all ends at least 1 inch (3 cm), except where ends are turned under in a hem or seam or held down by other stitching. Maintain thread tension so stitching is tight and lock is firmly fixed in center of material. Trim all ends. Take care, when restitching, to make a new stitch line. All hardware, leather, webbing, lines and netting used for repair must be the same as the original material.



#### ΝΟΤΕ

A hole or tear in the tent more than 4-3/4 inches (12 cm) in diameter or length may be repaired by a cement patch. The tear must not occur on seams, edges, or areas that support hardware. The materials used to make a cement patch are adhesive, round patches, roller, board, wire brush, and soft bristled brush. For cement patch repair, do steps 13 thru 20.

- 13. Select one of three sizes of patches that will overlap damaged area with a margin of at least 3/4 inch (19 cm) on all sides.
- 14. Place board under damaged area for a flat working surface.
- 15. Buff patch and damaged area of tent with a wire brush.

#### WARNING



Adhesive is flammable and can injure you. Keep it away from heat, sparks, and open flame. Avoid repeated or prolonged breathing of vapors. Avoid contact

with your skin.

- 16. Center patch over damaged area. Apply adhesive to patch and patch edge with a soft bristle brush, making a circle on tent.
- 17. Lift patch. Apply adhesive to area of tent inside adhesive circle.
- 18. Allow adhesive to dry until tacky.
- 19. Press cement surfaces together firmly with roller while tacky.
- 20. Seal by wiping edge of patch with soft bristle brush.



### ΝΟΤΕ

The watershed patch has the top edge angled to give a roof effect. Because the roof-type top edge sheds water, the patch lasts longer than a rectangular patch. For watershed patch repair, do steps 21 thru 25.

- Cut patch large enough to overlap 2 inches (5 cm) on all sides of area to be repaired. Allow for 3/4 inch (19 mm) turn-under of edge.
- 22. Fold patch in half lengthwise. Cut from open edges to folded edge at 22–1/2 degree angle.

- Center patch over damaged area on outside of tent. Turn under patch edges. Stitch in place with a row of stitching no more than 1/8 inch (3 mm) from the edge.
- Secure patch to tent with a second row of stitching. Place second row 3/8–1/2 inch (10–13 mm) from first row.
- 25. Turn material over. Cut away damaged area, notch corners, and turn edges in. Stitch turned edges to patch with a row of stitching no more than 1/8 inch (3 mm) from the edge.


#### NOTE

Extensive damage between seams is repaired with a seam-to-seam patch. For seam-to-seam patch repair, do steps 26 thru 30.

- 26. Open seam 2 inches (5 cm) beyond damaged area on both sides.
- 27. Square off damaged area from seam to seam.
- Cut patch 2 inches (5 cm) wider than squared-off section. Allow for 3/4 inch (19 mm) turn-under on sides.
- 29. Center patch over cutaway section. Turn sides under and reform double-felled seams at top and bottom.
- 30, Finish by stitching patch into place.

#### NOTE

For webbing and reinforcement repair, do steps 31 and 32.

- 31. Install webbing and reinforcements. Machine stitch a rectangular pattern 1/8 inch (3 cm) in from the edges, a set of stitches 1/8 inch (3 mm) in from end stitchings, and diagonal stitches from corner to corner.
- 32. Attach all leather reinforcements. Use the same stitching method used for webbing.
- 33. Install end clips. Insert strap into ball-type end clip. Flatten clip with hammer.
- 34. Install grommets per FM 10-16. Holes punched in the material to receive grommets shall be smaller than outside diameter of grommet barrel. Clinch grommets firmly without cutting material.
- Install line loops in fastener flaps. Use hand-sewn, overcast stitch. See FM 10-16 for overcast stitch and information on hand sewing.
- 36. Install netting. Use machine stitching.

#### ΝΟΤΕ

The tent should be treated, as needed. Use sealing compound that is textile, paste form and fire, water, weather and mildew resistant. To use sealing compound, do steps 37 thru 42.



#### WARNING

Sealing compound is flammable. Keep it away from open flame. Keep compound off your skin. Wash well after handling. Use solvent spray precautions.

- 37. Make sure tent is dry. Remove dirt, oil and grease stains.
- 38. Erect tent (see your -10).

#### WARNING



Dry cleaning solvent P-D-680 is toxic and flammable. Always use in an open area with good air flow, away from sparks, heat or flames. Wear

goggles and gloves. Do not breathe vapors. Avoid contact with skin, eyes and clothes. If you get dizzy while using solvent, breathe fresh air and get medical help. If solvent gets on hands, wash them. If solvent gets in eyes, flush eyes with fresh water and get medical help immediately. Keep fire extinguisher nearby.

- 39. Reduce paste to spray consistency by mixing with dry cleaning solvent.
- 40. Apply compound by spray gun. Operator should wear respirator.
- 41. Apply compound to patches and newly repaired areas.
- 42. Allow at least 24 hours for tent to dry.



# FOLLOW-THROUGH STEPS

1. Stow or install tent on carrier (see your -10).

END OF TASK

# CHAPTER 16

# MAINTENANCE OF NON-SKID RAMP KIT

# INSTALL NON-SKID RAMP KIT (M106A2 AND M125A2 ONLY)

## DESCRIPTION

This task covers: Prepare Ramp (page 16-1). Install (page 16-3).

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Portable Electric Drill (Item 23, App B) Electrical Disc Sander (Item 76, App B) Pneumatic Hammer (Item 40, App B) Screw Threading Set (Item 79, App B)

#### Materials/Parts:

Non-skid ramp winterization kit (10942588) Wood blocks, 6 x 6 x 12 inches (2)

# PREPARE RAMP

- 1. Place two wood blocks at rear of carrier. Position blocks so ramp and ramp door will rest on blocks when lowered.
- 2. Lower ramp (see your -10) onto blocks.
- 3. Remove ramp door handle stop (1). Discard stop. Use pneumatic hammer.
- 4. Grind weld area smooth. Use sander.
- 5. Remove spring pin (2) that secures handle release (3) and two washers (4) to release bracket (5). Keep release, spring pin, and washers.
- 6. Remove bracket (5). Discard bracket. Use pneumatic hammer.
- 7. Grind weld area smooth. Use sander.
- Remove nut (6) that secures inner handle (7) to outer handle (8). Remove handles, key (9), and shim washers (10). Discard inner handle (7). Keep nut, key, and shim washers.

#### **Personnel Required:**

Track Vehicle Repairer 63H10

References:

See your -10

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10)



#### ΝΟΤΕ

All dimensions shown in the following illustration are in inches and metric equivalents. Dimension tolerances are  $\pm$  1/16 inch (2 mm), unless otherwise indicated.

- 9. Locate, drill, and thread mounting holes as explained in following illustration and text.
- 10. Place ramp non-skid plate on ramp to use as a template to locate five holes. Drill five holes with 27/64 inch (11 mm) drill. Tap holes 1/2-13 UNC-2B to at least 1 inch (3 cm) deep. Use screw threading set.
- Place ramp door non-skid plate on ramp door to use as a template to locate four holes. Drill four holes with 27/64 inch (11 mm) drill. Tap holes 1/2-13 UNC-2B at least 1 inch (3 cm) deep. Use screw threading set.
- Place new handle stop and new release bracket on ramp to use as template to locate five holes. Drill five holes with 5/16 inch (8 mm) drill. Tap holes 3/8-16 UNC-2B to at least 1 inch (3 cm) deep. Use screw threading set.



# INSTALL

- Place bracket spacer (1) and release bracket (2) on ramp (3). Secure with three key washers (4) and screws (5).
- 14. Place handle release (6) with one washer (7) on each side in release bracket (2). Secure with spring pin (8).
- 15. Place stop spacer (9) and handle stop (10) on ramp (3). Secure with two key washers (11) and screws (12).
- Place ramp non-skid plate (13) on ramp (3). Secure with five key washers (14) and screws (15).
- 17. Place ramp door non-skid plate (16) on ramp door (17). Secure with four key washers (18) and screws (19).

- Bend one tab of each key washer (4, 11, 14, and 18) up against flat of each screw (5, 12, 15, and 19).
- 19. Insert outer handle (20) in ramp with at least one shim (21). Install at least one shim (21), key (22), inner handle (23), and nut (24) on handle (20).
- 20. Turn handle (23) to lock ramp door. Then, raise ramp (see your -10).
- 21. Open and close door, checking door action and handle end play. Adjust per step 22.
- 22. Add or remove shims (21) on either side of ramp, as needed, to keep ramp door flush with outside of ramp. Ramp door must be within 1/32 inch (2 mm) with outside of ramp. There must be no handle end play.



# FOLLOW-THROUGH STEPS

- 1. Raise and lock ramp (see your -10).
- 3. Stop engine (see your -10).
- 2. Remove wood blocks from ramp area.



# CHAPTER 17 MAINTENANCE OF CAPSTAN AND ANCHOR KITS

# TASK INDEX

Task	Page	Task	Page
Install Capstan Kit (M113A2 and M1059 only)	.17-2	Install Anchor Kit (M113A2 and M1059 only)	17-6

# INSTALL CAPSTAN KIT (M113A2 AND M1059 ONLY)

# **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Hacksaw Frame (Item 39, App B) Measuring Tape (Item 92, App B) Torque Wrench (Item 112, App B) Trailer Mounted Welding Shop (Item 96, App B

#### Materials/Parts:

Welding Electrode (Item 83, App C) Hacksaw blade (Item 10, App C) Kit P/N 5703657 (19207)

# INSTALL

NOTE There are three configurations of the shroud cover installation. They are shown below and on page 17-3. Before cutting, select the one that your carrier has.

1. Mark cutting lines as shown in the upper view of the correct illustration for your carrier's shroud cover (left side).

#### **Personnel Required:**

Metalbody Repairer 44B

#### References:

See your -10 See your -20 TM 9-237 TM 43-0139

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10) Carrier on level surface with tracks removed from sprockets (see your -20)

- 2. Use hacksaw and cut the front shroud cover and shroud, as needed, along the cutting lines. The final cut should look like the lower view of the correct illustration of your carrier's shroud cover (left side).
- 3. Repeat above steps (1 and 2) on the right side of your earner.
- 4. Smooth out any sharp edges that may remain on the shroud cover with a round file.

#### MARKING FOR CUTTING LINES

#### AFTER CUTTING



STEP)



17 1/2 INCH (44 CM) SHROUD COVER (NO STEP)



MARKING FOR CUTTING LINES



AFTER CUTTING

AFTER CUTTING



17 1/2 INCH (44 CM) SHROUD COVER (WITH STEP)

COVER O SHROUD

12 INCH (30 CM) SHROUD COVER (WITH STEP) 5. Remove 10 screws (1) from left sprocket (2) and 10 screws from right sprocket.

# ΝΟΤΕ

Two types of screws are provided in capstan kit. One type of screw is for counterbore holes in sprocket. The other type of screw is for holes without counterbore construction. Twenty of each type of screw is provided. Use as applicable.

- 6. Place two adapters (3) on two sprockets (2).
- Secure adapters (3) to sprockets (2) with 20 screws (4). Tighten screws to 110–115 lb-ft (149–156 N•m) torque. Use torque wrench.
- Make sure retainer (5) is installed in drum
  (6) with pin (7).
- 9. Install drum (6) on adapter (3). Secure with retainer (5).







- 10. Measure and mark the correct positions for the smaller stowage support (1) and for the larger support (2) on top of carrier.
- 11. Remove all paint, alodine, and debris from surfaces under stowage supports to be welded.

#### ΝΟΤΕ

All weld sizes are minimum. Do not exceed 1/16 inch (2 mm) over specified sizes.

- 12. Weld supports (1 and 2) to top plate of carrier as marked in step 10 in accordance with TM 9–237. Use electrode type 5356.
- 13. Clean weld area and apply touch-up paint to repaired area (see TM 43-0139).
- 14. Unscrew two retainers (3) to remove two drums (4) from two adapters (5).
- 15. Place one drum (4) over stowage support(1). Place the other drum (4) over stowage support (2). Secure with two retainers (3).



# FOLLOW-THROUGH STEPS

1. Install tracks on carrier (see your -20).

END OF TASK

# INSTALL ANCHOR KIT (M113A2 AND M1059 ONLY)

# **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Measuring Tape (Item 92, App B) Portable Electric Drill (Item 23, App B) Screw Threading Set (Item 94, App B) Twist Drill Set (Item 98, App B)

## Materials/Parts:

Electrode Kit P/N 5703656 (19207)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10)

# INSTALL

- 1. Locate and mark POINT A and POINT B on the left side of carrier, using dimensions given below.
- 2. Mark a line between POINT A and POINT B.

#### NOTE

The positions of 10 screws, out of the 20 screws furnished in the kit, are measured from the line connecting POINT A and POINT B.



- 3. Measure and mark the center points for holes, using the dimensions given below.
- 4. Drill and tap the 10 holes marked in step 3. Tap holes to 1/2-13 UNC-2B, 1 inch (3 cm) minimum full thread depth.



- 5. Locate and mark POINT C and POINT D on the left side of carrier, using dimensions given below.
- 6. Mark a line between POINT C and POINT D.





- 7. Measure and mark the center points for 10 holes, using the dimensions given below.
- 8. Drill and tap 10 holes as marked in step 7. Tap holes to 1/2–13 UNC-2B, 1 inch (3 cm) minimum to 1 9/16 inch (4 cm) maximum full thread depth.



- 9. Install two hook brackets (1) on earner. Secure with four screws (2).
- Install two hooks (3) on brackets (1). Secure with two spacers (4), square nuts (5), and wingnuts (6). Stake last two threads of hook to retain wingnuts.
- 11. Install two supports (7) on carrier. Secure with eight flat washers (8) and screws (9).
- 12. Install four angle brackets (10) on carrier. Secure with eight screws (11).

13. Remove two anchors (12) from the cables and towlines of anchor kit.



- 14. Slide two anchors (12) into supports (7) and brackets (10) on left side of carrier.
- 15. Fasten two hooks (3) to anchors (12) and tighten wingnuts.





- 16. Place tarpaulin (1), four straps (2), and fid(3) on top deck of earner.
- 17. Place two cable assemblies, six towlines, six shackles, and fid on tarpaulin (1).
- Fasten anchor kit items (4) on tarpaulin (1) with three straps (5) that are part of tarpaulin.
- Wrap tarpaulin (1) over anchor kit items
  (4). Fasten tarpaulin together with three straps (6) and webbing (7) that are parts of tarpaulin. Use fid (rounded pin) to tuck towlines into tarpaulin.
- 20. Install tarpaulin (1) on top deck of carrier. Secure with four straps (2) fastened to loops on top deck.



END OF TASK



# CHAPTER 20 MAINTENANCE OF MACHINE GUN ARMOR SHIELD KIT

# TASK INDEX

	Task	Page	Task	Page
8	Install Commander's Cupola Armor Shields (M113A2, M106A2, M125A2, M1059 and M1064 only)		Install Cargo Hatch Armor Shields (M113A2 only)	.20-5
		Repair Machine Gun Shield Mounting Arm (M113A2 and M1059 only)	.20-9	

# INSTALL COMMANDER'S CUPOLA ARMOR SHIELDS (M113A2 M106A2, M125A2, M1059, AND M1064 ONLY)

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Portable Electric Drill (Item 23, App B) Screw Threading Set (Item 79, App B) Trailer Mounted Welding Shop (Item 96, App B) Twist Drill Set (Item 98, App B)

#### Materials/Parts:

Machine Gun Shield Kit 11660854 (19207) Spacer, 1/16-1/8 inch thick (2) Wood blocks of equal height (2)

# INSTALL

- If four shield mounting holes are already drilled in cupola hatch, remove and discard four 1/2–13 screws and flat washers from hatch. If mounting holes are NOT drilled, follow steps 3 thru 5.
- Remove two 5/8-18 screws (1) and washers (2) from outboard support legs of machine gun pintle (3). Discard screws. Keep flat washers.
- 3. Remove machine gun mount and support from cupola. Close cupola (see your -10).

# ΝΟΤΕ

# All dimensions are in inches with metric equivalents.

- Measure and mark four points (A, B, C, and D) on cupola shown at right. Measure point positions from four existing screw holes that secure machine gun support to cupola.
- 5. Drill four holes using 27/64 (11 mm) drill. Drill to a maximum depth of 1-1/4 (3 cm). Tap with a 1/2–13 UNC tap to a minimum depth of 7/8 (22 mm).

#### **Personnel Required:**

Track Vehicle Repairer 63H10 Helper

#### **References:**

See your -10 TM 43-0139 TM 9-237

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10)



- Remove locknut (1), two flat washers (2), and cap screw (3) that secure hook (4), spring (5), and two spacers (6) on cupola hatch. Discard hook. Keep all other parts.
- Place new hook (4), spring (5), and two spacers (6) on cupola hatch. Secure with two flat washers (2), cap screw (3), and locknut (1).
- Remove locknut (7) and flat washer (8) that secure bumper (9) and flat washers (10) to cupola hatch. Remove bumper and washers. Keep washers. Discard locknut.
- 9. Place new bumper extension bracket (11) on cupola hatch with welded end up. Secure with new cap screw (12), flat washer (13), and locknut (14).
- Use flat washers (10), as needed, to compress bumper 1/4 inch (6 mm) when cover is open and latched. Place flat washers (10) and bumper (9) on bracket (11). Secure with flat washer (8) and new locknut (7).

#### NOTE

Gun shields are large and bulky. Get an assistant to help you.

- Install curved doors (15) in guide channels of shields (16 and 17). There are two doors in each shield. Install four clips (18) to secure doors open. Bend clips to turn freely around loop on doors.
- Place left and right shields (16 and 17) on cupola. Secure with two retained flat washers (19), two cap screws (20), four flat washers (21), four lockwashers (22), and four cap screws (23).
- Remove two cap screws (24) and lockwashers (25) that secure plastic covered stop (26) on machine gun support. Remove stop. Discard stop, screws, and lockwashers.
- 14. Place spacer (27) and bracket (28) on machine gun support. Secure with two machine screws (29).
- Install flat door (30) in slots in bracket (28). Install four hooks (31). Close hooks to form a chain from loop on door to loop on bracket.



- Place front armor shield (1) on a level surface with shield plate supported on two blocks (2) of equal height. Place blocks about 2–1/2 inches (6 cm) apart with hole in plate centered between blocks. Blocks must support pintle flange of machine gun mount.
- 17. Place machine gun mount (3) on shield plate (1). Install machine gun in mount. Center machine gun in shield slot.
- Place two 1/16-1/8 inch (2-3 mm) thick spacers (4) between blocks and shield plate so pintle flange is 1/16-1/8 inch (2-3 mm) below shield plate.
- Using a level, check to see that pintle flange (3) and shield plate (1) are level. Make sure machine gun is still centered in slot. Remove machine gun.
- 20. Use a welding machine and tack weld pintle flange to shield plate (1) in four places. Then weld pintle to upper surface on plate with not less than 3/16 inch (4 mm) fillet weld all around pintle flange. Weld in accordance with TM 9–237.

- 21. Raise and lower machine gun mount. Check for interference between ammunition tray and shield plate. Use a hand grinder and grind off plate, as needed.
- 22. Touch up any damaged areas with paint. See TM 43-0139.



23. Install front shield (1) with machine gun pintle on cupola support. Install travel strap (5) and clamp (6) on right armor shield (7).



END OF TASK

# INSTALL CARGO HATCH ARMOR SHIELDS (M113A2 ONLY)

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Portable Electric Drill (Item 23, App B) Portable Electric Drill (Item 24, App B) Screw Threading Set (Item 79, App B) Twist Drill Set (Item 98, App B) Twist Drill Set (Item 99, App B) Measuring Tape (Item 92, App B)

#### Materials/Parts:

Machine Gun Shield Kit 11660854 (19207)

#### INSTALL

#### ΝΟΤΕ

If carrier is equipped with antenna guards on the right side, the forward guard may be a three or four screw type.

 Remove 9 or 10 screws (1) and flat washers (2) that secure right front antenna guard (3), right rear antenna guard (4), and left rear antenna guard (5) on hull top deck. Remove guards. Discard antenna guards and screws. Keep washers.

#### Personnel Required:

Track Vehicle Repairer 63H10

#### **References:**

See your -10

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10)

- 3. Remove eight screws (6) that secure left and right rear antenna access covers (7) on hull top deck. Remove covers, adapters (8), and gaskets (9). Discard two covers, two adapters, and eight screws. Keep gaskets.
- Place two gaskets (9) and two new covers (7) on hull top deck. Secure with eight new screws (6).



5. If armor gun shield mounting holes are not drilled and tapped in hull top deck, go to step 6. If these holes have been drilled and tapped, go to step 9.

# ΝΟΤΕ

All dimensions are in inches with metric equivalents.

6. Measure center points for 12 holes as shown below, 6 holes on each side of top deck.

- 7. Drill holes to a maximum depth of 1-1/4 inch (3 cm) using drill sizes as shown below.
- 8. Tap six holes (rear) to 1/2–13 UNC–2B, two holes (middle) to 5/8-11 UNC-2B, and four holes (front) to 3/8-16 UNC-2B. Tap all holes to 7/8 inch (22 mm) minimum depth.
- 9. If holes are already in carrier, remove and discard six 1/2 inch (13 mm) screws and washers, two 5/8 inch (16 mm) screws and washers, and four 3/8 inch (10 mm) screws and washers.



- 10. If pintle socket plate mounting holes are not drilled and tapped in cargo cover and on inside rear hull plate, go to step 11. If these holes have been drilled and tapped, go to step 13.
- Measure center point for four holes as shown below. Two holes are on cargo cover. Two holes are on inside rear hull plate.
- Drill all holes to 1–1/4 inch (3 cm) maximum depth. Tap all holes to 7/8 inch (22 mm) minimum depth.
- Remove two 1/2 inch (13 mm) screws and four washers from cargo cover. Remove two screws and four washers from inside rear hull plate. Discard washers. Keep screws.



- Place two mounting arms (1) on top deck with flat surface of mount parallel to side of hull. Loosen mounting screw and rotate mount, as needed. Secure with six flat washers (2), lock washers (3), and cap screws (4).
- 15. Place armor shield (5) in left and right mounting arm (1).
- 16. Place two brackets (6) on top deck. Secure with four flat washers (7), lock washers (8), and cap screws (9).
- Place clips (10) on left and right brackets (6). Secure with four machine screws (11), flat washers (12), and selflocking nuts (13).
- 18. Install straps (14) on left and right brackets (6).
- 19. Install two restrictors (15) on top deck.

- Insert four shield retaining straps (16) through loops under each side of both shields (5). Install clamps (17) on each strap (16). Connect clamps to loops on shields. Tighten straps to secure shields.
- Place 7.62 mm platforms or caliber .50 adapters (18) on left and right shields (5). Secure with two bolts (19), nuts (20), and cotter pins (21). Stow unused platforms or adapters (18) in carrier tool bag (see your -10 for stowage).
- Place plates (22) on cargo cover and on inside rear hull plate. Secure with four flat washers (23), four new lock washers (24), and four screws (25).
- 23. Place pintle socket (26) on one of the two plates (22). Secure with strap (27). Lace strap through loop on plate and around the round bar of the pintle socket. Secure strap.



END OF TASK

# REPAIR MACHINE GUN SHIELD MOUNTING ARM (M113A2 AND M1059 ONLY)

# **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Hand Arbor Press (Item 72, App B)

#### Materials/Parts:

Bearing Bushing Lockwasher (2)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20

#### **Equipment Conditions:**

Rear armor shield mounting arm removed (see your -20)

# REMOVE

- Remove two cap screws (1) and lockwashers (2) that secure lock (3) to arm (4). Remove lock. Discard lockwashers.
- 2. Remove cap screw (5) that secures mount (6) and bracket (7) to arm (4). Remove mount and bracket.
- 3. Press bracket bearing (8) and bushing (9) from arm (4). Discard bearing and bushing.

#### INSTALL

- 4. Press new bushing (9) and bracket bearing (8) in arm (4).
- 5. Install bracket (7), arm (4), and mount (6). Secure with cap screw (5).
- 6. Secure lock (3) to arm (4) with two new lockwashers (2) and cap screws (1).

#### FOLLOW-THROUGH STEPS

1. Install rear armor shield mounting arm (see your -20).



# END OF TASK

# CHAPTER 21

# MAINTENANCE OF TURN SIGNAL KIT

# INSTALL TURN SIGNAL KIT (M741A1 ONLY)

#### DESCRIPTION

This task covers: Prepare (page 21-1). Modify (page 21-2). Install (page 21-4). Test (page 21-14).

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Drill Set (Item 29, App B) Drill Set (Item 98, App B) Multimeter (Item 62, App B) Portable Electric Drill (Item 23, App B) Screw Threading Set (Item 94, App B)

#### Materials/Parts:

Turn signal kit 11661195

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **References:**

See your -10 See your -20 TM 43-0139

# PREPARE

- 1. Remove right stop light-tail light (1) (see your -20). Discard tail light, gasket, two studs, and nuts.
- 2. Remove four screws and washers that secure guard (2) to hull (see your -20). Discard one screw and washer.
- Remove left stop light-tail light (3) (see your -20). Discard gasket, two screws, and washers. Retain guard (4). Turn tail light in to supply.
- Remove trailer wiring harness (5) and receptacle (6) (see your -20). Retain attaching hardware and gasket. Remove and retain four washers and shells from trailer harness. Discard harness.

# 

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#### **Equipment Conditions:**

Ramp lowered (see your -10) Engine stopped (see your -10) Carrier blocked (see your -10) Battery ground lead disconnected (see your -20) Trim vane lowered and power plant front access door open (see your -10) Commander's seat removed (see your -20) Rear compartment floor plates removed (see your -20)

# MODIFY

- On left side of carrier, locate two holes as shown. Drill two 13/64 inch (5 mm) diameter holes to 1-1/8 inch (3 cm) maximum depth.
- 6. Use a 14-20 UNC-2B tap to thread these two holes to 9/16 inch (14 mm) minimum depth.





- On right side of carrier, use a hand file to file outside sharp edge from right tail light large mounting hole. File to about 1/16 inch (2 mm) radius.
- Locate two holes as shown. Drill two 13/64 inch (5 mm) diameter holes to 1–1/8 inch (3 cm) maximum depth.
- 9. Use a 1/4-20 UNC-2B tap to thread two holes to 9/16 inch (14 mm) minimum depth.

NOTE Dimensions are in inches with metric equivalents.





10. Modify left stop light-tail light guard. Lay out and cut a 2-1/2 inch (6 cm) wide notch to full depth of guard flange as shown.



- 11. Locate two holes in front of carrier as shown. Drill two 5/16 inch (8 mm) diameter holes to 1-5/16 inch (3 cm) maximum depth.
- 12. Use a 3/8-16 unc-2B tap to thread the two holes to 1-1/8 inch (3 cm) minimum thread depth.



- 13. Locate two holes in front of carrier as shown. Drill two 5/16 inch (8 mm) diameter holes to 1-5/16 inch (3 cm) maximum depth.
- 14. Use a 3/8-16 UNC-2B tap to thread two holes to 1-1/8 inch (3 cm) minimum thread depth.



- 15. Locate three holes in driver's compartment as shown. Drill three 13/64 inch (5 mm) diameter holes on inside of forward sloped hull plate to 1-1/8 inch (3 cm) depth.
- 16. Use a 1/4-20 UNC-2B tap to thread these three holes to 3/4 inch (19 mm) minimum thread depth.

NOTE Dimensions are in inches with metric equivalents.



17. Locate hole in power plant compartment side panel as shown. Drill a 9/16 inch (14 mm) diameter hole through panel.



NOTE Dimensions are in inches with metric equivalents.

 Clean areas around all drilled holes with a wire brush. Apply paint, as needed. See TM 43-0139.

# INSTALL

- 19. Remove screw (1) and washer (2) that secure instrument panel to upper mount (3).
- 20. Remove screw (4), nut (5), mounts (6 and 7), and washer (8).



21. Swing instrument panel out to provide access to light selector switch (9) and connector (10).

- Place new flasher (11) on inside front sloped hull plate. Secure with two new washers (12) and screws (13).
- 23. Use a scraper to remove paint from front bilge pump discharge tube (14). This provides a ground for control assembly (15) and clamp (16).
- 24. Install new control (15) on discharge tube (14). Place control 1/2 inch (13 mm) maximum below sight glass.

#### ΝΟΤΕ

The control lever, when placed in RIGHT SIGNAL POSITION, wil be 6 inches (15 cm) from inside front sloped hull plate.

25. Tighten control assembly (15) and clamp (16).



- 26. Install new wiring harness (1). Connect harness to control (2) and flasher (3).
- Install new lead (4) and flasher ground lead (5) to hull. Secure leads to hull with new washer (6) and screw (7). Install terminal retaining washer (8) between hull and leads.
- Install new clamp (9) on bilge pump discharge tube (10). Secure clamp (9) and loose end of new lead (4) with new screw (11), two new washers (12), and nut (13).



29. Disconnect connector (14) from light selector switch (15) on instrument panel.



- Unscrew light selector switch packing nut (16) from connector (14) Slide grommet (17) down on leads
- Thread circuit 467 lead of new wiring harness (1) through packing nut (16) and grommet (17). Solder circuit 467 lead to pin J of light switch.
- 32. Install grommet (17) in packing nut (16). Connect to light switch (15).



NOTE Main wiring harness is on ceiling above instrument panel.

- Connect circuit 22 lead of carrier main wiring harness (1) to circuit 22-461 lead of new wiring harness (2).
- 34. Install wiring harness grommet (3) in 9/16 inch (14 mm) diameter hole in power plant side panel.
- 35. Thread circuit 460 lead of harness (2) through grommet (3).

- 36. Connect circuit 22 lead of harness (2) to circuit 22 lead from light selector switch (4).
- 37. Route circuit 461 lead along carrier main harness (1) to stuffing tube (5) at left front of earner.
- Route new wiring harness (6) along carrier main harness (1) to center rear of carrier and to upper right tail light.
- 39. Secure wiring harnesses (2 and 6) to carrier main harness (1) with one new strap (7) next to each existing harness clamp.
- 40. Connect circuit 22-460 lead of harnesses (2 and 6) on ceiling above instrument panel.



- 41. Swing instrument panel back into place.
- 42. Install washer (1), mounts (2 and 3), screw (4), and nut (5).
- 43. Install upper mount (6), washer (7), and screw (8).
- 44. Route new wiring harness (9) along existing headlight wiring harness.
- 45. Secure harness with one strap (10) next to each existing harness clamp.
- 46. Connect circuit 460 leads of harness (9 and 11).



- Disconnect circuit 514 and 515 leads (1) from right infrared headlight (2). Disconnect circuit 25 lead (3) from horn (4). Tag each lead for later identification.
- 48. Unscrew nut (5) from stuffing tube (6).
- 49. Slide gasket (7) down on leads. Use a sharp knife to slip gasket at three holes. Pull leads free of gasket. Discard gasket.
- 50. Use a sharp knife to slit new gasket (7) at four holes. Insert circuit 514 and 515 leads (1) for infrared headlight. Insert circuit 25 lead (3) for horn.

- 51. Thread circuit 460 lead of harness (8) through stuffing tube (6) and remaining hole in new gasket (7).
- 52. Install new shell (8), new sleeve (9), and new terminal (10) on circuit 460 lead (11). Crimp terminal (10) on lead. Slide sleeve (9) and shell (8) over terminal (10).
- 53. Insert new gasket (7) into stuffing tube (6). Install nut (5).
- 54. Connect circuit 514 and 515 leads (1) to infrared headlight (2). Connect circuit 25 lead (3) to horn (4).



 Install new right front turn signal light (1), stud (2), and washer (3) in guard (4).
 Secure with new lock washer (5) and nut (6).

#### NOTE

A minimum of 1-1/2 threads should extend through nut after installing light guard.

- 56. Install new guard (4) and light assembly on hull. Secure with two new washers (7) and screws (8).
- 57. Connect circuit 460 lead (9) to turn signal light (1).



- 58. Disconnect circuit 514 and 515 leads (10) from left infrared headlight (11). Disconnect circuit 19 lead (12) from blackout headlight (13). Tag all leads for later installation.
- 59. Unscrew nut (14) from stuffing tube (15). Slide gasket (16) down on leads.
- Use a sharp knife to slit gasket (16) at. three holes. Pull leads free of gasket. Discard gasket.
- Use a sharp knife to slit new gasket (16) at four holes. Install on 514 and 515 leads (10) and 19 lead (12).
- 62. Thread circuit 461 lead on harness (17) through stuffing tube (15) and remaining hole of new gasket (16).
- 63. Install new shell (18), new sleeve (19), and new terminal (20) on circuit 461 lead on harness (17).
- 64. Crimp terminal (20) on lead. Slide sleeve (19) and shell (18) over terminal (20).
- 65. Insert new gasket (16) in Stuffing tube (15). Install nut (14).
- 66. Connect circuit 514 and 515 leads (10) to infrared headlight (11). Connect circuit 19 lead (12) to blackout headlight (13).



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 67. Install new turn signal light (1), new stud (2), and new washer (3) in guard (4). Secure with new lockwasher (5) and new nut (6).

## NOTE

A minimum of 1-1/2 threads should extend through nut after installing light in guard.

- 68. Install new guard (4) with light assembly on hull. Secure with two new washers (7) and new screws (8).
- 69. Connect circuit 461 lead on harness (9) to new turn signal light (1).



- 70. Install elbow (10) on bottom of ramp.
- Thread new trailer light wiring harness (11) through retained cover (12), receptcal connector (13), gasket (14), elbow (10), nut (15), spring (16), connector (17), and ramp.
- 72. Tighten nut (15) on elbow (10).

#### NOTE

Be sure harness is not twisted before it is secured to ramp.



- Install new trailer light wiring harness ground lead (18) and retained wiring harness clamp (19). Secure with retained washers (20) and screw (21).
- 74. Install four retained shells (22), one new shell (22), four retained washers (23), and one new washer (23) on leads of new trailer wiring harness (11).



- <sup>75.</sup> Install new wiring harness (1) in rear of earner. Route harness (1) from center rear along carrier main wiring harness (2) to upper right rear of earner.
- 76. Secure harness (1) to earner main harness (2) with one new strap (3) next to each existing harness clamp.
- 77. Connect circuit 21 leads of harness (1), trailer light harness (4), and carrier main harness (2).



- 78. Route new wiring harness (5) from center rear of carrier along main harness (2) to the upper right rear of carrier.
- 79. Secure harness (5) to earner main harness (2) with one new strap (3) next to each existing clamp.
- Route new wiring harness (6) from center rear of carrier along main wiring harness (2) to the upper left rear of carrier.
- 81. Secure harness (6) to carrier main harness (2) with one new strap (3) next to each existing clamp.
- 82. Connect circuit 23 lead on harness (6), new trailer wiring harness (4), and circuit 23 lead of harness (5).

- Connect remaining leads of trailer harness (4) to leads on carrier main harness (2) that include circuit 22-460 lead.
- 84. Unscrew nut (7) from stuffing tube (8). Slide gasket (9) down on leads.
- 85. Use a sharp knife to slit gasket at three holes. Pull leads free of gasket (9). Discard gasket.
- Use a sharp knife to slit new gasket (9) at four holes. Insert leads of carrier main harness (2) in gasket.
- 87. Thread circuit 23 lead of harness (5) through stuffing tube (8) and remaining hole in gasket (9).
- 88. Insert new gasket (9) into stuffing tube (8). Install nut (7).





GO TO NEXT PAGE
- On right side of earner, install new reflector (1) and new gasket (2) on hull. Secure with two new screws (3) and new washers (4).
- 90. Thread leads of new stop light-tail light (5) through new gasket (6), new spacer (7), new gasket (6), and large mounting hole in hull.
- 91. Install stop light-tail light (5), gasket (6), spacer (7), and gasket (6) to hull.
- 92. From inside carrier, install existing connector ground lead (8) under stop light-tail light new mounting screw (9). Secure with new washer (10) under terminal.

- Install existing cable clamp (11), existing washer (12), and new washer (13) under stop light-tail light new mounting screw (14).
- 94. Connect circuit 21 leads of stop light-tail light to new wiring harness (15).
- 95. Connect circuit 22-460 lead of harness (16) to stop light-tail light circuit 22-460-461 lead.
- 96. Connect circuits 23 and 24 to existing rear main wiring harness (17).



- 97. On left side of earner, install new reflector (1) and new gasket (2) on hull. Secure with two new screws (3) and new washers (4).
- 98. Thread leads of new stop light-tail light (5) through new gasket (6), new bracket (7), and retained modified guard (8).
- 99. Install stop light-tail light (5), gasket (6), and bracket (7) on retained guard (8). Secure with two new washers (9) and new screws (10).
- 100. Connect circuit 23 lead to new wiring harness (11). Connect remaining leads 21. 22-460-461, and 24 to rear main wiring harness (12).
- 101. Install retained guard (8) with stop light-tail light to hull. Secure with three retained washers (13) and screws (14).

Omit screw and washer from hole nearest right side of new stop light-tail light.





# TEST

- 102. Connect battery ground lead (see your -20).
- 103. Turn MASTER SWITCH ON (see your -10).
- 104. Place main light selector switch in STOP or SER DRIVE position.
- 105. Move control lever to the left. Check left front turn signal light and left rear stop light-tail light. The light on the control lever, the left front turn signal light, and the left stop light-tail light should flash on-and-off.
- 106. Use a multimeter to check for 24 volts on-and-off at pin B of the trailer receptacle.
- 107. Move control lever to the right. Check right front turn signal light and right rear stop light-tail light. The tight on the control lever, the front signal light, and the right stop light-tail light should flash on-and-off.
- 108. Use multimeter to check for 24 volts at pin J of the trailer wiring harness receptacle.
- 109. Lift stop on control lever and move lever to extreme left. The light on the control lever, both front turn signal lights, and both rear stop light-tail lights should flash on-and-off.
- 110. Use multimeter to check for 24 volts on-and-off at pin B of the trailer receptacle.

# FOLLOW-THROUGH STEPS

- 1. Install commander's seat (see your -20).
- 2. Install rear compartment floor plates (see your -20).
- 3. Raise and lock ramp (see your -10).

111. Place main light selector switch in B.O. DRIVE position and infrared-blackout selecting switch in B.O. position. The front blackout marker lights, blackout headlight, and blackout marker lights in the tail lights should come on. The blackout stop lights should come on when both differential steering levers are pulled to brake the earner.



- 4. Stop engine (see your -10).
- 5. Close power plant front door and raise trim vane (see your -10).

END OF TASK

# CHAPTER 21.1

# ELECTRICAL/COMMUNICATIONS EQUIPMENT (M1068 ONLY)

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#### **REPAIR POWER ENTRY BOX ASSEMBLY A4 (M1068 ONLY)**

#### DESCRIPTION

This task covers: Disassemble (page 21.1-2). Assemble (page 21.1-3). Clean, Inspect, and Repair bee Chapter 2).

#### **INITIAL SETUP**

#### Tools

General Mechanic's Tool Kit (Item 35, App B)

#### **Materials/Parts:**

Locknut (8) Lockwasher

#### **Personnel Required:**

Power-Generation Equipment Repairer 52D10

#### **References**:

see your -20

#### **Equipment Conditions:**

Power entry box removed (see your -20)

#### DISASSEMBLE

- 1. Open lid (1) to access faceplate (2).
- 2. Remove six screws (3), washers (4), and faceplate (2) from power entry box (5).
- 3. Remove four screws (6), cap and chain (7), locknuts (8), and cable W14 (9) from AC POWER OUT hole on faceplate (2). Discard locknuts.

4. Remove four screws (10), cap and chain (11), locknuts (12), and cable W13 (13) from EXTERNAL POWER IN hole on faceplate (2). Discard locknuts.

#### NOTE Tag all leads before removing from terminals.

**5.** Remove wingnut (14), two washers (15), nut (16), lockwasher (17), screw (18), and five leads (19) from faceplate (2). Discard lo&washer.

#### ASSEMBLY

- 6. Install five leads (1), screw (2), new lockwasher (3), nut (4), two washers (5), and secure with wingnut (6) on faceplate (7).
- 7. Install cable W13 (8) in EXTERNAL POWER IN hole on faceplate (7) with cap and chain (9) and secure with four screws (10) and new locknuts (11).
- 8. Install cable W14 (12) in AC POWER OUT hole on faceplate (7) with cap and chain (13) and secure with four screws (14) and new locknuts (15).
- 9. Install faceplate (7) on power entry box (16) and secure with six screws (17) and washers (18).
- 10. Close and secure lid (19) on power entry box (16).



#### FOLLOW-THROUGH STEPS

1. Install power entry box (see your -20).

**END OF TASK** 

#### **REPAIR EXTERNAL COMMUNICATION BOX All (M1068 ONLY)**

#### DESCRIPTION

This task covers: Disassemble (page 21.1-4). ( Assemble (page 21.1-7).

Clean, Inspect, and Repair (see Chapter 2).

#### **INITIAL SETUP**

#### **Tools:**

Electronic Equipment Tool Kit Tk-105/G (Item 94.1, App B)

#### **Masterials/Parts**

Locknut (8) Locknut (8) Locknut (4) Locknut (2) Lockwasher (22)

#### DISASSEMBLE

- 1. Remove four screws (1), locknuts (2), and two latches (3) from communication box (4). Discard locknuts.
- 2. Remove four screws (1), locknuts (2), and two catches (5) from communication box lid (6). Discard locknuts.
- 3. Remove four screws (7), locknuts (8), and latch half (9) from lid (6). Discard locknuts.

#### **Personnel Required:**

Radio Repair 29E10

#### **References:**

see your -20

#### **Equipment Conditions:**

External communication box removed (see your -20)

- 4. Remove four screws (10), locknuts (11), and latch half (12) from communication box (4). Discard locknuts.
- 5. Remove two screws (18), four washers (14), two locknuts (15), and lid (6) from communication box (4). Discard locknuts.



See following page for wiring diagram for assemble/disassemble of wires to connectors.

Tag leads/cables before removing/disconnecting. Replace pads only if damaged.

6. Remove twelve screws (1), lockwashers (2), cable W117 (3), and cable W118 (4) from communication box (5). Discard lockwashers.

#### NOTE

If cable W118 is being replaced, remove connector (6) before discarding.

- 7. Remove fourteen screws (7), lockwashers (8), and faceplate (9) from communication box (5). Discard lockwashers.
- 8. Remove two screws (10), locknuts (11), and four caps (12) from faceplate (9). Discard locknut.

- 9. Remove two screws (13), locknuts (14), and caps (15) from faceplate (9). Discard locknuts.
- 10. Remove four cables (16) from faceplate (9).
- 11. Loosen sixteen binding posts (17) and remove cable W115 (18).
- 12. Remove four connectors (19) and four cables (20) from faceplate (9).
- 13. Remove two nuts (21), four bushings (22), cable W101 (23), and cable W102 (24) from faceplate (9).



# WIRING DIAGRAM





#### ASSEMBLE

#### NOTE See previous page for wiring diagram for assemble/disassemble of wires to connectors.

- 14. Install cable W101 (1), cable W102 (2) on faceplate (5) and secure with four bushings (3) and two nuts (4).
- 15. Install four cables (6) and connectors (7) on faceplate (5).
- 16. Connect cable W115 (8) to sixteen binding posts (9).
- 17. Install four cables (10) on faceplate (5).
- 18. Install two cape (11) on faceplate (5) and secure with two screws (12) and new locknuts (13).

- 19. Install four caps (14) on faceplate (5) and secure with two screws (15) and new locknuts (16).
- 20. Install faceplate (5) on communication box (17) and secure with fourteen screws (18) and new lockwashers (19).
- 21. Install cable W117 (20) and cable W118 (21) on communication box (19) and secure with twelve screws (22) and new lockwashers (23).



#### TM 9-2350-261-34

- 22. Install lid (1) on communication box (2) and secure with two screws (3), four washers (4), and two new locknuts (5).
- 23. Install latch half (6) on communication box (2) and secure with four screws (7) and new locknuts (8).
- 24. Install latch (9) on lid (1) and secure with four screws (10) and new locknuts (11).
- 25. Install two catches (12) on lid (1) and secure with four screws (13) and new locknuts (14).
- 26. Install two latches (15) on communication box (2) and secure with four screws (13) and new locknuts (14).



#### **FOLLOW-THROUGH STEPS**

1. Install external communication box (see your -20).

**END OF TASK** 

# REPLACE/REPAIR INVERTER AND INVERTER HOUSING ASSEMBLY A2 (M1068 ONLY)

#### DESCRIPTION

This task covers: Remove (page 21.1-9). Clean, Inspect, and Repair (see Chapter 2). Install (page 21.1-12).

#### **INITIAL SETUP**

#### **Tools:**

General 'Mechanic's Tool Kit (Item 35, App B)

#### **Materials/Parts:**

Lockwasher (12) Lockwasher (6) Lockwasher (4) Self-locking nut (16) Self-locking nut (8) Self-locking nut (8) Self-locking nut (4) Self-locking nut (3) Self-locking nut (2)

#### **Personnel Required:**

Power-Generation Equipment Repairer 52D10 Helper (H)

#### REMOVE

#### **NOTE** It is not necessary to remove the Housing to remove one or both Inverters.

1. Remove ten screws (1), lockwashers (2), and cover (3) from inverter housing (4). Discard lockwashers.

#### **References:**

see your -10 see your -20 TM 11-7010-256-12&P

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10) All external power disconnected (TM 11-7010-256-12&P) Battery ground lead disconnected (see your -20) Power control enclosure removed (see your -20)

- 2. Remove four screws (5), locknuts (6), and terminal block TB2 (7) from cover (3). Discard locknuts.
- 3. Remove two screws (8), locknuts (9), and terminal block TB1 (10) from cover (3). Discard locknuts.



Change 4 21.1-9

	NOTE	
Tag	leads/cables	before
removing	g/disconnecting	

- 4. Remove ten screws (1), cable W5 (2), and six leads (3) from terminal block TB2 (4).
- 5. Remove two set screws (5), cable W6 (6), and two leads E4 (7) from terminal block TB1 (8).
- 6. Remove screw (9), ground lead W632 (10), ground lead W432 (11), and lockwasher (12) from carrier wall. Discard lockwasher.

- Remove screw (9), two ground leads E5 (13), and lockwasher (12) from carrier wall. Discard lockwasher.
- 8. Remove three screws (14), locknuts (15), six washers (16), from blackout curtain (17) and inverter housing (18). Discard locknuts.
- 9. Disconnect two cable W15 connectors (19) from inverter IN1 (20) and inverter IN2 (21).



#### NOTE Both inverters are removed the same way.

- 10. Remove three screws (1) and lockwashers (2) from mount (3) and tray (4). Discard lockwashers.
- 11. Remove mount (3) and inverter (5), from housing (6). Have Helper assist.
- 12. Remove four screws (7), washers (8), locknuts (9), and mount (3) from inverter (5). Discard locknuts.
- 13. Remove four screws (10), lockwashers (11), and tray (4) from four resilient mounts (12). Discard lockwashers.
- 14. Remove sixteen screws (13), locknuts (14), thirty-two washers (15), and four straps (16) from tray (4). Discard locknuts.

- 15. Remove eight locknuts (17). washers (18), screws (19), and four resilient mounts (12), from housing (6). Discard locknuts.
- 16. Remove three screws (20), mounting strip (21), inverter housing (6), and retaining strip (22) from sponson.



#### INSTALL

#### NOTE Both inverters are installed the same way.

- 17. Install retaining strip (1), inverter housing (2), mounting strip (3), on sponson and secure with three screws (4).
- 18. Install four resilient mounts (5) on inverter housing (2) and secure with eight screws (6), washers (7), and new locknuts (8).
- 19. Install four straps (9) on tray (10), secure with sixteen screws (11), thirty-two washers (12), and new locknuts (13).
- 20. Install tray (10) on four resilient mounts (5) and secure with four screws (14) and new lockwashers (15).

- 21. Install mount (16) on inverter (17) and secure with four screws (18), washers (19), and new locknuts (20).
- 22. Install mount (16) and inverter (17) in housing (2), secure on tray (10) with three screws (21) and new lockwashers (22). Have Helper assist.



Before installation of inverters IN1 and IN2, shut POWER switches OFF. The cascade remote harness W15 will control inverters.

Installation for inverters IN1 and IN2 are different, follow schematic for proper wiring connections:

- 23. Connect two cable W15 connectors (1) to inverter IN1 (2) and inverter IN2 (3).
- 24. Install blackout curtain (4) on inverter housing (5) and secure with six washers (6), three screws (7), and new locknuts (8).
- 25. Install two ground leads E5 (9) on carrier wall and secure with new lockwasher (10), and screw (11).

- 26. Install ground lead W432 (12) and ground lead W632 (13) on carrier wall and secure with new lockwasher (10) and screw (11).
- 27. Connect Cable W6 (14) and two leads E4 (15) on terminal block TB1 (16) and secure with two set screws (17).
- 28. Connect cable W5 (18) and six leads (19) on terminal block TB2 (20) and secure with ten screws (21).



PART NUMBER	"A" (5)	"8" (S
12383902-1 (IN1)	IN1 E1(A2TB2-1)	IN1 E2(A2TB2-2)
12383902-2 (IN2)	IN2 E1(A2TB2-3)	IN2 E2(A2TB2-4)



- 29. Install terminal block TB1 (1) on cover (2) and secure with two screws (3) and new locknuts (4).
- 30. Install terminal block TB2 (5) on cover (2) and secure with four screws (6) and new locknuts (7).
- 31. Install cover (2) on inverter housing (8) and secure with ten screws (9) and new lockwashers (10).



## FOLLOW-THROUGH STEPS

1. Install power control enclosure (see your -20). 2. Connect battery ground lead (see your -20).

END OF TASK

# REPAIR AC POWER EXTENSION BOXES A6 AND A7 (M1068 ONLY)

#### DESCRIPTION

This task covers: Disassemble (page 21.1-15). Clean, Inspect, and Repair see Chapter 2). Assemble (page 21.1-W.

#### INITIAL SETUP

#### Tools:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B)

#### **Matexials/Parts:**

Self-locking nut (40)

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

#### DISASSEMBLE

NOTE Mechanical Disasembly/Assembly are the same for A6 and A7. Electrical reference designators are different. Use Wiring Diagram for reassembly.

1. Remove four screws (1), cover (2), and gasket (3), from extension box (4).

#### NOTE

# Tag all leads before disconnecting for proper assembly later.

2. Remove four screws (5), locknuts (6), and connectors J1 (7) from extension box (4). Discard locknuts.

#### **References:**

see your -10 see your -20

#### **Equipment Conditions:**

AC power extension box A6 removed (see your -20) AC power extension box A7 removed bee your -20)

- 3. Disconnect leads from connectors if necessary.
- 4. Remove sixteen screws (8), locknuts (9), four dust caps (10), and connectors (11) from cover (2). Discard locknuts.



### **ASSEMBLE**

.16

- 5. Install four connectors (1), dust caps (2), on cover (3) and secure with sixteen screws (4) and new locknuts (5).
- 6. Install connector J1 (6) on extension box (7) and secure with four screws (8) and new locknuts (9).

26

18

18

7. connect leads to connectors if necessary.

8. Install gasket (10), cover (3), on extension box (7) and secure with four screws (11).

#### NOTE

Color Designation for Terminals:

- H (HOT) = YELLOW
- N (NEUTRAL) = WHITE
- G (GROUND) = GREEN



# 12383854-2 (A7) WIRING DIAGRAM



J1

A

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#### FOLLOW-THROUGH STEPS

- 1. Install AC power extension A6 box (see your -20).
- 2. Install AC power extension A7 box (see your -20).

21.1-16 Change 4 **END OF TASK** 

# REPAIR ROADSIDE DC POWER EXTENSION BOX A9 (M1068 ONLY)

#### DESCRIPTION

This task covers: Disassemble (page 21. 1-17). Assemble (page 21.1-18).

#### INITIAL SETUP

#### **Tools:**

Automotive Fuel and Electrical System Repair Took Kit (Item 7, App B)

#### **Materials/Parts**

Locknut (28)

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

#### DISASSEMBLE

NOTE See wiring diagram for assemble/disassemble wires to connectors.

1. Remove four screws (1), cover (2) and gasket (3) from extension box (4).

#### NOTE

Tag all leads before disconnecting for **r** proper assembly later.

- Remove four screws (5), locknuts (6), and connector J1 (7) from extension box (4). Discard locknuts.
- 3. Remove four screws (8), locknuts (9), and connector J2 (10) from extension box (4). Discard locknuts.
- Remove sixteen screws (11), locknuts (12), four dust caps (13), and four connectors J18-J21 (14) from cover (2). Discard locknuts.

Clean, Inspect, and Repair (see Chapter 2).

#### **References:**

See your-20

#### **Equipment Conditions:**

Roadside DC power extension box removed (see your -20)

- 5. Remove four screws (15), locknuts (16), dust cap (13), and connector J23 (17) from cover (2). Discard locknuts.
- 6. Disconnect leads from connectors if necessary.



#### ASSEMBLE

#### NOTE See wiring diagram for assemble/disassemble of wires to connectors.

- 7. Install connector J23 (1) on cover (2) with dustcap (3), secure with four screws (4) and new locknuts (5).
- 8. Install four connectors J18-J21 (6) on cover (2) with dust caps (3), secure with sixteen screws (7) and new locknuts (8).
- 9. Install connector J2 (9) on extension box (10), secure with four screws (11) and new locknuts (12).
- 10. Install connector J1 (13) on extension box (10), secure with four screws (14) and new locknuts (15).

- 11. Connect leads to connectors if necessary.
- 12. Install cover (2) on extension box (10) with gasket (16) and secure with four screws (17).

J1

J2



## **FOLLOW-THROUGH STEPS**

1. Install roadside DC power extension box (see your -20).

# **REPAIR ROADSIDE AND CURBSIDE DATA PANEL ASSEMBLIES** A12 AND A13 (M1068 ONLY)

#### DESCRIPTION

This task covers: Remove (page 21.1-19). Install (page 21.1-21).

**INITIAL SETUP** 

#### **Tools:**

Radio Equipment Tool Kit (Item 94.2, App B)

#### **Materials/Parts**

Locknut (4) Lockwasher (14)

#### References See your -10

See your -20

#### **Equipment conditions:**

Clean, Inspect, and Repair (see Chapter 2).

Data box removed (see your -20)

CURBSIDE

PANEL

# **Personnel Required:**

Radio Repairer 29E10

#### REMOVE

NOTE Tag all leads before removal for proper installation later.

Follow illustration for remove/install of red/black binding posts.

See wiring diagram for disassemble/assemble of wires to connectors/binding posts.

- 1. Remove 14 screws (1), lockwashers (2), and faceplate (3) from box (4). Discard lockwashers.
- 2. Disconnect leads (5) from 24 binding posts (6).



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(A13) WIRING DIAGRAM

J112 (LAN B)



J105 (LAN A)

J106

(LAN A)

J107

(LAN B)

J108

(LAN B)

#### NOTE

See wiring diagram for assemble/disassemble of wires to connectors/binding posts.

Follow ble/disasemble of red/black binding posts.

- 8. Install 24 binding posts (1) on faceplate (2).
- 9. Install connector J1 (3) on box (4) and secure with four screws (5) and new lockuuts (6).

#### Do step 10 for roadside data panel only. Do step 11 for curbside data panel only.

- 10. Install four connectors J109 thru J112 (7), on faceplate (2) and secure with jamnuts (8).
- 11. Install four connectors J105 thru J108 (9) on faceplate (2) and secure with jamnuts (8).
- 12. Install four connectors J1, J2, J4, J5 (10), on box (4) and secure with jamnuts (8).



J3

8

See wiring diagram for assemble/disassemble of wires to connectors/binding posts.

# Follow illustration for ble/disassemble of red/black binding posts.

- 13. connect leads (1) to 24 binding posts (2).
- 14. Install faceplate (3) on box (4) and secure with 14 screws (5) new lockwasher (6).





#### **FOLLOW-THROUGH STEPS**

1. Install data box (see your -20).

**END OF TASK** 

21.1-22 Change 4

# REPAIR POWER CONTROL ENCLOSURE, RIGHT PANEL (M1068 ONLY)

#### DESCRIPTION

This task covers: Disassemble (page 21.1-23) Assemble (page 21.1-25).

# INITIAL SETUP

#### **Tools:**

General Mechanic's Tool Kit (Item 35, App B)

#### **Materials/Parts**

Locknut (16) Locknut (8) Locknut (4) Lockwasher (12) Lockwasher (2) Lockwasher (2)

## **Personnel Required:**

Power-Generation Equipment Repairer 52D10 Helper (H)

#### **References:**

see your -10 see your -20

#### **Equipment Conditions:**

Power control enclosure assembly removed bee your -20)

#### DISASSEMBLE

11

- 1. Remove 12 screws (1), lockwashers (2), and cover (3) from enclosure (4). Discard lockwashers.
- 2. Remove eight screws (5) and lockwashers (6) connecting power supplies (7) to bracket (8) and shift (move or slide) power supplies (7) to the left. Discard lockwashers. Have Helper assist.
- 3. Remove 10 screws (9) and lockwashers (10) from faceplate (11). Lower faceplate. Discard lockwashers.



GO TO NEXT PAGE

D D D D D

#### NOTE Tag all leads and cables before removal.

- 4. Remove screw (1), lockwasher (2), and circuit 31.A lead (3) from positive terminal of connector J25 (4).
- 5. Remove screw (5), lockwasher (6), and circuit 32E lead (7) from negative terminal of connector J25 (4).
- 6. Remove screw (8), lockwasher (9), and circuit 36C lead (10) from positive terminal of connector J26 (11).
- 7. Remove screw (12), lockwasher (13), and circuit 32C lead (14) from negative terminal of connector J26 (11).

- 8. Remove eight screws (15), locknuts (16), two dust caps (17), connector J25 (4), and connector J26 (11) from enclosure (18). Discard locknuts.
- 9. Remove circuit leads 20B, 18D, and 3AC (19) from connector J37 (20).
- 10. Remove circuit leads 11A, 28A, 12A, 28B, and 3W (21) from J27 (22).
- 11. Remove circuit lead 44A (23) from J28 (24).
- 12. Remove circuit 34A (25) from J29 (26).
- 13. Remove 16 screws (27), locknuts (28), and connectors J37 (20), J27 (22), J28 (24), and J29 (26) from enclosure (18). Discard locknuts.





14. Remove circuit lead8 22A, 21A, 3AA, 18C, and 27A (1) from ground fault interrupter
(2). Remove two screws (3), lockwashers (4), and ground fault interrupter (2) from enclosure (5). Discard lockwashers.

#### NOTE

#### See wiring diagram to diconnect wires from terminal blocks. There are set screws securing each wire.

 Remove all wiring from terminal blocks (6) by loosening all set screws. Remove four screws (7), locknuts (8), eight washers (9), and two terminal block (6) from enclosure (5). Discard locknuts.

#### ASSEMBLE

- 16. Install two terminal blocks (6), four screws (7), new locknuts (8), and eight washers (9) on enclosure (5). Use wiring diagram. Install all wiring to terminal blocks and secure all set screws.
- 17. Install ground fault interrupter (2) on enclosure (5) with two new lockwashers (4) and screws (3). Install circuit leads 22A, 21A, 3AA, 18C, and 27A (1) on ground fault interrupter (2).



- Install connector J29 (1), four screws (2), and new locknut (3) on enclosure (4). Install circuit lead 34A (5) on J29 (1).
- 19. Install connector J28 (6), four screws (7), and new locknuts (8) on enclosure (4). Install circuit lead 44A (9) on J28 (6).
- 20. Install connector J27 (10), four screws (11), and new locknuts (12) on enclosure (4). Install circuit leads 11A, 28A, 12A, 28B, and 3W (13) on J27 (10).
- 21. Install connector J37 (14), four screws (15), and new locknuts (16) on enclosure (4). Install circuit leads 20B, 18D, and 3AC (17) on J37 (14).

- 22. Install connector J25 (18), connector J26 (19), two dust caps (20) with retainers, eight screws (21), and new locknuts (22) on enclosure (4).
- 23. Install circuit 32C lead (23), screw (24), and lockwasher (25) on negative terminal of connector J26 (19).
- 24. Install circuit 36C lead (26), screw (27), and lockwasher (28) on positive terminal of connector J26 (19).
- 25. Install circuit 32E lead (29), screws (30), and lockwasher (31) on negative terminal of connector J25 (18).
- 26. Install circuit 31A lead (32), screw (33), and lockwasher (34) on positive terminal of connector J25 (18).



- 27. Close faceplate (1) and install 10 screws (2) and new lockwashers (3).
- 28. Move power supplies (4) into the proper position inside power enclosure (5). Have helper assist.
- 29. Install eight screws (6), new lockwashers (7) and secure power supplies (4) to bracket (8) inside enclosure (5).
- 30. Install cover (9), 12 new lockwashers (10), and screws (11) on power enclosure (5).



# FOLLOW-THROUGH STEPS

1. Install power control enclosure assembly (see your -20).

**END OF TASK** 

Change 4 21.1-27

# **REPAIR POWER CONTROL ENCLOSURE, LEFT PANEL** (M1068 ONLY)

# **DESCRIPTION**

This task covers: Disassemble (page 21.1-28). Assemble (page 21.1-31).

# **INITIAL SETUP**

#### **Tools:**

General Mechanic's Tool Kit (Item 35, App B)

#### **Materials/Parts**

Locknut (40) Lockwasher (10) Strap

## **Personnel Required:**

Power-Generation Equipment Repairer 52D10

# DISASSEMBLE

- 1. Remove ten screws (1), lockwashers (2), and lower faceplate (3) from enclosure (4). Discard lockwashers.
- 2. Remove two screws (5), locknuts (6), four washers (7), relay bail (8) relay XK2 (9), and relay socket (10) from left panel (11). Discard locknuts.
- 3. Unplug relay socket (10) from relay XK2 (9).
- 4. Remove straps (12) from wires as required. Discard straps.

# **References:**

See your -10 See your -20

#### **Equipment Conditions:**

Power control enclosure assembly removed (see your -20).

# 

# Tag all leads/wires before removal for proper installation later.

# See wiring diagram for disassemble/ assemble of wires/leads.

- 5. Remove six screws (1), lockwashers (2), and eight circuit leads (3) from terminals of relay XK2 socket (4).
- 6. Remove two screws (5), locknuts (6), washers (7), and relay XK5 (8) from left panel (9). Discard locknuts.
- 7. De-solder/remove four wires (10) from terminals (11) of relay XK5 (8).

- 8. Remove two screws (5), locknuts (6), washers (7), and relay XK3 (12) from left panel (9). Discard locknuts.
- 9. De-solder/remove five wires (10) from terminals (11) of relay XK3 (12).
- 10. Remove two screws (5), locknuts (6), washers (7), and relay XK4 (13) from left panel (9). Discard locknuts.
- 11. De-solder/remove four wires (10) from terminals (11) of relay XK4 (13).



# WIRING DIAGRAM



21.1-30 Change 4

Tag all leads/wires before removal for proper installation later.

# See wiring diagram for disassemble/ assemble of wires/leads.

- 12. Remove straps (1) from wires as required. Discard straps.
- 13. Remove sixteen screws (2), locknuts (3), four connectors J24 (4), J31 (5), and J36 (6) from left panel (7). Discard locknuts.
- 14. Remove sixteen screws (2), locknuts (3), and four connectors J30 (8), J32 (9), J33 (10), and J34 (11) from 1eft panel (7). Discard locknuts.
- 15. Remove/de-solder twenty-eight wires (12) from terminals of connectors. See wiring diagram.

# ASSEMBLE

- 16. Solder/install twenty-eight wires (12) on terminals of connectors. See wiring diagram.
- 17. Install four connectors J30 (8), J32 (9), J33 (10), and J34 (11) on left panel (7), secure with sixteen screws (2) and new locknuts (3).
- 18. Install four connectors J24 (4), J31 (5), and J36 (6) on left panel (7), secure with sixteen screws (2) and new locknuts (3).
- 19. Install new straps (1) on wires as required.



# See wiring diagram for disassemble/ assemble of wires/leads.

- 20. Solder/install four wires (1) on terminals (2) of relay XK4 (3).
- 21. Install relay XK4 (3) on left panel (4), secure with two screws (5), new locknuts (6), and washers (7).
- 22. Solder/install five wires (1) on terminals (2) of relay XK3 (8).
- 23. Install relay XK3 (8) on left panel (4), secure with two screws (5), new locknuts (6) and washers (7).

- 24. Solder/install four wires (1) on terminals (2) of relay XK5 (9).
- 25. Install relay XK5 (9) on left panel (4), secure with two screws (5), new locknuts (6), and washers (7).
- 26. Install eight circuit leads (10) on terminals of relay socket (11), secure with six screws (12) and lockwashers (13).



10

- 27. Plug relay socket (1) in relay XK2 (2).
- 28. Install relay bail (3) over relay XK2 (2), and relay socket (1) on left panel (4) and secure with two screws (5), new locknuts (6), and four washers (7).
- 29. Install new straps (8) on wires as required.
- 30. Close/install faceplate (9) on enclosure (10), secure with ten screws (11) and new



# **FOLLOW-THROUGH STEPS**

1. Install power control enclosure assembly (see your -20).

**END OF TASK**
# **REPAIR POWER CONTROL ENCLOSURE, REAR PANEL** (MI068 ONLY)

## DESCRIPTION

This task covers: Disassemble (page 21.134). Assemble (page 21.136).

## **INITIAL SETUP**

#### TOOLS

General Mechanic's Tool Kit (Item 35, App B)

#### **Materials/Parts:**

Locknut (9) Lockwasher (10) Strap

#### **Personnel Required:**

Power-Generation Equipment Repairer 52D10

## DISASSEMBLE

#### NOTE Tag all wires before disconnecting them.

- 1. Remove ten screws (1), lockwashers (2), and lower faceplate (3). Discard lockwashers.
- 2. Remove nut (4), lockwasher (5), and lead 31A (6) from terminal A1 of relay K6 (7).
- 3. Remove nut (4), lockwasher (5), and leads 31.B and 31C (8) from terminal A2 of relay K 6 (7)

Clean, Inspect, and Repair (see Chapter 2).

## **References:**

See your -10 See your -20

#### **Equipment Conditions:**

Power control enclosure assembly removed bee your -20)

- 4. Remove nut (9), lockwasher (10), and lead 44A (11) from terminal X1 of relay K6 (7).
- 5. Remove nut (9), lockwasher (10), and lead 32Q (12) from terminal X2 of relay K6 (7).
- 6. Remove two screws (13), locknuts (14), four washers (15), and relay K6 (7) from rear panel (16). Discard locknuts.
- 7. Remove straps (17) from leads as required. Discard straps.

- 8. Remove leads 1C and 1D (1) from terminal T1 of contactor relay K1 (2).
- 9. Remove leads 2C, 2D and 2F (3) from terminal T2 of contactor relay K1 (2).
- 10. Remove leads 8A and 8B (4) from terminal L2 of contactor relay K1 (2).
- 11. Remove lead 2F (5) from terminal A2 of contactor relay K1 (2).
- 12. Remove lead 5A (6) from terminal A1 of contactor relay K1 (2).
- 13. Remove lead 7A (7) from terminal L1 of contactor relay K1 (2).
- 14. Remove four screws (8), locknuts (9), washers (10), and contactor relay K1 (2) from rear panel (11). Discard locknuts.
- 15. Disconnect leads 16A and 16B (12) from terminal A2 of reversing contactor RC1 (13).

- 16. Disconnect leads 28G and 28D (14) from terminal L2 of reversing contactor RC1 (13).
- 17. Disconnect lead 28D (14) from terminal Al of reversing contactor RC1 (13).
- 18. Disconnect leads 13A and 13D (15) from terminal L1 of reversing contactor RC1 (13).
- 19. Disconnect lead 9B (16) from terminal 51 of reversing contactor RC1 (13).
- 20. Disconnect. leads 15A and 15B (17) from terminal 52 of reversing contactor RC1 (13).
- 21. Disconnect leads 17A and 17B (18) from terminal T1 of reversing contactor RC1 (13).
- 22. Disconnect leads 18A and 18B (19) from terminal T2 of reversing contactor RC1 (13).



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- 23. Disconnect lead 15A (1) from terminal A2 of contactor RC1 (2).
- 24. Disconnect leads 8A, 8D, and 8E (3) from terminal L2 of contactor RC1 (2).
- 25. Disconnect leads 8G and 8E (4) from terminal Al of contactor RC1 (2).
- 26. Disconnect leads 9A, 9B, and 9C (5) from terminal L1 of contactor RC1 (2).
- 27. Disconnect lead 13D (6) from terminal 51 of contactor RC1 (2).
- 28. Disconnect lead 14A (7) from terminal 52 of contactor RC1 (2).
- 29. Disconnect lead 17A (8) from terminal T1 of contactor RC1 (2).
- 30. Disconnect lead 18A (9) from terminal T2 of contactor RC1 (2).
- 31. Remove three screws (10), locknuts (11), washers (12), and contactor RC1 (2) from rear panel (13). Discard locknuts.

## **ASSEMBLE**

- 32. Install contactor RC1 (2), three screws (10), washers (12), and new locknuts (11) in rear panel (13).
- 33. Install lead 18A (9) in terminal T2 of contactor RC1 (2).
- 34. Install lead 17A (8) in terminal T1 of contactor RC1 (2).
- 35. Install lead 14A (7) in terminal 52 of contactor RC1 (2) .
- 36. Install lead 13D (6) in terminal 51 of contactor RC1 (2).
- 37. Install leads 9A, 9B and 9C (5) in terminal L1 of contactor RC1 (2).
- 38. Install leads 8G and 8E (4) in A1 of contactor RC1 (2).
- 39. Install leads 8A, 8D, and 8E (3) in terminal L2 of contactor RC1 (2).
- 40. Install lead 15A (1) in terminal A2 of contactor RC1 (2).



- 41. Install leads 18A and 18B (1) in terminal T2 of reversing contactor RCl (2).
- 42. Install leads 17A and 17B (3) in terminal T1 of reversing contactor RC1 (2).
- 43. Install leads 15A and 15B (4) in terminal 52 of reversing contactor RC1 (2).
- 44. Install lead 9B (5) in terminal 51 of reversing contactor RC1 (2).
- 45. Install leads 13A and 13D (6) in terminal L1 of reversing contactor RC1 (2).
- 46. Install lead 28D (7) in terminal A1 of reversing contactor RC1 (2).
- 47. Install leads 28G and 28D (7) in terminal L2 of reversing contactor RC1 (2).
- 48. Install leads 16A and 16B (8) in terminal A2 of reversing contactor RC1 (2).

- 49. Install contactor relay K1 (9), four screws (10), washers (11), and new locknuts (12) on rear panel (13).
- 50. Install lead 7A (14) in terminal L1 of contactor relay K1 (9).
- 51. Install lead 5A (15) in terminal A1 of contactor relay K1 (9).
- 52. Install lead 2F (16) in terminal A2 of contactor relay K1 (9).
- 53. Install leads 8A and 8B (17) in terminal L2 of contactor relay K1 (9).
- 54. Install leads 2C, 2D, and 2F (18) in terminal T2 of contactor relay K1 (9).
- 55. Install leads 1C and 1D (19) in terminal T1 of contactor relay K1 (9).



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- 56. Secure leads with new straps (1) as required.
- 57. Install relay K6 (2), two screws (3), new locknuts (4), and four washers (5) on rear panel (6).
- 58. Install lead 32Q (7), lockwasher (8), and nut (9) on terminal X2 of relay K6 (2).
- 59. Install lead 44A (10), lockwasher (8), and nut (9) on terminal X1 of relay K6 (2).

- 60. Install leads 31B and 31C (11), lockwashers (12), and nut (13) on terminal A2 of relay K6 (2).
- 61. Install lead 31A (14), lockwasher (12), and nut (13) on terminal Al of relay K6 (2).
- 62. Close faceplate (15) and install ten screws (16) and new lockwashers (17).



## **FOLLOW-THROUGH STEPS**

1. Install power control enclosure assembly see your -20).

## **END OF TASK**

21.1-38 Change 4

## **REPLACE POWER CONTROL ENCLOSURE POWER SUPPLIES** (M1068 ONLY)

## DESRIPTION

This task covers: Remove (page 21.1-39). (page 21.1-40).

## **INITIAL SETUP**

#### **Tools:**

General Mechanic's Tool Box (Item 35, App B)

#### **Materials/Parts:**

Lockwasher (4) Lockwasher (8) Lockwasher (12) Locknut (16) Strap

## Personnel Required:

Clean, Inspect, and Repair (see Chapter 2). Install

Power-Generation Equipment Repairer 52D10 Helper (H)

#### References

See your -10 See your -20

## **Equipment Conditions:**

Power control enclosure assembly removed see your -20)



#### NOTE

## Tag all leads before disconnecting from terminals.

- 4. Remove four nuts (1) and five leads (2) from two power supplies (3 and 4).
- 5. Disconnect jumper cable (5) from two power supplies (3 and 4).
- 6. Remove three screws (6) and four leads (7) from power supply (3). Lift power supply (3) from enclosure, have helper assist.
- 7. Remove three screws (8) and five leads (9) from power supply (4). Lift power supply from enclosure, have helper assist.
- 8. Remove four screws (10), lockwashers (11), and bracket (12) from four isolators (13). Discard lockwashers.
- 9. Remove 16 locknuts (14), screws (15), and four isolators (13) from enclosure (16). Discard locknuts.

## INSTALL

10. Install four isolators (13), 16 screws (15), and new locknuts (14) in enclosure (16).

- 11. Install bracket (12), four new lockwashers (11), and screws (10) on four isolators (13).
- 12. Lift power supply (4) into enclosure, have helper assist. Install circuits 10A and 10B leads with screw (8) on AC HIGH terminal of power supply (4).
- 13. Install circuits 8B and 8C leads with screw (8) on AC LOW terminal of power supply (4).
- 14. Install circuit 3Z lead with screw (8) on GND terminal of power supply (4).
- Lift power supply (3) into enclosure, have helper assist. Install circuit 10B lead with screw (6) on AC HIGH terminal of power supply (3).
- 16. Install circuit 8C lead with screw (6) on AC LOW terminal of power supply (3).
- 17. Install circuits 3Z and 3Y leads with screw (6) on GND terminal of power supply (3).



## 21.1-40 Change 4

- 18. Connect jumper cable (1) to J1 on power supply (2) and J1 on power supply (3).
- 19. Connect circuits 31E and 31D (4) leads with nut (5) to positive terminal of power supply (2).
- 20. Connect circuits 31C (6) and 31D (4) leads with nut (5) to positive terminal of power supply (3).
- 21. Connect circuits 32D and 32E (7) leads with nut (5) to negative terminal on power supply (3).

- 22. Connect circuit 32D (7) with nut (5) to negative terminal of power supply (2).
- 23. Secure power supply (2) with four screws (9) and new lockwashers (10) on bracket (11).
- 24. Secure power supply (3) with four screws (9) and new lockwashers (10) on bracket (11).
- 25. Install cover (12) on enclosure (15). secure with 12 new lockwashers (13) and screws (14).



## FOLLOW-THROUGH STEPS

1. Install power control enclosure assembly (see your -20).

## **REPAIR SIGNAL PATCH PANEL BOX A10 (M1068 ONLY)**

## DESCRIPTION

This task covers: Disassemble (page 21.1-42). Clean, Inspect, and Repair (see Chapter 2). Assemble (page 21.1-44).

## **INITIAL SETUP**

#### **Tools:**

Electronic Equipment Tool Kit (Item 94.1, App B)

#### **Materials/Parts:**

Sealing compound (Item 74.1, App C) Sealing compound primer (Item 72.1, App C) Lockwasher (as needed) Locknut (20) Rivet (as needed)

## DISASSEMBLE

1. Remove twelve screws (1), lockwashers (2), two strips (3), and three jackfields (4) from signal patch panel box (5).

**NOTE** Tag all wires/leads before removal, use wiring diagram (page 21.1-43).

- **2.** Remove twenty locknuts (6), screws (7), and five connectors J135,J136,J138,J139, and J140, (8) from signal patch panel box (5). Discard locknuts.
- **3.** Disconnect wires (9) from five connectors J135, J136, J138, J139, and J140 (8).
- 4. Remove screws (10), lockwashers (11), and 156 jacks (12) from three jackfields (4). Discard lockwashers.
- 5. Remove two leads (13) from each jack (12).

18

## **Personnel Required:**

Radio Repairer 29E10

#### **References:**

See your -20

## **Equipment Conditions:**

Signal patch panel box removed (see your -20)

- 6. Remove jamnuts (14), lockwashers (15), and eight connectors (16) from signal patch panel box (5).
- 7. Remove wires (17) from eight connectors (16).
- **8.** If dust caps (18) are damaged, remove rivets (19) and dust caps from signal patch panel box (5).



## SIGNAL PATCH PANEL BOX A10 WIRING DIAGRAM



## **ASSEMBLE**

- 9. If dust caps (1) were removed, install dust caps on signal patch panel box (2) and secure with new rivers (3).
- 10. Install eight connectors (4) on signal patch panel box (2), secure with lockwashers (5) and jamnuts (6).

#### NOTE **Install wires (7) on eight connectors (4)** using wiring diagram (page 21.1-43).

Apply primer and sealant to threads of screws (11).

11. Install 156 jacks (8) on three jackfields (9), SECURE with new lockwashers (10) and screws (11).

NOTE Install two leads (12) on each jack (8) using wiring diagram (page 21.1-43).

12. Install five connecters J135, J136, J138, J139, and J140 (13) on signal patch panel box (2), secure with twenty screws (14) and new locknuts (15).

## NOTE

#### Install wires (16) on five connectors J135, J136, J138, J139, and J140 (13), using wiring diagram (page 21.1-43).

13. Install three jackfields (9) on signal patch panel box (2), secure with two strips (17), twelve new lockwashers (18), and screws (19).



## **FOLLOW-THROUGH STEPS**

1. Install signal patch panel box (see your -20).

## **REPAIR PHONE EXTENSION BOX A14 (M1068 ONLY)**

## DESCRIPTION

This task covers: Disassemble (page 21.1-45). Assemble (page 21.1-46).

## INITIAL SETUP

#### Tools:

Electronic Equipment Tool Kit (Item 94.1, App B)

## **Material/Parts:**

Adhesive (Item 1, App C) Locknut (4) Lockwasher (12) Strap

## DISASSEMBLE

1. Remove 12 screws (1), lockwashers (2), and faceplate (3) from phone extension box (4). Discard lockwashers.

#### NOTE Tag all leads before removal.

- 2. Disconnect all leads (5) from 24 binding posts (6).
- 3. Remove 24 binding posts (6) from faceplate (3).

Personnel Required: Radio Repairer 29E10

#### **References:**

see your -10 see your -20

#### **Equipment Conditions:**

Phone extension box removed from stowage box (see your -20)

- 4. Remove and discard straps (7), as required.
- 5. Remove four locknuts (8), screws (9), and connector J1 (10) from phone extension box (4). Discard locknuts.
- 6. Remove leads (11) from connector J1 (10).
- 7. Remove any damaged gaskets (12).



## ASSEMBLE

8. If removed, install new gaskets (1) by applying a thin coat of adhesive to phone extension box surface and to gasket surface. Allow 10 to 20 minutes to dry (tacky to the touch). Position gasket on phone extension box and press firmly into place.

#### NOTE

#### Use wiring diagram to identify location of post by color and for rewiring connector J1 and binding posts.

9. Install leads (2) in connector J1 (3).

- 10. Install connector J1 (3) on phone extension box (4). Secure with four screws (5) and new locknuts (6).
- 11. Install 24 binding posts (7) on faceplate (8).
- 12. Connect all leads (9) to 24 binding posts (7).
- 13. Install new straps (10), as required.
- 14. Install faceplate (8) on phone extension box (4). Secure with 12 new lockwashers (11) and screws (12).



## **FOLLOW-THROUGH STEPS**

1. Stow phone extension box in stowage box (see your -20).

## **REPAIR TENT INTERFACE PANEL BOX ASSEMBLY A5** (M1068 ONLY)

## DESCRIPTION

This task covers: Disassemble (page 21.1-47). Assemble (page 21.1-50).

## **INITIAL SETUP**

#### **Tools:**

General Mechanic's Tool Box (Item 35, App B) Electronic Equipment Tool Kit (Item 94.1, App B)

#### **Materials/Parts:**

Adhesive (Item 1, App C) Lockwasher (14) Self-locking nut (30)

## DISASSEMBLE

1. Remove 14 screws (1), lockwashers (2), and faceplate (3) from box (4). Discard lockwashers.

## NOTE

## Do not remove gasket unless gasket is damaged.

2. If any of four gaskets (5) are damaged, remove only the damaged gaskets from box (4).

#### NOTE

Tag all leads before disconnecting from connectors. Use wiring diagram (page 21.1-49).

Clean, Inspect, and Repair (see Chapter 2).

#### **Personnel Required:**

Power-Generation Equipment Repairer 52D10 Radio Repairer 29E10

#### **References:**

See your -10 See your -20

#### **Equipment Conditions:**

Tent interface panel box assembly removed (see your -20)

- 3. Remove four locknuts (6), screws (7), connector (8) and gasket (9) from box (4). Discard locknuts.
- 4. Remove four locknuts (10), screws (11), dust cap (12), connector J137 (13), and gasket (14) from faceplate (3). Discard locknuts.
- 5. Disconnect four leads (15) from four binding posts (16).



10

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1

- 6. Disconnect three lead terminals (1) from connector J11 (2).
- 7. Disconnect three terminals (1) from connector J12 (3).
- 8. Disconnect three lead terminals (1) from connector J13 (4).
- 9. Remove 12 screws (5), locknuts (6), three dust caps (7), connectors (2, 3, and 4), and gaskets (8) from faceplate (9). Discard locknuts.
- 10. Remove four screws (5), locknuts (6), J7 connector (10), and gasket (11) from box (12). Discard locknuts.

- 11. Remove two jamnuts (13) and connectors J9 and J10 (14) from box (12).
- 12. Remove two jamnuts (15) and connectors J113 and J114 (16) from faceplate (9).
- Remove four screws (5), locknuts (6), connector J22 (17), gasket (18), and dust cap (19) from faceplate (9). Discard locknuts.
- 14. Remove four binding posts (20) from faceplate (9).
- 15. Remove two locknuts (21), screws (22), and caps (23) from faceplate (9). Discard lock-nuts.
- 16. Remove six nuts (24), screws (25), washers (26), two catch assemblies (27), and pads (28) from box (12).



## WIRING DIAGRAM FOR TENT INTERFACE PANEL BOX ASSEMBLY A5 (M1068 ONLY)

JH

JI2 | H

JI3 H

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G

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G



## ASSEMBLE

- 17. Install two catch assemblies (1), pads (2), six screws (3), washers (4), and nuts (5) on box (6).
- 18. Install two caps (7), screws (8), and new locknuts (9) on faceplate (10).
- 19. Install four binding posts (11) on faceplate (10).
- 20. Install connector J22 (12), gasket (13), dust cap (14), four screws (15), and new locknuts (16) on faceplate (10).
- 21. Install two connectors J113 and J114 (17) and jamnuts (18) on faceplate (10).
- 22. Install two connectors J9 and J10 (19) and jamnuts (20) on box (6).

- 23. Install connector J7 (21), gasket (22), four screws (15), and locknuts (16) on box (6).
- 24. Install three connectors (23, 24, and 25), gaskets (26), dust caps (27), 12 screws (15), and new locknuts (16) on faceplate (10).

## NOTE Use wiring diagram (page 21.1-49).

- 25. Connect three lead terminals (28) on connector J13 (23).
- 26. Connect three lead terminals (28) on connector J12 (24).
- 27. Connect three lead terminals (28) on connector J11 (25).



- 28. Install four leads (1) on four binding posts (2).
- 29. Install connector J137 (3), gasket (4), dust cap (5), four screws (6), and new locknuts (7) on faceplate (8).
- 30. Install connector J8 (9), gasket (10), four screws (11), and new locknuts (12) on box (13).
- 31. Install new gaskets (14) by applying a thin coat of adhesive to box surface and to gasket surface. Allow 10 to 20 minutes to dry (tacky to the touch). Position gasket on box (13) and press firmly into place.
- 32. Install faceplate (8), 14 new lockwashers, (15) and screws (16) on box (13).



#### **FOLLOW-THROUGH STEPS**

1. Install Tent interface panel box assembly bee your -20).

# **REPAIR ROADSIDE AC POWER EXTENSION BOX A18** (M1068 ONLY)

## DESCRIPTION

This task covers: Disassemble (page 21.1-52). Assemble (page 21.1-53).

## **INITIAL SETUP**

#### **Tools:**

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B)

#### Marterials/Parts:

Locknut (24)

#### **Personnel Required:**

Fuel and Elec Sys Rep 63G10

## DISASSEMBLE

NOTE

See wiring diagram for assemble/disassemble of wires to connectors.

1. Remove four screws (1), cover (2) and gasket (3), from extension box (4).

#### NOTE

Tag all leads before disconnecting for proper assembly later.

The four screws that secure connector J1 are shorter. Do not mix with other connectors.

Clean, Inspect, and Repair (see Chapter 2).

### **References:**

See your -20

#### **Equipment Conditions:**

Roadside AC power extension box Al8 removed (see your -20)

- 2. Remove four screws (5), locknuts (6), and connector J6 (7) from extension box (4). Discard locknuts.
- 3. Remove four screws (8), locknuts (9), and connector J1(10) from extension box (4). Discard locknuts.
- 4. Disconnect leads from connectors if necessary.
- 5. Remove 16 screws (11), locknuts (12), four connectors (13), and dust caps (14) from cover (2). Discard locknuts.



#### ASSEMBLE

#### NOTE

The four screws that secure connector J1 are shorter. Do not mix with other connectors.

- 5. Install four connectors (1) on cover (2) with dust caps (3) and secure with 16 screws (4) and new locknuts (5).
- 6. Install connector J1 (6) on extension box (7) and secure with four screws (8) and new locknuts (9).
- 7. Install connector J6 (10) on extension box (7) and secure with four screws (11) and new locknuts (12).

## NOTE See wiring diagram for assemble/disassemble of wires to connectors.

- 8. Connect leads to connectors if necessary.
- 9. Install gasket (13) on extension box (7) with cover (2) and secure with four screws (14).





J1

#### FOLLOW-THROUGH STEPS

1. Install roadside AC power extension box A18 (see your -20).

## **REPAIR CURBSIDE AC POWER EXTENSION BOX A19** (M1068 ONLY)

## DESCRIPTION

This task covers: Disassemble (page 21.1-64). Clean, Inspect, and Repair (see Chapter 2). Assemble (page 21.1-55).

## INITIAL SETUP

## **Tools**:

Automotive Fuel and Electrical System Repair Tool Kit (Item 7, App B)

## Materials/Parts:

Locknut (28)

## **Personnel Required:**

Fuel and Elec Sys Rep 63G10

## DISASSEMBLE

NOTE See wiring diagram for assemble/disassemble of wires to connectors.

1. Remove four screws (1), cover (2), and gasket (3) from extension box (4).

NOTE Tag all leads before disconnecting for proper assembly later.

## **References:**

See your -20

## **Equipment Conditions:**

Curbside AC power extension box A19 removed (see your -20)

- 2. Remove four screws (5), locknuts (6), and connector J15 (7) from extension box (4). Discard locknuts.
- 3. Remove 24 mews (8), locknuts (9), six connectors (10), and dust caps (11) from cover (2). Discard locknuts.



## ASSEMBLE

- 4. Install six connectors (1) on cover (2) with dust caps (3) and secure with 24 screws (4) and new locknuts (5).
- 5. Install connector J15 (6) on extension box (7) and secure with four screws (8) and new locknuts (9).

## NOTE See wiring diagram for assemble/assemble of wires to connectors.

- 6. Connect leads to connectors if necessary.
- 7. Install gasket (10) on extension box (7) with cover (2) and secure with four screws (11).





(A19) WIRING DIAGRAM

## **FOLLOW-THROUGH STEPS**

1. Install curbside AC power extension box A19 (see your -20).

# REPLACE LAN A CABLE W101 AND/OR LAN B CABLE W102 (M1068 ONLY)

## DESCRIPTION

This task covers: Remove (page 21.1-56). Install (page 21.1-57).

## **INITIAL SETUP**

## **Tools:**

Electronic Equipment Tool Kit (Item 94.1, App B)

#### **Materials/Parts:**

Locknut (2) Lockwasher (14) Strap

## **Personnel Required:**

Radio Repairer 29E10 Helper (H)

## REMOVE

- 1. Lift and secure cover (1) of external communications box All (2).
- 2. Remove fourteen screws (3), lockwashers (4), and faceplate (5) from external communications box A11 (2). Discard lockwashers.

## NOTE Tag cables before disconnecting them.

3. Disconnect cable W101, jack J103 (6), jamnut (7), inside bushing (8) and outside bushing (9) from faceplate LAN A (10) on external communications box A11 (2).



#### **References:**

See your -10 See your -20 TM 11-7010-256-12&P

#### **Equipment Conditions:**

Engine stopped (see your -10) Carrier blocked (see your -10) All external power disconnected (see TM 11-7010-266-12&P) Battery ground strap disconnected see your -20)

- 4. Disconnect cable W102, jack J104 (11) jamnut (7), inside bushing (8) and outside bushing (9) from faceplate LAN B (12) on external communications box All (2).
- 5. Remove and push cable(s) W101 and/or W102 (6 and/or 11) down into hull, pull through opening in bottom (13) of external communications box All (2). Have helper assist.



- 6. Remove two locknuts (1), four washers (2), two screws (3), and clamps (4) from cables W101 (5) and W102 (6). Discard locknuts.
- 7. Remove and discard straps (7) as required.
- 8. Disconnect cable W101, (5) from data panel assembly A12, jack J1 (8), remove from vehicle.
- 9. Disconnect cable W102, (6) from data panel assembly A12, jack J4 (9), remove from vehicle.

## INSTALL

10. Install cable W101, jack J103 (5) and/or W102 jack J104 (6) in vehicle and route through hole in hull top plate (10) up into base of external communications box A11 (11). Have helper assist.

- 11. Connect cable W101, (5) on data panel assembly A12, jack J1 (8).
- 12. Connect cable W102, (6) on data panel assembly A12, jack J4 (9).
- 13. Connect cable W101, jack J103 (5) with inside bushing (12), on faceplate LAN A (13) secure with outside bushing (14) and jamnut (15).
- 14. Connect cable W102, jack J104 (6) with inside bushing (12), on faceplate LAN B (16) secure with outside bushing (14) and jamnut (15).
- 15, Secure cable W101 (5) and/or W102 (6) to hull with two clamps (4), screws (3), four washers (2), and two new locknuts (1).
- 16. Secure slack in cable with new straps (7) as required.
- 17. Install faceplate (17) on external communications box A11 (11), secure with fourteen new lockwashers (18), and screws (19).



## **FOLLOW-THROUGH STEPS**

1. Connect battery ground strap (see your -20).

- 3. Turn MASTER SWITCH OFF (see your -10).
- 2. Turn MASTER SWITCH ON (see your -10). Check that electrical system works properly.

# REPLACE RF 1,2,3,4 CABLE ASSEMBLIES W111, W112, W113, AND W114 (M1068 ONLY)

## **DESCRIPTION**

This task covers: Remove (page 21.1-58). Install (page 21.1-59).

## **INITIAL SETUP**

## Tools

Electronic Equipment Tool Bit (Item 94.1, App B)

## Material/Parts:

Lockwasher (14) Straps

## **Personnel Required**

Radio Repairer 29E10

## REMOVE

- 1. Lift and secure cover (1) of external communications box (2).
- 2. Remove 14 screws (3), lockwashers (4), and faceplate (6) from external communications box (2). Discard lockwashers.

## **NOTE** Tag all cables before disconnecting them.

- 3. Disconnect W111, plug P2 (6) from jack J115 (7) on faceplate (5).
- Disconnect W112, plug P2 (8) from jack J116 (9) on faceplate (5).
- 5. Disconnect W113, plug P2 (10) from jack J117 (11) on faceplate (5).
- 6. Disconnect W114, plug P2 (12) from jack J118 (13) on faceplate (5).
- 7. Remove and discard straps (14) as required.
- 8. Remove five clamps (15) and screws (16).
- 9. Remove clamp (17) and screw (18).

## **Personnel Required (cont):**

Helper (H)

## **References**:

See your -20

## **Equipment Conditions:**

External communication box removed (see your -20)

10. Pull harness through base (19) of communications box (2). Have helper assist.



#### NOTE Tag all cables before disconnecting them.

- 11. Disconnect W111, plug P1 (1) from jack J115 (2) on signal patch panel box (3).
- 12. Disconnect W112, plug P1 (4) from jack J116 (5) on signal patch panel box (3).
- 13. Disconnect W113, plug P1 (6) from jack J117 (7) on signal patch panel box (3).
- 14. Disconnect W114, plug P1 (8) from jack J118 (9) on signal patch panel box (3).
- 15. Remove cable assemblies from carrier. Have helper assist.

## INSTALL

- 16. Install cable assemblies in carrier. Have helper assist.
- 17. Push harness into base (10) of external communications box (11). Have helper assist.
- 18. Connect W111, plug P1 (1) to jack J115 (2) on signal patch panel box (3).
- 19. Connect W112, plug P1 (4) to jack J116 (5) on signal patch panel box (3).
- 20. Connect W113, plug P1 (6) to jack J117 (7) on signal patch panel box (3).
- 21. Connect W114, plug P1 (8) to jack J118 (9) on signal patch panel box (3).
- 22. Connect harness to inside of faceplate (12) of external communications box (11).
- 23. Connect W111, plug P2 (13) to jack 5115 (14) on faceplate (12).
- 24. Connect W112, plug P2 (15) to jack J116 (16) on faceplate (12).
- 25. Connect W113, plug P2 (17) to jack J117 (18) on faceplate (12).

### **FOLLOW-THROUGH STEPS**

1. Install external communication box (see your -20)

- 26. Connect W114, plug P2 (19) to jack J118 (20) on faceplate (12).
- 27. Install clamp (21) and screw (22).
- 28. Install five clamps (23) and screws (24).
- 29. Install new straps (25) as required.
- 30. Install faceplate (12) on external communications box (11), secure with 14 screws (26) and new lockwashers (27).
- 31. Lower and secure cover (28) of external communications box (11).



## **REPLACE CABLE ASSEMBLY W115 (M1068 ONLY)**

## DESCRIPTION

This task covers: Remove (page 21.1-60). Install (page 21.1-61).

## **INITIAL SETUP**

## **Tools:**

Electronic Equipment Tool Kit (Item 94.1, App B)

## Materials/Parts

Lockwasher (14) Strap

## **Personnel Required:**

Radio Repairer 29E10 Helper (H)

## **References:**

See your -20

## **Equipment Conditions:**

External communication box removed (see your -20)

## REMOVE

- 1. Open and secure lid (1) on external communication box (2).
- Remove 14 screws (3), lockwashers (4), and faceplate (5) from external communication box: (2). Discard lockwashers.

## NOTE

## Tag leads before disconnecting from binding posts.

- 3. Remove binding posts (6) and 16 leads (7) from external communication box (2).
- 4. Remove screws (8) and clamps (9) from weldnuts (10), as required.
- 5. Remove and discard straps (11), as required.
- 6. Disconnect cable assembly W115, plug P106 (12) from jack J136 (13) on signal patch panel box (14).
- 7. Pull cable assembly W115 down through base (15) out of external communications box (2). Remove cable assembly W115 from vehicle. Have helper assist.



## INSTALL

- 8. Install cable assembly W115 into vehicle, and route cable up through base (1) into external communications box (2). Have helper assist.
- 9. Connect cable assembly W115, plug P106 (3) to jack J136 (4) on signal patch panel box (5).
- 10. Install clamps (6) on cable assembly and secure to weldnuts (7) with screws (8), as required.
- 11. Install new straps (9) to secure cable W115, as required.
- 12. Connect 16 leads (10) to binding post (11) on faceplate (12).
- 13. Install faceplate (12) on external communication box (2) and secure with 14 new lockwashers (13) and screws (14).
- 14. Close and secure lid (15) on external communication box (2).



## **FOLLOW-THROUGH STEPS**

1. Install external communication box (see your -20)

## **REPLACE CABLE ASSEMBLIES W117 AND W118 (M1068 ONLY)**

## DESCRIPTION

This task covers: Remove (page 21.1-62). Install (page 21.1-63).

## **INITIAL SETUP**

#### **Tools:**

Electronic Equipment Tool Kit (Item 94.1, App B)

## **Material/Parts:**

Lockwasher (12) Strap

#### **Personnel Required**

Radio Repairer 29E10

## REMOVE

#### **NOTE** Tag all cables before disconnecting them.

- 1. Remove 12 screws (1), lockwashers (2), and connectors J101 (3) and J102 (4) from the external communication box (5). Discard lockwashers.
- 2. Remove cable assemblies W117 (6) from connector J101 (3).
- 3. Remove cable W117 (6) and W118 (7) from connector J102 (4) of external communication box (5).
- 4. Remove screws (8) and clamps (9) from weldnuts (10), as required.
- 5. Remove and discard straps (11), as required.
- 6. Disconnect cable assembly W118, plug P105 (12) from jack J135 (13) on signal patch panel box (14).
- 7. Pull cable assembly W118 down through base (15) out of external communications box (5). Remove cable assembly W118 from vehicle. Have helper assist.

## **Personnel Required (cont):**

Helper (H)

References: See your -20

Equipment Conditions: External communication box removed (see your -20)



## INSTALL

- 8. Install cable assembly W118 into vehicle, and route cable up through base (1) into external communications box (2). Have helper assist.
- 9. Connect cable assembly W118, plug P105 (3) to jack J135 (4) on signal patch panel box (5).
- 10. Install clamps (6) **on cable assembly and** secure to weldnuts (7) with screws (8), as required.
- 11. Install new straps (9) to secure cable assembly, as required.
- 12. Install cable W117 (10) and W118 (11) on connector J102 (12) of external communication box (2).
- 13. Install cable assembly W117 (10) on connector J101 (13).
- 14. Install connectors J101 (13) and J102 (12) on the external communication box (2), secure with 12 screws (14), and new lockwashers (15).





## FOLLOW-THROUGH STEPS

1. Install external communication box (see your -20)

# **REPAIR CURBSIDE DC POWER EXTENSION BOX A8** (M1068 ONLY)

## DESCRIPTION

This task covers: Disassemble (page 21.1-64). Assemble (page 21.1-65).

## **INITIAL SETUP**

#### **Tools:**

Automotive Fuel and Electrical System Repair Took Kit (Item 7, App B)

#### **Materials/Parts:**

Self-locking nut (20)

Personnel Required: Fuel and Elec Sys Rep 63G10

## DISASSEMBLE

NOTE See wiring diagram for assemble/disassemble of wires to connectors.

1. Remove four screws (1), cover (2) and gasket (3), from extension box (4).

NOTE Tag all leads before disconnecting for proper assembly later. Clean, Inspect, and Repair (see Chapter 2).

## **References:**

See your -20

## **Equipment Conditions**

Curbside DC power extension box removed (see your -20)

- 2. Remove four screws (5), locknuts (6), and connector J1 (7) from extension box (4). Discard locknuts.
- 3. Disconnect leads from connectors if necessary.
- 4. Remove sixteen screws (8), locknuts (9), four connectors (10) and dust caps (11) from cover (4). Discard 1ocknuts.



## ASSEMBLE

- 5. Install four connectors (1) on cover (2) with dust caps (3) and secure with sixteen screws (4) and new locknuts (5).
- 6. Install connector J1 (6) on extension box (7) and secure with four screws (8), and new locknuts (9).

#### NOTE See wiring diagram for assemble/disassemble of wires to connectors.

- 7. Connect. leads to connectors if necessary.
- 8. Install gasket (10) on extension box (7) with cover (2) and secure with four screws (11).



## (A8) WIRING DIAGRAM



## **FOLLOW-THROUGH STEPS**

1. Install curbside DC power extension box (see your -20).

## **CHAPTER 22** MAINTENANCE OF FIRE EXTINGUISHER SYSTEM

## SERVICE CHEMICAL FIRE EXTINGUISHER (M1059 ONLY)

## **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Mail and parcel post scale (Item 78, App B)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

## **INSPECTION AND MAINTENANCE**

- 1. Invert extinguisher (1) and open nozzle (2) to release any remaining pressure or dust from cartridge receiver (3) and hose (4).
- 2. Return extinguisher (1) to upright position.
- 3. Inspect visual inspection seal wire (5) for security.
- 4. Examine outer components for cleanliness and corrosion or damage.

#### **References:**

see your -20

#### **Equipment Conditions:**

Fire extinguisher removed from earner (see your -20)



WARNING

Mechanical damage, evidence of welding or corrosion constitute a potential personnel hazard. Use extreme caution when hanfire fire extinguishers in this condition. Replace if necessary.

5. Check exterior shell (6), cartridge guard (7), cartridge receiver (3), hose (4), nozzle (2), and hand assembly (8) for wear or other disorders.



- 6. Check nameplates (1) for legibility and security. If nameplate is loose, remove and examine mounting area on shell (2) for corrosion.
- 7. Pull cartridge guard (3) from extinguisher (4). Inspect the inside components for working order and cleanliness.
- 8 Unscrew cartridge (5) left hand thread (counterclockwise). Check seal (6) for punctures.



WARNING A cartridge can be punctured if the lever does not work freely. Do not install the cartridge before you make sure the puncture lever works freely.

- 9. Weigh cartridge (5). If weight is less than 1/2 oz. of weight stamped on cartridge, the cartridge must be replaced. Use 5-pound mail and parcel post scale.

- 10. Remove nozzle (7) from holder (8) and lift hose (9) from behind puncture lever (10).
- 11. Operate puncture lever (10) to check for proper working order.
- 12. Check the pressure relief vent (11) for obstructions.
- 13. Remove cartridge receiver gasket (12) and check for cuts or wear. If damaged, replace.



- 14. Examine hose (1) and hose couplings (2) for cuts or cracks.
- 15. Check nozzle (3) for proper operation.
  - a. Check handle (4) for binding.
  - b. Unscrew nozzle tip (5) and inspect for obstructions or damaged gasket (6).
  - c. Inspect plunger tip (7) for cuts or brittleness.
- 16. Check hose (1) for blockage.
  - a. Place extinguisher (8) horizontally on solid surface and discharge outlet UP.
  - b. Loosen filler cap (9) three and one half turns.

- c. Wipe nozzle (3) clean and blow into extinguisher (8), observing gas escape from filler cap (9).
- d. Unscrew hose (1) from extinguisher (8) and check preformed packing (10) for damage. If damaged, replace.
- 17. Return extinguisher (8) to upright position and remove filler cap (9). Remove any remaining dust.
- 18. Inspect filler cap (9) threads for nicks, cross threading, corrosion, and wear.
- 19. Check pressure relief vent (11) for obstructions.
- 20. Remove quad ring (12) and flat gasket (13) from filler cap (9).



- Thoroughly clean threads and gasket surface with stiff brush. Ensure pressure relief vent (1) grooves are unobstructed.
- 22. Thoroughly clean threads of top collar (2) with stiff 'brush. Wipe clean with a rag.



- 23. Remove retainer (3) and preformed packing(4) which secure stem indicator assembly(5). Clean or replace parts as required. Cap
  - (6) should be replaced only if damaged.
- 24. Reassemble cap indicator (7). Reset indicator by pulling it in.

- 25. Clean gasket (8) and quad ring (9) with dry wiping rag. Inspect for cuts, breaks, wear, and elasticity.
- 26. Apply a thin coat of grease to gasket (8) surfaces.
- 27. Install gasket (8) and quad ring (9) on filler cap (10).



- 28. Ensure inside of shell (11) is clean and dry. Fill extinguisher with agent as required.
- 29. Install filler cap (10).
- 30. Lift puncture lever (12) and place hose (13) behind lever securing nozzle (14) in holder (15).




#### WARNING



Do not install cartridge without hose in place behind puncture lever. Cartridge will discharge if lever is pushed.

- 31. Install cartridge (1).
- 32. Install cartridge guard (2).
- 33. Install visual inspection seal wire (3).





#### FOLLOW-THROUGH STEPS

1. Install fire extinguisher in earner (see your -20).

END OF TASK

#### CHAPTER 23

## MAINTENANCE OF CHEMICAL AGENT AUTOMATIC ALARM MOUNTING KIT

# INSTALL CHEMICAL AGENT AUTOMATIC ALARM MOUNTING KIT (M113A2 ONLY)

#### DESCRIPTION

This task covers: Prepare Carrier (page 23-1). Install (page 23-2).

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B) Torque Wrench (Item 116, App B) Torque Wrench (Item 117, App B)

#### Materials/Parts:

Kit P/N 12313244 (19207) Self-locking nut (2)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### **PREPARE CARRIER**

 Remove two locknuts (1), screws (2), and right front personnel seat backrest (3) from sponson brackets. Remove backrest from carrier. Retain backrest and attaching parts. Discard locknuts.



#### **References:**

See your -10 See your -20

#### **Equipment Conditions:**

Ramp lowered (see your -10) Engine stopped (see your -10) Carrier blocked (see your -10)

2. Release latch (4) on each side of battery box. Lift and slide cover (5) from box. Retain cover.



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# INSTALL

- 3. Remove four capscrews (1) and flat washers (2) from right hull plate.
- 4. Secure new detector unit bracket (3) to right hull plate with four cap screws (1) and washers (2). Tighten screws to 264-288 in-lb (30-33 N•m) torque. Use torque wrench (item 110).
- 5. Secure low profile mount (4) to bracket (3) with four cap screws (5), washers (6), and nuts (7). Tighten screws to-72-78 in-lb (8-9 N•m) torque. Use torque wrench (item 109).





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5-7-

- Remove two cap screws (1), flat washers (2), and locknuts (3) from battery box cover (4). Discard locknuts.
- Place refill kit mounting bracket (5) on battery box cover (4). Secure with two cap screws (1), flat washers (2), and new locknuts (3).
- 8. Install strap assembly (6) on bracket (5).

- 9. Remove five cap screws (7) and flat washers (8) from overhead.
- Place alarm unit mounting bracket (9) on overhead. Secure with five flat washers (8) and cap screws (7). Tighten screws to 264-288 in-lb (30-33 N•m) torque. Use torque wrench (item 110).
- 11. Install four machine screws (10), flat washers (11), and locknuts (12) in openings in alarm part of bracket (9).
- 12. Install strap assembly (13) on bracket (9).



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- 13. Thread battery cable (1) through rear grommet (2) of junction box (3).
- 14. Connect circuit 6B POS lead (4) to rear terminal of circuit breaker (5).
- 15. Connect circuit 7B NEG lead (6) to terminal strip (7).
- 16. Thread alarm unit cable (8) through rear grommet (2) of junction box (3).
- 17. Connect 509B lead (9) to terminal strip (7).
- 18. Connect 509C lead (10) to terminal strip (7).

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#### NOTE

# Check wiring connections with wiring diagram before attaching junction box.

- 19. Remove two cap screws (11) and flat washers (12) from hull.
- Place junction box (3) on hull. Secure with two flat washers (12) and cap screws (11). Tighten screws to 72-78 in-lb (8-9 N•m) torque. Use torque wrench (item 109).
- 21. Remove two machine screws (13) from hull.
- 22. Place two new cradles (14) on hull. Secure with two machine screws (13).
- 23. Remove two dome light lead cradle clips (15).
- 24, Route alarm unit cable (8) over two cradles (14) and along dome light lead. Secure with two new cradle clips (16) and dome light cradle clips (15).





- 25. Remove plug from hole in battery box.
- 26. Install grommet (1) in hole in battery box.
- 27. Thread battery cable (2) through grommet (1) and into battery box.



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 4

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 NEG

 POS
 POS

 NEG
 POS

 TAPE CABLE
 Cable

 TO THIS POINT

#### FOLLOW-THROUGH STEPS

1. Raise and lock ramp (see your -10).

- 28. Connect cable (2) to battery terminals. Connect 6B POS lead (3) to positive terminal. Connect 7B NEG lead (4) to negative terminal.
- 29. Install battery box cover (see your -20).
- 30. Install front personnel seat backrest (5) to sponson brackets with two screws (6) and new locknuts (7).
- 31. Test electrical continuity of chemical alarm kit circuits (see your -20).



END OF TASK

<sup>2.</sup> Stop engine (see your -10).

## CHAPTER 24 MAINTENANCE OF SHIPPING CLOSURE AND FRAME

#### 

# REMOVE SHIPPING CLOSURE AND FRAME (ALL EXCEPT M577A2, M1068, AND M741A1)

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B)

#### **Equipment Conditions**

Carrier delivered to using troops

**Personnel Required** 

Track Vehicle Repairer 63H10

#### REMOVE

#### NOTE

Do not damage or destroy the closure cover or frame. They can be used again. Turn them in to supply personnel.

- 1. Fold Up cover (1). Release 16 straps (2).
- 2. Remove eight rods (3) from cover (1).
- 3. Remove cover (1) from frame (4).
- 4. Remove four screws (5), 12 washers (6), and four tiedown supports (7) from four track shroud retainers (8).
- Remove four track shroud bolts (9) and washers (10) from driver's compartment. Install them in four track shroud retainers (8).
- 6. Remove four screws (11), nuts (12), eight washers (13), and four supports (7) from frame (4).
- 7. Remove frame (4) from carrier.



END OF TASK

3

# REMOVE SHIPPING CLOSURE AND FRAME (M577A2, M1068, AND M741A1 ONLY)

#### **INITIAL SETUP**

#### Tools:

General Mechanics Tool Kit (Item 35, App B)

#### **Personnel Required:**

Track Vehicle Repairer 63H10

#### REMOVE

#### NOTE

Do not damage or destroy the closure cover or frames. They can be used again. Turn them in to supply personnel.

1. Fold up cover (1). Release 20 rod clamps (2). Have helper assist.

#### **Personnel Required (cont):**

Helper (H)

#### **Equipment Conditions:**

Carrier delivered to using troops

- 2. Remove 10 rods (3) from cover (1).
- 3. Remove cover (1) from upper frame (4) and lower frame (5). Have helper assist.



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- 4. Remove eight screws (1), nuts (2), and upper frame (3) from lower frame (4). Have helper assist.
- 5. Remove two screws (5), eight washers (6), and two frame supports (7) from two track shroud retainers (8).
- Remove two screws (9), washers (10), nuts (11), and frame supports (7) from lower frame (4).
- Remove two screws (12), washers (13), nuts (14), and lower frame (4) from two extension brackets (15).
- 8. Remove lower frame (4) from earner. Have helper assist.



- 9. Remove two track shroud retainer bolts (1) and washers (2) from driver's compartment. Install bolts and washers in two track shroud retainers (3).
- 10. Remove two end fittings (4), screws (5), nuts (6), and eight washers (7) from driver's compartment.
- Install two end fittings (4) on two extension brackets (8). Secure with two screws (5), nuts (6), and eight washers (7).



END OF TASK

# APPENDIX A REFERENCES

#### SCOPE

This appendix lists all forms, field manuals, technical manuals and miscellaneous publications to be used by personnel in operating and maintaining the earners. The DA PAM 25-30 series Department of the Army Pamphlets should be consulted often for the latest changes or revisions to references given in this appendix and for new publications relating to the material covered in this technical manual.

#### FORMS

AOAP Log	DA Form 2408-20
Duty Roster	DA Form 6
Equipment Component Register	DA Form 2408-10
Equipment Control Record	DA Form 2408-9
Equipment Daily or Monthly Log	DA Form 2408-1
Equipment Modification Record	DA Form 2408-5
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Maintenance Request	DA Form 2407
Processing and Reprocessing Record for Shipment, Storage, and Issue of Vehicles and Spare Engines	DD Form 1397
Recommended Changes to Publications and	
Blank forms	DA Form 2028
Uncorrected Fault Record	DA Form 2408-14

#### LUBRICATION

Lubrication Order, Carrier, Personnel, Full Tracked, Armored
M113A2 (2350-01-068-4077); Carrier, Command Post, Light,
Tracked M577A2 (2350-01-068-4089); Carrier, Mortar, 107-MM,
Self-Propelled M106A2 (2350-01-069-6931); and Carrier,
Mortar, 81-MM, Self-Propelled M125A2 (2350-01-068-4087);
Carrier, Smoke Generator, Full Tracked, M1059
(2350-01-203-0188); Carrier, Mortar, 120-MM, Self-Propelled, M1064
(2350-01-338-3116) Carrier, Standardized Integrated Command
Post System, M1068 (2350-01-354-5657)LO 9-2350-261-12
Lubrication Order, Combat Vehicle, Anti-Tank, Improved Tow
Vehicle, M901 (2350-01-045-1123); M901A1, (2350-01-103-5641) LO 9-2350-259-12
Lubrication Order, Chassis, Gun, Anti-Aircraft Artillery, 20-MM Self-Propelled (M163 Weapons System) M74141:
(2350.01.000.8020)
(2350-01-035-0325)LO 9-2550-500-15

#### FIELD MANUALS

Basic	Cold	Weather	Manual	FM 31-70	)
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Chemical, Biological, Radiological and Nuclear Defense	FM 21-40
Desert Operations (How to Fight)	FM 90-3
Explosives and Demolitions	FM 5-25
First Aid for Soldiers	FM 21-11
Fundamentals of Machine Tools	FM 9-24
General Repair of Tents, Canvas, and Webbing	FM 10-16
General Body Repair and Related Operations	FM 43-2
Machine gun 7.62.MM, M60	FM 23.67
Manual for Tracked and Combat Vehicle Driver	FM 21-306
Mountain Operations	FM 90-6
Northern Operations	FM 31-71
Operation and Maintenance or Ordnance Material in Cold	
Weather (0°F to-65°F)	FM 9-207

# TECHNICAL MANUALS

Ammunition, General (Reprinted w/Basic Incl C1 - C2)	TM 9-1300-200
Ammunition and Explosive Standards	
(Reprinted w/Basic Incl C1 - C6)	TM 9-1300-206
Cooling Systems: Tactical Vehicles	TM 750-254
Destruction of Conventional Ammunition and Improved Conventional Munitions to Prevent Enemy Use (excluding toxic and incapacitating chemical agents for combat units)	TM 750-244-5-1
Direct Support and General Support Maintenance — Repair Parts and Special Tools List for Combat Vehicle, Anti-Tank, Improved Tow Vehicle, M901 (2350-01-045-1123); and M901A1 (2350-01-103-5641).	TM 9-2350-259-34P
Direct and General Support Maintenance Manual Transmission, Automatic (2520-00–066-4240) Allison Div., GMC Model TX100-1	TM 9-2520-254-34
Direct and General Support Maintenance Manual: Engine, Diesel with Container (2815–00-022-6732) Composed of: Engine, Diesel (Detroit Diesel GMC Model 5063-5299 series 6V53) and Container Assembly (8115–00–202–8589) Engine Diesel with Container (2815-00-909-5949) Composed of: Engine, Diesel (Detroit Diesel GMC Model 5063-5398 series 6V537) and Container Assembly	
(8115-00-999-5356)	TM 9-2815-205-34
Direct and General Support Maintenance Manual: Generator, Engine Accessory Prestolite Model AMA-5102UT (2920-00-909-2483); Leece-Neville Models 3002AC and 3002AD (2920-00-909-2483), 5504AA and 5504AB (2920-00-475-1446), 2184AC (2920-00-782-1955) and 5300GP (2920-00-818-8635) Regulator, Generator Leece-Neville Model 3392R12P (2920-00-540-9476)	TM 9-2920-225-34
DS. GS. and Depot Maintenance Repair Parts and Special Tools	
Lists for Periscope, M17 (6650-704-3549)	TM 9-6650-213-35P

Direct Support and General Support Maintenance Manual	
(Including Depot Maintenance Repair Parts and Special Tools Lists); Rifle: 5.56-MM, M16 (NSN 1005-00-856-6885), M16A1 W/E (1005-00-073-9421) and Bipod, Rifle:	
M3 w/Carrying Case (1005-00-890-2609)	TM 9-1005-249-34
Direct Support and General Support Maintenance Manual for Periscope: M19, Old and New Configuration (NSN 6650-00-765-2971 and 1240-01-005-6035), M24, Old and	
New Configuration (6650-00-344-4647 and 1240-01-005-6036)	. TM 9-1240-216-34
Direct Support and General Support Maintenance Manual: Radio Sets, AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43	
(5820-00-223-7415), AN/VRC-44 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5320-00-223-7434), AN/VRC-48 (5820-00-223-7435) and AN/VRC-49 (5820-00-223-7437) and Receiver-Transmitters, Radio RT-246/VRC, RT-246A/VRC	
(5820-00-892-0623), RT-524/VRC and RT-524 A/VRC	
(5820-00-892-0622) (NAVELEX 0967-LP-432-3030) (Reprinted w/Basic incl C1)	TM 11-5820-401-34-2
Direct Support and General Support Maintenance Manual:	
Radio Sets, AN/VCR-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415) AN/VCR-44 (5820-00-223-7417)	
AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433),	
AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435)	
and AN/VRC-49 (5820-00-223-7437); Receivers, Radio R-442/VRC	
0967-LP-432-3060)	TM 11-5820-401-34-3
Direct Support and General Support Maintenance Repair Parts	
and Special Tools Lists (Including Depot Maintenance Repair	
Parts and Special Tools List): Machine Gun: 7.62-MM,	
M60 W/E (NSN 1005-00-605-7710) and Mount, Tripod Machine	TM 0-1005-224-34P
Direct Support and General Support Maintenance Repair Parts	111 3 1000 224 341
and Special Tools Lists for Periscope: M19, Old and New	
Configuration, (NSN 6650-00-765-2971 and 1240-01-005-6035),	
M24, Old and New Configuration (6650-00-344-4647 and	TM 0 4040 040 04D
1240-01-005-6036)	TM 9-1240-216-34P
and Special Tools Lists (Including Depot Maintenance Repair	
Parts and Special Tools List) for Angle Drive, Cooling Fan	
NSN 2990-00-712-1280); Gearcase Transfer (2520-00-711-8377,	
2520-00-179-5608, 2520-00-572-8605, 2520-00-800-3405, 2520-00-0172-0270);	
Differential. Steering Control (2520-00-714-6135):	
Drive Assembly, Output (2520-00-895-9164); Final Drive,	
Vehicular (2520-00-224-7952): Brake Assembly, Pivot Steer	
(2520-00-088-9866 and 2520-00-003-8334) and Cylinder	
Assembly, myulaulic blake maslel (2030-00-079-9109)	11VI 9-2020-206-34P

Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Transmission, Automatic w/Container (NSN 2520-00-066-4239) (Allison Div., GMC Model TX 100-1) ......TM 9-2520-254-34P Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Engine, Diesel w/Container (NSN 2815-00-124-5390) Composed of: Engine, Diesel (Detroit Diesel Model 5063-5299, Series 6V53) and Container (8145-00-138-7809); Engine, Diesel w/Container (2815-00-909-5949) Composed of: Engine, Diesel (Detroit Diesel Model 5063-5398, Series 6V53T) and Container Assembly (8145-00-999-5356) and Engine, Diesel w/Container (2815-01-031-6154) Composed of Engine, Diesel (Detroit Diesel Model 5063-5395, Series 6V53T) and Container Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools); Generator, Engine Accessory (AC) (Prestolite Model AMA-5102UT) (FSN 2920-909-2483), (Leece-Neville Models 300 2AC and 3002AD) (2920-909-2483), (Models 5504AA and 5504AB) (2920-475-1446), (Model 2184AC) (2920-782-1955) and (Model 5300GP) (2920-818-8635) ......TM 9-2920-225-34P Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Radio Set AN/PRC-25 (NSN 5820-00-857-0759) .....TM 11-5820-398-34P Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Receiver-Transmitters, Radio RT-524/VRC and RT-524A/VRC (NSN 5820-00-892-0622)..... TM 11-5820-401-34P-2-2 Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Radio Set Control Groups AN/GRA-39 (NSN 5820-00-889-3860), AN/GRA-39A Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List for Radio Sets AN/VRC-53 (NSN 5820-00-223-7467), AN/VRC-64 (5820-00-223-7475), AN/GRC-125 (5820-00-223-7411), AN/GRC-160 (5820-00-223-7473) and Amplifier, Power Supply Groups, OA-3633/GRC and OA-3633A/GRC (Parts List for OA-3633/GRC and OA-3633A/GRC (5820-00-973-3383 Only) ..... TM 11-5820-498-34P C1 Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Radio Set, AN/PRC-77 (NSN 5820-00-930-3724) .....TM 11-5820-667-34P

Direct Support and General Support Maintenance Repair Parts and Special Tool Lists (Including Depot Maintenance Allowances): Generator, Engine Accessory, Alternating Current, Prestolite Model AMA-5102UT; Leece-Neville Models 3002AC and 3002AD, 5504 AA and 5504AB, 2184AC, and 5300GP and Regulator, Generator, Leece-Neville Model 3392R12P (FSN 2920-540-9476) Direct Support and General Support Maintenance Manual: Angle Drive Cooling Fan; Gearcase Transfer; Differential, Steering Control: DS-200, Drive Assembly Output; Final Drive,	. TM 9-2920-247-34P
Vehicular; Brake Assembly, Pivot Steer; Cylinder Assembly,	TM 0-2520-238-31
Direct Support and General Support Maintenance, Repair Parts, and Special Tools Manual for Generator, Alternating Current, 200 AMPS (2920-01-147-1575) Leece-Neville	TM 0 0000 057 000D
Model A0012260	IM 9-2920-257-30&P
Inspector's Inspection Criteria	TM 750-245-4
Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists): Telephone Set TH 312/PT (NSN 5805-00-543-0012)	TM 11 5905 201 25
(10 31W1-2P1-292) (Reprinted W/Basic Incl C1 - C2)	. 11111-3603-201-35
Including Repair Parts and Special Tools); Control Frequency Selector, C-2742/VRC and Control, Radio Set, C-2299/VRC (NAVELEX 0967-432-3020) (Reprinted w/Basic Incl C1)	TM 11-5820-401-35-1
Direct Support, General Support and Depot Maintenance Manual (Including Repair Parts and Special Tools List): Mountings MT-1029/VRC (NSN 5820-00-893-1323) and MT-1898/VRC (5820-00-803-1324) (NAVELEX 0067 LP 432-3131)	
(Reprinted w/Basic Incl C1)	TM 11-5820-401-35-9
Direct Support, General Support and Depot Maintenance Manual: Radio Set Control Groups AN/GRA-39 (NSN 5820-00-889-3660), AN/GRA-39A (5820-00-082-3998) and AN/GRA-39B (5820-00-949-9909) (Reprinted w/Basic Incl C2 - C5)	. TM 11-5820-477-35
Direct Support, General Support, and Depot Maintenance Manual for Radio Sets, AN/VRC-53 (NSN 5820-00-223-7467), AN/VRC-64 (5820-00-223-7475), AN/GRC-125 (5820-00-223-7411) and AN/GRC-160 (5820-00-223-7473) and Amplifier Power Supply Groups, OA-3633/GRC and OA-3633A/GRC (5820-00-973-3383)	TM 11-5820-498-35
Direct Support, General Support, and Depot Maintenance Manual: Radio Set AN/PRC-77 (Reprinted w/Basic Incl C1)	TM 11-5820-667-35
Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools List); Electrical Transient Suppressor, MX-7778/GRC (Reprinted	
w/Basic Incl C1 – C2)	TM 11-5915-223-35

Unit and Intermediate Maintenance Repair Parts and Special Tools Lists (Including Depot repair Parts) for Mortar, 120-MM, M120 Mortar, 120-MM Unit and Intermediate Direct Support Maintenance Manual (Including Repair Parts and Special Tools Lists) for M107MM (10885903) Turn Table and Mount (81MM Mortar turntable and Mount) (10885812), 81MM Mortar Bipod Assembly Direct Support Maintenance Manual Including Repair Parts and Special Tools List Including Depot Maintenance Repair Parts and Special Tools for 81-MM Mortar, M29A1 (NSN 1015-00-999-7794) ......TM 9-1015-200-30&P Direct Support Maintenance Manual (Including Repair Parts and Special Tools List): Purifier, Air: M2A1 (NSN 4240-00-307-7805): Purifier, Air: M2A2 (NSN 4240-00-868-7906) and Precleaner and Particulate Filter Assembly: M1A1-19 (NSN 4240-01-026-3112)..... TM 3-4240-276-30&P Direct Support Maintenance Manual for Mortar, 4.2-Inch: M30 (Cannon, M30 on Mount, M24A1 (NSN 1015-00-840-1840) Direct Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts) for Mortar, 4.2-Inch M30 (Cannon, M30 on Mount, M24A1) (NSN 1015-00-840-1840) and Trainer, Subcaliber, 60-MM, M31 (8429878) Equipment Improvement Report and Maintenance Summary for TARCOM Equipment (Reprinted w/Basic Incl C1).....TM 43-0143 Equipment Serviceability Criteria for Radio Set AN/PRC-25 ..... TM 11-5820-398-ESC Hand Receipt Catalog Covering Content of Components Of End Item (COEI), Basic Issue Items (BII) and Additional Authorization List (AAL) for Mortar, 4.2-Inch, M30 (Cannon, M30 on Mount, M24A1) (NSN 1015-00-840-1840) ......TM 9-1015-215-10-HR Hand Receipt Manual Covering Basic Issue Items (BII) and Additional Authorization List (AAL) for M60 Machine Gun Hand Receipt Manual Covering Basic Issue Items (BII) and Additional Authorization List (AAL) for M16A1 Rifle Hand Receipt Manual Covering Content of Components Of End Item (COEI), Basic Issue Items (BII) and Additional Authorization List (AAL) for 81-MM Mortar, M29A1 

Hand Receipt Manual Covering the End Item/Components Of End Item (COEI), Basic Issue Items (BII) and Additional Authorization List (AAL) for Radio Sets, AN/VRC-12 (NSN 5820-00-223-7412) AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), and AN/VRC-49 Hand Receipt Manual Covering End Item/Components Of End Item (COEI), Basic Issue Items (BII, and Additional Authorization List (AAL) for Radio Sets, AN/VRC-53 (NSN 5820-00-223-7467), AN/VRC-63 (5820-00-223-7475), AN/GRC-125 (5820-00-223-7411) and AN/GRC-160 Hand Receipt Manual Covering End Item/Components Of End Item (COEI). Basic Issue Items (BII) and Additional Authorization List (AAL) for Radio Set AN/PRC-77 (NSN 5820-00-930-3724).....TM 11-5820-667-12-HR Hand Receipt Manual Covering End Item/Components Of End Item (COEI), Basic Issue Items (BII) and Additional Authorization List (AAL) for Night Vision Sight, Crew Served Weapons AN/TVS-5 (NSN 5855-00-629-5327) LIN Z46658..... TM 11-5855-214-10-HR Hand Receipt Manual Covering End Item/Components Of End Item (COEI), Basic Issue Items (BII) and Additional Authorization List (AAL) for Night Vision Goggles, AN/PVS-5 and AN/PVS-5A (NSN 5855-00-150-1820) LIN N04456 ..... TM 11-5855-238-10-HR Hand Receipt Manual Covering End Item/Components Of End Item (COEI), Basic Issue Items (BII) and Additional Authorization List (AAL) for Suppressor, Electrical Transient MX-7778/GRC NSN 5915-00-937-9564) LIN Y99990 ..... TM 11-5915-223-12-HR Hand Receipt Manual Covering End Item/Components Of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) for Suppressor, Electrical Transient, MX-7778A/GRC (NSN 5915-00-413-6718) ..... TM 11-5915-224-14-HR Inspection, Care, and Maintenance of Antifriction Bearings ...... TM 9-214 Operation and Organizational Maintenance Switchboard, Telephone, Manual SB-993/GT .....TM 11-5805-294-12 Operator's Manual: Mask, Chemical-Biological: Aircraft ABC-M24 and Accessories and Mask, Chemical-Biological: Tank M25/M25A1 and Accessories ......TM 3-4240-280-10 Operator's Manual for Tester, Airflow, Gas-Particulate Filter Unit: M39......TM 3-6680-316-10 Operator's Manual for M60, 7.62-MM Machine Gun NSN 1005-00-605-7710) TM 9-1005-224-10 Operator's Manual: M16A1 Rifle ...... TM 9-1005-249-10 Operator's Manual for Mortar, 81-MM, M29A1 (NSN 1015-00-999-7794) ..... TM 9-1015-200-10 Operator's Manual for 4.2-Inch Mortar, M30 (NSN 1015-00-840-1840) 

Operator's Manual for Mortar, 120–MM, M121 ...... TM 9-1015-250-10 Operator's Manual: Radio Sets AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), and AN/VRC-49 Operator's Organizational and Field Maintenance Manual for Generator Set, Gasoline Engine (6115-00-699-6248) Composed of: Generator (Delco Model GMV 85A5) and Engine (Detroit Diesel Model A41-2), Generator Set, Engine Driven, 4.2 KW, 150 amp, 28V, DC (Model DC 4.2 Ord/28) (Y115-857-1297) Composed of: Starter, Generator, (Jack and Heinz Model Operator's Quick Checks for Receiver-Transmitters, RT-246/VRC (NSN 5820-00-892-0623) and RT-524/VRC Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List): Radio Set AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), AN/VRC-49 (5820-00-223-7437), AN/VRC-54 (5820-00-223-7567) and AN/VRC-55 (5820-00-402-2265): Mounting MT-1029/VRC (5820-00-893-1323) and MT-1898/VRC (5820-00-893-1324), Antenna AT-912/VRC (5820-00-897-6357); Control, Frequency Selector C-2742/VRC (5820-00-892-3343) and Control, Radio Set C-2299/VRC (5820-00-892-3340) (Reprinted w/Basic incl C1 - C3) .....TM 11-5820-401-12 Operator's and Organizational Maintenance Manual: Suppressor, Electrical Transient, MX-7778/GRC (NSN 5915-00-937-9564) (Reprinted w/Basic Incl C1 - C5) .....TM 11-5915-223-12 Operator's and Organizational Maintenance Manual: Radio Set Control Groups AN/GRA-39 (NSN 5820-00-889-3860), AN/GRA-39A (5820-00-082-3998) and AN/GRA-39B (5820-00-949-9909) (Reprinted w/Basic Incl C1 - C2) .....TM 11-5820-477-12 Operator's and Organizational Maintenance Manual: Radio Sets, AN/VRC-53 (NSN 5820-00-223-7467), AN/VRC-64 (5820-00-223-7475), AN/GRC-125 (5820-00-223-7411) and AN/GRC-160 (5820-00-223-7473) and Amplifier-Power Supply Groups OA-3633/GRC and OA-3633A/GRC (5820-00-973-3383) (Reprinted w/Basic incl C1 - C9).....TM 11-5820-498-12 Operator's and Organizational Maintenance Manual; Radio Set AN/PRC-77 (NSN 5820-00-930-3724) (Including Receiver-Transmitter, Radio RT-841/PRC-77) (5820-00-930-3725) (Reprinted w/Basic Incl C1 - C8) ......TM 11-5820-667-12 Operator's Manual for Night Vision Sight, Crew Served Weapons AN/TVS-5 (NSN 5855-00-629-5327) ......TM 11-5855-214-10 Operator's Manual for Night Vision Goggles, AN/PVS-5 and 

Operator's, Organizational Direct Support and General Support Maintenance Manual: Suppressor, Electrical Transient MX-7778A/GRC (NSN 5915-00-413-6718) (Reprinted w/Basic Incl C1-C4)TM 11-5915-224-14 Operator's Organization, Direct Support and General Support
Maintenance Manual, Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Switchboard, Telephone, SB-993/GT (FSN 5805-708-2202)TM 11-5805-294-14P
Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tool Lists): Radio Set, AN/PRC-25 (NSN 5820-00-857-0759) (Including Receiver-Transmitter, Radio, RT-505/PRC-25) (5820-00-857-0934) (Reprinted w/Basic incl C1-C5)TM 11-5820-398-12
Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List for Decontaminating Apparatus: Portable, 14 Liter, M13 NSN 4230-01-133-4121
Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List) Generator Set, Smoke, Mechanical: Pulse Jet, M157 TM 3-1040-279-12&P
Operator's Manual: Carrier, Personnel, Full Tracked, Armored M113A2 (2350–01-068-4077); Carrier, Command Post, Light, Tracked M577A2 (2350-01-068-4089); Carrier, Mortar, 107-MM, Self-Propelled M106A2 (2350-01-069-6931); Carrier, Mortar, 81-MM, Self-Propelled M125A2 (2350-01-068-4087); Carrier, Smoke Generator, Full Tracked, M1059 (2350-01-203-0188); Carrier, Mortar, 120-MM, Self-Propelled M1064 (2350-01-338-3116); and Carrier, Standardized Integrated Command Post System, M1068 (2350-01-354-5657)
Operator's Manual, Combat Vehicle, Anti-Tank, Improved Tow Vehicle, M901 (NSN 2350-01-045-1123); M901A1, (NSN 2350-01-103-5641)
Operator's Manual, Gun, Anti-Aircraft Artillery, Self- Propelled: 20-MM, M163 (M741A1 Chassis) TM 9-2350-300-10 Operator's Manual: Welding Theory and Application
(Reprinted w/Basic incl C1.C3)TM 11-5805-201-12 Operator, Organizational, DS and GS Maintenance Manual Including Repair Parts List for Torch Outfit, Welding, Gas (Westinghouse Model 137) (NSN 3431-00-691-1415)TM 9-3431-258-14&P Operator, Organizational, DS and GS Maintenance Manual: Identification, Inspection, Classification, Maintenance, Storage Dispection and Issue of Solid Pubber Tires and
Track Components

Operator, Organizational, DS and GS Maintenance Manual for Lead-Acid Storage Batteries ......TM 9-6140-200-14 Operator, Organizational, DS and GS Maintenance Manual: Welding Set, Arc, Inert Gas Shielded; Plastic or Metallined Gun; for 3/4 inch Wire; DC, 115V (Westinghouse Model SA-135) (FSN 3431-8799709) ......TM 5-3431-200-15 Operator, Organizational, DS and GS Maintenance Manual, Including Repair parts and Special Tools List (including Depot Maintenance Repair Parts and Special Tools): Various Machine Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tool Lists) for Mast, AB-903/G (NSN 5965-00-933-2197) (Reprinted w/Basic Incl C1-2) ......TM 11-5985-263-15 Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List) for M1068 Standardized Integrated Command Post System ..... TM 11-7010-256-12&P Operator's, Unit, and Direct Support Maintenance Manual Including Repair Parts and Special Tools List) for Modular Command Post System (MCPS) ...... TM 10-5410-229-13&P Organizational and Field Maintenance Repair Parts List for Generator Set, Gasoline Engine ......TM 9-6115-202-24P Organizational Maintenance Manual: Carrier, Personnel, Full Tracked, Armored, M113A2, 2350-01-068-4077; Carrier, Command Post, Light Tracked, M577A2, 2350-01-068-4089; Carrier, Mortar, 107-MM, Self Propelled, M106A2, 2350-01-069-6931; Carrier, Mortar, 81-MM, Self Propelled, M125A2, 2350-01-068-4087; Carrier, Mortar, 120-MM, Self Propelled, M1064, 2350-01-338-3116; Chassis, Gun, Anti-Aircraft Artillery, 20-MM, Self-Propelled, (M163 Weapons System) M741A1, 2350-01-099-8929; Carrier, Smoke Generator, Full Tracked, Armored, M1059, 2350-01-203-0188; Combat Vehicle, Anti-Tank, Improved Tow Vehicle, M901A1, 2350–01–103-5641; Carrier, Standardized Integrated Command Post System, M1068, 2350-01-354-5657 ..... TM 9-2350-261-20 Organizational Maintenance Manual Including Repair Parts and Special Tools Lists: Installation Kits for Alarm, Chemical Agent, Automatic Portable for Truck 2-1/2 Ton, M13 (FSN 6665-479-2719): Portable for Carrier, Command and Reconnaissance, Armored, M15 (6665-479-2720), Portable w/Power Supply for Truck 2-1/2 Ton, M18 (6665-479-2718) and 3/4 Ton, M17 (6665-479-2717), Portable w/Power Supply for Truck, Utility 1/4 Ton M16 (6665-479-2716) (Reprinted w/Basic incl C1, C2) ......TM 3-6665-274-20 Organizational Maintenance Manual Including Repair Parts and Special Tools List for 81-MM Mortar, M29A1 (NSN 1015-00-999-7794) 

Organizational Maintenance Manual (Including Repair Parts and Special Tools List) for Mortar, 4.2-Inch: M30 (Cannon M30 on Mount M24A1 (NSN 1015-00-840-1840) and Trainer,
Subcaliber, 60-MM: M31 (8429878) (Reprinted w/Basic Incl C1-3)
(NSN 2805-00-776-0483) (Model 4A032-II) (NSN 2805-00-608-7512) TM 5-2805-203-24P Organizational, Direct Support, General Support Maintenance Manual (Including Repair Parts and Special Tools Lists) for Machine Gun, 7.62-MM, M60 W/E (NSN 1005-00-605-7710) and Mount, Tripod, Machine Gun, 7.62-MM, M122 (1005-00-710-5599) TM 9-1005-224-24
Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools Lists: Rifle, 5.56-MM, M16A1 W/E (NSN 1005-00-073-9421); 5.56-MM, M16 (1005-00-856-6885) and Bipod, Rifle, M3 w/Carrying Case (1005-00-890-2609)TM 9-1005-249-24&P
Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Night Vision Sight, Crew Served Weapon AN/TVS-5 (NSN 5855-00-629-5327) (Reprinted w/Basic Incl C1) TM 11-5855-214-24&P
Organizational, Direct Support, General Support, and Depot Maintenance Manual, Including Repair Parts and Special Tools Lists: Machine Gun Caliber .50 Browning, M2 Heavy Barrel, Flexible
Military Standard Models (Model 4A032-I and Model 4A032-II
Organizational Maintenance Manual: Night Vision Goggles, AN/PVS-5 and AN/PVS-5A (NSN 5855-00-150-1820)TM 11-5855-238-20
Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools Lists (Including Depot Repair Parts and Special Tools List); Night Vision Goggles AN/PVS-5 and AN/PVS-5A (NSN 5855-00-150-1820)TM 11-5855-238-24&P
Organizational Maintenance Repair Parts and Special Tools List for Telephone Set TA-312/PT (NSN 5805-00-543-0012) (Reprinted w/Basic Incl C1)TM 11-5805-201-30P
Organizational Maintenance Repair Parts and Special Tools List for Radio Set AN/PRC-25 (NSN 5820-00-857-0759) TM 11-5820-398-20P

Organizational Maintenance Repair Parts and Special Tools List for Radio Sets, AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435) , AN/VRC-49 (5820-00-223-7437), AN/VRC-54 (5820-00-223-7567) and AN/VRC-55 (5820-00-402-2265); Receiver-Transmitters Radio RT-246/VRC and RT-246A/VRC (5820-00-892-0623 ), RT-524/VRC and RT-524A/VRC (5820-00-892-0622); Receivers Radio, R-442/VRC and R-442A/VRC (5820-00-892-0624), Mountings, MT-1029/VRC (5820-00-893-1323) and MT-1898/VRC (5820-00-893-1324) Control, Frequency Selector, C-2742/VRC (5820-00-892-3343) and Control Radio Set C-2299/VRC (5820-00-892-3340) (NAVELEX 0967-LP-432-3160)......TM 11-5820-401-20P Organizational Maintenance Repair Parts and Special Tools List: Radio Set Control Groups, AN/GRA-39 (NSN 5820-00-889-3860), AN/GRA-39A (5820-00-082-3998) and AN/GRA-39B (5820-00-949-9909) .....TM 11-5820-477-20P Organizational Maintenance Repair Parts and Special Tools List for Radio Sets, AN/VRC-53 (NSN 5820-00-223-7467), AN/VRC-63 (5820-00-223-7475), AN/GRC-125 (5820-00-223-7411), AN/GRC-160 (5820-00-223-7473) and Amplifier-Power Supply Groups, OA-3633/GRC and OA-3633A/GRC (Parts List for Organizational Maintenance Repair Parts and Special Tools Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Suppressor, Electrical, Transient MX-7778/GRC Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools List) for Suppressor, Electrical Transient MX-7778A/GRC Organizational and Direct Support Maintenance Repair Parts and Special Tools Lists for Headset-Microphone Kit, MK-1697/G (NSN 5965-00-313-8958)..... TM 11-5965-286-23P Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Mast, AB-903/G (NSN 5965-00-933-2197) ..... TM 11-5985-263-24P Organizational and Direct Support Maintenance Manual (Including Repair Parts and Special Tools Lists): Mask, Chemical-Biological Aircraft, ABC-M24 and Accessories and Mask, Chemical-Biological Tank M25/M25A1 and Accessories (Reprinted w/Basic incl C1) ..... TM 3-4240-280-23&P

Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists: Antenna AS-1729/VRC (NSN 5985-00-985-9024)	M 11-5985-262-24P
Organizational and Direct Support Maintenance Repair Parts and Special Tools Lists for Antenna Group, OE-254/GRC (NSN 5985-01-063-1574)	M 11-5985-357-23P
Plastic Laminated Diagrams for Direct and General Support Maintenance Receiver-Transmitter, Radio RT-841/PRC-77 (NSN 5820-00-930-3725) (Part of Radio Set, AN/PRC-77) TM	1 11-5820-667-34LD
Plastic Laminated Diagrams for Direct and General Support Maintenance Receiver-Transmitters, Radio RT-524/VRC and RT-524A/VRC (NSN 5820-00-892-0622) (Part of Radio Sets AN/VRC-46, AN/VRC-47, AN/VRC-48 and AN/VRC-49)TM	/ 11-5820-401-34LD-2
Plastic - Laminated Condensed Operating Instructions for Radio Set AN/VRC-46 (NSN 5820-00-223-7433 )	M 11-5820-401-10-LD-5
Painting Instructions for Field Use	TM 43-0139
Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Command)	TM 750-244-3
Procedures for Demilitarization of Tank Automotive Equipment (U.S. Army Tank-Automotive Command	TM 750-262-6-1
Preservation, Packaging, and packing of Military Supplies and Equipment (Packing, Vols TM 38-230-1 and I and II)	TM 38-230-2
Preparation and Inspection of Industrial Equipment for Storage or Shipment	TM 38-260
Procedures for Destruction of Electronics Material To Prevent Enemy Use (Electronics Command)	TM 750-244-2
Procedures for Destruction of Equipment in Federal Supply Classifications 1000, 1005, 1010, 1015, 1020, 1025, 1030, 1055, 1090 and 1095 To Prevent Enemy Use	TM 750-244–7
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use (US Army Tank-Automotive Command)	TM 750-244-6
Unit Maintenance, Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools List) for Carrier, Personnel, Full Tracked, Armored, M113A2, 2350-01-068-4077; Carrier, Command Post, Light Tracked, M577A2, 2350-01-068-4089; Carrier, Mortar, 107-MM, M30, Self-Propelled, M106A2, 2350-01-069-6931; Carrier, Mortar, 81-MM, M29A1, Self-Propelled, M125A2, 2350-01-068-4087; Chassis, Gun, Anti-Aircraft Artillery, M741A1, 2350–01-099-8929; Carrier, Smoke Generator, Full Tracked, M1059, 2350-01-203-0188; Combat Vehicle, Anti-Tank, Improved Tow Vehicle, M901A1, 2350-01-103-5641; Carrier, Mortar, 120-MM, M121, Self-Propelled, M1064, 2350–01-338-3116; Carrier, Standardized Integrated	
Command Post System, M1068, 2350-01-354-5657	ТМ 9-2350-261-24Р тм 9-243

#### MISCELLANEOUS PUBLICATIONS

The Army Maintenance Management System (TAMMS)	DA PAM 738-750
Carrier, Command Post, Light Tracked, M577 and M577A1; Processing for Storage and Shipment of	MIL-C-46746D(AT)
Carriers, Personnel, Full-Tracked: Armored, M113A2 and M113A3; Mortars, Self-Propelled, 107MM, M106, M106A2, and 81MM, M125A1 and M125A2, and 120MM, M1064; and Smoke Generator, M1059; Processing for Storage and Shipment of	MIL-C-45360G(AT)
Carriers, Armored, Full-Tracked, M901 TOW Vehicle (Less TOW Weapon) and M981 FISTV; Processing for Storage and Shipment of	MIL-C-62327A(AT)
Chassis, Weapon, Full-Tracked, M741 and M741A1; Processing for Storage and Shipment of	MIL-C-62074C(AT)
Color, Marking and Camouflage Painting of Military Vehicles, Construction Equipment, and Materials Handling Equipment Continental Models AV-1790 and AO-895 GMC Models 6V53/6V53T	TB 43-0209
and 8V71T Series Engines: Repair of Aluminum oil Coolers	TB 9-2300-403-45
Equipment Improvement Report and Maintenance Digest: Tank	
	TB 0 2200 400 20
Nonseronautical Equipment Army Oil Analysis Program (AOAP)	IB 9-2300-409-30 TB 43-0210
Safety Inspection and Testing of Lifting Devices	TR 43-0142
Use of Antifreeze Solutions. Antifreeze Extender.	
Cleaning Compounds, and Test Kit in Engine	
Cooling Systems	TB 750-651
Warranty Program for Carrier, Command Post Light, Tracked M577A2 (Contract Number DAAE07-86-A068)	. TB 9-2350-261-35-1
Accident Reporting and Records	AR 385-40
Control of Health Hazards from Lasers and Other High Intensity Optical Sources (Reprinted w/Basic Incl C1)	AR 40-46
Dictionary of United States Army Terms (Short Title: AD) (Reprinted w/Basic Incl C1 - C2)	AR310-25
Packaging of Army Material for Shipment and Storage (Reprinted w/Basic Incl C1)	AR 746-1
Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat (MCO P3570.1)	AR 385-63
Federal Supply Code for Manufacturers: United States and Canada - Name to Code and Code to Name (CSA-ESS H4-1/H4-2)	SR 708-41/42
Quality Deficiency Report (Category II).	SF 368
Testing AC and DC Generators and Regulators Using 500 Amp	ST 0 4010 495 40
Soldering	TR-SIC-222

# APPENDIX B COMMON TOOLS AND SUPPLEMENTS AND SPECIAL TOOL/FIXTURES LIST

#### Section I. INTRODUCTION

#### SCOPE

This appendix lists all common tools and supplements and special tools/fixtures needed to maintain the M113A2, M577A2, M106A2, M1064, M125A2, M741A1, M1059, M1068, and M901A1 carriers.

#### **EXPLANATION OF COLUMNS**

a. Column 1 – Item Number. This number is assigned to the entry in the listing and is referenced in the Initial Setup to identify the item (e.g., "Torque wrench (Item 100, App B)").

b. Column 2- Name. This column lists the item by noun nomenclature and other descriptive features (e. g., "Sander, disc, electrical").

*c.* Column 3 – National Stock Number. This is the National Stock Number (NSN) assigned to the item; use it to requisition the item.

d. Column 4 – Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

*e. Column 5 – Reference.* This column identifies the authorizing Supply Catalog (SC) for Repair Parts and Special Tools List (RPSTL) for items listed in this appendix.

# Section II. COMMON TOOLS AND SUPPLEMENTS AND SPECIAL TOOLS/FIXTURES LIST

-	(1) ITEM			(4)	(5)	
	NO.	ITEM NAME	STOCK NUMBER	PART NUMBER	REFERENCE	
	1	Adapter, hoisting, transmission	4910-00-572-8614	8356184	TM 9-2350-261-24P	
	2	Adapter, spindle, portable sander	5130-00-293-2330	CP-50	SC 4940-95-CL-A31	
	3	Adapter, torque wrench	5120-00-213-6976	11663358-1	TM 9-2350-261-24P	
	4	Adapter, torque wrench, 1/2 inch drive,	5120-00-977-7421	10917666	TM 9-2350-261-24P	
	5	Aproputility	0415 00 002 6100	MIL A 41920	SC 4010-05-CL-A01	
	6	Tomb outfit welding	3431-00-002-0100	MIL-A-41029	SC 4940-95-CL-A01	
	7	Automotive fuel and electrical system repair	5180-00-754-0655	SC4910-95-CL-A50	SC 5180-95-CL-B08	
		tool kit				
	8	Bar, bucking rivet	5120-00-293-2501	44B14865	TM 9-2350-261-24P	
	9	Bearing lubricating kit	4930-00-357-6301	41K96-625	SC 4910-95-CL-A31	
	10	Wrench set, impact	5130-00-221-0607		SC 4910-95-A31	
	11	Brush, wire, scratch	7920-00-291-5815	HB178	SC 4940-95-CL-B04	
_	12	Bushing, insert tool	5120-00-318-7481	10932383-2	TM 9-2350-261-24P	
	13	Inserter, bearing	5120-00-318-7484	10932383-3	TM 9-2350-261-24P	
	14	Inserter bearing	5120-00-318-7494	10932303-4	TM 9-2350-201-24P	
	16	Calipers micrometer inside 0-6 inch	5120-00-229-3058	184	SC 3470-95-CL-A15	
	17	Calipers, micrometer, outside 0-3 inch	5120-00-554-7135	GGG-C-105	SC 4910-95-CL-A63	
	18	Clinometer	6675-00-777-4529	TB107A	TM 9-2350-261-24P	
	19	Crimping tool, terminal	5120-00-432-7836	MY28	TM 9-2350-261-24P	
	20	Cutter, hole forming	5133-00-966-5959	RCDC82-1031	TM 9-2350-261-24P	
_	21	Cutter, hole forming	5133-00-966-5960	RCDC64-765	TM 9-2350-261-24P	
	22	Degreaser	4940-00-078-9192		SC 4910-95-CL-A76	
	23	Drill, portable electric, 1/2 inch	5130-00-293-1849	WD-661-TY3CLA	SC 3470-95-CL-A74	
	24	Drill, portable electric, 3/4 Morse taper	5130-00-473-6228	ES212W5TAND	50 4910-95-0L-A31	
	25	Drill set twist Morse 1 $1/32$ to 1 $1/4$ in	5133-00-542-4001	GGG-D-751	TM 9-2350-201-24P	
	27	Drive tool, insert bearing	5120-00-966-5963	10932490-1	TM 9-2350-261-24P	
	28	Drive tool, insert bearing	5120-00-966-5964	10932490-2	TM 9-2350-261-24P	
	29	Drill set, twist	5133-00-449-6775	GGG-D-751	SC 4910-95-CL-A01	
	30	Drive tool, lockring, circuit card	5120-01-165-0488	R112D	TM 9-2350-261-24P	
	31	Electrical tool kit	5180-00-876-9336	7550526	SC 4910-95-CL-A31	
	32	Extractor screw set	5120-00-610-1888	A-A-28	SC 4910-95-CL-A31	
	33	Face, nammer, inserted	5120-00-585-8202	GGG-H-33	SC 4910-95-CL-A31	
	34	General mechanics tool kit	5180-00-177-7033	50A SC5180-00-CL-N26	SC 5180-90-CL-A76	
	36	Gloves, welder's, leather	8415-00-268-7859	A-A-50022	SC 5910-95-CI -A31	
	37	Goggles, industrial	4240-00-269-7912	A-A-1814	SC 3431-95-CL-A31	
	38	Gun, soldering	3439-00-542-0396	8200G3	SC 4910-95-CL-A31	
	39	Hacksaw, frame	5110-00-289-9657	163-20	SC 4910-95-CL-A31	
	40	Hammer, pneumatic, PO	5130-00-889-8984	A-A-2350		
	41	Heater, gun type, electrical	4940-00-561-1002	500A	SC 4910-95-CL-A72	
	42	Helmet, welder's	4240-00-540-0623	A-A-1994	SC 4940-95-CL-B04	
	43	Holder, insert hammer face	5120-00-903-8553	GGG-H-33	SC 4940-95-CL-A31	
	44	Holder, insert hammer face	5120-00-903-8555	GGG-H-33TY1	SC 4910-95-CL-A31	
	45	Holding tool, insert	5120-00-318-7478	10932383-1	TM 9-2350-261-24P	
	46	Inserter, bearing	5120-01-249-6363	R213D	TM 9-2360-261-24P	
	47	Inserter, bearing	5120-00-378-4276	R212D	TM 9-2350-261-24P	
	48	Inserter, bearing	5120-00-473-7017	R210D	TM 9-2350-261-24P	
	49	Inserter, bearing	5120-00-708-2641	K108D	I IM 9-2350-261-24P	
	UC 1	i insentel, bealing	1 3120-00-473-7013	I RZUDU	1 IVI 9-2330-201-24P	

(1) ITEM	(2)	(3) NATIONAL	(4)	(5)
NO.	ITEM NAME	STOCK NUMBER	PART NUMBER	REFERENCE
51	Inserter, bearing	5120-966-5963	10932490-1	TM 9-2350-261-24P
52	Inserter, bearing	5120-00-966-5964	10932490-2	TM 9-2350-261-24P
53	Inserter, screw thread	5120-01-163-1425	CR06W	TM 9-2350-261-24P
54	Inserter, screw thread	5120-01-163-9922	CR10W	TM 9-2350-261-24P
55	Inserter, screw thread	5120-01-159-6487	CR12W	TM 9-2350-261-24P
56	Inserter, screw thread	5340-01-153-1860	CR08W	TM 9-2350-261-24P
57	Inserter, screw thread	5120-01-163-1425	CR06W	TM 9-2350-261-24P
58	Inserter, screw thread	5120-01-254-1497	CR13W	IM 9-2350-261-24P
59	Mechanical puller kit	5180-00-423-1596	PE12	SC 4910-95-CL-A31
60	Mechanical puller kit	5180-00-587-4151		SC 4910-95-CL-A72
61	Body and fender repair tool kit	5180-00-754-0643	SC5180-90-CL-N34	SC 5180-90-CL-N34
62	Multimeter, digital	6625-01-265-6000		SC 4910-95-CL-A31
63	Nonmetallic rod	9390-00-458-0130	8/24/6/	INI 9-2350-261-24P
64	4 inch to 6.5 inch	5120-00-293-0186	7082060	SC 4910-95-CL-A31
65	Pliers, retaining ring, internal, 1.75 inch to 2 inch	5120-00-293-0045	T161-3	SC 4910-95-CL-A31
66	Pliers, retaining ring, external, 3.5 inch to 6.5 inch	5120-00-595-9552	7083704	SC 4910-95-CL-A31
67	Pliers, retaining ring, external, 0.07 inch to 1 inch	5120-00-288-9717	2104893	SC 4910-95-CL-A31
68	Pliers, retaining ring, internal, 1.02 inch to 1.37 inch	5120-00-293-0048	6518470	SC 4910-95-CL-A31
69	Pliers, snap ring	5120-00-595-9551	APS10254	SC 4910-95-CL-A31
70	Positioner, bearing	4910-01-128-0093	12313101	TM 9-2350-261-24P
71	Power supply, hydraulic	TBD		TBD
72	Press, arbor, hand op, 60 ton	3444-00-449-7295	26A49	SC 4910-95-CL-A31
73	Puller set	5120-01-140-0950	4205A	TM 9-2350-261-24P
74	Puller, mechanical	5120-00-378-4293	1043	SC 5120-95-CL-A31
75	Radiator test plug set	4910-00-273-3660	2005-S-S	SC 4910-95-CL-A76
76	Sander, disc, electrical	5130-00-857-8526	00590	SC 4940-95-CL-A31
	Sander, disc, electrical	5130-00-596-9728	00-5-90	SC 3431-95-CL-A01
/8	Scale, mail and parcel post -5 lbs.	6670-01-021-4860	1509 CCC T 220	SC 4910-95-CL-A31
79	Screw threading set	5180-00-448-2362	GGG-1-330	5C 4910-95-CL-A31
80	Screw, cap, nexagon	5305-00-207-6954	MS16007 61	TM 0 2250 261 24P
	Screw, cap, socket nead	2520 01 102 2560	206DB1	TM 0-2350-201-24P
02	Sewing machine, muusinai	3330-01-102-0300	(110/220)/// C60/1)	1101 9-2350-201-241
83	Sling endless	3940-00-675-5003	PD101-96	TM 9-2350-261-24P
84	Sling assembly engine and differential	3940-00-646-6893	10942647	TM 9-2350-261-24P
85	Socket wrench set 3/8 inch drive	5120-00-322-6231	GGG-W-641	SC 4910-95-CI -A31
86	Socket wrench set, 3/4 inch drive	5120-00-204-1999	GGG-W-641	SC 4910-95-CL-A31
87	Socket, socket wrench, 3/4 inch drive	5120-00-261-2818	A-A-1395	TM 9-2350-261-24P
88	Socket, taper shank	3460-00-227-7520	A-A-51132 TY3CL1SIZE5	TM 9-2350-277-24P
89	soldering and desoldering set	3439-00-460-7198	W-TCP-K	SC 3431-95-CL-A01
90	Staker, bearing	5120-01-128-0094	12313102	TM 9-2350-261-24P
91	Stand, radiator, test	4910-00-078-9190	MILS4534	SC 4910-95-CL-A76
92	Tape, measuring	5210-00-234-6745	GGG-T-106	SC 4910-95-CL-A31
93	Thread inserter holder kit	5180-00-966-5958	10932383	TM 9-2350-261-24P
94	Threading set, screw	5180-00-448-2362	GGG-T-330	SC 4910-95-CL-A31
94.1	Tool kit, electronic equipment	5180-00-610-8177	TK-105	SC 5180-91-CL-R07
94.2	Tool kit, radio equipment	5180-00-064-5178	TK-101/G	SC 5180-91-CL-R13
95	Tool set, oversize rosan insert	5180-00-966-5961	10932474	TM 9-2350-261-24P
96	I railer mounted welding shop	3431-00-935-7821	MILW52629	SC 3431-97-CL-E03
97	I restle, motor vehicle maintenance	4910-00-251-8013	306	SC 4910-95-CL-A31
98	I wist drill set, 1/16 to 1/2 inch	5133-00-293-0983		SC 4910-95-CL-A31
99	I WIST OFILI SET, 33/64 to 3/4 Inch	5133-00-596-8088	000-D-751	50 34/0-95-0L-AU2
I 100	washel, liat	0310-00-067-7493	111321103-13	

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(1) ITEM	(2)		(4)	(5)
NO.	ITEM NAME	STOCK NUMBER	PART NUMBER	REFERENCE
101	Washer, flat	5310-00-809-4058	MS27183-10	Improvised Tool
102	Welding machine, arc	3431-01-032-6289	7550000	SC 3431-95-CL-A01
103	Wrench, adjustable	5120-00-423-6728	AC115	SC 4910-95-CL-A31
104	Wrench, insert	5120-01-250-6420	CRB2112WIS	TM 9-2350-261-24P
105	Wrench, socket	5120-00-966-5962	10932475	TM 9-2350-261-24P
106	Wrench kit, 5mm to 12mm, open end	5120-01-070-8954	E5860MDFSS	SC 4910-95-CL-A31
107	Wrench, open end box	5120-00-740-3347	10949344	TM 9-2350-261-24P
108	Wrench, open end fixed, 1 1/8 x 1 5/16	5120-00-184-8438	1037A	SC 4910-95-CL-A01
109	Wrench, open end fixed, 1 15/16 x 1 1/2	5120-00-277-2323	39A	SC 4910-95-CL-A31
110	Wrench, socket	5120-00-966-5962	10932475	TM 9-2350-261-24P
111	Wrench, spanner	5120-01-263-3628	CRB2112D	TM 9-2350-261-24P
112	Wrench, torque, 1/2 inch drive, 0-170 ft-1b	5120-00-640-6364	A-A-2411	SC 4910-95-CL-A31
113	Wrench, torque, 1/2 inch drive, 0-300 ft-lb	5120-00-247-2536	F3001	SC 4910-95-CL-A31
114	Wrench, torque, 1/2 inch drive, 0-150 ft-lb	5120-00-247-2540	F150	SC 4910-95-CL-A31
115	Wrench, torque, 3/4 inch drive, 0-600 ft-lb	5120-00-221-7983	SW130-301	SC 4910-95-CL-A31
116	Wrench, torque, 3/8 inch drive, 0-150 in-lb	5120-00-230-6380	TE12A	SC 4910-95-CL-A31
117	Wrench, torque, 3/8 inch drive, 0-600 in-lb	5120-00-542-5681	B58	SC 5180-95-CL-A12

# APPENDIX C EXPENDABLE/DURABLESUPPLIES AND MATERIALS LIST

# Section I. INTRODUCTION

### **SCOPE**

This appendix lists expendable supplies and materials you will need to maintain the M113A2, M677A2, M106A2, M1064, M126A2, M1059, M1068, and M901A1 carriers. These items are authorized to you by CTA 50-570, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

# **EXPLANATION OF COLUMNS**

a. *Column 1 - Item Number.* This number is assigned to the entry in the listing and is referenced in the Materials/parts section of the task to identify the material (e.g., "Dry cleaning solvent (Item 18, App C)").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

- 0 Unit Maintenance
- F Direct Support Maintenance
- H General Support Maintenance

*c. Column 3 - National Stock Number.* This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. *Column 4 -Description.* Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Commercial and Government Entity Codes (CAGEC) in parentheses followed by the part number.

*e.* Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

# Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

j	(1)	(2)	(3)	DEG	(4)	(5)
	NO.	LEVEL	NATIONAL STOCK NUMBER	DESC CAGEC & 1	CRIPTION PART NUMBER	U/M
	1	0	8040-01-068-2423	ADHESIVE	(94960) 2141PT	ΡT
	2	0	8040-00-839-4919	ADHESIVE SEALANT	(04963) EC1099	QT
	3	0	8040-00-728-3088	ADHESIVE SEALANT	(78500) 1199-T-3842	OZ
	4	0	4720-01-074-4978	AIR DUCT HOSE	(19207) 8724783-3	FT
	5	0	9150-00-985-7244	AIRCRAFT GREASE	(81349)MIL-G-23827	OZ
	6	F	8030-00-251-3980	ANODIC COATING	(81349) ML-A-8625	ΡT
	7	0	6850-00-181-7940	ANTIFREEZE	(81349) MIL-A-46153	GL
	8	0	8030-00-251-3980	ANTIFREEZE COMPOUND	(81349) MIL-A-907	LB
	9			DELETED		
	10	0	5110-00-277-4588	BLADES, HACKSAW	(54940) 31-51024	EA
	11	0	8030-00-577-4740	CALKING COMPOUND	(81348) TT-C-1796	GL
	12	0	8135-00-392-8971	CELLOPHANE	(07055) BS27-3	FT
	13	0	7920-00-044-9231	CLEANING CLOTH	(51200) MIRACLEWIPEL001	LB
	14	0	6950-00-227-1887	CLEANING COMPOUND	(81349) MIL-C-43454	QT
	15	0	8350-00-616-0022	CLOTH, VINYL COATED NYLON	(81349) MIL-C-20696	YD VD
•	10	F	8305-00-170-3903	CLOTH ADDACHUE	(81348) CCCC 428	
	17		5350-00-221-08/2 6850 00 285 8011	CLUIH, ABRASIVE	(58536) A-A-1266	
•	10	F	5070 00 782 5056	ELECTRICAL INSULATION	(81348) P-D-680 (10907) 1099649	GL FΔ
	19	r F	3970-00-782-3030	TAPE	(19207) 1088648	
	20	F	6145-00-102-4660	ELECTRICAL WIRE	(06090) 10603-0	FT
	21	U E	6145-01-102-4659	ELECTRICAL WIRE	(06090) 10603-00	
	22	F O	6145-00-538-8219	ELECTRICAL WIRE	(19207) 8690175 (01040) M10400 1 0	F I FT
	23	0	6145-00-161-1609	ELECTRICAL WIRE	(81349) M13480-1-3	FI ET
	24 95	0	0145-00-152-0499	ELECTRICAL WIRE	(81439) M13480-1-5	Г I ГТ
	20	0	6145-00-705-0076	ELECTRICAL WIRE	(81439) M13480-1-7 (81240) M12480/1 0	FT FT
•	20	F	6810 00 240 0354	ELECTRICAL WIRE	(81349) IN13480/1-9 (10907) 10975590	
	28	F	8010-00-243-3334	ELECTROLITE SOLFORIC ACID	(19207) 10875529 (81349) MIL-F-52929	OT
	29	0	9150-01-152-4119	ENGINE LUBRICATING OU	(81349) MIL-L-92025 (81349) MIL-L-92104GRADF15W40	GL
-	30	F	8010-00-926-2133	FILLER DENT METAL	(09275) BD4208	KT
	31	0	7930-00-282-9699	GENERAL DETERGENT	(81349) MIL-D-16791	GL
	32	0	9150-00-231-9062	GENERAL LUBRICATING OIL	(81348) VVL800	GL
	32	0	9150-00231-9062	GENERAL LUBRICATING OIL	(81348) VVL800	GL
	32.1	0	9150-01-197-7690	GREASE, AUTOMOTIVE, 1.75 LB CAN	(81349) MIL-G-10924	CN
			9150-01-197-7689	GREASE, AUTOMATIC, 6.50 LB CAN	(81349) MIL-G-10924	CN
			9150-190-0906	GREASE, AUTOMATIC, 25 LB CAN	(81349) MIL-G-10924	CN
	33	0	9150-01-131-3324	HYDRAULIC FLUID (FRH)	(81349) MIL-H-46170	QT
-	34	F	6850-00-145-0255	INSPECTION PENETRANT	(81349) MIL-I-25135	ĒΑ
	35	0	5970-01-159-8000	INSULATING COMPOUND	(83574) PR1568AEROSOL	ΟZ
	36	0	5970-00-161-7422	INSULATING VARNISH	(24446) 1201	GL
	37	0	5970-00-063-1495	INSULATION SLEEVING	(81349) M23053/1-103-0	FT
	38	0	5970-00-063-1499	INSULATION SLEEVING	(81349) M23053/1-102-0	FT
	39	0	5970-00-063-1496	INSULATION SLEEVING	(813491 M23053/1-105-0	FT
	40		5970-00-954-1624	INSULATION SLEEVING	(81439) M23053/5-107-0	
	41		5970-01-044-4531	INSULATION SLEEVING	(81349) M23053/1-104-0	FT
	42	U E	5970-00-816-6056	INSULATION TAPE	(81348) HH-I-595-B-108-0	FT
	43		8010-00-598-5156	LACQUER (PAINT)	(78767) ML 119	GL EA
	44	F	0040-00-285-4694	LENS FAFEK METAL SHEET	(81348) ININ-P-40 (81248) OO A 250/2	EA EA
	45 46	F	6810-00-286-3785	METAL STEEL METHYL ISOBUTYL KETONE	(81346) D 1153	GL

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(1) ITEM	(2)	(3) NATIONAL	DES	(4) CRIPTION	(5)
NO.	LEVEL	STOCK NUMBER	CAGEC &	PART NUMBER	U/M
47	0	9150-00-754-2595	MOLYBDENUM D GREASE	(81349) MIL-G-21164	LB
48	0	9505-00-293-4208	NONELECTRICAL WIRE	(96906) MS20995C32	LB
49	0	4720-00-177-0671	NONMETALLIC HOSE	(19207) 11662995	EA
50	0	4720-01-114-7686	NONMETALLIC HOSE	(19207) 11662995-2	EA
51	0	4720-01-106-6616	NONMETALLIC HOSE	(19207) 11662995-3	EA
52	0	4720-00-177-0672	NONMETALLIC HOSE	(19207) 11662996	EA
53	0	4720-00-156-5970	NONMETALLIC HOSE	(19207) 11662999	EA
54	F	9890-00-180-7289	NONMETALLIC ROD	(19207) 8724763	FT
55	F	9390-00-458-0130	NONMETALLIC ROD	(19207) 8724767	FT
56	F	9390-00-414-7139	NONMETALLIC ROD	(19207) 8724764	FT
57	F	9390-00-146-9333	NONMETALLIC ROD	(19207) 8724765	FT
58	0	5330-00-807-2874	NONMETALLIC SPECIAL SEAL	(19207) 10861633	EA
59	0	4720-01-063-1848	NONMETALLIC TUBING	(19207) 11678025	EA
60	0	8125-01-082-9697	OIL SAMPLE BOTTLES	(81996) PD8125-1	EA
61	0	8105-00-837-7754	PLASTIC BAG	(58536) A-A-1779	EA
62	F	9330-01-141-4504	PLASTIC MOLDING MATERIAL	(81349) MIL-P-21929	EA
63	0	9330-00-614-9056	PLASTIC SHEET	(19207) 10943241	EA
64	-		DELETED		
65	0	4720-00-491-0102	PREFORMED HOSE	(96906) MS521301A203R	FT
66	F	8030-00-664-4944	PRESERVATIVE COATING, CANVAS	(81348) TT-P-595	GL
67	0	9390-00-142-6414	RUBBER SPECIAL SEAL	(19207) 10932464	EA
68	0	7930-00-170-5467	SADDLE SOAP	(81349) P-S-609	LB
69	0	8030-00-656-1426	SEALING COMPOUND	(62377) MIL-S-4518TY3	PT
70	0	8030-01-166-0675	SEALING COMPOUND	(05972) 567-47	EA
71	0	8030-00-252-3391	SEALING COMPCOUND	(81349) MIL-S-45180TY2	OZ
72	F	8030-00-924-1878	SEALING COMPOUND	MIL-S-22473	PT
73	0	8030-00-723-5344	SEALING COMPOUND, FUEL TANK	(83574) PR-1440A-2	QT
74	0	8030-00-980-3975	SEALING COMPOUND PRIMER	(05972) 764-56	OZ
75	0	8105-00-290-0340	SHIPPING SACK	(58536) A-A-160	EA
76	0	6850-00-880-7616	SILICONE COMPOUND	(81349) MIL-S-8660	OZ
77	F	3439-01-219-7884	SOLDERING FLUE	(85150) DAYFLO STD	CL
78	0	5970-00-841-1172	TAPE, INSULATION	(81349) MIL-I-22444	EA
79		8310-00-988-1301	THREAD, POLYESTER	(70167) 23B28030-3	TU
80	0	3439-00-453-5472	TIN ALLOY SOLDER	(81348) SN60WRMAP2 0.036 1LB	LB
81	F	5610-00-141-7838	WALKWAY COMPOUND - NON	(80244) MIL-W-5044TY2	GL
82	0	4010-00-724-8287	WELDED CHAIN	(19207) 10932700P	F۵
83	F	3439-00-803-9498	WELDING ELECTRODE	(31505) AWSA5.10-69ER53560	OZ
				.0471/2LB	
84	0	4010-00-585-2108	WELDLESS CHAIN	(16003) C43974	EA
85	0	4010-01-029-8248	WELDLESS CHAIN	(80205) NAS1455B1-600	EA
86	0	7920-00-205-1711	WIPING RAG	(58536) A-A-2522	LB
87	0	8010-00-515-2208	PRIMER COATING	(54636) E90Y3	GL

# APPENDIX D GLOSSARY

ac	alternating current
amp	amperage/ampere
арр	appendix
attn	attention
BII	basic issue items
°C	degrees Celsius
CAGE	Commercial and Government Entity Codes (Used to be FSCM)
cm	centimeter
cmd	command
cmkg	centimeter-kilogram
COEI	components of end item
DA	Department of the Army
dc	direct current
deg	degree
ea	each
EIR	Equipment Improvement Recommendations
FM	field manual
°F	degrees Fahrenheit
Н	helper
Hz	hertz
in	inch
kg	kilogram
lb-ft	pound-foot
in–lb	inch-pound
LO	Lubrication Order
LRU	lowest replaceable unit
MALF	malfunction
MIL	military
mkg	meter-kilogram
mm	millimeter

MTOE	Modified Table of Organization and Equipment,
N-m	Newton-meter
ΝΑΤΟ	North Atlantic Treaty Organization
NBC	nuclear-biological-chemical
NIIN	national item identification number
NSN	national stock number
psi	pounds per square inch
p w r	power
RPSTL	Repair Parts and Special Tools List
sec	second
SW	switch
sys	system
temp	temperature
ТМ	technical manual
TMDE	test, measurement. and diagnostic equipment
V	volts
Vdc	volt direct current
abrasive:	harsh, rough
burr:	a rough area remaining on metal after it has been cast, cut or drilled
caustic:	corrode or dissolve by chemical action
chase:	a groove cut
chunked:	parts broken off, a damaged item
crocus:	a variety of iron oxide, used in the form of an abrasive powder for polishing
hone:	sharpen, enlarge, smooth out
race:	a groovelike part in which a moving part slides or rolls
scored:	grooved, scratched, notched

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#### LINEAR MEASURE

- 1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
- 1 Meter = 100 Centimeters = 100 Millimeters = 39.37 Inches
- 1 Kilometer = 1000 Meters = 0.621 Miles

#### WEIGHTS

- 1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1000 Grams = 2.2 Lb 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

#### LIQUID MEASURE

1 Milliter = 0.001 Liters = 0.0338 Fluid Ounces

1 Liter = 1000 Mililiters = 33.82 Fluid Ounces

#### SQUARE MEASURE

- 1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
- 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

#### CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

#### 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**

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TO CHANGE Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Meters Cubic Meters Cubic Meters Mililiters Mililiters	TO Inches Feet Feet Vards Miles Square Inches Square Feet Square Feet Square Miles Acres Cubic Feet Cubic Feet Fluid Ounces Fluid Ounces	XO         XO           0.394         44           3.280         WO           0.621         WO           0.155         L           1.764         WI           1.196         VO           0.386         VO           36.315         NI           1.306         I           0.034         KO	4 5 6 7 1	3 1ا
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