TM 9-2350-224-35

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FIELD AND DEPOT MAINTENANCE MANUAL

FOR

TANK, COMBAT, FULL TRACKED: 90-MM GUN, M48A3 W/E (2350-895-9154)

HULL, SUSPENSION, FINAL DRIVE, SLIPRING BOX, TURRET, AND MISCELLANEOUS COMPONENTS



HEADQUARTERS, DEPARTMENT OF THE ARMY



WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

CARBON MONOXIDE IS A COLORLESS, ODORLESS, DEADLY POISON-OUS GAS, WHICH, WHEN BREATHED, DEPRIVES THE BODY OF OXYGEN AND CAUSES SUFFOCATION. EXPOSURE TO AIR CONTAMINATED WITH CARBON MONOXIDE PRODUCES SYMPTOMS OF HEADACHE, DIZZINESS, LOSS OF MUSCU-LAR CONTROL, APPARENT DROWSINESS, COMA., PERMANENT BRAIN DAMAGE OR DEATH CAN RESULT FROM SEVERE EXPOSURE.

IT OCCURS IN THE EXHAUST FUMES OF FUEL-BURNING HEATERS AND INTERNAL-COMBUSTION ENGINES AND BECOMES DANGEROUSLY CONCENTRATED UNDER CONDITIONS OF INADEQUATE VENTILATION. THE FOLLOWING PRECAUTIONS MUST BE OBSERVED TO INSURE THE SAFETY OF PERSONNEL WHENEVER THE PER-SONNEL HEATER, MAIN, OR AUXILIARY ENGINE OF ANY VEHICLE IS OPERATED FOR MAINTENANCE PURPOSES OR TACTICAL USE.

- 1. DO NOT OPERATE HEATER OR ENGINE OF VEHICLE IN AN ENCLOSED AREA UNLESS IT IS ADEQUATELY VENTILATED.
- 2. DO NOT IDLE ENGINE FOR LONG PERIODS WITHOUT MAINTAINING ADEQUATE VENTILATION IN PERSONNEL COMPARTMENTS.
- DO NOT DRIVE ANY VEHICLE WITH INSPECTION PLATES, COVER PLATES, ENGINE COMPARTMENT DOORS REMOVED UNLESS NECESSARY FOR MAIN-TENANCE PURPOSES.
- 4. BE ALERT AT ALL TIMES DURING VEHICLE OPERATION FOR EXHAUST ODORS AND EXPOSURE SYMPTOMS. IF EITHER ARE PRESENT, IMME-DIATELY VENTILATE PERSONNEL COMPARTMENTS. IF SYMPTOMS PERSIST, REMOVE AFFECTED PERSONNEL FROM VEHICLE AND TREAT AS FOLLOWS: EXPOSE TO FRESH AIR; KEEP WARM; DO NOT PERMIT PHYS-ICAL EXERCISE; IF NECESSARY, ADMINISTER ARTIFICIAL RESPIRATION.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

TM 9-2350-224-35

TECHNICAL MANUAL

No. 9-2350-224-35

HEADQUARTERS DEPARTMENT OF THE ARMY WASHINGTON 25, D.C., 24 June 1963

FIELD AND DEPOT MAINTENANCE MANUAL FOR

TANK ,COMBAT, FULL TRACKED: 90-MM GUN, M48A3 W/E (2350-895-9154);HULL,SUSPENSION,FINAL DRIVE, SLIPRING BOX, TURRET,AND MISCELLANEOUS COMPONENTS

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

<u>a.</u> Technical Manual 9-2350-224-35 is the field and depot maintenance manual for the hull, suspension system, final drives, slipring box, turret, and miscellaneous components of the 90-MM Gan Full Tracked Combat Tank M48A3 (figs. 1 and 2). It contains detailed descriptions of the above named components and complete instructions for restoring their serviceability.

<u>b</u>. The appendix contains a list of references, including supply manuals, forms, technical manuals, and other available publications applicable to the M48A3 Tank.

2. Errors and Omissions

The first edition of the manuals is published in advance of complete technical review. Use DA Form 2028 to report errors and omissions directly to the Commanding General, USArmy Tank-Automotive Center, Detroit Arsenal, Center Line, Michigan. ATTN: SMOTA-FM.

3. Field and Depot Maintenance Allocation

Refer to the maintenance allocation chart contained in TM 9-2350-224-20.

Note. This manual was prepared prior to the availability of the official maintenance allocation chart. When discrepancies exist between allocations as reflected by this manual and those contained in the maintenance allocation chart, the allocations listed in the chart will be followed.

4. Forms, Records, and Reports

Execution of authorized forms in appendix I, is the unit officer's responsibility per instructions contained in TM 38-750.

5. Pictorial Publication Reference Guide

Figure 3 identifies publications pertaining to the specific components used in the M48A3 tank.

6. Pictorial Guide to Contents

Figures 4 through 19 illustrate and identify components of the M48A3 Tank. Components contained in this manual are referenced in this index to their pertinent paragraphs in the manual. Components not contained in this manual are referenced in this index to their pertinent technical manual.

Section II. DESCRIPTION AND DATA

7. Description

Descriptions of the hull, suspension system, final drives, slipring box, turret and miscellaneous components and their relationship to the system of which they are a part are contained in TM 9-2350-224-10 and TM 9-2350-224-20. To facilitate repair operations, more detailed description of these components is in chapters 6 through 15 in this manual.

8. Data

a. TM 9-2350-224-10 and TM 9-2350-224-20 contain tabulated technical data, descriptions, performance characteristics, and general information pertinent to the hull, usupension system, final drives, slipring box, turret and miscellaneous components of the M48A3 Tank.

<u>b.</u> Additional technical data pertinent to field and depot maintenance are in chapters 6 through 15 in this manual.



Figure 1. Tank, combat, full tracked, 90-mm gun M48A3 - left front view



Figure 2. Tank, combat, full tracked, 90-mm gun M48A3 - right rear view



Figure 3. Pictorial publications reference



Figure 4. Pictorial index - 90-mm gun, full tracked combat tank M48A3



Figure 5. Pictorial index - hull (1 of 2)



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Figure 6. Pictorial index - hull (2 of 2)



Figure 7. Pictorial index - driver's compartment (1 of 3)



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Figure 8. Pictorial index - driver's compartment (2 of 3)



Figure 9. Pictorial index - driver's compartment (3 of 3)



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Figure 10. Pictorial index - turret basket opening



Figure 11. Pictorial index - power plant (1 of 2)



Figure 12. Pictorial index - power plant (2 of 2)

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Figure 13. Pictorial index - engine compartment



Figure 14. Pictorial index - turret (1 of 6)

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Figure 15. Pictorial index - turret (2 of 6)



Figure 16. Pictorial index - turret (3 of 6)

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Figure 17. Pictorial index - turret (4 of 6)



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Figure 19. Pictorial index - turret (6 of 6)

CHAPTER 2

PARTS, SPECIAL TOOLS AND EQUIPMENT FOR FIELD AND DEPOT MAINTENANCE

9. General

Tools, equipment and maintenance parts over and above those available to the using organization are supplied to ordnance field maintenance units and depot shops for maintaining, repairing and rebuilding the materiel.

10. Parts

Maintenance parts are listed in TM 9-2350-224-35P which is the authority for requisitioning replacements. Parts not listed in TM 9-2350-224-35P as authorized repair parts, but which are required by depotshops in rebuild operations, may be requisitioned and will be supplied if available. Requisitions for these parts must contain a complete justification of requirements.

11. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this material are listed in ORD 6 SNL J-9, Section 3; SM 9-4-4910-J9-1 and 8; SM 9-4-5180-A19, A21 and A59 and are authorized for issue by TA and TOE.

12. Special Tools and Equipment

The special tools and equipment tabulated in table I are listed in TM = 2350-224-35P. Table I lists only those special tools and equipment necessary to perform the operations described in this manual. It is included for information only, and is not to be used as a basis for requisitions.

Item	Identifying No.	Fig.	Ref. Fig.	Use
ADAPTER, SOCKET WRENCH	B-7026898	22		Attaching power wrench to
BOLT, EYE, LIFTING	(5120-632-5797) 8708807 (5306-699-1222)	21	329	Turret race disassembly and assembly.
CROWFOOT ATTACHMENT, socket wrench	8708403 (5120-554-7346)	21		Fuel tank drain valve removal and installation.
FIXTURE, track connecting	F-8741739 (5120-605-3926)	22		Removing and installing tracks.
PULLER, two leg type	C-8708558	22		Removal - installation of track
REMOVER	(5120-627-8021) (5120-627-8021)	21		Removal of final drive output shaft outer bearing seal, spacer, and seal retainer
REMOVER	7355871 (5120-735-5871)	21	230	Removal of personnel heater
REMOVER AND REPLACER	7027414 (5120-614-1454)	21		Track tension adjusting link bearing removal and instal- lation.
SCRAPER	7355872 (5110-735-5872)	21		Scraping carbon from personnel heater igniter housing.
SLING, LIFTING	8366457 (4910-383-3680)	21		Removal and installation of final drive assembly.
SLING, LIFTING	D-8387711 (4910-776-8906)	23		Removal and installation of turret.

Table I. Special Tools and Equipment for Field and Depot Maintenance

Table I.	Special	Tools	and	Equipment	for	Field	and	Depot	Maintenance -	Continued
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Item	Identifying No.	Fig.	Ref. Fig.	Use
SLING, LIFTING	K-10886915 (4910-791-5421)	23		Removal and installation of power plant and grille cover.
TEST SET ASSEMBLY, HEATER	8686690 (4910-671-6613)	20		Testing personnel heater.
WRENCH, BOX	8708198 (5120-508-1570)	21	266	Final drive output drive nut removal and installation.
WRENCH, open end, fixed	C-8708683 (5120-563-7342)	22		Adjusting track tension link.

13. Improvised Tools

The improvised tools illustrated in table I, figure 24, and dimensional detail drawings furnished, apply only to field and depot shops

and are included to enable these maintenance organizations to fabricate the tools locally. These tools are of chief value to maintenance organizations engaged in rebuilding a large number of identical components; however, they are not available for issue.



Figure 20, Special tools and equipment (1 of 5)



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Figure 24. Special tools and equipment (5 of 5)

CHAPTER 3

TROUBLESHOOTING

Section I. GENERAL

14. Purpose: Analysis of Repair to Vehicle

Note. Information in this chapter is for use of ordnance maintenance personnel in conjunction with and as a supplement to the troubleshooting section in the organizational maintenance technical manual-TM 9-2350-224-20. This chapter provides continuation of instructions where a remedy in TM 9-2350-224-20 refers to ordnance maintenance personnel for corrective action.

Operation of a deadlined vehicle without a preliminary examination can cause further damage to a disabled component and possible injury to personnel. By careful inspection and troubleshooting, damage and injury can be avoided and, in addition, the causes of faulty operation of a vehicle or component can often be determined without extensive disassembly.

15. General Instructions and Procedures

This chapter contains inspection and troubleshooting procedures to be performed while a disabled component is still mounted in the vehicle or after it has been removed. a. The inspections made while the component is mounted in the vehicle are visual and are to be performed before attempting to operate the vehicle. The object of these inspections is to determine the condition of the component, and if found defective, to take precautions to prevent any further damage to it.

b. The troubleshooting procedures are those which are performed while the component is mounted in the vehicle beyond the scope of the using organization. Check the troubleshooting section of TM 9-2350-224-20, then proceed as outlined in this chapter.

c. Inspection after the component is removed from the vehicle is performed to verify the diagnosis made while the component was in the vehicle, to uncover further defects, or to determine malfunctions if the componentalone is received by the ordnance establishment. This inspection is particularly important in the last case because it is often the only means of determining the malfunction without completely disassembling the component.

Section II. PROCEDURES

16. General

Do not operate any power-actuated components in the vehicle prior to completing the inspection below. Careful manual operation, where applicable, may be performed to determine normal or abnormal functioning.

17. Inspections

a. Inspect Exteriors. The appearance of an assembly or component will indicate its general condition and will reflect the type of usage it has received. Examine for bent or broken lines or parts, fungus growth, moisture, corrosion, dirt or other foreign matter, wear, oil stains, bare wire, worn insulation, tampering and evidence of misuse which might indicate the source of trouble and the need for repairs.

b. Inspect Completeness. Check to see that all components are present and are properly mounted. Secure or replace as required.

18. Troubleshooting Tables

The troubleshooting procedures are presented in tables II through VI. Refer to the table which details the troubleshooting procedure for the faulty component, and proceed to isolate the cause of malfunction. Ť

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Table II. Troubleshooting Fuel and Air Intake System Components

Malfunction	Probable causes	Corrective action
	FUEL PRIMER PUMP	
 Does not purge fuel lines and fuel pumps of air. 	<u>a.</u> Faulty fuel primer pump.	<u>a</u> . Remove fuel primer pump (TM 9-2350-224-20). Dis- assemble and clean. Inspect all parts and make repairs as necessary.
	b. Bent or damaged fuel primer pump lines.	 b. Repair or replace lines (TM 9-2350-224-20).
	c. Quick disconnects improperly coupled or damaged at engine.	c. Couple quick disconnects properly or replace (TM 9-2350-224-20).
	PERSONNEL HEATER FUEL PUMP	
 Does not feed fuel to personnel heater. 	<u>a</u> . Fuel pump burned out or shorted.	a. Test continuity of fuel pump by connecting a suitable ohmmeter between circuit 402 (fig. 87) and ground. A reading of infinity indicates fuel pump open. Install new fuel pump.
	b. Bent or damaged purge pump intake line.	b. Repair or replace lines (TM 9-2350-224-20).
	<u>c</u> . Purge pump line quick dis- connect improperly coupled or damaged at engine.	<u>c</u> . Couple quick disconnect properly or replace (TM 9-2350-224-20).
	d. Main fuel line not connected properly.	\underline{d} . Connect fuel line properly.
	e. Primary filter or in-tank fuel pump screens.	e. Change primary filter element (TM 9-2350-224-20) or clean fuel pump screen.
	<u>1</u> . No electrical power in circuit 402 (fig. 87).	 Turn on heater switches and connect voltmeter between circuit 402 and ground. Met er should read 24 v. If voltage is low or zero, check personnel heater circuit.
	\underline{g} . Fuel shutoff valve not open.	g. Open fuel shutoff valve.

Malfunction	Probable causes	Corrective action
	FUEL TANK ELECTRICAL FUEL PUMPS	
 Left or right fuel pump inoperative. 	<u>a</u> . Shorted fuel pump.	a. Connect ammeter in fuel pump circuit. If pump requires more than 1.5 amp to operate, replace pump.
	b. Open circuit.	b. Using an ohmmeter, check continuity of fuel pump circuit No. 76 (TM 9-2350-224-20).
 Left or right fuel pump operates but does not pump fuel. 	a. Outside strainers clogged.	$ \underline{a.} \begin{array}{c} \text{Remove fuel pump} & (\text{TM 9-} \\ 2350-224-20), & \text{disassemble,} \\ \text{and clean.} \end{array} $
	b. Faulty magnetic clutch or impeller.	b. Replace pump (TM 9-2350- 224-20).
	FUEL TANKS	
5. Fuel tanks leak.	a. Cracked or porous welds, punctures, or breaks.	 a. Drain fuel tank (TM 9-2350- 224-20) and remove from vehicle. Clean tank and repair.
	b. Left fuel tank drain valve loose or defective.	b. Tighten drain valve or drain fuel tank and install new drain valve if defective.
	 <u>c.</u> Access cover (left or right tank) mounting screws loose. 	<u>c.</u> Tighten access cover mounting screws.
	<u>d.</u> Access cover (left or right tank) gasket damaged or deteriorated.	d. Drain fuel tank (TM 9-2350- 224-20) and install new gasket.
	e. Capacitor and housing assembly (left or right) mounting screws loose.	e. Tighten mounting screws.
	 Capacitor and housing assembly (left or right) gasket damaged or deteriorated. 	$\underline{\mathbf{f}}$. Proceed as in $\underline{\mathbf{d}}$ above.
 Foreign matter and sediment in fuel tanks. 	Fuel tank filler filter screen punctured.	Drain fuel tanks (TM 9-2350- 224-20), Clean interior of fuel tanks, and install new filter.

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Sable II. Troubleshooting Fuel and Air Intake System Components - Continued

Malfunction	Probable causes	Corrective action
	FUEL TANKS - Continued	
 Fuel gage does not indicate properly. 	a. Faulty fuel gage.	a. Remove and test fuel gage (TM 9-2350-224-20). Install new fuel gage as required.
	<u>b.</u> Faulty tank unit.	b. Remove tank unit (TM 9-2350- 224-20) and test. Install new fuel gage if required, and test.
	<u>c.</u> Faulty fuel switch.	<u>c.</u> Remove fuel selector switch (TM 9-2350-224-20) and test. Install new fuel selector switch if required.
 Pressure relief valve does not release internal air pressure from fuel tank. 	Pressure relief valve dirty, clogged, or defective.	Remove valve. Disassemble and clean. Inspect all parts (TM 9-2350-224-20). Install new parts as required.
	AIR CLEANERS	
 Loss of engine power and/or excessive black oxbaugt smoke 	$\underline{\underline{a}}$. Malfunction in air cleaner blower assembly.	<u>a.</u> See item 10 for corrective action.
black exhaust shioke,	b. Damaged access door gasket.	b. Replace access door gasket (TM 9-2350-224-20).
	<u>c.</u> Dust outlet of cyclone tubes blocked.	<u>c.</u> Use compressed air to blow dust from tubes and out of dust chamber (TM 9-2350- 224-20).
	<u>d.</u> Damaged filter gasket.	<u>d.</u> Replace filter (TM 9-2350- 224-20).
	e. Damaged filter bag.	e. Replace filter (TM 9-2350- 224-20).
	 Dust bypassing air cleaner because of loose or faulty connections between air cleaner outlet and engine turbosuperchargers. 	 Tighten connections, or replace (TM 9-2350-224-20) if faulty.
	g. Damaged turbosupercharger resulting from faulty blower.	g. Replace turbosupercharger (TM 9-2990-200-35).
	$\frac{h.}{h.} Air cleaner blower impeller blades are eroded more than 1/4 of their original length.$	<u>h.</u> Replace impeller.
	i. Faulty impeller housing.	i. Replace impeller housing.
	I	

sgmmajwfc@comcast.net 12 Feb 2016 Table II. Troubleshooting Fuel and Air Intake System Components - Continued

Malfunction	Probable causes	Corrective action	
	AIR CLEANERS - Continued		
10. Blower assembly will not activate air	<u>a.</u> Faulty or worn motor brushes.	<u>a.</u> Replace brushes.	
cleaning system.	b. Stator winding shorted.	b. Replace blower motor.	
	<u>c.</u> Motor bearing seized.	c. Rebuild blower motor.	
	<u>d.</u> Motor armature faulty.	d. Rebuild motor.	
	e. Blower clogged with dirt or other foreign matter	e. Clean blower.	
	<u>f.</u> No electrical power to blower.	<u>f. Check electrical circuits in</u> air cleaner system.	
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Table III. Troubleshooting Hull Electrical System Components

Malfunction	Probable causes	Corrective action
	HULL WIRING HARNESSES	
1. Hull electrical compo- nents inoperative.	Major damage to wiring harnesses.	Replace or repair damaged hull wiring harnesses.
	POWER PLANT WIRING HARNESSES	
2. Power plant electrical components inoperative.	Major damage to wiring harnesses.	Replace or repair damaged power plant wiring harnesses.
	CONTROL PANEL WIRING HARNESSES	
 Control panel compo- nents inoperative. 	Major damage to wiring harnesses.	Replace damaged control panel wiring harnesses.
	INDICATOR PANEL WIRING HARNESSES	
 Indicator panel compo- nents inoperative. 	Major damage to wiring harnesses.	Replace indicator panel wiring harnesses.
	GENERATOR CONTROL BOX	
5. Evidence of moisture	a. Faulty gasket or gaskets.	<u>a.</u> Replace damaged gaskets.
box.	b. Cracked or broken cover or bottom plate.	b. Replace cover or bottom plate.
	c. Cracked or broken case.	c. Replace case.
	d. Faulty receptacle on box.	d. Replace receptacle.
	e. Cover not fastened securely.	e. Tighten down cover.
	f. Vent plug missing or loose.	f. Tighten or install vent plug.
6. No charging current to	a. Faulty relay assembly.	a. Replace relay assembly.
battery connector.	b. Faulty regulator assembly.	b. Replace regulator assembly.
	<u>c.</u> Damaged battery connector assembly or generator connector assembly.	<u>c.</u> Replace damaged connector assembly.
	d. Loose connector plug.	d. Tighten connector plug.
	e. Line switch contacts burned or pitted.	e. Clean contacts with fine sand- paper.

Table III. Troubleshooting Hull Electrical System Components - Continued

Malfunction	Probable causes	Corrective action
	GENERATOR CONTROL BOX - Continued	
7. Low charging voltage to battery connector.	a. Dirty or corroded contacts on connector plug.	<u>a.</u> Clean connector plug.
	b. Faulty relay assembly.	b. Replace relay assembly.
	c. Faulty regulator assembly.	<u>c.</u> Replace regulator assembly.
	<u>d.</u> Defective voltage adjustment,	<u>d.</u> Replace voltage adjusting rheostat.
 High charging voltage to battory connector 	<u>a.</u> Faulty regulator assembly.	<u>a.</u> Replace regulator assembly.
to battery connector.	<u>b.</u> Defective voltage adjustment.	b. Replace voltage adjusting rheostat.
 Intermittent charging current flow to battery connector. 	<u>a.</u> Intermittent open or short circuit in connector assembly.	<u>a.</u> Replace connector assembly.
	b. Intermittent open or short circuit in regulator assembly.	b. Replace regulator assembly.
	<u>c.</u> Damaged contacts or faulty relay coil in relay assembly.	<u>c.</u> Clean contact with fine sand- paper or replace assembly.
	INFRARED POWER SUPPLY	
10. Evidence of moisture	a. Damaged receptacle gasket.	a. Replace faulty gasket.
infrared power supply.	b. Broken, bent, or distorted cover.	b. Replace cover.
	<u>c.</u> Base cracked or broken.	c. Replace base.
1. Broken tube envelope.	a. Broken hold-down spring.	a. Replace cover.
	b. Faulty shock mount or mounts (causing excessive vibration).	b. Replace damaged shock mounts.
	c. Broken or damaged mount- ing bracket.	<u>c.</u> Replace mounting bracket.

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Table III. Troubleshooting Hull Electrical System Components - Continued

Malfunction	Probable causes	Corrective action
	INFRARED POWER SUPPLY - Continued	
12. No output voltage.	<u>a.</u> Broken connection at input or output receptacle.	<u>a.</u> Solder connection.
	b. Faulty vibrator.	b. Replace vibrator.
	c. Faulty tubes.	<u>c.</u> Replace tubes.
	d. Open or short circuit in potting assembly.	d. Replace bottom plate and potting assembly.
13. Low output voltage.	a. Dirty or corroded vibrator or tube socket pins.	a. Clean socket pins.
	b. Damaged voltage regulator tube.	b. Replace voltage regulator tube.
	<u>c.</u> Faulty circuit in potting assembly.	c. Replace bottom plate and potting assembly.
14. High output voltage.	a. Faulty voltage regulator tube.	<u>a.</u> Replace tube.
	b. Faulty circuit in potting assembly.	b. Replace bottom plate and potting assembly.
15. Intermittent output.	a. Broken hold-down spring (allows tube or vibrator to loosen in socket).	a. Replace cover.
	b. Loose connection.	b. Solder connection.
	c. Vibrator contacts sticking.	<u>c.</u> Replace vibrator.
	<u>d.</u> Intermittent open or short circuit in tube.	<u>d.</u> Replace faulty tube.
	ACCESSORY OUTLET	
16. No power from	a. Internal damage to outlet.	<u>a.</u> Replace outlet.
accessory ourier.	b. Damaged harness or loose connection.	b. Repair (TM 9-2350-224-20) or replace harness. Tighten loose connection.

Table IV. Troubleshooting Controls and Linkage

Probable causes	Corrective action
STEERING CONTROL AND LINKAGE	
a. Steering return spring be- neath wheel mount assembly weak or broken.	<u>a.</u> Replace spring.
<u>b.</u> Spring stop pins bent or broken.	<u>b.</u> Replace pins.
<u>c.</u> Binding in linkage due to in- sufficient lubrication.	<u>c.</u> Lubricate linkage in accord- ance with LO 9-2350-224-10.
<u>d.</u> Binding due to damaged steering wheel mount components.	d. Replace faulty components.
e. Binding due to damaged link assemblies.	e. Replace link assemblies.
<u>f.</u> Binding due to damaged packing or bearing in sleeve assembly.	<u>f.</u> Replace packing or bearing.
g. Bent tube binding against con- nector rod.	g. Replace tube.
<u>a.</u> Steering control linkage dis- connected.	<u>a.</u> Connect steering control linkage.
b. Damaged or broken parts in linkage.	b. Replace faulty parts.
Bent connecting rod or damaged link assembly.	Replace connecting rod or link assembly.
a. Threads on connector rod, rod end, or pin nut stripped or damaged.	<u>a.</u> Replace faulty parts.
b. Engine or transmission mounts worn or broken.	b. Replace mounts (TM 9-2350- 224-20).
See items $1\underline{c}$ through $1\underline{g}$ above.	See items 1c through 1g above.
a. Damaged boot, together with damaged tube and sleeve assembly seals.	<u>a.</u> Replace boot and seals.
b. Damaged housing gasket, coupled with damaged tube and sleeve seals.	b. Replace gasket and seals.
	Probable causes STEERING CONTROL AND LINKAGE a. Steering return spring be- neath wheel mount assembly weak or broken. b. Spring stop pins bent or broken. c. Binding in linkage due to in- sufficient lubrication. d. Binding due to damaged steering wheel mount components. e. Binding due to damaged packing or bearing in sleeve assembly. g. Bent tube binding against con- nector rod. a. Steering control linkage dis- connected. b. Damaged or broken parts in linkage. Bent connecting rod or damaged. a. Threads on connector rod, rod end, or pin nut stripped or damaged. b. Engine or transmission mounts worn or broken. See ittems 1c through 1g above. a. Damaged boot, together with damaged tube and sleeve assembly.

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Malfunction	Probable causes	Corrective action
	SHIFTING AND STARTING CONTROL AND LINKAGE	
1. Shifting and starting very stiff.	<u>a.</u> Excessive dirt accumulated around linkage.	<u>a.</u> Clean linkage.
	b. Binding of linkage due to in- sufficient lubrication.	b. Lubricate linkage in accord- ance with LO 9-2350-224-10.
	c. Damaged parts in shifting control mechanism.	<u>c.</u> Replace damaged parts.
	d. Binding due to damaged link assemblies.	d. Replace link assemblies.
	e. Binding due to damaged packing or bearing in sleeve assembly.	e. Replace bearing or packing.
	<u>f.</u> Bent tube binding against connector rod.	\underline{f} . Replace tube.
2. Shifting control will not	a. Jammed linkage.	a. Remove obstruction.
sint.	b. Shifting control linkage dis- connected.	b. Connect shifting control linkage.
	<u>c.</u> Broken or damaged parts in shifting linkage.	<u>c.</u> Replace faulty parts.
3. Engine will not start.	a. Bent control rod or rods.	a. Replace damaged control rods.
	b. Faulty neutral shift switch.	b. Replace neutral shift switch.
 Linkage repeatedly moves out of adjust- ment 	a. Damaged mountings on linkage.	<u>a.</u> Replace faulty parts.
ment.	b. Stripped or damaged threads on connector rod, rod end, or jamnut.	b. Replace damaged parts.
 Water seepage into crew compartment when fording. 	a. Damaged boot, combined with damaged sleeve and tube assembly seals.	a. Replace boot and seals.
	b. Damaged linkage box or housing gasket together with damaged sleeve and tube assembly seals.	<u>b.</u> Replace gasket and seals.

Table IV. Troubleshooting Controls and Linkage - Continued

Table IV. Troubleshooting Controls and Linkage - Continued

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Malfunction	Probable causes	Corrective action
	ACCE LERATOR AND THROTTLE CONTROLS AND LINKAGE	
1. Accelerator pedal does not return to released	a. Weak or broken accelerator return spring.	<u>a.</u> Replace spring.
position.	b. Return spring clamp damaged or broken.	<u>b.</u> Replace spring clamp.
	c. See item 2 below.	c. See item 2 below.
2. Accelerator pedal binding.	a. Excessive dirt accumulated around linkage.	<u>a.</u> Clean linkage.
	b. Insufficient lubrication.	b. Lubricate linkage in accord- ance with LO 9-2350-224-10.
	<u>c.</u> Damaged parts in accelerator pedal assembly.	<u>c.</u> Replace damaged parts.
	d. Damaged packing or bearing in sleeve assembly.	d. Replace packing or bearing.
	e. Damaged lever or bracket assembly.	e. Replace lever or bracket.
	f. Bent linkage cover or tube.	f. Replace cover or tube.
3. Accelerator inopera-	a. Broken parts in linkage.	a. Replace faulty parts.
tive.	b. Linkage disconnected.	b. Connect linkage.
4. Engine races when accelerator pedal is	 <u>a.</u> Pedal or linkage binding (see item 2 above). 	<u>a.</u> See item 2 above.
Teleaseu.	b. Bent linkage tube assembly.	b. Replace bent tube.
5. Throttle lever does not remain in engaged	a. Broken dog on throttle handle assembly.	a. Replace handle assembly.
position.	b. Damaged teeth or broken gear segment.	<u>b.</u> Replace gear segment.
	<u>c.</u> Weak or broken throttle lever spring.	<u>c.</u> Replace spring.
	d. Damaged throttle bracket.	d. Replace throttle bracket.
	e. Throttle segment gear threads or fastening screw threads stripped.	e. Replace gear or screw.

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Malfunction	Probable causes	Corrective action
	ACCE LE RA TOR AND THROTTLE CONTROLS AND LINKAGE - Continued	
5. Throttle lever does not remain in engaged	f. Throttle segment installed incorrectly.	f. Remove segment and reinstall.
position - Continued	g. Key missing between throttle segment and shaft.	g. Install new key.
6. Linkage repeatedly	a. Damaged mountings on linkage.	a. Replace faulty parts.
ment.	b. Stripped or damaged threads on adjustable portions of linkage.	<u>b.</u> Replace damaged parts.
7. Lubricant leaking from tube assembly.	Damaged seals.	Replace seals.
	BRAKE CONTROL AND LINKAGE	
1. Brake pedal binding.	 <u>a.</u> Excessive dirt accumulated around linkage. 	<u>a.</u> Clean linkage.
	b. Insufficient lubrication.	b. Lubricate linkage in accord- ance with LO 9-2350-224-10.
	c. Damaged parts in brake pedal assembly.	<u>c.</u> Replace faulty parts.
	d. Damaged parts in linkage.	d. Replace faulty parts.
	e. Bent linkage tubes, shields, or enclosure plate.	e. Replace linkage tubes, shields, or enclosure plate.
	 <u>f.</u> Damaged packing in linkage tube. 	f. Replace packing.
Brakes will not re- lease once applied.	a. Foreign object wedged inside guide assembly.	a. Remove foreign object.
	b. Bent connecting rod or lever.	b. Replace damaged part.
	<u>c.</u> Linkage binding.	<u>c.</u> Replace faulty parts.
 Brakes will not operate when pedal is de- 	a. Broken parts in linkage.	a. Replace faulty parts.
pressed.	b. Linkage disconnected.	b. Connect linkage.

Table IV. Troubleshooting Controls and Linkage - Continued

Table IV. Troubleshooting Controls and Linkage - Continued

Malfunction	Probable causes	Corrective action
	BRAKE CONTROL AND LINKAGE - Continued	
4. Brake on one side of	a. Bent connecting rod.	a. Replace rod.
lease.	b. Damaged linkage tube or bent lever housing on trans- mission.	b. Replace tube or lever housing.
	c. Linkage out of adjustment.	<u>c.</u> Adjust linkage (TM 9-2350- 224-20).
 Brake on one side of vehicle will not apply. 	See item 4 above.	See item 4 above.
6. Brakes will not re-	a. See item 3 above.	a. See item 3 above.
position.	b. Damaged or broken brake safety lock.	b. Replace brake safety lock.
	c. Damaged brake locking link.	c. Replace brake locking link.
 Brake will not apply in park position. 	 Broken or damaged teeth on brake safety lock. 	a. Replace brake safety lock.
	b. Weak or broken brake safety lock spring.	b. Replace spring.
	c. Bent or broken connecting rod.	c. Replace connecting rod.
	d. Linkage disconnected.	d. Connect linkage.
 Linkage repeatedly moves out of adjust- 	a. Damaged mountings on linkage.	a. Replace faulty parts.
ment.	b. Weak or broken adjuster pawl tension spring.	<u>b.</u> Replace spring.
	<u>c.</u> Damaged adjuster ratchet.	c. Replace ratchet.
	d. Stripped or damaged threads on adjustable portion of linkage.	d. Replace damaged parts.
	e. Stops on adjuster pawl adjusted improperly.	e. Adjust stops (TM 9-2350-224- 20).
 Water seepage into crew compartment when fording. 	a. Damaged packing in linkage tube together with damaged boot.	a. Replace packing and boot.
	b. Damaged packing in linkage tube together with damaged shield gasket on side of transmission.	b. Replace packing and gasket.

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Malfunction 1. Hatch cover will not open to required angle.	Probable causes DRIVER'S HATCH COVER Linkage bent, twisted, damaged or broken. Limit stop improperly set or broken.	Corrective action Replace or straighten linkage.
1. Hatch cover will not open to required angle.	DRIVER'S HATCH COVER Linkage bent, twisted, damaged or broken. Limit stop improperly set or broken.	Replace or straighten linkage.
1. Hatch cover will not open to required angle.	Linkage bent, twisted, damaged or broken. Limit stop improperly set or broken.	Replace or straighten linkage.
	Limit stop improperly set or broken.	
2. Hatch cover open beyond required angle.	51 011011	Set limit stop or replace.
3. Water enters hull.	. Hatch cover does not contact seal properly.	<u>a.</u> Check and aline hatch cover shaft housing assemblies.
b	• Hatch cover seal damaged.	b. Replace hatch cover seal.
c	 Hatch cover does not close firmly. 	<u>c.</u> Aline where necessary.
d	L Damaged periscope mount seal.	<u>d.</u> Replace periscope mount seal.
e	Damaged periscope lid seal.	e. Replace periscope lid seal.
<u>f.</u>	Periscope lid does not close firmly.	<u>f.</u> Aline where necessary.
4. Periscope mount assembly does not turn properly	Damaged periscope mount bearing.	a. Replace periscope mount bearing.
b	. Improper shimming.	b. Check and shim properly.
<u>c</u>	Dirt around periscope assembly.	<u>c.</u> Remove periscope assembly and clean.
I	HULL-TURRET INFLATABLE SEAL	
5. Seal will not inflate a properly.	. Malfunction in assembly of seal to the hull.	a. Check and correct malfunction
b	. Seal is damaged and leaks.	b. Replace seal.
6. Seal will not deflate.	Faulty check valve or bleeder cock.	a. Replace check valve or bleeder cock (TM 9-2350-224-20).
b	 Pinched hose or foreign matter in hose, valve, or seal. 	b. Remove obstruction.

Table V. Troubleshooting Hull Components

Table V. Troubleshooting Hull Components - Continued

Malfunction	Probable causes	Corrective action
	DRIVER'S SEAT	
7. Backrest will not adjust or retain desired	a. Damaged or broken torsion springs.	a. Replace torsion springs.
position.	b. Bent or damaged parts.	b. Repair or replace parts.
8. Seat will not rise to full height.	a. Damaged or broken seat compression springs.	<u>a.</u> Replace seat compression springs.
	b. Rust, paint, or dirt on guides or post.	b. Clean affected parts.
 Seat will not retain vertical adjustment. 	<u>a.</u> Damaged or sheared vertical spring pin assembly.	a. Replace vertical spring pin assembly.
	b. Damaged or broken vertical adjustment spring.	b. Replace vertical adjustment spring.
10. Seat will not retain horizontal adjustment.	a. Damaged or sheared horizon- tal adjustment pin.	a. Replace horizontal adjustment pin.
	b. Damaged or broken horizon- tal adjustment spring.	b. Replace horizontal adjustment spring.
11. Seat will not trip.	<u>a.</u> Improperly adjusted tripping linkage.	<u>a.</u> Adjust linkage to assure vertical movement of seat.
	b. Sheared trip pin.	b. Replace trip pin.
12. Seat will not retain horizontal position.	Damaged or broken trip lever spring.	Replace trip lever spring.
	SPEEDOMETER	
13. Speedometer does not indicate, indicates	a. Faulty speedometer.	a. Replace speedometer (TM 9-2350-224-20).
erratically, sticks.	b. Damaged speedometer drive adapter.	b. Replace drive adapter.
	<u>c.</u> Damaged drive shaft assembly.	c. Replace drive shaft assembly or faulty components (TM 9-2350-224-20).
	d. Sharp bend in drive shaft assembly.	d. Reroute drive shaft assembly.

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Table V. Troubleshooting Hull Components - Cont	inued
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Malfunction	Probable causes	Corrective action
	TACHOMETER	
14. Tachometer does not operate, indicates	a. Faulty tachometer.	<u>a.</u> Replace tachometer (TM 9-2350-224-20).
erratically, or stress.	b. Damaged tachometer drive adapter.	b. Replace drive adapter (TM 9-2350-224-20).
	<u>c.</u> Damaged drive shaft assembly.	$\frac{\text{c. Replace drive shaft assembly}}{\text{or faulty components}}$ (TM 9-2350-224-20).
	d. Damaged tachometer drive shaft coupling.	d. Replace drive shaft coupling (TM 9-2350-224-20).
	e. Sharp bend in drive shaft assembly.	e. Reroute drive shaft assembly.

Table VI. Troubleshooting Personnel Heater

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Malfunction	Probable causes	Corrective action
1. Heater does not start, blower does not run.	<u>a.</u> Faulty wiring or circuit breaker.	a. Repair wiring. Replace circuit breaker in master control panel.
	b. Faulty blower.	b. Repair or replace blower.
	c. Faulty fuel pump.	c. Refer to table II.
	d. Faulty flame detector switch.	d. Replace switch.
	e. Defective thermostat.	e. Replace thermostat.
2. Blower runs when heater switch is in HI or LO position, but heater does not ignite.	<u>a.</u> No fuel pressure.	a. Check fuel supply. Operate purge pump to prime personnel heater fuel pump. Check fuel lines to pump and heater. Replace personnel heater fuel pump.
	b. Faulty igniter.	b. Replace igniter.
	c. Faulty overheat switch.	c. Replace switch.
	d. Faulty fuel control valve.	d. Repair or replace valve.
	e. Faulty time delay cartridge.	e. Replace cartridge.
	f. Faulty preheat resistor.	f. Replace resistor.
3. Blower runs when	a. Faulty flame detector switch.	a. Repair or replace switch.
position but heater goes out after a short interval.	b. Restriction in ventilating airflow.	b. Remove restriction.
	c. Faulty overheat switch.	<u>c.</u> Replace switch.
	d. Faulty time delay switch.	<u>d.</u> Replace time delay switch.
4. Heater overheats and	<u>a.</u> Restriction in vent airflow.	<u>a.</u> Remove restriction.
stopp but mile	b. Faulty fuel control valve.	b. Repair or replace valve.
5. Heater overheats but continues to burn.	Faulty overheat switch in conjunction with other defects (4 above).	Replace overheat switch, and then determine other cause of (4 above).
6. Heat output too low.	a. Faulty fuel control valve.	a. Repair or replace valve.
	b. Low fuel pressure.	b. Check for restriction in lines to and from personnel heater fuel pump. Check fuel pump (table II)
	c. Heater switch set at LO.	c. Switch to HI.

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Malfunction	Probable causes	Corrective action
7. Heater smokes excessively or "bangs"	a. Leaking fuel control valve.	a. Repair or replace valve.
upon starting.	b. Flame detector switch fails when starting in HI.	b. Repair of replace switch.
8. Blower does not stop when heater is turned off.	Faulty flame detector switch.	Repair or replace switch.
9. Odor of fuel in ventilating airstream.	Leaking fuel connection at standpipe or fuel control valve.	Tighten fuel connections.

Table VI. Croubleshooting Personnel Heater - Continued

CHAPTER 4

REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

19. General

This chapter identifies the major components of the M48A3 tank and indicates a systematic procedure for their removal and installation.

20. Power Plant

Refer to TM 9-2350-224-20.

21. Range Finder M17B1C

Refer to TM 9-2350-224-20.

22. Gun Elevating and Turret Traversing System

Refer to TM 9-2350-215-35/2.

23. Caliber .50 Machinegun HB M2, Tank Commander's Cupola M1

Refer to TM 9-1000-213-35.

24. 90-MM Gun Cannon M41, and 90-MM Combination Gun Mount M87A1

Remove or install the gun and mount as one unit, in accordance with the instructions contained in TM 9-1015-219-35.

25. Turret

a. <u>Removal</u>. Follow the alphabetical sequence of the views in figures 25 and 26 for removal of the turret.

<u>b. Installation</u>. Follow the numerical sequence of the views in figures 25 and 26 for installation of the turret.

26. Technical Inspection

Perform a technical inspection, using DA Form 2404 (Equipment Inspection and Maintenance Worksheet) and as outlined in TM 9-2350-224-20 for the "Q" (quarterly) or 750mile organizational maintenance service.



Figure 25. Removal and installation of turret (1 of 2)





CHAPTER 5

GENERAL CLEANING, INSPECTION, AND REPAIR

27. Scope

This chapter contains general cleaning, inspection, and repair instructions for the components of the M4843 tank covered in this manual. Necessary additional data pertinent to a specific component is included in the appropriate chapter.

28. General

<u>a</u>, All components must be cleaned after disassembly and prior to inspection. Make certain the work bench is free from foreign matter. To ensure cleanliness, place a large sheet of heavy wrapping paper on the work bench. This precaution will protect the working surfaces and reduce the chance of misplacing small parts. During disassembly and assembly, avoid striking finished surfaces together.

b. Cleaning operations, processing solutions, processing procedures, and the chemical methods required for the cleaning of Ordnance materiel are described in TM 9-208-1.

29. Cleaning Parts

a. Parts.

- (1) <u>Mechanical</u>. Material received in Ordnance shops from storage will be cleaned by one of the following methods, which is applicable and available. If some time is to elapse before the start of repair or rebuild operations, apply a light grade of preservative oil to all polished metal surfaces to prevent rusting.
 - (a) <u>Dip-tank methods</u>. Disassemble materiel as required and place parts in a perforated metal basket. Submerge and agitate the parts in a tank containing dry-cleaning solvent or mineral spirits paint thinner. Extent of treatment in each tank will depend on ways with which the dirt, oil and grease dissolve.
 - (b) Vapor-degreaser method. Tanks containing a heated solution of trichlorethylene or perchlorethylene (type

II) are used mostly for degreasing items that are very greasy or oily and are not readily cleaned by the dip-tank method. Place parts in a perforated metal basket and submerge just below the vapors in the tank and keep there until all the grease or oil melts and runs off the parts.

Warning: Do not inhale or expose hands to vapor-degreaser fumes.

- (c) Steam method. Place parts in a perforated metal basket and steam treat until clean. This method is less efficient than the vapor-degreaser method and may require additional cleaning of parts to remove all traces of grease, particularly from the recessed areas.
- (2) <u>Cleaning mechanical parts during re-</u> pair and rebuild.
 - (a) Remove dirt and other foreign matter from all metal surfaces. This can be done by the dip-tank method or vapordegreaser method, or by cleaning with a cloth soaked in dry-cleaning solvent or mineral spirits paint thinner. In the dip-tank method, agitation for approximately one minute in each tank is sufficient; in the vapor degreasermethod, treatment for about two or three minutes is sufficient.
- (b) Foreign matter is more easily removed from recessed areas when the proper tools are used. A stiff bristled brush or a pointed wooden stick will serve well in this instance.
- (3) Electrical insulation, wiring, and components. Refer to TM 9-208-1.
- (4) Cleaning after shop inspection. After shop inspections, dip part in a tank containing fingerprint removing oil (type A), remove (use rubber gloves), and dry thoroughly with dry, compressed air (provided with moisture filter traps) or by wiping with a clean, lint-free, dry cloth. Apply preservative as soon as possible after cleaning.

sgtmajwfc@comcast.net 12 Feb 2016

b. Bearings. Remove surface dirt and oil or grease from any ball or needle bearings by one of the above methods, then place the bearings in hot oil (approximately 140°F) to loosen congealed oil or grease from the recessed areas. Dip and agitate the bearing in clean dry-cleaning solvent or mineral spirits paint thinner. Dry the bearing thoroughly and coat it with a thin film of lubricant and wrap it tightly in oiled or waxed paper until ready for inspection or assembly.

<u>Note</u>. Do not spin a bearing with compressed air.

See TM 9-214 for the care and maintenance of bearings.

30. Inspection and Repair

a. Inspection and Repair for Cast Parts and Machined Surfaces.

- Inspect cast parts for cracks or fractures, and inspect interiors for scores and burs.
- (2) Inspect machined surfaces for cracks, fractures, and signs of galling, pitting, scoring, or corrosion.
- (3) Remove minor scores and burs from machined surfaces and interiors of cast parts with a fine stone or crocus cloth that has been dipped in dry-cleaning solvent or mineral spirits paint thinner. Replace part if it is cracked, fractured, or excessively scored or burred.
- b. Inspection and Repair of Bearings.
 - Inspect all bearings in accordance with TM 9-214.
 - (2) Inspect balls for cracks, fractures, signs of galling, pitting or corrosion. Take several measurements of the diameter of each ball to check for roundness and proper diameter.
 - (3) Perform maintenance functions on bearings as prescribed in TM 9-214.
 - (4) Replace balls if they are damaged in any way.

c. Inspection and Repair of Bushing Type-Bearings. Inspect bearings for cracks, fractures, signs of galling, pitting, scoring, or corrosion.

Note. Inspection is to be accomplished without removal of the bearing. Use a small mirror and pencil-type flashlight where necessary.

(2) Replace bearings if they are damaged in any way.

Caution: Observe position of defective bearing within housing so that the new bearing may be replaced in a similar manner.

d. Inspection of Seals and Gaskets. Tag all seals and gaskets for inspection.

- e. Inspection and Repair of Gears.
 - Inspect gears for wear, nicks, flaking, scoring, and burring. Check that gears are secure with the component on which they have been shrunk or pressed.
 - (2) Remove minor nicks with a fine stone or crocus cloth that has been dipped in dry-cleaning solvent or mineral spirits paint thinner. Replace gears if teeth are damaged in any other way.
- f. Inspection and Repair of Splined Parts.
 - (1) Inspect splines for cracks, fractures and deformation.
 - (2) Inspect shafts for cracks, fracturing, scores, and deformation.
 - (3) Replace any splined parts if splines do not permit a secure fit.
 - (4) Replace shafts if they are cracked, fractured, scored or deformed.

g. Inspection and Repair of Threaded Parts.

- Inspect all screws, bolts, nuts, and threaded holes for worn or damaged threads.
- (2) Repaired damaged threads in tapped holes by chasing with a suitable tap. If necessary, drill out threaded holes, plug, and retap.

- h. Inspection of Snap Rings.
 - Inspect snap rings for damage that would impair their use.
 - (2) Replace snap rings if damaged in any way.

i. Dowel Pin Removal. Remove dowel pins by one of two methods.

- Grip dowel pin with self-locking pliers and pull with a twisting motion.
- (2) Grind pin off flush with surface and drill out remainder of pin with a suitable size drill.

j. <u>Stud Removal</u>. Remove studs by one of the three following methods:

(1) Apply penetrating oil to base of stud. Thread two hex nuts of the proper size on the stud, then jam the nuts. Apply suitable wrench to lower of the two hex nuts and unscrew stud.

- (2) Apply penetrating oil to base of stud and sharply tap head of the stud several times with a hammer. Grip stud with self-locking pliers and unscrew.
- (3) Grind stud off flush with surface and drill out remainder of stud with a suitable size drill. Chase threads in parts with a suitable size tap.

k. Inspection of Welds. Inspect all weldments for broken or defective welds.

- 1. Inspection and Repair of Finish.
 - Inspect all painted surfaces in accordance with TM 9-213.
 - (2) Inspect plated surfaces for signs of flaking, wear, or deterioration of the plating.
 - (3) Repaint painted surfaces, where reguired as prescribed in TM 9-213.
 - (4) Remove old plating, if necessary, and replace according to standard shop practice.

CHAPTER 6

FUEL AND AIR INTAKE SYSTEM COMPONENTS

Section I. GENERAL

Component

31. Scope

This chapter contains repair, rebuild, removal and installation instructions pertaining to the primer pump, fuel tanks and air cleaners.

32. References

Repair, rebuild and replacement instructions for the other components of the fuel and air intake system are contained in the following technical manuals:

Component	Technical manual
Fuel Injection Pump	TM 9-2910-212-35
High-Pressure Fuel Lines	TM 9-2815-200-35
Fuel Injector Nozzles	TM 9-2815-200-35
and	TM 9-2910-212-35

Fuel Injection Pump	
Shutoff Solenoid	TM 9-2815-200-35
Fuel Booster Pump	TM 9-2910-213-35
Turbosuperchargers	TM 9-2990-200-35
Condensate Removers	TM 9-2350-224-20
Hoses, Lines, and Fittings	TM 9-2350-224-20
Fuel Shutoff Valve	TM 9-2350-224-20
Check Valve	TM 9-2350-224-20
Fuel Tank Isolation Valve	TM 9-2350-224-20
Fuel Return Selector and	
Isolator Valve	TM 9-2350-224-20
Primary Fuel Filter and	
Filter Element	TM 9-2350-224-20
Secondary Fuel Filter	
and Filter Element	TM 9-2815-200-35
Manifold Heater Ignition Coil,	
Lines and Fittings, Nozzle,	
Ignition Plug, and Solenoid	TM 9-2350-224-20

Technical manual

Section II. FUEL PRIMER PUMP

Description

The fuel primer pump assembly, shown in figure 9, is a hand-operated, double acting pump used to purge and prime the engine fuel lines. Several strokes of the pump handle will pump out any air present in the engine fuel lines. Both air and fuel are then passed through the primer pump and the fuel return system to the fuel tanks, where the air is discharged.

A pushbutton-type switch in the end of the pump handle actuates the engine manifold heater, fuel shutoff valve solenoid, and ignites the manifold heater spark plug. These actions take place simultaneously when the button is pressed. The button must be held down to keep the manifold heaters operating.

Figure 28 illustrates the operation of the fuel primer pump. Part A of the figure shows the flow during the downstroke of the pump handle. As the handle is lowered the piston moves rearward, compressing the air in the cylinder behind it and causing a partial vacuum in the portion of the cylinder in front of it. The resulting differential in pressure between the inlet chamber and the section of the chamber in front of the piston causes the spring-loaded ball valve (1) to open, thus drawing air through the cylinder. At the same time, the compressed air in the other portion of the cylinder holds ball valve (2) closed and forces open ball valve (3). When ball valve (3) opens, the air is evacuated into the outlet chamber where it exerts pressure against ball valve (4), holding it closed, and passes out through the pump outlet line and the fuel return system into the fuel tank. The actions just described occur almost simultaneously.

Part B of figure 28 illustrates the operation of the pump during the upstroke of the handle. As the handle is raised the piston moves forward into the cylinder, compressing the air in front of it and creating a partial vacuum behind it. The differential in pressure between the inlet chamber and the section of the cylinder behind the piston causes the spring-loaded ball valve (2) to open, drawing air through the input fuel line and inlet chamber and into the cylinder. At the same time, the compressed air in front of the piston holds ball valve (1) closed and forces open ball valve (4). When ball valve (4) opens, the air is evacuated into the outlet chamber where it exerts pressure against the ball valve (3), holding it closed, and passes out through the outlet line. As a result, a sustained flow of air is maintained during both strokes of the handle.

After several strokes of the handle the air is evacuated from the input lines and is replaced by fuel, at which time hand pumping can be terminated.

34. Removing

Refer to TM 9-2350-224-20 for removing the pump.

35. Rebuild

a. Disassembly. Figures 29 and 30 identify the components of the pump. Follow the alpha-

betical sequence of the views in figures 31 through 33 for the proper disassembly procedure.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning instructions.

c. Inspection and Repair. Refer to paragraphs 27 through 30 for inspection, repair, and refinishing instructions and procedures. Figures 29 and 30 provide repair and rebuild standards, specific inspection data and points of measurement.

d. <u>Assembly</u>. Figures 29 and 30 identify the components of the pump. For assembly procedures follow the numerical sequence of the views in figures 31 through 33.

36. Installation

Refer to TM 9-2350-224-20 for installation instructions of the pump in the vehicle.



Figure 27. Fuel primer pump assembly



Figure 28. Operation of fuel primer pump assembly (functional diagram)



- A Lever-to-body link 10905212
- B Pump handle lever 10863690
- C Lower handle sleeve 10873725
- D Manifold heater switch assembly 7064938
- E 1-1/8 id x 1/8 thk Preformed packing 501228
- F Upper handle sleeve 10873723
- G Operating handle 10873724
- H 1/4 Lockwasher 96906-35337-25

- J No. 10-24 x 5/16 pan head screw 96906-35335-60
- K 5/16 dia Electrical clamp 573033
- L $1/4-20 \ge 3/8$ Assembled washer screw 423553
- M-3/4 Lockwasher 96906-35337-32
- N 3/4-10 Hex nut 96906-35691-1202
- P 1/4 x 43/64 Headed straight pin 138083
- Q = 1/16 x 1/2 Cotter pin 190432

Reference letter Inspection data and points of measurement		Size and fit of	Wear limits	
	new parts	Field	Depot	
а b	Contacts must not be broken or damaged and must be free of dirt and corrosion. Pushbutton action must be positive, and metal bellows must be intact.			

Figure 29. Fuel primer pump handle assembly - partial exploded view - wear limits

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Figure 30. Fuel primer pump, body assembly - partial exploded view

- A Piston and rod assembly 7703661
 - 1 Rod assembly 703653
 - a Yoke 7703658
 - b Pin 142492
 - c Rod 7703651
 - 2 3/4 id x 1/8 thk Preformed packing 501218
 - 3 Gland 7703657
 - 4 Piston 7703650
 - 5 1/4 id x 1/16 thk Preformed packing 501461
 - 6 9/32 Washer 178474
 - 7 1/4-28 Slotted hex nut 125215
 - 8 1/16 x 1/2 Cotter pin 190432
- B 1-1/16 id x 1/8 thk Preformed packing 501230
- C 1/2 id x 3/32 thk Preformed packing 501460
- D Locking wire 8698703
- E Body 703649

- F 1/2 id x 3/32 thk Preformed packing 501460
- G Outlet valve assembly 7703663
 - 1 Outlet valve 7703654
 - 2 5/16 dia Steel ball 587934
 - 3 Helical compression spring 7084464
 - 4 4/8 Housing dia internal retaining ring 583003
- H 5/8 id x 3/32 thk Preformed packing 501212
- J Outlet valve retainer 7703656
- K Inlet valve assembly 7703662
 - 1 Inlet valve 7703652
 - 2 5/16 dia Steel ball 587934
 - 3 Helical compression spring 7084463
 - 4 3/8 Housing dia internal retaining ring 583003

Reference letter Inspection data and points of measurement	Increation data and points of management	Size and fit of	Wear limits	
	new parts	Field	Depot	
c	Must be straight with undamaged threads OD of piston rod ID of gland Fit of rod in gland	0.497 to 0.499 0.505 to 0.507 0.006L to 0.010L		
e f	OD of piston Cylinder surfaces must not be worn	0.990 to 0.995	(*)	(*)
f	ID of cylinder	1.000 to 1.002	(*)	(*)
e-f	Fit of piston in cylinder	0.005L to 0.012L	(*)	(*)
g	ID of valve	0.373 to 0.380	(*)	(*)
h	OD of spring	0.240 to 0.370	(*)	(*)
h	Free length of spring	0.790 to 0.810	(*)	(*)
g-h	Fit of spring in valve	0.003L to 0.010L	(*)	(*)
j	ID of valve	0.373 to 0.380	(*)	(*)
k	OD of spring	0.240 to 0.370	(*)	(*)
k	Free length of spring	0.870 to 0.890	(*)	(*)
j-k	Fit of spring in valve	0.003L to 0.010L	(*)	(*)

Figure 30. Fuel primer pump, body assembly - partial exploded view - wear limits (continued)



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Figure 31. Disassembly and assembly of fuel primer pump (1 of 3)

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Figure 32. Disassembly and assembly of fuel primer pump (2 of 3)



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Figure 33. Disassembly and assembly of fuel primer pump (3 of 3)

37. Description and Data

a. Description. The two interconnected aluminum fuel tanks, shown in fig. 34 are located on either side of the power plant in the engine compartment. The right tank incorporates a filler tube with filter and vent cap, and both tanks are equipped with a float-type fuel gage, a condensate removal quick-disconnect and plug, a drain valve on the left tank, a drain plug on the right tank, and an electric fuel pump and associated parts. The left tank has an emergency filler. The tanks are shock mounted at the bottom front and rear, top rear and at the front. Ground straps are installed to assure discharge of any static electricity.

b. Tabulated Data.

Fotal capacity - both tanks	370					
Left tank	185					
Right tank	85					
Construction riveted and weld	led					
aluminum plate and extrusions, with						
external baffles						

38. Replacement of Left Fuel Tank

a. <u>Removal.</u> Follow the alphabetical sequence of the views in figures 35 thru 41 for the proper removal procedure.

<u>b.</u> <u>Installation</u>. Follow the numerical sequence of the views in figures 35 thru 41 for the proper installation procedure.

39. Replacement of Right Fuel Tank

<u>a. Removal.</u> Follow the alphabetical sequence of the views in figures 42 thru 49 for the proper removal procedure.

<u>b.</u> Installation. Follow the numerical sequence of the views in figures 42 thru 49 for the proper installation procedure.

40. Rebuild

a. General. This chapter gives instructions for cleaning, inspecting, repairing, stripping and painting the fuel tanks and accessories.

b. Cleaning. The tanks should be cleaned with a solution of high-pressure cleaning compound and water, as prescribed in TM 9-247. This solution should be applied to the interior and exterior of the fuel tanks by means of a high-pressure steam cleaning machine. The tanks must be rinsed thoroughly with hot water upon completion of cleaning.

c. Inspection.

 Tanks must be free of cracks, fractures, deformation, and must be free of nicks and scores in excess of 1/32 inch deep.

Note. Minor denting that does not affect serviceability of the tank is acceptable.

- (2) Check threaded openings for worn or damaged threads.
- Check for flaked, chipped or worn paint.
- (4) Inspect each tank for broken or defective welds.
- d. Repairing.
 - Repair minor cracks, fractures, broken or damaged welds, or nicks and scores according to standard shop practice.
 - (2) Repair worn or damaged threads by chasing with the proper size tap to allow insertion of a helicoil unit. Generally, there is insufficient thread material available to permit retapping.

Caution: Do not allow metal chips to drop inside tank when retapping threaded holes.

- (3) Repair damaged painted areas as follows:
 - (a) Remove flaked, chipped or scratched paint down to the bare metal and feather the edges of the area with sandpaper.
 - (b) Apply one coat of zinc yellow primer paint to the area and allow to dry.
 - (c) Apply white synthetic gloss enamel to the primed surface and allow to dry.

sgtmajwfc@comcast.net 12 Feb 2016

(d) Consult TM 9-208-1 and TM 9-213 for the procedures to follow when the fuel tanks must be completely stripped of paint and then repainted. **Caution:** Use care in stripping paint from tanks. Do not apply caustic solutions to the aluminum. Paint removers of either type may be used as they will not harm aluminum.



Figure 34. Fuel tanks installed - rear view



Figure 35. Removal and installation of left fuel tank (1 of 7)



Figure 36. Removal and installation of left fuel tank (2 of 7)



Figure 37. Removal and installation of left fuel tank (3 of 7)



Figure 38. Removal and installation of left fuel tank (4 of 7)



Figure 39. Removal and installation of left fuel tank (5 of 7)





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Figure 40. Removal and installation of left fuel tank (6 of 7)



Figure 41. Removal and installation of left fuel tank (7 of 7)



RIGHT FUEL TANK



Figure 42. Removal and installation of right fuel tank (1 of 8)


Figure 43. Removal and installation of right fuel tank (2 of 8)





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Figure 45. Removal and installation of right fuel tank (4 of 8)



Figure 46. Removal and installation of right fuel tank (5 of 8)

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Figure 47. Removal and installation of right fuel tank (6 of 8)



Figure 48. Removal and installation of right fuel tank (7 of 8)



Figure 49. Removal and installation of right fuel tank (8 of 8)

e. Fuel Tank Accessories.

- Disassembly of fuel tank mounts. Follow the alphabetical sequence of the views in figures 51, 52, 53, 54, and 55 for the proper disassembly procedures.
- (2) <u>Cleaning of fuel tank mounts</u>. Refer to paragraphs 27 thru 30 for general cleaning, and refinishing instructions.
- (3) <u>Inspection and rebuild of fuel tank</u> mounts. Figures 56, 57, 58, 59, and 60 identify the components and specific points for inspection and rebuild of the fuel tank mounts.
- (4) Assembly of fuel tank mounts. Follow the numerical sequence of the views in figures 51, 52, 53, 54, and 55 for the proper assembly procedures.



Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter		new parts	Field	Depot
a b c d	Must not be bent, cracked, broken, or distorted. Replace if deeply scored, bent, worn, or distorted. Clean with a solution of soap and warm water. Rinse thoroughly with warm clean water. Apply rubber preservative compound. Replace if rubber is cut, deteriorated, or worn. Braid strap must not be cut, frayed, or worn. Remove all grease, oil, and grime by cleaning with trichlorethylene. The vapors of trichlor- ethylene are toxic. Use only in a well-ventilated area and avoid prolonged inhalation of fumes.			

Figure 50. Cleaning, inspection and repair of fuel tank mounts (typical) - and wear limits



Figure 51. Disassembly and assembly of upper front fuel tank mount



Figure 52. Disassembly and assembly of top rear fuel tank mount (both tanks)



Figure 53. Disassembly and assembly of left lower front fuel tank mount



Figure 54. Disassembly and assembly of right lower front fuel tank mount

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Figure 55. Disassembly and assembly of lower rear fuel tank mount (both tanks)



- B Washer 96906-15795-221 C - Nut 96906-35690-522 D - Lockwasher 8376831
- E Washer 96906-15795-213
- G Bracket 10884064
- H Screw 96906-35304-60
- J Bumper 10893642
- K Lockwasher 7064833
- L Bracket 10884128
- M-Washer 10863910
- N Lockwasher 96906-35338-31
- P Nut 96906-35690-1022

Figure 56. Lower rear fuel tank mount (both tanks) - exploded view



- A Nut 96906-35690-1028 B - Lockwasher 96906-35338-31 C - Plate 10863918 D - Washer 96906-15795-221
- E Washer 96906-35333-29
- F Nut 96906-35691-1028
- G Nut 96906-35690-1028
- H Lockwasher 96906-35338-31
- J Washer 10863910
- K Bumper 10893642
- L Bolt 10893633
- M-Bracket 10893636

- N Washer 96906-15795-212
- P Screw 96906-51099-29
- Q Screw 96906-35304-171
- R Nut 96906-35690-625
- S Lockwasher 7046833
- T Screw 96906-35304-625

Figure 57. Upper front fuel tank mount (both tanks) - exploded view - wear limits



A - Bracket 10893634 B - Washer 10863910 C - Bumper 10893642 D - Bracket 10893641

- E Lockwasher 96906-35338-31 F - Screw 96906-35304-169
 - G Nut 96906-35690-529

 - H Lockwasher 96906-35338-26
- J Washer 96906-15795-212 K - Screw 96906-35304-33 L - Screw 96906-35304-64
- M-Washer 7064833

Figure 58. Top rear fuel tank mount (both tanks) - exploded view - wear limits



- A Nut 96906-35690-1028 B - Lockwasher 96906-35338-31 C - Washer 10863910 D - Bumper 10893642
- E Base 10873682

- F Lockwasher 96906-35338-26
- G Screw 96906-35304-32
- H Bracket 10870889
- J Washer 96906-15795-221
- K Screw 96906-35304-170 L - Nut 96906-35690-525
- M-Lockwasher 96906-35338-26
- N Washer 96906-15795-212
- P Screw 96906-35304-33





- A Nut 96906-35690-1028 B - Lockwasher 96906-35338-31
- C Washer 10863910
- D Bumper 10893642
- E Bracket 10863914

- F Bracket 10870885
- G Nut 96906-35690-525
- H Lockwasher 96906-35338-26
- J Washer 96906-15795-221
- K Screw 96906-35304-170 L - Washer 96906-15795-212 M-Screw 96906-35304-32 N - Screw 96906-35304-33 P - Lockwasher 96906-35338-26
- Figure 60. Right lower front fuel tank mount exploded view wear limits

- (5) <u>Removal of fuel gage</u>. Follow the alphabetical sequence of the views in figure 61 for the proper removal procedure.
- (6) <u>Cleaning</u>. Refer to paragraphs 27 thru 30 for general cleaning, and refinishing instructions.
- (7) Inspection and repair. Figure 62 identifies the specific points for inspection and rebuild of the fuel gage.
- (8) <u>Installation</u>. Follow the numerical sequence of the views in figure 61 for the correct installation procedure.



Figure 61. Removal and installation of fuel gage (both tanks)



Figure 62. Inspection and repair of fuel gage

- (9) Removal of capacitor, housing assembly, and related parts. Follow the alphabetical sequence of the views in figures 63 and 64 for the proper removal procedure.
- (10) Disassembly of capacitor, housing assembly and related parts. Figure 65 identifies the components and related parts of the capacitor and housing assembly. Follow the alphabetical sequence of the views in figure 66 for the proper disassembly procedure.
- (11) Cleaning. Refer to paragraphs 27 thru $\overline{30 \text{ for general cleaning and refinishing instructions.}}$

- (12) Inspection and repair. Paragraphs 27 thru 30 contain general inspection and repair instructions. Figure 65 illustrates repair and rebuild standard points of measurement and specific inspection data.
- (13) Assembly of capacitor, housing assembly, and related parts. Figure 65 identifies the components and related parts of the capacitor and housing assembly. Follow the numerical sequence of the views in figure 66 for the proper assembly procedure.
- (14) Installation of capacitor, housing assembly, and related parts. Follow the numerical sequence of the views in figures 63 and 64 for the proper installation procedure.



Figure 63. Removal and installation of capacitor and housing assembly and related parts (left tank)



Figure 64. Removal and installation of capacitor and housing assembly and related parts (right tank)



- A 0.041 Lockwire 96906-20995-F41
- B 1/4-28 x 1-3/4 Fillister head screw 96906-35266-86
- C 1/4 Washer 96906-15795-210
- D = 5/16-18 x 7/8 Cap screw 96906-51099-33
- E = 5/16 Washer 96906-15795-212
- F Gasket 10864012
- G Access cover 10870962 (right tank) Access cover 10870421 (left tank)
- H Gasket 10870952 (right tank) Gasket 10873918 (left tank)
- J Screw 96906-35223-42
- K No. 8 Lockwasher 96906-35333-21
- L Electrical lead and connector assembly 7061059 (right tank) Electrical lead and connector assembly 7061058 (left tank)

- M-No. 10 lockwasher 96906-35338-24
- N No. 10-32 x 1/2 fillister head screw 96906-35338-24
- P Capacitor and housing assembly 7061046
 - 1 Housing 7061045
 - 2 Housing gasket 7412721
 - 3 Connector assembly 7018245
 - a Capacitor assembly 7024640
 - b Plate 7024639
 - c Shell 7064587
 - d Plate 7019004
 - e Lockwasher 96906-35335-15
 - f Connector pin 7018188
 - g Screw 96906-35223-13
 - 4 No. 6-32 x 3/8 assembled washer screw 451633

Reference	Increation data and points of measurement	Size and fit of	Wear limits			
letter	inspection data and points of measurement	new parts	Field	Depot		
a h	Polish surfaces of lug lightly with 4/0 sandpaper. Insulator not deteriorated.					

Figure 65. Capacitor and housing assembly and related parts (both tanks) exploded view - wear limits

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Figure 66. Disassembly and assembly of capacitor and housing assembly and related parts (both tanks)

- (15) Disassembly of condensate removal disconnect and plug. Figure 67 identifies the components of the condensate removal quick disconnect and plug. Follow the alphabetical sequence of the views in figure 68 for the proper disassembly procedure.
- (16) <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.
- (17) Inspection and repair. Figure 67 shows specific points for inspection and repair.
- (18) Assembly of condensate removal quick disconnect and plug. Figure 67 identifies the components of the condensate removal quick disconnect and plug. Follow the numerical sequence of the views in figure 68 for the proper assembly procedure.



A	-	Plug	108	704	62

- B Ring 7263772 C - Ring 7263770
- D Spring 7263771
- E Gasket 501462
- F Ball 145638
- G Sleeve 7027487

Reference	Transition data and points of management	Size and fit of	Wear limits			
letter	inspection data and points of measurement	new parts	Field	Depot		
a b c	Surfaces must not be damaged or scored. Chain must be soldered securely to plug, not broken. Ball seating chamfer inside lockring must be smooth and not worn. Must not be fatigued.					

Figure 67. Condensate removal quick disconnect and plug (both tanks) - wear limits

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Figure 68. Disassembly and assembly of condensate removal quick disconnect and plug (both tanks)

- (19) <u>Removal of emergency filler</u>. Figure 70 identifies the components of the emergency filler. Follow the alphabetical sequence of the views in figure 69 for the proper removal procedure.
- (21) Inspection and repair. Refer to paragraphs 27 thru 30 for general inspection and rebuild data. Figure 70 illustrates repair and rebuild standard points of measurement and specific inspection data.
- (22) Installation of emergency filler. Follow the numerical sequence of the views in figure 69 for the proper installation procedure.



Figure 69. Removal and installation of emergency filler



A = 0.041 Lockwire 96906-20995-F41 C = 1/4 Washer 96906-15795-210 E = Gasket 10864393 B = 1/4-20 x 3/4 Cap screw 96906-51099-6 D = Cover 10870318 F = Filter assembly 7528113

Reference letter	Ingraction data and points of management	Size and fit of	Wear limits		
	inspection data and points of measurement	new parts	Field	Depot	
a	Legend must be legible. Paint must not be chipped or cracked.				
b	Must not be clogged, torn, or deformed.				

Figure 70. Emergency filter - exploded view - wear limits

41. Testing

Upon completion of repairs, the fuel tanks must be subjected to one of the two tests prescribed in this paragraph. The dynamic test, described in a below, is preferred over the static test, described in b below. The tanks should be subjected to the static test only if the dynamic test procedure is impractical.

- a. Dynamic Test.
 - Mount tank in a suitable fixture that may be rotated at variable speeds up to 10 rpm.
 - (2) Fill tank with a colored liquid up to not less than 75 percent of its rated capacity.

Note. The liquid used shall be a oneto-two percent, low-surface-tension, water solution employing either Tergitol No. 7 (25 percent solution), Aerosol OT or equal, and a water soluble dye (color optional).

- (3) Seal all openings of tank but one.
- (4) Install a suitable fitting on the one opening and introduce compressed air into the tank until a pressure of 3 psi has been reached.
- (5) Hold pressure at 3 psi and rotate the fixture at a speed of 3 rpm for 3 minutes. Then rotate the fixture at a speed of 10 rpm for 7 minutes.

Note. Transition from the lower rpm to the higher rpm must be made without pause.

- (6) There must be no leakage. Leakage, if present, will be indicated by the presence of the colored liquid on the outside of the tank.
- (7) Relieve the pressure, and empty colored liquid from tank. Remove tank from fixture.
- (8) Rinse tank thoroughly with hot water and allow to dry.
- (9) Seal all openings until the proper coverings are installed, at which time the seals should be removed.
- b. Static Test.
 - (1) Seal all openings of tank but one.
 - (2) Install a suitable fitting on the one opening and introduce compressed air into the tank until a pressure of 3 psi has been reached.
 - (3) Hold pressure at 3 psi and inspect all joints for leaks by means of a soap and water solution brushed on the joints.
 - (4) There must be no leakage. Leakage, if present, will be indicated by the presence of air bubbles in the soap and water solution.
 - (5) Relieve the pressure, and rinse exterior of tank with hot water. Allow to dry.
 - (6) Seal all openings until the proper coverings are installed, at which time the seals should be removed.

Note. This test may also be performed using a pressure gage and checking for reduced pressure.

Section IV. FUEL TANK PUMPS

42. Description and Data

b. Tabulated Data.

Manufact	u	r	er	۰.								т	ol	cŀ	ıe	ir	n	С	0	rporation
Model.													(C	rċ	ln	aı	10	e	Standard
Type	÷	÷	Ĵ		ì	÷.	ì	ì	Ĵ	Ì	Ĵ	Ĵ								Impeller
Capacity										į.	÷	Ĵ	÷	Ĵ	ŝ	Ĵ	÷	Ĵ	ŝ	, 220 gph
Maximun	'n	p	re	es	s	u	re	ŧ,	÷				÷	Ĵ	Ĵ	Ĵ		Ĵ	Ĵ	6.7 psi

43. Replacement of Left Fuel Pump

Refer to TM 9-2350-224-20 for replacement instructions of the left fuel pump.

44. Replacement of Right Fuel Pump

Refer to TM 9-2350-224-20 for replacement instructions of the right fuel pump.

45. Rebuild

Note. The procedure is the same for both the left and right fuel pump.

<u>a.</u> Disassembly. Figure 72 identifies the components of the electrical fuel pump. Disassemble the fuel pump as follows:

- Remove the two sections of the retainer from the mount.
- (2) Remove the mount from the hermetically sealed motor.

(3) With the use of a suitable tool, straighten the four crimped tabs located around the perimeter of the motor base, and separate the motor from the pump.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning instructions.

<u>c. Inspection and Repair.</u> Refer to paragraphs 27 through 30 for general inspection, repair, and rebuild instructions.

d. Assembly. Figure 72 identifies the components of the electrical fuel pump. Assemble the fuel pump as follows:

- Position the motor on the pump by alining the four tabs located around the perimeter of the motor base with the four blind holes in the pump.
- (2) Using a suitable tool, bend the four tabs into the blind holes in the pump sufficiently to secure the motor to the pump.
- (3) Position the mount over the motor so that the lip on the motor case engages the slit on the inner circumference of the mount. Press the mount firmly onto the lip on the motor case.
- (4) Position the two sections of the retainer on the mount, and press firmly until each section snaps securely into place.

46. Testing

Refer to figure 73 for testing instructions for the assembled electrical fuel pump.



Figure 71. Fuel pump assembly



A	-	Fuel	pump	retaine	r 217442
В	-	Fuel	pump	mount]	24100

C - Fuel pump motor 218117 D - Fuel pump 38281

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter		new parts	Field	Depot
a	Housing not cracked or dented. Connector and tabs must not be bent or broken. Replace pump if motor operation is not satisfactory. Screen must not be cut or clogged. Replace pump if operation is not smooth and dependiable.			

Figure 72. Fuel tank electrical fuel pump - exploded view - wear limits



CURVE IS FOR 800 FT ELEVATION. ALLOW 1 IN. OF MERCURY PER 1000 FT ALTITUDE DIFFERENTIAL

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47. Description

a. Air Intake System. Two fender-mounted dry-type air cleaners are used to filter the engine combustion air prior to delivery of the air to the engine turbochargers. Functionally, the air intake system operates as follows:

- Unfiltered air from the air intake is passed through the inlet hose to the air cleaner.
- (2) The air cleaner filters the air.
- (3) The clean, filtered air is passed through the outlet hose to the engine turbochargers.
- (4) The air cleaner air intake assembly is mounted at the crew compartment bulkhead. This intake assembly can be reversed to take air either from the crew compartment or engine compartment, depending on vehicle operating conditions. During normal operations the intake assembly can be installed in either position (longer periods between air cleaner servicing can be attained by taking air from the crew compartment). The assembly must always be positioned to take crew compartment air during operation under extremely dusty conditions or during deep-water fording.

b. Dry-Type Air Cleaner Operation. Unfiltered air is drawn through the air cleaner inlet and into the primary separator stage of the air cleaner. The primary separator, which is an integral part of the air cleaner housing, consists of 91 cycle tubes of 1-1/2-inch diameter mounted adjacent to each other for compact assembly. As the unfiltered air enters the cycle tubes, the helix vanes on the tubes introduce a centrifugal motion to the air which removes a large percentage of the dust from the air. This collected dust passes into a dust chamber and is expelled to the outside atmosphere by the electric motor driven blower assembly. The primary separator removes larger dust particles but allows smaller particles to pass through to the secondary filter stage of the air cleaner where the partially cleaned air is then filtered through the secondary separator. This separator consists of a fabric surface-type filter that operates principally by layer filtration, in that, after a period of operation, the dust forms a layer on the surface of the fabric filter material. After passing through the secondary filter stage, the resultant clean air is delivered through the turbochargers to the engine.

48. Repair of Air Cleaners and Associated Parts

a. <u>Removal</u>. Observe the alphabetical sequence of the views in figure 74 for the proper removal procedure.

b. Disassembly. Figures 75 through 78 identify the components of the air cleaner. Observe the alphabetical sequence of the views in figure 79 for the proper disassembly procedure.

c. Cleaning. Refer to paragraph 29 for general cleaning instructions, and refer to TM 9-2350-224-20 for the proper cleaning procedure of the filter bag.

d. Inspection and Repair. Refer to paragraph 30 for general inspection, repair, and refinishing instructions. Figures 75 through 78 show specific points for inspection and repair.

e. <u>Assembly</u>. Figures 75 through 78 identify the components of the air cleaner. Observe the numerical sequence of the view in figure 79 for the proper assembly procedure.

<u>f. Installation.</u> Observe the numerical sequence of views in figure 74 for the proper installation procedure.



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- A Cover 10870450
- B Gasket 8762886
- C Ribbed neck pin 8762859
- D Door assembly 8762836
 - 1 Gasket 8762834
 - 2 Rivet 8762831
 - 3 Door 8762835
 - 4 Handle assembly 10873851
- E Screw 10864268
- F 3/8 Lockwasher 96906-35335-21
- G 3/8-16 x 7/8 Assembled washer screw 423570
- H Bracket 8762884
- J Plug 10863625
- K 1/4 Washer 96906-15795-210
- L = 1/4-20 x 5/8 Assembled washer screw 425325

Reference	Ingreation data and points of measurement	Size and fit of	Wear limits			
letter	inspection data and points of measurement	new parts	Field	Depot		
a	Must not be cracked, broken, or deformed. Must be free of broken welds.					
b	Not cracked, broken, or deformed.					

Figure 75. Air cleaner - partial exploded view - wear limits



Figure 76. Air cleaner - partial exploded view

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- A 5/16-18 x 3/4 Assembled washer screw 425336
- B Cover 8762777
- C Gasket 10863870
- D 3/8-24 Hex nut 96906-35690-622
- E 3/8 Lockwasher 96906-35338-27
- F Air intake 8762785
- G Gasket 8762781
- H Gasket 8762776
- J 3/8-16, 3/8-24 x 7/8 Stud 96906-15986-HP15
- K Flange 8762784
- L Rubber hose assembly 10870140
- M- Grooved coupling clamp 8711310
- N Elbow 8762787 (left)
- Elbow 8762788 (right)
- P Gasket 8762780

- Q 5/16 Washer 96906-15795-212
- R 5/16 Lockwasher 96906-35338-26
- S 5/16-24 Hex nut 96906-35690-522
- T Elbow 8762789
- U Gasket 8762779
- V Air cleaner assembly 10863539 (left) Air cleaner assembly 10863540 (right)
- W-3/8 Washer 446477
- X 3/8-16 x 1 Cap screw 96906-35303-60
- Y Inlet gasket 8762775
- Z Elbow 10863871 (left) Elbow 10863874 (right)
- AA Hose clamp 8711309
- BB Preformed hose 8762783
- CC Nut 96906-35690-222

Reference	Increation data and points of measurement	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a b	Replace rubber gaskets on ends of metal flanges if worn or damaged. Must not be deformed. Mating surfaces must be free of burs and evidence of leaks.			

Figure 76. Air cleaner - partial exploded view - wear limits (continued)



- A 5/16-18 x 1-1/4 Cap screw 96906-35307-36 L 5/8 Washer 705667 B - 5/16 Lockwasher 96906-35338-26 C - Clamp assembly 8762829
- D 5/16-18 Hex nut 96906-35690-502
- E 3/8-16 x 5/8 Cap screw 96906-35307-57
- F 3/8 Lockwasher 96906-35338-27
- G Pad 8762879
- H Gasket 10870043
- J Adapter 8762871
- K Gasket 7722972

- M-Washer 7057352
- N Nut 7056641
- P Lead assembly 10863590
- Q Hose clamp assembly 96906-35842-3
- R Blower hose 8762862
- S Lead assembly 10863589
- T 1/4 Lockwasher 96906-35335-19
- U 1/4-20 x 5/8 Assembled washer screw 186493
- V Blower assembly 10905010

Reference	Inspection data and points of measurement Size and i	Size and fit of	Wear Limits		
letter	hispection data and points of measurement	new parts	Field	Depot	
a b c d	Must not be deformed or have broken welds. Terminals not bent, broken, or corroded. Termi- nal securely fastened to conductor. Clamp strap must not be bent or broken, and serrations not worn. Clamp must operate smoothly when screw is turned. Terminals not bent broken, or corroded. Termi- nals securely fastened to conductor.				

Figure 77. Air cleaner - partial exploded view - wear limits

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- A Air cleaner box 10863531 (left) Air cleaner box 10863532 (right)
- B Gasket 8762865
- C Air filter 8762849
- D Air filter baffle 8762847

E - Basket 8762846

- F Rod 10915294
- G 1/4-20 x 5/8 Assembled washer screw 186493 H - Spring 8762873

Reference	The second se	Size and fit of new parts	Wear limits			
letter	inspection data and points of measurement		Field	Depot		
a	Must not be cracked, broken, or deformed. Must be free of cracked or broken welds. Studs must not be damaged.					
b	Must not have holes or torn seams. Rubber gasket must not be damaged.					
c	Must not be bent, broken, or deformed. Must be free of broken welds.					
d	Must not be cracked, broken, or fatigued.					





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49. Rebuild of Blowers and Blower Motors

a. <u>Removal of Blower</u>. Refer to TM 9-2350-224-20 for removal of blower.

b. Disassembly of Blower and Blower Motor. Figures 80 and 81 identify the components of the air cleaner blower and motor. Observe the alphabetical sequence of the views in figures 82 through 84 for the proper disassembly procedure.

c. Cleaning, Inspection, and Repair of Blower and Blower Motor. Refer to paragraphs 27 through 30 for general cleaning, inspection, repair, and refinishing instructions. Figures 80 and 81 show specific points for inspection and repair.

d. Assembly of Blower and Blower Motor. Figures 80 and 81 identify the components of the air cleaner blower and motor. Observe the numerical sequence of the views in figures 82 through 84 for the proper assembly procedure.

e. Installation of Blower. Refer to TM 9-2350-224-20 for installation of blower.



- A No. 8-32 x 3/8 assembled washer screw 420495
- B Motor cover 10870920
- C Seal 96906-9021-157
- D Sleeve insulation D-26086
- E Vane axial fan motor 10905006
- F Fan impeller 10870894
- G Seal 96906-9021-154
- H Housing 10905009

- J Lead assembly 8728292
- K Lead assembly 10870919
- L Clip 8728293
- M Assembled washer screw 420486
- N Preformed packing 96906-28775-111
- P Pin 589700
- Q Lockwasher W124
- R Screw S35-4

Reference letter	Inspection data and points of measurement	Size and fit of new parts	Wear limits	
			Field	Depot
a	Terminals securely fastened to conductor. Con- nector undamaged and secure. Terminals securely fastened to conductor. Con- nector undamaged and secure.			

Figure 80. Air cleaner blower and motor - partial exploded view - wear limits

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- A Screw 8-32 x1/4 Brass *
- B Lockwasher*
- C Front head 7076475000
- D Spring washer*
- E Brush 8728295
- F Brush holder assembly 7002406000
 - 1 Plate and brush holder 7025205001 2 - Spring 8728294
- G Armature assembly 7003553000
 - 1 Bearing 1022516022
 - 2 Armature*
- H Body and field assembly 7003560000

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- J Rear head 7004153000
- K Washer*
- L Felt washer*
- M Motor through bolts*
- N Lockwasher*
- P Screw 6190350060
- Q Washer 6230110041
- R Screw*
- S Cable clamp 7024940001
- T Screw 8-32 x 1/4 Brass*

*No Part Number available

Reference letter	Inspection data and points of measurement	Size and fit of new parts	Wear limits	
			Field	Depot
a b c d	Brush support brackets must be secure and un- damaged. New brushes and springs must seat properly when assembled. See TM 3-214. Commutator surfaces smooth, mica undercut at least 1/32-inch deep, windings undamaged. Housing undamaged, windings free of moisture, dirt, and oil y varnish unbroken, leads secure and free of residual oil, terminals secure on conductors.			

106 Figure 81. Air cleaner blower motor - partial exploded view - wear limits


Figure 82. Disassembly and assembly of air cleaner blower and motor (1 of 3)



Figure 83. Disassembly and assembly of air cleaner blower and motor (2 of 3)



Figure 84. Disassembly and assembly of air cleaner blower and motor (3 of 3)

CHAPTER 7

HULL ELECTRICAL SYSTEM COMPONENTS

Section I. GENERAL

50. Scope

This chapter contains instructions for repair and replacement of the hull wiring harnesses, power plant wiring harnesses, control panel wiring harnesses, indicator panel wiring harnesses, generator control box, infrared power supply, and accessory outlet.

51. References

The other components of the hull electrical system are covered in the following technical manuals:

Generator	I WI 9-2920-224-30
Voltage Control Box	TM 9-2350-224-20
Starter	TM 9-2920-221-35
Switches, Circuit	
Breakers	TM 9-2350-224-20
Relays, Receptacles,	
Lamps, and Lights	
Instruments	TM 9-2350-224-20
Sending Units and	
Switches	TM 9-2350-224-20
Batteries	TM 9-6140-200-15
Radio Interferences	
Suppression System	TM 9-2350-224-20

Section II. WIRING HARNESSES

52. Description

The hull wiring harnesses, used to interconnect the various hull electrical components, comprise the following cable assemblies, lead assemblies, straps, and wiring assemblies:

Number	Figure
8724501	85
7407905	89
10916642	88
10916644	87
10916600	89
10916627	90
10916023	95
10916916	96
10863758	95
10926048	91
10926049	91
10916601	89
10916599	89
10930004	93
10916902	96
8346181	85
7364790	85
10863703	95
10916633	92
10863699	95
	Number 8724501 7407905 10916642 10916644 10916627 10916623 1091601 10863758 10926048 10926048 10926049 10916599 10930004 10916599 1098002 8346181 7364790 10863703 10916633

53. Replacement of Harnesses

a. Identifying Circuits. An identification number is assigned to each of the electrical

circuits in the hull. These numbers, along with the name of the associated circuit, are listed in table VII below. Each cable, lead, and branch of a wiring harness is wrapped with a corresponding numbered metallic marker near each termination to identify the circuit or circuits associated with that cable. In figure 330, the hull wiring diagram, the circuit number is shown within a break at the terminal of each line.

Table VII. Hull Electrical Circuit Numbers

No.	Circuit Name
1	Generator field circuit
2	Generator armature circuit
5	Ammeter or shunt to starter ter- minal block or battery connection
10	Ammeter or shunt to instrument panel circuit breakers
14	Starter switch circuit (including feed) to relay or solenoid
15	Main light switch feed
16	Light switch (HT) to service head- lamp or dimmer switch
17	Dimmer switch to upper beam
18	Dimmer switch to lower beam
19	Light switch (BOD) to blackout driving lamp, including resistor
20	Light switch (BHT) to blackout marker lamps

Circuit

.

Table VII. Hull Electrical Circuit Numbers - Continued

Circuit		Circuit	
No.	Circuit Name	No.	Circuit Name
21	Light switch (HT) to service tail	400A	Heater emergency switch feed
	lamp	401	Heater starting switch to coil and
22	Light switch (S) to service stop		indicator light
	lamp	402	Heater starting switch to pump and
23	Light switch (BS) to blackout stop		solenoid valve
	lamp	405	Heater starting switch to motor and
24	Light switch (BHT) to blackout tail	105	indicator light if used
05	lamps	407	Heater in operating position indi-
20	Start relay circuit breaker (extra)	415	Cator circuit
21	notruments feed (instruments with	415	reed to special ventilating fan or
28	Fuel gage to conding unit or left	415 4	Air cleaner dust exhauster motor
20	upper tank gage to selector switch	1154	relay control
30	Fuel selector switch to left lower	415B	Air cleaner dust exhauster motor
00	tank	110D	hattery feed
31	Fuel selector switch to right lower	415C	Gas narticulate filter feed
01	tank	426	Ground auxiliary interphone
33	Water and oil temperature gage to	450	Bilge pump switches feed and
	sending unit		jumper between switches
36	Oil pressure gage to sending unit	457	Interphone #10
37	Outlet socket	459	Control circuit for master relay
38	Dome lamp circuit, including		and indicator light
	breaker and switch	459A	Instrument panel feed to master
40	Instrument light circuit		switch and master switch indica-
41	Interphone #1		tor
42	Interphone #2	463	Interphone #11
43	Interphone #3	464	Interphone #12
44	Interphone #4	475A	Jettison fuel switch (extra)
45	Interphone #5	475B	Jettison fuel switch (extra)
47	Slip ring feed	475C	Jettison fuel tank solenoid (extra)
48	24-volt radio feed	478	Generator equalizer circuit, inter-
49	Receptacle, auxiliary power outlet,		pole type
	positive lead	486	Manifold heater main engine
50	Receptacle, auxiliary power outlet,	509	Warning light circuit, selective
F 1	negative lead		warning system
51	Interphone #7	509H	Engine low oil pressure warning
54A	Fuel cut-off solenoid feed	FOODT	horn feed
60	Detterphone #6 (extra)	209P.L	Engine low oil pressure warning
75	Stop switch aircuit (sw to ss on		bigh oil tomponeture
15	main light switch)	5007	Engine and transmission oil
77	Fuel nump switch to fuel nump_left	5051	tomporature warning
78	Fuel nump switch to fuel nump-		lamp
10	right	514	Dimmer switch to B O upper beam
81	Battery to starting motor terminal	011	(IR)
01	block, including master switch	515	Dimmer switch to B.O. lower beam
82	Starter motor terminal block to	0.10	(IR)
	starter motor left	516	Power pack feed (IR)
98	Interphone #8	516A	Infrared switch feed
99	Interphone #9	517	Periscope feed (IR)
321	Transmission lube pressure gage	519	High beam indicator circuit
	circuit	920	Engine heater switch
324	Transmission temperature gage	920A	Oil heater indicator (extra)
	circuit	950	External voltage adjustment con-
400	Heater feed		trol rheostat

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Table VII.	Continued
Circuit	
No	Circuit Name
975	Fire-extinguisher relay control circuit feed
975A	Fire-extinguisher and fuel shutoff relay feed

b. Bemoving or Installing Harmesses. Removal and installation of the harmesses can be accomplished through the use of the wiring diagram (fig. 330) and the installation diagrams (figs. 85 through b6) for identification, location, and routing. Figures 97 through 108 show the internal cabling of the components in figure 330. To simplify installation, tag each cable clamp as the harness, lead, or cable is removed from it. When installing a harness, lead, or cable, first connect each branch or end to the proper electrical component, routing the cable as shown in the applicable figures 85 through 96. Then arrange the cables under the clamps which were tagged during removal, and fasten the clamps. Be careful to avoid pinching the cables under the clamps or kinking them at the bends. Before applying power, check to see that the cable plugs are connected to the proper receptacles on the electrical components.

Note. All electrical harnesses, cables, and leads installed in the engine compartment must be sprayed with ignition insulating compound. Avoid overspraying the compound onto adjacent components.

Note. Refer to figure 330, wiring diagram hull electrical system located in back of manual.



Figure 85. Hull wiring (front of bulkhead) - locator



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Figure 87. Hull wiring harness (10916644)



Figure 88. Hull wiring harness (10916642)



Figure 90. Hull wiring harness (10916627)

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Figure 91. Hull wiring: harness (10926048), left headlight and harness (10926049), right headlight



Figure 92. Hull wiring lead assembly (10916633)

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Figure 93. Hull wiring harness assembly, warning horn (7985917) and cable assembly, warning horn (10930004)



Figure 94. Rear of bulkhead



Figure 95. Hull wiring: harness (10863758), lead (10863703), harness (10916023) and lead (10863699)



Figure 96. Hull wiring: harness assembly (10916916) and cable assembly (10916902)



Figure 98. Wiring diagram, indicator panel - schematic



Figure 99. Control panel circuit - schematic







Figure 103. Gage and warning light circuit - schematic







Figure 105. Fuel pump circuit - schematic







Figure 107. Air cleaner blower motor circuit - schematic



Figure 108. Engine and transmission electrical installation - schematic

Section III. POWER PLANT WIRING HARNESSES

54. Description

The power plant wiring harnesses connect the starter, starter solenoid, generator, fuel solenoids, fuel shutoff solenoid, right and left hand manifold preheater coils, oil temperature and pressure sending units, and neutral shift switch to the hull wiring harnesses through quick-disconnect plugs and receptacles mounted on brackets at the front of the engine. The following make up the power plant wiring harnesses, cables, and strap:

- Cable Assembly 10887593 (engine disconnect to starter solenoid)
- Cable Assembly 10887564 (engine disconnect to starter)

Cable Assembly 10887570 (starter to ground) Lead Assembly 10863732 (engine disconnect to generator)

Strap 7724127 (generator to ground)

- Harness Assembly 10905292 (generator to neutral shift switch)
- Wiring Harness Assembly 10916035 (engine disconnect to generator, left hand coil, engine and transmission oil temperature and pressure, neutral shift switch, right hand coil, fuel solenoid and fuel shutoff solenoid).

55. Replacement of Harnesses

a. Identifying Circuits. Refer to table VII for identification of power plant electrical circuit numbers appearing on the metallic markers fastened to each cable. These numbers also appear in figure 108, the engine and transmission electrical installation wiring diagram.

<u>b. Removing or Installing Harnesses.</u> Refer to figures 109 and 110 to remove or install harnesses. Tag each cable clamp as the harness, lead or cable is removed. This will aid in routing the cable during installation.

When installing a harness, lead or cable, first identify the proper electrical component for each branch or end, and route the cable as shown in figures 100-110. Then arrange the cables under the clamps which were tagged during removal, and fasten the clamps. Be careful to avoid pinching the cables under the clamps or kinking them at the bends. Before applying power, check to see that the cable plugs are connected securely to the proper receptacles.

Spray replacement harnesses, cables or leads with ignition insulating compound after installation. Avoid overspraying onto adjacent areas.



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Figure 109. Power plant wiring harness installation (1 of 2)

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Section IV. CONTROL PANEL WIRING HARNESS

56. Description

The control panel wiring harnesses, shown in figure 9, interconnect the switches, indicator lights, and circuit breakers of the control panel and hull wiring harnesses. The following wiring harnesses and leads make up the control panel wiring harnesses.

Harness Assembly	10916630
Harness Assembly	10916631
Harness Assembly	10916616
Cable Assembly	10916595
Cable Assembly	10916602
Cable Assembly	10916617

57. Replacement of Harnesses

a. Removal of Control Panel. Refer to TM 9-2350-224-20.

<u>b. Identifying Circuits</u>. Refer to table VII and figures 113 through 117 to identify connection points or plugs.

c. <u>Removal of Wiring Harnesses</u>. Follow the alphabetical sequence of views in figure 112 for the proper removal procedure.

d. Installation of Wiring Harnesses. Follow the numerical sequence of the views in figure 112 for the proper installation procedure.

e. <u>Installation of Control Panel</u>. Refer to TM 9-2350-224-20.



Figure 111. Control panel



Figure 112. Removal and installation of control panel wiring harness



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Figure 113. Control panel main power circuits



Figure 114. Control panel wiring - cable 10916616 (1 of 4)



Figure 115. Control panel wiring - cable 10916630 (2 of 4)



Figure 116. Control panel wiring - cable 10916631 (3 of 4)



Figure 117. Control panel wiring - cables 10916595, 10916602 and 10916617 (4 of 4)

Section V. INDICATOR PANEL WIRING HARNESSES

58. Description

The indicator panel wiring harnesses, which interconnect the instruments, panel lights and switch of the indicator panel and the full wiring harness, comprise the following:

1.	Wiring Harness Assembly	8762441
2.	Cable Assembly	8762440

59. Replacement of Harness

a. Removal of Indicator Panel. Refer to $T\overline{M}$ 9-2350-224-20 for the removal of the indicator panel.

b. Removal of Wiring Harness. Follow the alphabetical sequence of the views in figure 119 to identify the points of connection of the harness plugs.

c. Installation of Wiring Harness. Follow the numerical sequence of the views in figure 119 for the proper installation procedure. Figure 98 shows the points of connection of the harness and cable.

d. Installation of Indicator Panel. Refer to TM 9-2350-224-20 for installation of the indicator panel.



Figure 118. Indicator panel



Figure 119. Removal and installation of indicator panel wiring harness

Section VI. GENERATOR CONTROL BOX

60. Description

The generator control box, shown in figure 10, consists of a voltage regulator assembly, relay assembly, and receptacles for the battery and generator cables. Its function is to control the voltage to the batteries. It connects the generator automatically to the batteries when the generator voltage is high enough to charge, and disconnects when the generator voltage fails below that of the batteries. It also furnishes voltage to the lights and all accessories.

61. Repair of Generator Control Box

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for removal instructions.

b. Disassembly. Figure 121 identifies the components of the generator control box. The proper disassembly procedure is given in figures 122 and 123 in alphabetical sequence.

c. Cleaning, Inspection and Replacement of Components. Paragraphs 27 through 30 give general cleaning and inspection instructions. Figure 121 provides repair and rebuild standards, specific inspection data and points of measurement.

d. Assembly. Figure 121 identifies the components of the generator control box. Follow the numerical sequence of the views in figures 122 and 123 for the proper assembly procedure.

e. Installation. Refer to TM 9-2350-224-20 for installation instructions.



Figure 120. Generator control box



- A Lead seal 583068
- B Screw 8383636
- C 1/4 Lockwasher 121637
- D Regulator cover 8689197
- E Gasket 546905
- F Bus bar*
- G No. 10-32 x 7/16 Assembled washer screw 451634
- H Relay assembly 8689245
- J Case 8689199
- K No. 10-32 x 3/8 Assembled washer screw 425567
- L Screw 145371
- M Nameplate 8724048
- N Gasket 7358505
- P Receptacle and cable assembly 8383624
- Q Receptacle and cable assembly 8383625
- R Plug 125947
- S Voltage regulator assembly 8723895
 - 1 Plate*
 - 2 Regulator assembly*
 - 3 Loop clamp*
 - $4 Screw^*$
 - 5 Bolt*

*No part number available.

Reference	Increation data and points of missequeroment	Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a	Terminals must be fastened firmly. Leads must be soldered securely. Mounting lugs must not be bent. Leads must be soldered securely. Terminals			
	must be fastened firmly. Connector must not be damaged or bent.			
c	Terminals must be fastened firmly and leads must be soldered securely. Mounting lugs must not be bent.			

Figure 121. Generator control box (exploded view)-wear limits



Figure 122. Disassembly and assembly of generator control box (1 of 2)

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Section VII. INFRARED POWER SUPPLY

62. General

The infrared power supply, shown in figure 10, furnishes power for operation of the driver's infrared periscope.

63. Repair of Infrared Power Supply

a. Removal. Refer to TM 9-2350-224-20 for removal instructions.

b. Disassembly. Figures 125 and 126 identify the components of the infrared power supply. Follow the alphabetical sequence of the views in figures 127, 128, and 129 for the proper disassembly procedure. c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

d. <u>Inspection and Repair</u>. Figures 125 and 126 show repair and rebuild standard points of measurement and specific inspection data.

e. Assembly. Figures 125 and 126 identify the components of the infrared power supply. Follow the numerical sequence of the views in figures 127, 128, and 129 for the proper assembly procedure.

f. Installation. Refer to TM 9-2350-224-20 for installation instructions.



Figure 124. Infrared power supply



- A 1/4-20 x 1-3/4 Cap screw 121490
- B Washer 7978751
- C No. 6-32 hex nut 134530
- D No. 6 lockwasher 138526
- E Shock mount 7978749
- F No. 6-32 x 1/4 roundhead screw 132688
- G Ground strap 7978753
- H No. 8-32 x 3/8 roundhead screw 121832 S Mounting bracket 7978750
- J No. 8 lockwasher 138530

- K Receptacle 7388345
- L Gasket 7358502
- M-9/16 Washer 147579
- N 1/4-20 Hex nut 123179
- P Power pack 7355743
- Q No. 6-32 x 3/8 fillister head screw 131890
- R Receptacle 7720498

Reference	To month and the second and the second and the	Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a b c	Must retain elasticity and must not be cut or permanently deformed. Apply rubber preserv- ative compound MIL-C-LIS20B. Terminal lugs must be securely fastened to ground strap. Clean surfaces of lugs to assure good electrical contact. Must not have loose, damaged, dirty, or corroded electrical contacts. Connector body and threads work with damaged.			

Figure 125. Infrared power supply - partial exploded view-wear limits



- A Power pack cover 7355741
- B Gasket 7954712
- C Electron tube 8377130
- D Electron tube 8377129
- E Bottom plate and potting assembly 7355740
- F Power pack base 7355742
- G Vibrator 8377128

Reference	Inspection data and points of	Size and fit of	Wear limits	
letter	measurement	new parts	Field	Depot
a	Holddown springs on inside of cover must not be loose and must not be fatigued, Legend must be legible. C-washers and captive screws securely fastened			
b	to cover. Test and replace if necessary.			
e	Test and replace if			
d	Recessary. Resistor must not be cracked, bro- ken, or show in- dications of over- heating.			
e	Tube sockets must not be loose. Pins must not be loose, damaged, dirty, or corroded.			
f	Bottom plate must not be bent or damaged. Potting assembly must not be damaged or show indications of overheating. All components must be mounted firmly. Pins and case must not be bent, bro-			

Figure 126. Infrared power supply partial exploded view wear limits



.





Figure 128. Disassembly and assembly of infrared power supply (2 of 3)



REMOVE OR INSTALL BOTTOM PLATE AND POTTING ASSEMBLY ORD E35710

Figure 129. Disassembly and assembly of infrared power supply (3 of 3)

Section VIII. ACCESSORY OUTLET

64. Description

The accessory outlet consists of a single wire socket assembly mounted on the front of the control panel. It provides a 24-volt power supply source for operation of the accessory equipment.

a. Removal of Control Panel. Refer to TM $\overline{9\text{-}2350\text{-}224\text{-}20}$ for the removal of the control panel.

b. Removal of Accessory Outlet. Follow the alphabetical sequence of the views in figure 130 for the proper removal procedure.

.

c. Installation of Accessory Outlet. Follow the numerical sequence of the views in figure 130 for the proper installation procedure.

<u>d.</u> Installation of the Control Panel. Refer to TM 9-2350-224-20 for the installation of the control panel.



Figure 130. Removal and installation of accessory outlet

CHAPTER 8

CONTROLS AND LINKAGE

Section I. GENERAL

65. Scope

This chapter contains instructions for field and depot maintenance of the steering controls and linkage, shifting controls and linkage, accelerator and throttle controls and linkage, and brake controls and linkage.

66. Description

The driver's controls (figs. 7 and 8) are connected to the engine and transmission by a series of mechanical linkages. The linkage consists primarily of link arms, bell cranks and connector rods which are terminated with either rod ends (eves) or clevises. The length of the rods can be adjusted by loosening the jam nut and turning the rod end in or out. Where the connector rods pass through the bulkheads, the openings are waterproofed by sleeves, bushings and seals. In the engine compartment the rods are enclosed in tubes which are sealed to prevent entry of water. dirt, dust or other foreign matter. The link arms in the engine compartment are housed in watertight boxes fitted with drain plugs to allow drainage of water should leakage or condensation occur. The linkage between the power plant and the hull utilizes split connector rods and rod ends that fit into link arms. These are fastened by cap screws to permit easy detachment for power plant removal.

Section II. STEERING CONTROLS AND LINKAGE

67. Replacement

a. <u>Removal</u>. Figures131through138identify the components of the steering controls and linkage. Follow the alphabetical sequence of the views in figures 139 through 142 for the proper removal procedure.

Note. Locations "2" through "8" referred to in figures 139 through 122 are designated in figures 131 through 138 and are intended to orient the individual disassembly/assembly procedures to the overall steering system. b. Repair and Rebuild Standards. Figures 131through 138 show repair and rebuild standard points of measurement for the steering controls and linkage.

<u>c. Installation</u>. Figures 131 through 138 identify the components of the steering controls and linkage. Follow the numerical sequence of the views in figures 139 through 142 for the proper installation procedure.

d. Adjustment. Refer to TM 9-2350-224-20.



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- A Screw, assembled washer 425862
- B Pin 7985633
- C Pin, cotter 96906-24665-132
- D Lever assembly 10916694
- E Centering spring 8693880
- F Retaining ring 96906-16624-2137
- G Cap screw 96906-23291-60
- H Washer 96906-35337-27
- J Mounting plate 10893734

- K Mounting plate 10893735
- L Mount assembly 10864179
- Needle roller bearing
 - 713465
 - 2 Pin, straight headed 10905116
 - 3 Mount 10864180
 - 4 Pin, straight headed
 - 7985626
- M-Sleeve 10863869

- N Wheel assembly 7970331
- P Button 8748338
- Q Screw 96906-35226-84
- R Lockwasher 96906-35337-25
- S Nut, plain hexagon 96906-35690-602
- T Plain rod bearing 8741800
- U Nut, plain hexagon 96906-35691-622
- V Tube assembly 8741922

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter		new parts	Field	Depot
a b a-b	ID of mount. ID of bearing. Fit of bearing mount.	1.6245 to 1.6255		

Figure 132. Steering controls and linkages - partial exploded view-wear limits (1 of 7)

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A - Tube assembly 8741922 B - Nut, plain hexagon 96906-C - Plain rod bearing 8741800

35691-622

D - Screw, assembled washer 425862

- E Bushing 10916662
- F Lever 10864308
- G Pin 96906-35086-219
- H Lever 10864457

- J Tube assembly 8741914
- K Bracket 10916681
- L Support 10916665

M - Shaft 10916678

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter		new parts	Field	Depot
a b a-b	OD of bearing. ID of bearing bore in support. Fit of bearing in support.	0.752 to 0.753 0.502 to 0.503 0.001T to 0.004T		

Figure 133. Steering controls and linkages - partial exploded view - wear limits (2 of 7)

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- A Tube assembly 8741914
- B Nut, plain hexagon 96906-35691-622
- C Plain rod bearing 8741800
- D Flat washer 8762167
- E Link assembly 10916679
 - 1 Bearing 7954599

- 2 Link 10916680
- F Flat washer 96906-15795-215 G - Hexagon slotted nut 96906-
- 35692-605 H - Cotter pin 96906-24665-283
- J Screw, assembled washer
 - 425862

K - Tube assembly 8741939
 L - Screw 96906-35292-62
 M - Washer 96906-35335-21
 N - Shaft assembly 10916675
 P - Stud 10863642
 Q - Plate 10863640
 R - Channel 10863643

Reference	Increation data and points of measurement	Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a b a-b	OD of bearing. ID of bearing bore in support. Fit of bearing in support.	0.689 to 0.690 0.686 to 0.688 0.001T to 0.004T		

Figure 134. Steering controls and linkages - partial exploded view - wear limits (3 of 7)



A - Fitting assembly 10916686

- 1 Nut 10916674
- 2 Ring 10916673
- 3 Lubrication fitting 96906-15001-3

4 - Seal 10916658

- B Shaft assembly 10916675
- C Sleeve assembly 10916672
 - 1 Sleeve assembly 10916701
 - 2 Seal 7976991 3 - Bushing 8720489

- D Packing 8762312
 E Nut 96906-35690-823
- F Nut 96906-35690-823
 F Connector 10916659
- G Nut 96906-35690-622
- H Tube 8741998

Reference	Inspection data and points of measurement	Size and fit of	Wear limits	
letter		new parts	Field Depo	
a b a-b	ID of sleeve. OD of bushing. Fit of bushing in sleeve.	1.2475 to 1.2480 1.2480 to 1.2500 0.0025T to .0000		

Figure 135. Steering controls and linkages - partial exploded view - wear limits (4 of 7)

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ORD E35717

A - Tube assembly 8741998 C - Strap B - Bolt, assembled washer D - Tube 187993 E - Plate

C - Strap 10863645 D - Tube assembly 10916957 E - Plate 10916695 F - Bolt, integral lockwasher 423564 G - Support 10863646 H - Washer, lock 96906-35335-20

J - Nut, plain 96906-35690-502

Figure 136. Steering controls and linkages - partial exploded view - wear limits - (5 of 7)

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A - Support assembly 10864120

- 1 Support 10864156
- 2 Lubrication fitting 96906-15001-1
- 3 Bearing 7954599
- B Flat washer 8762167
- C Arm 10911975
- D Pin 10912031

- E Stud 10915320
- F Plain hexagon nut 96906-35691-622
- G Plain rod bearing 8741800
- H Screw 96906-35298-64
- J Washer 96906-35337-27
- K Pin 96906-39086-171
 - Pin 96906-39086-171

- L Bracket 10916960
- M Plate 10916959
- N Deflector 10911979
- P Washer 96906-15795-210
- Q Washer 96906-35337-25
- R Screw 96906-35298-5
- S Tube assembly 8741998
- T Arm 10911974

Reference	Transition data and mainta of measurement	Size and fit of	Wear limits	
letter	inspection data and points of measurement	its of measurement new parts	Field	Depot
a b a-b	OD of bearing. ID of bearing bore in support. Fit of bearing in support.	0.689 to 0.690 0.686 to 0.688 0.001T to 0.004T		

Figure 137. Steering controls and linkages - partial exploded view - wear limits (6 of 7)



A - Lockwasher 96906-35338-67

- B Nut 10863994
- C Screw 96906-35298-109
- D Rod 10915324
- E Plain hexagon nut 96906-35691-622
- F Plain rod end bearing 8741800
- G Washer 96906-35337-27
- H Screw 96906-35298-64
- J Link 10911989

- K Self-locking nut 96906-20365-624c
- L Arm 10911988
- M-Spring pin 96906-39086-161
- N Bracket assembly 10921975
 - 1 Bracket 10921973
 - 2 Bearing 7954792
- P Pin assembly 10915321
- Q Lockwasher 96906-35337-25
- R Screw 96906-35297-6
- S Pin 10911986

- T Pin 10911984
- U Screw 96906-35298-62
- V Washer 96906-15795-214
- W Strip 10911981
- X Bracket 10911978
- Y Shield 10911980
- Z Support assembly 10911983 1 - Support 10911982
 - 2 Bearing 7954792
- AA Stud 10915320

Reference	Increation data and points of measurement	Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a b a-b c	Od of bearing. ID of bearing bore in bracket. Fit of bearing in bracket and support. Must be concentrie and not to be tapered.	1.31250005 1.3110 + .0005 1.3110 to 1.312		

Figure 138. Steering controls and linkages - partial exploded view - wear limits (7 of 7)

NOTE. REFER TO TM-9-2350-224-20 FOR THE ADJUSTMENT OF THE STEERING CONTROLS AND LINKAGE



REMOVE OR INSTALL STEERING WHEEL



REMOVE OR INSTALL LEVER ASSEMBLY, SPRING SLEEVE AND RELATED PARTS





REMOVE OR INSTALL STEERING WHEEL MOUNT ASSEMBLY (LOCATION 2)



REMOVE OR INSTALL STEERING WHEEL MOUNTING BRACKET (LOCATION 2)











Figure 141. Disassembly and assembly of steering controls and linkage (3 of 4)



REMOVE OR INSTALL CONNECTING ROD AND PIVOT (LOCATION 8)



REMOVE OR INSTALL CONNECTING ROD AND PIVOT ARM AT TRANSMISSION. (LOCATION 8)



ORD E35723

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Section III. SHIFTING CONTROLS AND LINKAGE

68. Replacement

<u>a. Removal.</u> Figures 144 through 150 identify the components of the shifting controls and linkage. Follow the alphabetical sequence of the views in figures 151 through 155 for the proper removal procedure.

Note. Locations "2" through "8" referred to in figures 144 through 150 are designated in figures 151 through 155 and are intended to orient the individual disassembly/assembly procedures to the overall shifting system. b. Repair and Rebuild Standards. Figures 144 through 150 show repair and rebuild standard points of measurement for the shifting controls and linkage.

<u>c. Installation.</u> Figures 144 through 150 identify the components of the shifting controls and linkage. Follow the numerical sequence of the views in figures 151 through 155 for the proper installation procedure.

d. Adjustment. Refer to TM 9-2350-224-20.



ORD E35724

Figure 143. Shifting controls and linkage - locator



- C Washer 96906-35333-25
- D Link 10916693
- E Bearing 96906-17131-35
- F Screw 96906-35292-36
- G Lockwasher 96906-35337-26
- H Guide assembly 10916684
- J Guide assembly 10916698
- K Shaft 10916692

- 2 Compression spring
- 8694036
- 3 Plunger 8694037
- 4 Pivot 10870079
- M- Cam assembly 10916682
 - 1 Cam 8694027
 - 2 Rod 10916683
 - 3 Knob 7970422

- N Straight headless pin 141291
- P Straight headless pin 141253
- Q Hexagon capscrew 96906-35291-62
- R Washer 96906-35337-27
- S Pin 8694025
- T Base assembly 10870452 1 - Base 7953922

 - 2 Needle roller bearing 713421
- U Boss 8689421

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter		new parts	Field	Depot
a b a-b c d c-d	ID of plunger bore in shifting pivot. OD of plunger flange. Fit of plunger in bore. OD of bearing. ID of bearing bore in base. Fit of bearing in base.	0.8125 to 0.8175 0.807 to 0.812 0.0005L to 0.0105L 1.5005 to 1.4995 1.4995 to 1.5005 0.0010T to 0.0010L		

Figure 144. Shifting controls and linkage - partial exploded view - wear limits (1 of 7)

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Reference	Inspection data and points of measurement	Size and fit of	Wear limits	
letter	hispection data and points of measurement	new parts	Field	Depot
a b a-b c c-d e e e-f	Minor OD of shaft. ID of inner bearing. Fit of bearing to shaft. OD of inner bearing. ID of outer bearing. Fit of inner bearing to outer bearing. OD of outer bearing. ID of bearing retainer. Fit of outer bearing to retainer.	0.4995 to 0.5000 0.4996 to 0.5000 0.0004T to 0.0005L 0.7595 to 0.7510 0.7505 to 0.7515 0.0005L to 0.0020L 0.9995 to 1.0000 0.9995 to 1.0005 0.0005T to 0.0010L		
g j h-j k g-k l-m	OD of stud. DD of bearing. ID of bearing bore in link. Fit of bearing in bore. ID of bearing. Fit of bearing on stud. Check bearing for cracks, galling and breaks.	0.4978 to 0.4988 0.689 to 0.690 0.686 to 0.688 0.001T to 0.004T 0.0005 to 0.0015 0.0017L to 0.0037L		

Figure 145. Shifting controls and linkage - partial exploded view - wear limits (2 of 7)



ORD E35727

A - Assembled washer screw 425862	3 – Ring 10916673	E - Preformed packing 8762312
B - Shaft assembly 10916675	4 - Seal 10916658	F - Nut 96906-35690-823
C - Fitting assembly 10916686	D - Sleeve assembly 10916672	G - Connector 10916659
1 - Nut 10916674	1 - Sleeve assembly 10916701	H - Nut 96906-35690-622
2 - Lubrication fitting 96906-	2 - Seal 7976991	J - Tube assembly 8741944
15001-3	3 - Bushing 8720489	K - Tube assembly 10916975

Reference	Reference letter Inspection data and points of measurement new	Size and fit of	Wear limits	
letter		new parts	Field	Depot
a b a-b	OD of bearing. ID of bearing. Fit of bearing in sleeve.	1.2480 to 1.2500 1.2475 to 1.2480 0.0025T to 0.0000		

Figure 146. Shifting controls and linkage - partial exploded view - wear limits - (3 of 7)









ORD E35728

- A Plain hexagon nut 96906-35690-502
- B Lockwasher 96906-35335-20
- C Mounting plate 10916695
- D Support 10863646
- E Strap 10863645

- F Integral lockwasher bolt 423564
- G Assembled washer bolt 187993
- H Tube assembly 10916975
- J Tube assembly 8741944
- K Nut 96906-35690-622
- L Connector 8388883
- M Plain hexagon nut 96906-35691-662
- N Plain rod end bearing 8741800

Figure 147. Shifting controls and linkage - partial exploded view (4 of 7)



Figure 148. Shifting controls and linkage - partial exploded view (5 of 7)



D - Screw 425861

- 423570
- K Set screw 435873
- R Flat washer 8762129

Reference	Inspection data and points of measurement	Size and fit of	Wear limits	
letter		new parts	Field Depot	
a b a-b c d c-d	OD of bearing. ID of bearing bore in bracket. Fit of bearing in bracket. OD of bearing. ID of bearing bore in link. Fit of bearing in link.	1.3120 to 1.3125 1.3110 to 1.3115 0.0005T to 0.0015T 1.0015 to 1.0025 0.9990 to 1.0000 0.0015T to 0.0035T		

Figure 149. Shifting controls and linkage - partial exploded view - wear limits (6 of 7)



- A Shaft 10873874
- B Assembled washer screw 187979
- C Shaft assembly 10876498 1 - Shaft 10870361
 - 2 Straight pin 141197
- D Lockwasher 96906-35338-67
- E Nut 103028
- F Bracket assembly 10887630
 - 1 Bearing assembly 7954792

- 2 Bracket 10887624
- G Lever 10887614
- H Screw 425861
- J Plain rod end bearing 8741800
- K Plain hexagon nut 96906-35691-622
- L Spring pin 96906-39086-161
- M Rod assembly 10893694
- N Screw 96906-35298-109

- P Nut 10863994
- Q Nut 96906-35690-622
- R Assembled washer screw 425862
- S Nut 122730
- T Washer 120338
- U Lever 10887609
- V Nut 96906-35691-422
- W Hexagon screw cap 96906-35292-8

Reference letter	Inspection data and points of measurement	Size and fit of	Wear limits	
		new parts	Field	Depot
ab. cd. ed. fb-f gc-g hb-h	Major OD of shaft. Minor OD of shaft. ID of pinhole in link and shaft. ID of bearing bore in bracket. OD of bearing, Fit of bearing, Fit of shaft in bearing. OD of pin. Fit of pin link and shaft. ID of pin hore in link.	0.745 to 0.755 0.495 to 0.498 0.187 to 0.192 1.3110 to 1.3115 1.3120 to 1.3125 0.0005 T to 0.0015T 0.4995 to 0.5010 0.0015L to 0.0060L 0.187 Interference fit. 0.500 to 0.502 0.002L to 0.007L		

Figure 150. Shifting controls and linkage - partial exploded view - wear limits (7 of 7)

PREVIOUS OPERATIONS:

REMOVAL

RIGHT HULL AMMUNITION RACK - REFER TO FIG. 198 POWER PLANT REMOVAL - REFER TO TM 9-2330-224-20 RIGHT FUEL TANK REMOVAL - REFER TO FIGS. 42-49 DRIVER'S SEAT - REFER TO FIG. 208

INSTALLATION

LUBRICATE FITTINGS - REFER TO LO 9-2350-224-10 ADJUSTMENT - TM 9-2350-224-20 RIGHT HULL AMMUNITION RACK - REFER TO FIG. 198 RIGHT FUEL TANK - REFER TO FIGS 42 THRU 49 POWER PLANT - REFER TO THG 9-2350-224-20 DRIVEN'S SEAT - REFER TO FIG. 208







REMOVE OR INSTALL CONNECTING LINK AND PARKING BRAKE ROD (LOCATION 2)



REMOVE OR INSTALL LINK (LOCATION 2)





sotmaiwfc@comcast.net 12 Feb 2016







Figure 153. Disassembly and assembly of shifting controls and linkage (3 of 5)



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Figure 154. Disassembly and assembly of shifting controls and linkage (4 of 5)

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Section IV. ACCELERATOR AND THROTTLE CONTROLS AND LINKAGE

69. Replacement

<u>a. Removal.</u> Figures 157 through 160 identify the components of the accelerator and throttle controls and linkage. Follow the alphabetical sequence of views in figures 161 through 165 for the proper removal procedure.

Note. Locations ''2'' through ''5'' referred to in figures 161 through 165 are designated in figures 157 through 166 and are intended to orient the individual disassembly/assembly procedures to the overall accelerator and throttle controls and linkage system. <u>b.</u> <u>Repair and Rebuild Standards</u>. Figures 157 through 160 show repair and rebuild standard points of measurement for the accelerator and throttle controls and linkage.

c. Installation. Figures 157 through 160 identify the components of the accelerator and throttle controls and linkage. Follow the numerical sequence of the views in figures 161 through 165 for the proper installation procedure.

d. Adjustment. Refer to TM 9-2350-224-20.



ORD E35737



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A – Handle assembly 8389097	1 – Housing 10863742	AA - Plain hexagon nut 96906-35691-
1 – Handle 8389098	2 - Sleeve bearing 7765216	522
2 - Sleeve bushing 7769181	M - Woodruff key 96906-35756-5	BB - Clevis 144242
B - Washer 96906-15795-114	N - Rod 8389077	CC - Cotter pin 119117
C - Helical extension spring	P - Screw 96906-35297-63	DD - Pin 120690
10870695	Q - Plain hexagon nut 96906-35691-602	EE - Link 10863811
D – Cotter pin 121222	R - Pedal assembly 10883989	FF - Ring 96906-16624-2046
E - Hexagon cap screw 96906-	S - Washer assembled screw 427235	GG - Rod 8389074
35291-62	T – Bracket 10916545	HH - Pin 593797
F - Washer 96906-35337-27	U - Spacer 7718758	JJ - Universal joint 8389093
G - Bracket assembly 8389072	V - Rod assembly 8389079	KK - Rod 8389092
H - Screw 425604	W - Loop clamp 8762159	LL - Channel 8389087
J - Detent plate 10870700	X - Return spring 7407083	MM- Spacer 8689417
K - Screw 186494	Y - Washer 96906-15795-218	NN - Shim 10870259
L - Housing assembly 10863743	Z - Bracket assembly 10863681	PP - Cover assembly 8389088

Reference		Size and fit of	Wear limits	
letter	Inspection data and points of measurement	new parts	Field	Depot
a b a-b	OD of bearing. ID of bearing bore. Fit of bearing in handle.	0.500 to 0.503		

Figure 157. Accelerator and throttle controls and linkage partial exploded view (1 of 4) - wear limits

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LOCATION 3	1 1 1 1 1 1 1 1 1 1 1 1 1 1	MN Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z
A - Rod assembly 8389079 B - Plain hexagon nut 96906-35691-52 C - Clevis 144242 D - Cotter pin 119117	N - Lockwasher 96906-35335-21 2 P - Screw 96906-35291-60 Q - Control tube 10863521 R - Rod end clevis 10863525	 4 - Seal 8388891 X - Sleeve assembly 8388903 1 - Tube assembly 8388904 2 - Plain encased seal 8711;
E - Pin 120690	S - Plain rod end bearing 8741800 T - Bucking 8280004	3 - Bushing 7992946 V - Backing 10904998
G - Nut 125043	U - Clevis pin 7067716	Z - Shield assembly 8389095
H - Washer 96906-15795-218	V - Cotter pin 121223	AA - Rod assembly 8389081
J – Thrust washer 7953926	W - Bulkhead fitting assembly	1 – Shaft 8389084

- K Lever assembly 10863592
 - 1 Lever 10863507
 - 2 Sleeve bearing 7953936
- L Support 10863541
- M Mounting plate 10916544
- W Bulkhead fitting assembly 8388884
 - 1 Nut 8388889
 - 2 Lubrication fitting 96906-15001 - 3

 - 3 Ring 8388898

- 13
 - 8904
 - 8711329

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- 15
- - 1 Shaft 8389084
 - 2 Pin 585927
 - 3 Joint 8389086
 - 4 Actuating rod 8389083
 - 5 Shaft 8389082
 - 6 Stud 8389085

Reference		Size and fit of	Wear limits	
letter	Inspection data and points of measurement	new parts	Field	Depot
a b a-b c d c-d	OD of bearing. ID of bearing bore in lever. Fit of bearing in lever. OD of bearing. ID of slever. Fit of bearing in sleve.	0.877 to 0.878 0.875 to 0.876 0.001T to 0.003T 1.2480 to 1.2500 1.2475 to 1.2480 0.0025T to 0.0000		

Figure 158. Accelerator and throttle controls and linkage partial exploded view (2 of 4) - wear limits


- A Access cover 10911731
- B Screw 96906-35303-32
- C Washer 96906-15795-213
- D Washer 10911839
- E Gasket 10911733
- F Nut 96906-20365-428
- G Rod end bearing 7388852
- H Assembled washer screw 425845 R Mounting support 8762960
- J Rod end clevis 7953916
- K Assembled washer bolt 425585
- L Housing assembly 7953947

1 - Housing 7953911

P - Clevis assembly 7953917

Q - Screw 96906-35303-35

M - Gasket 7953944

- 3 Sleeve bearing 7953913 N - Woodruff key 96906-35756-5
 - 2 Sleeve bearing 7953914 3 - Bushing 7992946
- 2 Plain encase seal 8711329 T - Assembled washer screw 423572
 - U Pipe hanger 8762175
 - V Mounting plate 8762136
 - W Mounting plate 8762137
 - X Gasket 10863728
 - Y Mounting pad 8762228
 - Z Assembled washer screw 425592
 - AA Plug 444688

Wear limits Reference Size and fit of Inspection data and points of measurement letter new parts Field Depot OD of bearing. 0,877 to 0,878 ID of bearing bore in housing. 0.875 to 0.876 Fit of bearing in housing. 0,001T to 0,003T a-b

> Figure 159. Accelerator and throttle controls and linkage partial exploded view (3 of 4) - wear limits

S - Housing assembly 10863868 1 - Housing 8762123



A - Bracket 10911783 M - Cotter pin 119120 1 - Link 7953999 N - Nut 125043 B - Pipe hanger 8762903 2 - Sleeve bearing 7755963 C - Screw 96906-35298-8 P - Rod 7953991 X - Control tube 8762853 D - Hose clamp 96906-35842-3 Q - Screw 96906-35298-10 Y - Rod protector tube 10911794 E - Rubber bellows 10911792 R - Nut 96906-20365-428 Z - Screw 96906-35303-32 F - Hose clamp 96906-35842-1 S - Bracket assembly 7953929 AA - Washer 96906-15795-213 G - Plain hexagon nut 96906-35691-522 T - Mounting bracket 8762227 BB - Washer 10911839 H - Rod end bearing 7388852 CC - Gasket 10911730 U - Assembled washer bolt 423573 J - Assembled washer screw 425845 V - Lubrication fitting 96906-15001-1 DD - Screw 96906-35303-34 K - Thrust washer 7953926 W - Link rod assembly 8762104 EE - Flat washer 96906-15795-210 L - Washer 96906-15795-218

> Figure 160. Accelerator and throttle controls and linkage partial exploded view (4 of 4)

Α

PREVIOUS OPERATIONS:

REMOVAL

LEFT AMMUNITION RACK REMOVAL - REF. TO FIG. 198 POWER PLANT REMOVAL - REF. TO TM 9-2350-224-20 LEFT FUEL TANK REMOVAL - REF. TO FIGS. 35-41

INSTALLATION

LUBRICATE FITTINGS - REF. TO LO 9-2350-224-10 ADJUSTMENT - REF. TO TM 9-2350-224-20 LEFT AMMUNITION RACK - REF. TO FIG. 198 LEFT FUEL TANK - REF. TO FIGS. 35-41 POWER PLANT - REF. TO TM 9-2350-224-20



REMOVE OR INSTALL THROTTLE LOCKING HANDLE SPRING (LOCATION 2)



RELEASE OR COMPRESS FRONT END RETURN SPRING (LOCATION 2)



REMOVE OR INSTALL THROTTLE LOCKING LEVER MECHANISM (LOCATION 2)



Figure 161. Disassembly and assembly of accelerator and throttle controls and linkage partial exploded view (1 of 5)



Figure 162. Disassembly and assembly of accelerator and throttle controls and linkage partial exploded view (2 of 5)



Figure 163. Disassembly and assembly of accelerator and throttle controls and linkage partial exploded view (3 of 5) sotmaiwfc@comcast.net 12 Feb 2016





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Section V. BRAKE CONTROLS AND LINKAGE

70. Replacement

a. Removal. Figures 167 through 173 identify the components of the brake controls and linkage. Follow the alphabetical sequence of views in figures 174 through 181 for the proper removal procedure.

Note. Locations "2" through "8," referred to in figures 174 through 181, are identified in figures 167 through 173. These "locations" are intended to orient the individual disassembly or assembly procedures to the overall brake controls and linkage.

b. Repair and Rebuild Standards. Figures 167 through 173 show repair and rebuild standard points of measurement for the brake controls and linkage.

c. Installation. Figures 167 through 173 identify the components of the brake controls and linkage. Follow the numerical sequence of views in figures 174 through 181 for the proper installation procedure.

d. Adjustment. Refer to TM9-2350-224-20.



Figure 166. Brake controls and linkage - locator





ORD E35748

- A Lever assembly 10870250 1 - Lever 10870301
 - 2 Sleeve bearing 775847
- B Lockwasher 96906-35335-23
- C Screw 96906-35298-113
- D Flat washer 8762129
- E Rod end bearing 8376445
- F Plain hexagon nut 96906-35691-822 P Lever assembly 10870234
- G Rod 10870240

- H Pin 10870161
- J Setscrew 435873
- K Plain hexagon nut 96906-35691-
 - 402
- L Bracket 10870162
- M Rod 10870241
- N Screw 96906-35298-114
 - - 1 Lever 10870236

- 2 Bearing 7732132
- Q Lever assembly 10870233
 - 1 Lever 10870232
 - 2 Bearing 7732132
- R Cotter pin 96906-24665-421
- S Clevis pin 96906-35810-38
 - T Pedal 10870245
 - U Bracket 10870163

Reference		Size and fit of	Wear limits	
letter	Inspection data and points of measurement	new parts	Field	Depot
a b a-b c d c-d e f e-f	OD of bearing. ID of bearing bore in lever. Fit of bearing in lever. OD of bearing. ID of bearing hore in lever. Fit of bearing in lever. OD of bearing. ID of bearing bore in lever. Fit of bearing in lever.	$\begin{array}{c} 1.0015 \ \text{to} \ 1.0025 \\ 1.0000 \ \text{to} \ 1.0015 \\ 0.0025T \ \text{to} \ 0.0000 \\ 1.0015 \ \text{to} \ 1.0025 \\ 1.0000 \ \text{to} \ 1.0015 \\ 1.0025T \ \text{to} \ 0.0000 \\ 0.940 \ \text{to} \ 0.941 \\ 0.9395 \ \text{to} \ 0.9405 \\ 0.0005L \ \text{to} \ 0.0015T \end{array}$		

Figure 167. Brake controls and linkage - partial exploded view - wear limits (1 of 7)

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Reference		Size and fit of	Wear	limits
letter	Inspection data and points of measurement	new parts	Field	Depot
a b a-b d c-d e f o-f	OD of bearing. ID of bearing bore in lock, Fit of bearing in lock. OD of bearing. ID of bearing bore in lever, Fit of bearing in lever. ID of roller. OD of bearing. Eit of bearing.	0, 6905 to 0, 6915 0, 6895 to 0, 6905 0, 0020T to 0, 0000 0, 6895 to 0, 6915 0, 6895 to 0, 6905 0, 0020T to 0, 0000 0, 689 to 0, 690 0, 6905 to 0, 6915 0, 0005T to 0, 0915		

Figure 168. Brake controls and linkage - partial exploded view-wear limits (2 of 7)



ORD E35750

- A Bracket 10870213
 B Spring 10870604
- C Clip 10870175
- D Shim 7983935
- E Brake pawl 10870226
- F Brake pawl 10870225
- G Screw 425601
- H Plate 10870188
- J Ratchet 10870298
- K Screw 96906-35298-113

- L Lockwasher 96906-35335-23
- M Stud 10870193
- N Pin 96906-16562-38
- P Screw 96906-35298-164
- Q Lockwasher 96906-35337-31
- R Shaft 10870237
- S Adjuster assembly 10870294 1 -Adjuster 10870295
 - 2 Sleeve bearing 10870317
- T Lever adjuster stop 10870249

- U Guide assembly 10870605 1 - Guide 10870184
 - 2 Pin 10870190
- V Cotter pin 96906-24665-283
- W Flat washer 96906-15795-212
- X Assembled washer screw 425599
- Y Pin 505046
- Z Lever assembly 10870213 1 - Lever 10870214
 - 2 Bushing 10870296

Reference		Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a b a-b c d c-d	ID of bearing hore in adjuster. Ob of bearing. Fit of bearing in adjuster. Ob of bearing. ID of bearing hore in lever. Fit of bearing in lever.	$\begin{array}{c} 1,3125 {\rm to} 1,3135 \\ 1,3140 {\rm to} 1,3155 \\ 0,0005T {\rm to} 0,0030T \\ 0,437 {\rm to} 0,438 \\ 0,4355 {\rm to} 0,4365 \\ 0,0005T {\rm to} 0,0025T \end{array}$		

Figure 169. Brake controls and linkage - partial exploded view - wear limits (3 of 7)



Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter		new parts	Field	Depot
a	OD of bearing. OD of bearing. DI of bearing bore in plate. Fit of bearing in plate. DI of bearing in plate. DI of bearing in plate. OD of bearing to this. Fit of bearing hore in link. Fit of bearing hore in lever. Fit of bearing hore in lever. Fit of bearing bore in lever. DI of bearing bore in lever. DI of bearing. Fit of bearing. Fit of bearing.	$\begin{array}{c} 0.7510 \ {\rm to} \ 0.7520 \\ 0.6905 \ {\rm to} \ 0.6915 \\ 0.7495 \ {\rm to} \ 0.7505 \\ 0.0005T \ {\rm to} \ 0.0025T \\ 0.0005T \ {\rm to} \ 0.0025T \\ 0.9490 \ {\rm to} \ 0.9410 \\ 0.9385 \ {\rm to} \ 0.3935 \\ 0.0005 \ {\rm to} \ 0.0395 \\ 1.00015 \ {\rm to} \ 1.0025 \\ 1.00015 \ {\rm to} \ 1.0025 \\ 1.00005 \ {\rm to} \ 0.0025T \\ 0.6895 \ {\rm to} \ 0.6905 \\ 0.6905 \ {\rm to} \ 0.6915 \\ 0.0025T \ {\rm to} \ 0.0055 \\ 0.6905 \ {\rm to} \ 0.6915 \\ 0.0025T \ {\rm to} \ 0.0055 \\ 0.6905 \ {\rm to} \ 0.6915 \\ 0.0025T \ {\rm to} \ 0.0005 \\ 0.6905 \ {\rm to} \ 0.6915 \\ 0.0020T \ {\rm to} \ 0.0005 \\ 0.6905 \ {\rm to} \ 0.6915 \\ 0.0020T \ {\rm to} \ 0.0005 \\ 0.0005 \ {\rm to} \ 0.005 \\ 0.005 \ {\rm to} \ 0.005 \\ 0.005 \ {\rm to} \ 0.005 \ {\rm to} \ 0.005 \\ 0.005 \ {\rm to} \ 0.005 \ {\rm to} \$		

Figure 170. Brake controls and linkage - partial exploded view - wear limits (4 of 7)



Figure 171. Brake controls and linkage - partial exploded view (5 of 7)



- A Rod assembly 10916737 B - Screw 96906-35292-63 C - Washer 96906-35337-27
- D Bushing 10916746
- E Shaft assembly 10916675
- F Bulkhead fitting assembly 10916686
 - 1 Nut 10916674
 - 2 Ring 10916673
 - 3 Lubrication fitting 96906-15001-3

- 4 Seal 10916658
- G Sleeve assembly 10916672
 - 1 Seal 7976991
 - 2 Bushing 8720489
 - 3 Sleeve 10916701
- H Packing 8762312
- J Control rod shield 10916703
- K Plain hexagon nut 96906-35691-822

Reference	Increation data and points of management	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a b a-b	OD of bearing, ID of sleeve, Fit of bearing in sleeve,	1.2480 to 1.2500 1.2475 to 1.2480 0.0025T to 0.0000		

Figure 172. Brake controls and linkage - partial exploded view-wear limits (6 of 7)



- A Control rod assembly 10916754
 - 1 Plug connector assembly 10916740
 - 2 Compression spring retainer 10873884
 - 3 Spring 10916728
 - 4 Pin 96906-16562-33
 - 5 Sleeve 10916739
- B Boot 10911734
- C Ring 10864097
- D Ring 10864096
- E Ring 10864095
- F Control rod assembly 8762430
 - 1 Control rod, left 8762442
 - right 10884059
 - 2 Roller needle bearing 709414
 - 3 Encased plain seal 7400356
- G Cover shield, left (shown) 10916764 Cover shield, right 10916725
- H Screw 96906-35298-104
- J Lockwasher 96906-35335-23

- K Sleeve nut 7953993
- L Gasket 10911782
- M Gasket 10916765
- N Cover assembly, left (shown) 10916767 Cover assembly, right 10916722
- P Screw 421027
- Q Packing 10887504
- R Coupling 10884059
- S Lever assembly, left (shown) 10916750 Lever assembly, right 10916759
 - 1 Lever, left 10916755
 - right 10916756
 - 2 Ring 10916757
- T Pin 10916717
- U Hose clamp 96906-35842-4
- V Hose clamp 96906-35842-3
- W Assembled washer screw 423562
- X Pipe hanger 8762487
- Y Bracket 8762144

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter		new parts	Field	Depot
a b a-b	ID of bearing bore in rod end. OD of bearing. Fit of bearing in rod end.	0.812 to 0.822		

Figure 173. Brake controls and linkage - partial exploded view-wear limits (7 of 7)





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Figure 175. Disassembly and assembly of brake controls and linkage (2 of 8)



REMOVE OR INSTALL ROD GUIDE COVER MOUNTING PLATE (LOCATION 6)



REMOVE OR INSTALL BRAKE PAWL EXTENSION SPRING (LOCATION 4)



REMOVE OR INSTALL BRAKE ADJUSTER ASSEMBLY (LOCATION 4)



REMOVE OR INSTALL RATCHET PAWL LEVER ASSEMBLY AND ATTACHED PARTS (LOCATION 4)



Figure 176. Disassembly and assembly of brake controls and linkage (3 of 8)

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DISCONNECT OR CONNECT FRONT CONNEC-TOR ROD (LEFT AND RIGHT) (LOCATION 5)



REMOVE OR INSTALL LEVER ASSEMBLY (LEFT AND RIGHT) (LOCATION 5)



REMOVE OR INSTALL STOP LIGHT STRAP (RIGHT SIDE ONLY) (LOCATION 5)



REMOVE OR INSTALL FRONT CONNECTING ROD (LEFT AND RIGHT) (LOCATION 7)



REMOVE OR INSTALL BULKHEAD SEAL NUT (LEFT AND RIGHT) (LOCATION 7)



REMOVE OR INSTALL CONTROL ROD SHIELD (LOCATION 7) ORD E35759

Figure 178. Disassembly and assembly of brake controls and linkage (5 of 8)



POSITIONING OF SEALS IN RELATION TO BULKHEAD AND SLEEVE ASSEMBLY (LEFT AND RIGHT) (LOCATION 7)







Figure 180. Disassembly and assembly of brake controls and linkage (7 of 8)



Figure 181. Disassembly and assembly of brake controls and linkage (8 of 8)

CHAPTER 9

HULL COMPONENTS

Section I. GENERAL

71. Scope

This chapter contains rebuild and replacement instructions for the fenders and fender stowage boxes, hull stowage boxes, brackets, straps, hull ammunition racks, infrared periscope mount, hull turret inflatable seal, gun shield cover and rear tachometer shaft bulkhead seal.

72. References Rebuild and replacement instructions for the following hull components are contained in TM 9-2350-224-20.

Towing Hook Towing Pintle Hull Access Covers and Seals Hull Periscope Door Seals and Springs Gun Travel Lock Hull Drain Valves, Controls, Linkage and Seals Driver's Escape Hatch Hull Turret Seal Inflating System Driver's Compartment Crash Pad.

Section II. FENDERS AND FENDER STOWAGE BOXES

73. Description

The fenders (fig. 5) and the fender stowage boxes (fig. 182) are constructed of steel. They are bolted to outriggers, which are in turn bolted to bases or bracket pads welded to the hull. If necessary, the fenders and stowage boxes can be removed to reduce the overall width of the vehicle for transportation. Should the fenders or fender boxes become damaged, they can be either repaired or replaced. Extra strong outriggers are utilized to support the air cleaners.

74. Replacement of Front Fenders

<u>a. Removal.</u> Follow the alphabetical sequence of the views in figure 183 for the correct removal procedure.

<u>b.</u> <u>Installation</u>. Follow the numerical sequence of the views in figure 183 for the proper installation procedure.

75. Rebuild of Center Fender Stowage Box

<u>a. Removal.</u> Follow the alphabetical sequence of the views in figure 185 for the proper removal procedure.

<u>b.</u> <u>Disassembly</u>. Figure 186 identifies the components of the center fender stowage box. Follow the alphabetical sequence of the views

in figure 187 for the proper disassembly procedure.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

d. Inspection and Repair. Figure 186 shows specific points for inspection and repair.

e. Assembly. Figure 186 identifies the components of the center fender stowage box. Follow the numerical sequence of the views in figure 187 for the correct assembly procedure.

f. Installation. Follow the numerical sequence of the views in figure 185 for the proper installation procedure.

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76. Replacement of Air Cleaner Fender Skirts

a. <u>Removal</u>. Follow the alphabetical sequence in figure 188 for the proper removal procedure.

b. Installation. Follow the numerical sequence in figure 188 for the proper installation procedure.

Note. Refer to paragraph 48 for the removal and installation procedures of the air cleaner assembly.

77. Rebuild of Rear Fender Stowage Boxes

a. <u>Removal</u>. Follow the alphabetical sequence of the views in figure 189 for the proper removal procedure.

b. Disassembly. Figure 190 identifies the components of the rear fender stowage boxes. Follow the alphabetical sequence of the views in figure 191 for the proper disassembly procedure.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning, inspection and refinishing instructions.

d. Inspection and Repair. Figure 190 shows specific points for inspection and repair.

e. Assembly. Figure 190 identifies the components of the rear fender stowage boxes. Follow the numerical sequence of the views in figure 191 for the proper assembly procedure.

<u>f.</u> <u>Installation</u>. Follow the numerical sequence of the views in figure 189 for the proper installation procedure.

78. Replacement of Rear Fenders and Shields

a. <u>Removal</u>. Follow the alphabetical sequence of the views in figure 192 for the proper removal procedure.

<u>b.</u> Installation. Follow the numerical sequence of the views in figure 192 for the proper installation procedure.

79. Replacement of Outriggers

a. Removal. Follow the alphabetical sequence of the views in figure 193 for the proper removal procedure.

b. Installation. Follow the numerical sequence of the views in figure 193 for the proper installation procedure.

Note. The procedure is the same for both left and right outriggers.

80. Rebuild of Handset Box

a. <u>Removal</u>. Observe figure 194 for the proper removal procedure.

b. Disassembly. Figure 195 identifies the components of the handset box. Follow the alphabetical sequence in figure 196 for the proper disassembly procedure.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for the general cleaning and refinishing instructions.

d. Inspection and Repair. Figure 195 shows specific points for inspection and repair.

e. Assembly. Figure 195 identifies the components of the handset box. Follow the numerical sequence of the views in figure 196 for the proper assembly procedure.

f. Installation. Observe figure 194 for the proper installation procedure.



Figure 182. Fenders, fender stowage boxes, outriggers, and handset box location

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Figure 183. Removal and installation of left front fender



- A Panel assy 7972010
 B Plate 8721688
 C Plate or pad 7970928
 D Support 8734265
- E Plate 8734264
- -----

 $\begin{array}{l} {\rm F} \mbox{ - Outrigger 7970946} \\ {\rm G} \mbox{ - Plate} \\ {\rm 1 \ - Left \ 8335317} \\ {\rm 2 \ - Right \ 8335318} \\ {\rm H} \mbox{ - Support \ 8734267} \\ {\rm J \ - Pad \ 7972776} \end{array}$

- K Plate 8335319
 L Pad 8721683
 M Pad 8721894
 N Plate 8734261
- P Outrigger 7970921

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Reference	erence Inspection data and points of measurement Size and fit of	Size and fit of	Wear	limits	
letter	* *	new parts	Field	Depot	
a b	Must not be broken, cracked, distorted, twisted or sections broken out. All brackets must not be bent, broken, distorted or twisted and all welds must be intact and have deep penetration.				

Figure 184. Left front fender - exploded view - wear limits

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NOTE, REMOVAL AND INSTALLATION PROCEDURE IS THE SAME FOR BOTH LEFT AND RIGHT BOXES

Figure 185. Removal and installation of center fender stowage box



- A Cover 8364731 B - Latch 6312712 C - Nut 503275 D - Plate 8705499 E - Box 1 - Left 10921937 2 - Right 10921937 F - Wusher 96906-35291-61 H - Screw 96906-33221-61 H - Screw 96906-33251-114 J - Bracket 8715514
- K Screw 96906-55291-113 L - Plate 10921933 M - Outrigger 8364675 N - Plate 8715721 P - Nut 503282 Q - Bolt 96906-35291-615 R - Screw 96906-35291-611 T - Plate 8364772 U - Nut 503275

V - Washer 96906-15795-215 W - Spring A-377167 X - Plug 144011 Y - Washer 120382 Z - Screw 123505 A - Latch assy 7324021 1 - Handle 6312896 2 - Tongue 5377254 3 - Washer 120394

- 4 Nut 218483
- 5 Pin 103374

Inspection data and points of measurement	Size and fit of new parts	Wear limits		
		Field	Depot	
All components must be securely fastened. Must not be broken or deformed. Must operate freely. All components must be securely fastened. Decals must be legible. Must not be fatigued. Must not be broken, deformed, worn or loose. Looseness may be corrected by tightening mut or mounting plates.				
	Inspection data and points of measurement All components must be securely fastened. Must not be broken or deformed. Must operate freely. All components must be securely fastened. Decals must be legible. Must not be broken or fatigued. Must not be broken, deformed, worn or loose. Looseness may be corrected by tightening nut or mounting plates.	Inspection data and points of measurement Size and fit of new parts All components must be securely fastened. Must not be broken or deformed. Must operate freely. All components must be securely fastened. Decals must be legible. Must not be broken, deformed, worn or losse. Losseness may be corrected by tightening nut or mounting plates.	Inspection data and points of measurement Size and fit of new parts Wear All components must be securely fastened. Must not be troken or deformed, Must operate freely. Size and fit of new parts Field All components must be securely fastened. Decais must be legible. Must not be troken, deformed, worn or loose. Looseness may be corrected by tightening nut or mounting plates. Item to the fit operation of the secure of the secur	

Figure 186. Center fender stowage box - exploded view - wear limits



Figure 187. Disassembly and assembly of center fender stowage box

NOTE. REMOVAL AND INSTALLATION PROCEDURE IS THE SAME FOR BOTH LEFT AND RIGHT AIR CLEANER FENDER SKIRTS SEE CHAPTER 6 - SECTION V, FIGURE 74 FOR REMOVAL AND INSTALLATION OF THE AIR CLEANER REMOVAL AND INSTALLATION NOTES



REMOVE OR INSTALL AIR CLEANER FENDER SKIRT



AIR CLEANER FENDER SKIRT REMOVED





REMOVE OR INSTALL REAR FENDER STOWAGE BOX INNER ATTACHING HARDWARE

Figure 189. Removal and installation of rear fender stowage box and fender skirt



A - Cover 10916811 B - Latch assy 6312712 1 - Handle 6312896 2 - Tongue 5377254 3 - Washer 120394 4 - Nut 426612 5 - Pin 121224 C - Nut 503275 D - Plate 8705499 E - Spring 5377167 F - Washer 7035747 G - Screw 5376929 H - Washer 96906-15795-215 J - Box 10916810 K - Plate 10916817 L - Outrigger 10921932 M - Plate 10916795 N - Screw 96906-35291-113 P - Bracket 8364690 Q - Screw 96906-35291-61 R - Nut 503282 S - Screw 96906-35291-112 T - Screw 96906-35291-63 U - Plug 144011 V - Latch assy 7324021 W-Washer 96906-35337-27 X - Screw 96906-35292-57

Reference	Inspection data and points of management	Size and fit of	Wear limits		
letter	inspection data and points of measurement	new parts	Field	Depot	
a	Must not be cracked, broken or corroded. Must operate freely.				
b	Must not be broken, deformed, worn or loose. Looseness may be corrected by tightening nut or mounting plate.				
c	Not broken or fatigued.				
d	Must not be fatigued.				

Figure 190. Rear fender stowage box and fender skirt - exploded view - wear limits







REMOVE OR INSTALL LEFT REAR FENDER



REMOVE OR INSTALL LEFT REAR FENDER SHIELD

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Figure 192. Removal and installation of rear fender and shield

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NOTE. REMOVAL AND INSTALLATION PROCEDURE IS THE SAME FOR LEFT AND RIGHT SIDE OUTRIGGERS



REMOVE OR INSTALL LEFT SIDE NUMBER 1 OUTRIGGER



REMOVE OR INSTALL LEFT SIDE NUMBER 2 OUTRIGGER



REMOVE OR INSTALL LEFT SIDE NUMBER 3 OUTRIGGER



REMOVE OR INSTALL LEFT SIDE NUMBER 4 OUTRIGGER



REMOVE OR INSTALL LEFT SIDE NUMBER 5 OUTRIGGER



REMOVE OR INSTALL LEFT SIDE NUMBER 6 OUTRIGGER ORD E35774

Figure 193. Removal and installation of outriggers





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- A Screw 96906-35295-6 B - Lockwasher 96906-35338-63
- C Grommet 96906-35489-52
- D Cover assy 10915285
 - 1 Plate 10915281
 - 2 Latch assy 7973953
 - 3 Gasket 10915282
- E Harness 10915364
- F Handset box 10926070
- G Screw 425325
- H Gasket 10893838
- J Gasket 10893839
- K Gasket 10893840
- L Clip 10915317
- M Screw and lockwasher 178459
- N Bracket assy 7970264
- P Nut 503267
- Q Screw and lockwasher 178459
- R Light assy 10915363
- S Gasket 10915319
- T Housing 10915328

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter		new parts	Field	Depot
a b c	Latch assembly must be securely fastened to cover. Springs inside latch must not be futigued. Must show no evidence of rust. Must not be bent, cracked, broken, or deformed, Welded objects must be secure. Clearance between box and cover when closed must be 0.06 to 0.08 inch. Cover must open and close freely. Must not be cracked, broken, deformed, or fatigued.			

Figure 195. Handset box - exploded view - wear limits



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Figure 196. Disassembly and assembly of the handset box

Section III. HULL STOWAGE BOXES AND BRACKETS

81. Description

The hull stowage boxes and brackets include the driver's periscope stowage box, flashlight holder, interphone support and canteen bracket (figs. 7 and 9). The periscope stowage box is a rectangular container fitted with a latching lid and internal pads. It is bolted to a bracket welded to the hull to the left of the left ammunition stowage rack. The flashlight holder is a steel cylindrical receptacle welded to the front of the hull between the dim n=r switch and the fire extinguisher. The interphone support is a metal hook welded to the upright support located at the left rear of the driver's position. The canteen bracket is of riveted and welded construction and is welded to the upright support at the left rear of the driver's position.

82. Repair and Replacement

Figure 197 contains information for repairing or replacing the periscope stowage box, flashlight holder, interphone support, and canteen bracket.



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Section IV. HULL AMMUNITION RACKS

83. Description

The hull ammunition stowage racks, shown in figure 7 consist of a number of tubes welded to supporting plates and sized to accept 90-mm ammunition. The ammunition is held in place by spring-loaded handles. Maintenance of the handles is covered in TM 9-2350-224-20.

84. Replacement of Ammunition Racks

<u>a. Removal.</u> Follow the alphabetical sequence of the views in figure 198 for the proper removal procedure.

<u>b.</u> <u>Installation</u>. Follow the numerical sequence of the views in figure 198 for the correct installation procedure.



Figure 198. Removal and installation of hull ammunition racks

Section V. INFRARED PERISCOPE MOUNT

85. Description

The infrared periscope mount, shown in figure 5, is in the driver's hatch. It is a quick release holding device for either the infrared or the daylight driver's periscopes. Both the mount itself and the mount lid have seals to make them waterproof.

86. Rebuild

 <u>a. Removal.</u> Follow the alphabetical sequence of views in figure 201 for proper removal procedure.

b. Disassembly. Figure 200 identifies the components of the infrared periscope mount. Follow the alphabetical sequence of the views in figures 202 and 203 for the proper disassembly procedure. c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

d. Inspection and Repair. Figure 200 shows repair and rebuild standard points of measurement and specific inspection data.

e. Assembly. Figure 200 identifies the components of the infrared periscope mount. Follow the numerical sequence of the views in figures 202 and 203 for proper assembly procedure.

f. Installation. Follow the numerical sequence of the views in figure 201 for proper installation procedure.



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Figure 199. Infrared periscope mount

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Figure 200. Infrared periscope mount - exploded view

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- A Hinge assembly 8386893 1 - 3/8 x 1-3/4 Straight pin 141389
 - 2 Hinge 8386894
- B Lid assembly 7970486
- 1 Lid 8730135
- C Seal 8697985
- D Mount 8386890
- E Plunger 7064418
- F Shim 8671395

Reference

letter

- G Latch assembly 8386881

- 8386884
- 4 Latch 8386882
- H 1/4 Lockwasher 120380
- J 1/4-20 x 3/4 Cap screw 186676
- K Screw 8386967
- L Retainer assembly 8762634
 - 1 Retainer 8762639
 - 2 Pin 8706392
- M Helical extension spring 8706391
- N Grooved headless pin 8706392
- 1 0.219 x 2-1/2 Spring pin P 1/8 x 5/16 Straight pin 141106

- 3 Helical compression spring S Helical compression spring 8671418
 - T Retainer 8762444
 - U Plunger assembly 8730134
 - 1 7/16-20 3/8 Hex socket setscrew 138771
 - 2 Helical compression spring 8730133
 - 3 Plunger 8730132
 - 4 Housing 8730131
 - V 3/8-24 x 1 Flathead screw 420699 W-3/8 Lockwasher 114618

Wear limits

Field Depot

- 585989 2 - Retainer 8386883
- Q Latch 8762421
- R Screw 8386968

Inspection data and points of measurement	Size and fit of new parts
Must not be distorted, cracked or broken, or fatigued. ID of pinhole in lid.	0.500 to 0.501

	fatigued.		
b	ID of pinhole in lid,	0.500 to 0.501	
a-b	Fit of pin in lid hole.	0.0010T to 0.0000	
c	Must have positive spring-loaded action. Must not bind or become cocked within its threaded		
	housing.		
d	Must not be cracked or distorted. Both ends must be closed and ground. Must not be fatigued.		
e	ID of pinhole in retainer.	0, 1870 to 0, 1875	
f	OD of pin.	0.1875 to 0.1880	1
e-f	Fit of pin in retainer.	0.0010T to 0.0000	
g	Not cracked or distorted. Both ends must ter- minate in a full round loop. Must not be fatigued.		
h	Not cracked or distorted. Both ends must be closed and ground. Must not be fatigued.		
j	Must not be cracked or distorted. Both ends must be closed and ground. Must not be fatigued.		
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Figure 200. Infrared periscope mount - exploded view - wear limits - (continued)



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REMOVE OR INSTALL PLATE ATTACHING HARDWARE





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Figure 202. Disassembly and assembly of infrared periscope mount (1 of 2)





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Section VI. HULL-TURRET INFLATABLE SEAL

87. Description

The hull-turret inflatable seal, shown in figure 6, is a reinforced synthetic rubber tube, U-shaped when deflated. It helps to keep out dust and dirt during vehicle operation and excludes drafts and cold air in cold weather operation. When inflated, it prevents the entry of water during fording operations.

The seal is inflated by means of a hand pump located on the hull floor at the left side of the driver's seat. Maintenance instructions of the inflating system, which also includes a manifold, gage, valve, and attaching hoses, are given in TM 9-2350-224-20.

88. Replacement of Seal

a. <u>Removal</u>. Follow the alphabetical sequence of the views in figures 205 and 206 for the proper removal procedure.

DEFLATED

b. Installation. Follow the numerical sequence of the views in figures 205 and 206 for the proper installation procedure.

c. Testing of Seal. The inflatable seal should be tested at three stages of installation. The first test, to be performed prior to installation in the vehicle is described in figure 206. A second test will be performed after installation in the hull-turret opening, prior to installation of the turret. This test consists of inflating the seal to a pressure of 25 psi. There should be no more than 1 psi pressure drop in 4 hours. After installation of the turret, the test should be repeated. If the pressure drop exceeds these limits, check the inflating system. If the inflating system is found to be free of leaks, the fault is in the inflatable seal; replace it with one that is known to be good. This test is to be performed if the vehicle is to be returned to use. If the vehicle is to be placed in storage, follow the storage instructions.



INFLATED



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REMOVE SEAL FROM GROOVE IN HULL



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REMOVE OR INSTALL INFLATING HOSE



Figure 205. Removal and installation of hull-turret inflatable seal (1 of 2)

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89. Description

a. Operation. The driver's seat mechanism, shown in figure 7, provides adjustment of seat height, position, and seatback. The seatmechanism also allows the seat to drop down for access to the driver's escape hatch. When the horizontal adjustment handle is pulled toward the seat, the locking pin is disengaged, and the driver can move the seat forward or backward into the desired position. When the seatheight adjusting handle is pulled up, the seat height locking pin is disengaged from the seat support, permitting the seat to be moved upward by spring tension, or downward by body weight to the desired position. The height adjusting handle is then released to engage the locking pin in one of the positioning holes.

b. Adjustment. The height of the seat back is adjusted by removing the wing nut, washer, and bolt which secure the seat-back frame to the vertical seat-back support. The seat back may then be moved up or down, as desired, and the bolt, washer, and nut installed and tightened. Tilt of the seat back is adjusted by raising the adjusting stop at the base of the seat-back support to disengage the stop from the support rod. After the seat-back support is tilted to the desired position, the adjusting stop must be released to re-engage the support rod. The seat can be dropped only after removing the seat-backrest support from its retainer and pulling the red tripping handle toward the seat. The complete assembly will rise and the seat will then drop to the driver's escape position.

90. Rebuild of Seat Mechanism

a. <u>Removal</u>. Follow the alphabetical sequence of the views in figure 208 for the proper removal procedure.

b. Disassembly. Figures 209 through 212 identify the components of the driver's seat. Follow the alphabetical sequence of the views of figures 213 through 218 for the correct disassembly procedure.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

d. Inspection and Repair. Figures 209 through 212 show repair and rebuild standard points of measurement and specific inspection data. e. Assembly. Figures 209 through 212 identify the components of the driver's seat. Follow the numerical sequence of the views in figures 213 through 218 for the proper assembly procedure.

f. Installation. Follow the numerical sequence of the views in figure 208 for the proper installation procedure.

g. Adjustment. Upon completing assembly and installation of the driver's seat, adjust the seat dumping mechanism as follows:

- Remove backrest, then actuate dumping handle and observe whether seat dumps and the adjusting assembly rises to the top of seat support.
- (2) If seat dumps but adjusting assembly does not rise to top of support, loosen jammuts that fasten link to clevis of adjusting assembly (fig. 216). Rotate adjusting nuts to shorten length of assembled link and clevis. Tighten jamnuts.
- (3) Repeat (1) above. If adjusting assembly still does not rise to top of support, repeat adjustment in (2) above.



Figure 207. Driver's seat



REMOVE OR INSTALL UPPER MOUNTING SCREWS AND DRIVER'S SEAT

ORD E35789

Figure 208. Removal and installation of driver's seat



A - Spring 7404673	M - Shaft 7962120
B - Bolt 120741	N - Ring 7404672
C - Washer 103320	P - Rod 7404668
D - Nut 120368	Q - Pin 443039
E - Retainer 7404629	R - Lever 7404644
F - Roller assembly 7968207	S - Support 7404625
1 - Roller 7968208	T - Plate 7404660
2 - Needle Bearing 709413	U - Screw 132908
3 - Seal 7404642	V - Washer 120217
G - Adjuster assembly 7404600	W-Retainer 7404661
H - Shaft 7404662	X - Guide 7404667
J - Washer 7404671	Y - Ring 7404670
K - Pin 443038	Z - Shaft 7404666

Υ.		Louis	1	740	100	0
1.1	-	HOUS	ing	740	400	м.

Reference	Increation data and points of measurement	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a a b a,b c d	Inspect in accordance with TM 9-214. OD of bearing . ID of bearing bore in bracket. Fit of bearing in bore. Padding not torn or worn. Must not be cracked, broken, distorted or fatigued.	1.2490 to 1.2530		

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Figure 209. Driver's seat - partial exploded view - wear limits (1 of 4)

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A - Tube 7404647 B - Screw 122181 C - Prame 8694613 D - Bock 7962791 R - Sorew 12955 D - Bock 7962791 R - Sorew 12955 D - Bock 7962791 R - Sorew 12955 D - Bock 7962791 D - Spring 7404675 N - Washer 13100 N - Spring 7404675 N - Spring 740467 N - Spring 740	- The	No.	
A - Tube 7404647 B - Screw 12181 C - Prime 8694613 D - Back 7962791 B - Screw 15785 D - Back 7962791 D - Screw 15785 D - Screw 157855 D - Screw 15785 D - Screw 157			INCHES
A - Tube 7404647 K - Washer 131101 U - Spring 7404675 B - Screw 122181 L - Nut 120378 V - Adjuster 333465 C - Frame 8694613 M - Boit 427881 W - Spring 7404655 D - Back 7962791 N - Washer 130320 X - Spring 7404655 E - Screw 129655 D - Wesher 130309 X - Spring 7404655			ORD E35791
F - Washer 120382 Q - Nut 120377 Y - Clip 7404676	A - Tube 7404647 B - Sorew 122181 C - Frame 8694613 D - Back 7962791 E - Sorew 187865 F - Washer 120382	 K - Washer 131101 L - Nut 120378 M - Bolt 427681 N - Washer 103320 P - Washer 1313099 Q - Nut 120377 	U - Spring 7404679 V - Adjuster 8338622 W - Spring 7404658 X - Spring 7404659 Y - Clip 7404676

Reference	Transition data and points of manufacture	Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a b c d f f h	Must not be fatigued. Must not be fatigued. Must not be fatigued. Must not be fatigued. Padding must not be torn or worn. Padding must not be torn or worn. Must not be broken, twisted, deformed or damaged.			

Figure 210. Driver's seat - partial exploded view - wear limits (2 of 4)

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- A Washer 7404615
- B Helical compression spring 7404612
- C Sleeve 7404614
- D 5/32 x 3/4 Grooved headless pin 443139
- E Pin assembly 7404620
- F X-Washer 7404624
- G Grooved headed pin 7404619
- H Vertical adjusting handle 7984205
- J Grooved headed pin 7962133
- K 3/8-24 Hex nut 219708
- L 1/16 x 5/16 Cotter pin 137127
- M Pin 7962132

- N Clevis 7404684
- P 5/16-24 Hex nut 221157
- Q 5/16 Lockwasher 103320
- R 11/32 Washer 120393
- S Link 7962128
- T Bell crank 7962129
- U Link 7962130
- V Arm 7962131
- W-Shoulder pin 7962390
- X 3/8-24 Hex nut 225831
- Y 3/8 Lockwasher 103321

Reference	Increation data and points of measurement	Size and fit of	Wear limits	
letter	hispection data and points of measurement	new parts	Field	Depot
a b	Must not be fatigued. Mounting holes not worn out of round.			

Figure 211. Driver's seat - partial exploded view - wear limits (3 of 4)



- A Grooved headed pin 7404619
- B Bracket assembly 7404601
- C 5/32 x 3/4 Grooved headless pin 443139
- D Pin 7404623
- E Bearing 7404617
- F Seal 7404618
- G Washer 7404615
- H Helical compression spring 7404612
- J Sleeve 7404613
- K 1/4-20 x 7/8 Fillister head screw 132268
- L 1/4 Lockwasher 120380
- M- Housing assembly 7968200
- N Shim 7968206
- P X-Washer 7404624
- Q Handle 7404611

Reference	Increation data and points of macquement	Size and fit of	Wear limits	
letter	hispection data and points of measurement	new parts	Field	Depot
a b c d	Bearing must not fit loosely in bracket bosses. See TM 9-214. Must not be fatigued. Housing not damaged. Holes not distorted. Plungers must move freely.			

Figure 212. Driver's seat - partial exploded view - wear limits (4 of 4)





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Figure 216. Disassembly and assembly of driver's seat (4 of 6)



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Figure 218. Disassembly and assembly of driver's seat (6 of 6)

Section VIII. GUN SHIELD COVER

shield cover.

91. Description

The gun shield cover, shown in figure 14 is a coated nylon cloth cover bound with 1 inch wide nylon tape. It is designed to fit over the gun shield to prevent water, sand, mud or other foreign material from entering the turret.

92. Repair

a. <u>Removal</u>. TM 9-2350-224-20 contains instructions for removal of the gun shield cover. b. <u>Cleaning.</u> Mud and dirt can be removed by scrubbing with soap and water. Use perchlorethylene to remove grease and hydraulic fluid.

 <u>c. Inspection and Repair.</u> Figure 219 illustrates specific points for inspection and repair.
 d. Installation. TM 9-2350-224-20 contains

instructions for the installation of the gun

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Figure 219. Inspection and repair of gun shield cover

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CHAPTER 10

PERSONNEL HEATER

Section I. DESCRIPTION AND DATA

93. Description

The personnel heater, shown in figure 8, is an all purpose multi-fuel vehicular type heater. It burns a mixture of air and various types of fuel in a sealed heat exchanger. Ventilating air and air for combustion are supplied by two separate blowers. The flow of fuel to the heat exchanger is regulated by a solenoid actuated fuel control valve which is mounted on top of the heater case. This valve is controlled by the personnel heater switch. Fuel enters the heat exchanger through two standpipes and is ignited within the heat exchanger by an electric glowtype igniter. An electric heating element surrounding the primary standpipe preheats the fuel to ensure a quick start. A flame detector switch shuts off the igniter and the fuel preheater as soon as a flame has been established within the heater, and permits the blower to operate at a higher speed. If the heater fails to ignite or if the temperature of the ventilating airstream exceeds a safe maximum, an overheat switch and an electric time delay cartridge act as safety switches to shut off the fuel flow. A combustion air fan blows air into the primary and secondary combustion air openings, where the air is heated and then circulated to the vehicle through a duct and transition box assembly.

Combustion products are exhausted to the outside of the tank through a flexible hose which is coupled through the hull to a metal exhaust tube mounted on the right front fender.

94. Data

Make Stewart warner
Model 8460 C-24
Weight
Overall dimensions:
Length
Width 8-5/32 in.
Height 11-3/4 in.
Input voltage required 18 to 28 v/dc
Current consumption:
Starting
Fuel jet fuel, gas-
oline, CI fuel,
DF1, DF2, DFA
(technical order
VV-F 800)
Fuel pressure 1 to 15 psi
Fuel pressure 1 to 15 psi Fuel consumption:
Fuel pressure 1 to 15 psi Fuel consumption: High heat
Fuel pressure 1 to 15 psi Fuel consumption: High heat 0.080 lb/min (0.80 gph) (0.80 gph)
Fuel pressure 1 to 15 psi Fuel consumption: High heat
Fuel pressure 1 to 15 psi Fuel consumption: 0.080 lb/min High heat 0.80 gph Low heat 0.042 lb/min (0.42 gph) 0.042 cb/min
Fuel pressure 1 to 15 psi Fuel consumption: 0.080 lb/min High heat 0.082 lb/min Low heat 0.042 lb/min Low heat 0.042 lb/min (0.42 gph) (0.42 gph)
Fuel pressure
Fuel pressure 1 to 15 psi Fuel consumption: 0.080 lb/min High heat 0.042 lb/min Low heat 0.042 lb/min Heat output (fresh air): (0.42 gph) High heat 60,000 btu/hr
Fuel pressure 1 to 15 psi Fuel consumption: 0.080 lb/min ligh heat 0.082 lb/min Low heat 0.042 lb/min Heat output (fresh air): (0.42 gph) High heat 60,000 btu/hr Low heat 50,000 btu/hr Total maximum heat output, 30,000 btu/hr
Fuel pressure 1 to 15 psi Fuel consumption: .0.080 lb/min High heat .0.080 gph) Low heat .0.042 lb/min (0.42 gph) .0.42 gph) Heat output (fresh air): .60,000 btu/hr High heat
Fuel pressure 1 to 15 psi Fuel consumption: 0.080 lb/min High heat 0.042 lb/min Low heat 0.042 lb/min Heat output (fresh air): (0.42 gph) High heat 60,000 bu/hr Low heat 30,000 bu/hr Total maximum heat output, including exhaust 84,000 bu/hr
Fuel pressure 1 to 15 psi Fuel consumption: 0.080 lb/min High heat 0.080 lb/min Low heat 0.042 lb/min Heat output (fresh air): 60,000 btu/hr High heat 30,000 btu/hr Total maximum heat output, including exhaust ncluding exhaust 84,000 btu/hr Free air delivery (high heat) 225 cfm



Figure 220. Personnel heater



ORD E35802

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- A Plate and guard assembly*
 - 1 Screw*
 - 2 Guard*
 - 3 Ring*
 - 4 Rivet*
 - 5 Wiring diagram plate*

*No Part Number available

 $\begin{array}{l} B &= Screw \; 8 - 32 - 3/8 \;\; 8359745 \\ C &= Air \; inlet \; louver \; 7971823 \\ D &= Blower \; assembly * \\ E &= Screw \; 10 - 32 - 1/2 * \\ F &= Screw \; 10 - 32 - 1/2 * \\ G &= Duct * \end{array}$

Reference	Reference letter Inspection data and points of measurement Size and fit of new parts	Size and fit of	Wear limits	
letter		new parts	Field	Depot
a	Must be legible.			

Figure 221. Personnel heater - partial exploded view - wear limits (1 of 4)



- A Assembled washer screw B - Cable assembly
- C Flame detector switch assembly * No Part Number available.

- D Terminal strip and receptacle assembly * E - Marker strip (single) 7971833
- F Secondary blower housing

Reference letter	Inspection data and points of measurement	Size and fit of new parts	Wear	limits
a	Must be legible.		Field	Depot

7973668

7971642

Figure 222. Personnel heater - partial exploded view - wear limits (2 of 4)

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- A Wick 7520346
- B Compression collar *
- C Ground terminal 7971649
- D Secondary fuel tube assembly *
- E Compression bushing 8720791
- F Primary fuel tube assembly *
- G Igniter assembly 7324355
- H Resistor assembly 7971638
- J Nut No. 8-32 7951221
- K Primary fuel tube assembly *
- L Secondary fuel tube assembly *
- M Flame detector switch assembly 7971642
- N Screw 6-32-1/4 *
- P Ceramic rod same as 7951586 ceramic rod 8335914
- Q Screw 10-32-1/2*
- R Lockwasher No. 8 96906-35333-021
- S Screw 8-32 7951215
- T Lockwasher No. 6 96906-35333-020
- U Nut 6-32 8720160
- V Screw, fillister head 6-32-3/8 8359533
- W Terminal strip and receptacle assembly *

*No Part Number available

X - Screw, fillister 8-32-5/8 8359534 Y - Screw 6-32-5/16 454735 Z - Cable assembly * AA - Hatch cover assembly G-700554* BB - Screw 10-32-5/8 * CC - Screw 10-32-3/8 * DD - Speed nut 5/16-18 7971877 EE - Guard mounting bracket * FF - Screw 10-32-5/8 441376 GG - Fuel control valve 7748718 HH - Fuel valve mounting spacer * JJ - Fuel valve mounting adapter gasket * KK - Plug button 188002 LL - Overheat switch assembly 8359600 MM- Single marker strip 7971833 NN - Heat exchanger housing assembly * PP - Nameplate * QQ - Blind rivet 7971875 RR - Screw 10-32-5/16 * SS - Rivet * TT - Burner and exchanger assembly * UU - Fuel inlet assembly 7748722

Reference letter	Inspection data and points of measurement	Size and fit of new parts	Wear limits	
			Field	Depot
a	Resistor must not be discolored. Wire windings must not be kinked or broken. Wire markings must be legible. Ceramic core must not be cracked or broken.			
b	Refer to fuel control valve cleaning, inspection and repair section (par. 98).			
c	Clean by sliding a clean piece of paper between contact points. Do not attempt to bend the blade or contact arm, or to change the setting of the adjusting screw. Replace switch if found de- fective.			
d	Clean both inside and outside.			
e	Must be legible.			
f	Replace if burned through or cracked. Must not have carbon in ignite pocket or have combus- tion residue on surface or heat exchanger. (Refer to figure 229 for detailed cleaning in- structions.)			
g	Replace.			
h	Replace.			
j	Must not be deformed, twisted, cut or torn.			
k	Replace.			

Figure 223. Personnel heater - partial exploded view - wear limits (3 of 4) (continued)



A - Housing assembly	*	H - Set screw	*
B - Wrap assembly	*	J - Nut 8-32	7951221
C - Vent blower wheel assembly	*	K - Cap screw 1/4-28 x 1	*
D - Motor mounting bracket assembly	8682425	L - Set screw	*
E - Blower motor 24 vdc	7974047	M - Grommet	7973670
F - Secondary blower cover assembly	*	N - Screw 10-32-3/8	*
G - Combination blower and wheel		P - Screw 10-32-3/8	*
assembly	8682420		

*No Part Number available

Reference letter	Inspection data and points of measurement	Size and fit of new parts	Wear limits	
			Field	Depot
a	Wipe dirt, dust and grease from motor with a clean cloth and dry cleaning solution. Do not immerse motor.			

Figure 224. Personnel heater - partial exploded view wear limits (4 of 4)

Section II. REBUILD OF PERSONNEL HEATER

95. Removal

Instructions are given in TM 9-2350-224-20 for the removal of the personnel heater. 96. Disassembly

Figures 221 through 224 identify the components of the personnel heater. Follow the alphabetical sequence of the views in figures 225 through 228 for the proper disassembly procedure.



Figure 225. Disassembly and assembly of personnel heater (1 of 4)

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Figure 227. Disassembly and assembly of personnel heater (3 of 4)



Figure 228. Disassembly and assembly of personnel heater (4 of 4)

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97. Cleaning

Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions. The following subparagraphs (a) and (b) provide specific points for cleaning:

a. <u>Burner and Heat Exchanger Assembly</u>. Refer to figure 229 for cleaning instructions for the burner and heat exchanger assembly. b. Blower. Immerse both fan wheels in mineral spirits paint thinner or dry-cleaning solvent and clean off all grease and dust. Also, clean housing inside and out. Wipe off the motor and mounting bracket but do not immerse in cleaning solvent since this may dissolve the lubricant.



Figure 229. Cleaning of burner and heat exchanger assembly

98. Inspection and Repair

Figures 221 through 224 provide repair and rebuild standards, points of measurement and specific inspection data. The following subparagraph provides specific points for inspection and repair:

a. <u>Fuel Control Valve</u>. Refer to figure 230 and the following instructions:

- Remove the fuel inlet screen and install a new one.
- (2) Apply 24-volts dc to the solenoids and listen for an audible click, indicating normal operation. If a solenoid does not actuate, replace it. Inspect solenoid leads; they must not be broken or crimped. Insulation must not be cut, frayed, or worn. Terminals must be intact. Replace solenoid having worn or damaged leads.
- (3) Remove the orifice plate and install a new one.
- (4) Do not disassemble the pressure regulator portion of the fuel control valve. If the valve cannot be brought within limits by adjusting the pressure regulator screw, replace the entire valve.

99. Disassembly of Flame Detector Switch

Figure 231 identifies the parts of the flame detector switch. Follow the alphabetical sequence of the views in figure 232 for the proper disassembly procedure.

100. Cleaning

Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

101. Inspection and Repair of Flame Detector Switch

Figure 231 identifies repair and rebuild standards, points of measurement and specific inspection data.

102. Assembly of Flame Detector Switch

Follow the numerical sequence of the views in figure 232 for the proper assembly procedure.

103. Assembly

Figures 221 through 224 identify the components of the personnel heater. Follow the numerical sequence of the views in figures 225 through 228 for the proper assembly procedure. Refer to figures 97 and 101 for the personnel heater wiring diagram. ÷

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REMOVAL AND INSTALLATION OF ORIFICE PLATE

ASSEMBLED WASHER SCREW ORIFICE PLATE

ORD E35811

Figure 230. Rebuild of fuel control valve



- A Nut 8720160
- B Spacer 7971840
- C Adjusting screw 7971952
- D Bracket 7971822
- E Helical compression spring 7971828
- F Rod 7951586
- Rod 8735914 (optional) * No Part number available.

G - Self- locking hex nut 503213

ORD E35812

- H Screw 131919
- J Bracket assembly 7971696
- K Screw *
- L Switch 8720782
- M Insulator 7971871

Reference	Y	nd points of measurement Size and fit of		Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot	
a b c d	Must not be fatigued. Not charred, pitted, cracked, chipped, worn, or deformed. Locking disk securely fastened. Replace if defective.				

Figure 231. Flame detector switch - exploded view - wear limits

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Figure 232. Disassembly and assembly of flame detector switch

a. Burning Test

- Install the heater on the test stand (Heater Test Set Assembly 8686690), in accordance with instructions accompanying the stand. Make sure that the jumper wire is connected across the two terminals of the thermostat receptacle. Make fuel, electric, and exhaust connections to the heater.
- (2) Preset the voltage control so that the input voltage will be 24 volts with the full starting load of the heater connected. The tests will not be valid unless this value of input voltage is usued, since ignition time and the action of the time-delay cartridge will be affected by the applied voltage.
- (3) With the above conditions established, turn on the heater control switch. The starting procedure for testing is the same used when the unit is installed in the vehicle. Begin timing operations from the instant the switch is turned on. Check for the following conditions:
 - (a) The current drawn should not exceed 16.5 amperes at the start, with a 24-volt input.
 - (b) The heater should ignite within 20 seconds from the time the switch is turned on. Note time of ignition and start timing flame detector switch action.
 - (c) The flame detector switch must transfer in more than 10 seconds, but less than 30 seconds from the instant the heater ignites.
 - (d) After the flame detector switch transfers, turn the control switch to HI (if the heater was started on LO), and observe fuel flow on the flowmeter. This rate should be between 0.078 and 0.082 pounds per minute at 70° F. ambient temperature. If the flow is not correct, turn the adjusting screw of the fuel control valve clockwise to increase fuel flow, or counterclockwise to reduce flow. Turn control switch to LO and check fuel flow; it should be between 0.040 and 0.0444 pounds per minute at 70° F. ambient. If, after adjusting fuel flow on high heat; it is

found that low heat flow is not within limits, or vice versa, it is an indication that one of the metering orifices is clogged, and the orifice plate must be replaced. Both low and high heat flow must be within limits for satisfactory heater operation.

b. Overheating Test. The overheating test should be conducted from a cold start, since a heater which has been burning and is still hot may not test within limits. To test the overheat switch, proceed as follows:

- Install the heater on the test stand in the manner directed for the burning test, and turn it on. Start timing from the moment of ignition.
- (2) As soon as the flame detector switch transfers, snap the control switch to high heat and completely shut off all ventilating airflow by holding a piece of cardboard or sheet metal over the air inlet. Note the time required for the overheat switch to shut off fuel flow (the heater will stop burning). This time must be between 80 and 150 seconds from the instant of ignition. Replace the overheat switch and retest if not within limits.

c. Purge Test. After testing the time-delay cariridge, connect the fuel line and turn the heater on. After the heater begins to operate hourn about one minute. Shut the heater off and time the blower operation from the moment the switch was turned off. The blower should continue to operate for between 1 and 3 minutes and then automatically stop. If the overrun or "purge" time is not within limits, reset the flame detector switch and retest.

d. Blower Timing. To time the blower, remove the guard from the inlet and mark the blower fan with chalk. Start the heater, and time the fan with a strobe-light type of tachometer, if available. Blower speed at high heat must be within the range of 6,000 to 6,800 rpm with no restriction on the heater outlet and an applied voltage of 24 volts. Replace the blower if not within lints.

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105. Installation

Refer to TM 9-2350-224-20 for installation of the personnel heater.

CHAPTER 11

SUSPENSION SYSTEM

Section I. GENERAL

106. Scope

This chapter contains information for field and depot maintenance of the suspension system of the 90-mm full-tracked combattank M48A3. Instructions are given for disassembly and assembly of the track tension adjusting links; removal and installation of the track support roller axles; and cleaning, inspection, and repair of these components. In addition, this chapter contains cleaning, inspection and repair instructions for the other components of the suspension system; removal and installation instructions for these components are given in TM 9-2350-224-20.

107. Description

a. General. The suspension system (fig. 4) on each side of the vehicle consists of

a track, track drive sprockets and hub, a track adjusting link, a compensating idler wheel and support arm, six road wheels with support arms, three track support rollers, track support roller axles, and torsion bars. The primary springing is accomplished by an individual torsion bar for each road wheel position. Secondary springing is provided by volute bumper springs, double at the No. 1 wheel position, and single at the other five road wheel positions.

b. Track. Each track consists of 81 individual rubber-shod steel track links connected together by means of end connectors and center guides. The center guides ride between the dual wheels and through a trough in the track drive sprocket hub to maintain track alimement.



Figure 233. Suspension system - location diagram

<u>c. Shock Absorbers</u>. There are three shock absorbers on each side of the tank to absorb the initial suspension shock and to help dampen suspension vibration.

d. <u>Track Drive Sprockets</u>. Pairs of track drive sprockets at the rear of the vehicle apply the drive torque from the final drives to the end connectors of the track.

e. Track Tension Adjusting Link. The track adjusting link connects the compensating idler wheel support arm to the No. 1 road wheel support arm are displaced upwards, the link moves the compensating idler support arm and wheel forward to take up the resulting slack in the track. The length of the link is adjustable, to adjust the tension of the track. The track tension adjusting link consists of a bearing eye and shaft threaded into a barrel assembly, with a collar and yoke welded to the end of the barrel. The link is equipped with a grease fitting and an adjustment locking bolt.

<u>f.</u> Compensating Idler Wheel and Support Arm. The compensating idler wheels are the dual wheels located at the forward sides of the vehicle. They are identical to and interchangeable with the road wheels and are mounted on the lower spindle of a support arm, similar to the road wheels.

g. Road Wheels and Supports. The road wheels are dual wheels that roll on the tracks. Each wheel is mounted on the axle-like lower spindle of a support arm; the upper end of the support arm has a hollow spindle that is bearing-mounted to a housing assembly that is bolted to the hull. The weight and momentum of the vehicle set up a rotational moment in the upper spindle which acts against the spring action of the torsion bar.

h. <u>Track Support Roller Axles</u>. The track support roller axles are installed in the support roller housings. Each axle assembly consists of an axle and a spacer. Five of the six axles are solid, while the sixth has a 0.38-inch bore, through which the keyed shaft passes, and connects the roller hub to the speedometer drive adapter.

j. Torsion Bars. The torsion bars are arranged transversely in pairs along the hull floor. The torsion bar anchor. The torsion bar is splined to the road wheel support arm, so that any displacement of the support arm acts against the spring action of the torsion bar.

Section II. REBUILD OF SUSPENSION SYSTEM

108. Track

a. Removal. Refer to TM 9-2350-224-10 for the removal of the track.

 $\underline{b.}$ Cleaning. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

<u>c.</u> Inspection and Repair. Figure 234 identifies repair and rebuild standards, points of measurement and inspection data.

d. Installation. Refer to TM 9-2350-224-10 for installation of the track.

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ORD E35815

А	-	Guide 7044259		С-	Connector	8686239
в	-	Link assembly	7354779	D -	Cap 70695	45

Reference	Townsting data and activity of more survey to	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a	Guide hole must not be out of round.			
b	Inside radius of track shoe guide.	0.62500 to 0.62550		
c	OD of track shoe link pin.	1.24650 to 1.24900		
d	Rubber and metal parts must not be chipped or cracked. Rubber block must not be loose. Track pins must not be severely worn.			
b,d	Fit of guide on pin.	0.00050L to 0.00225L		
e	Wedge bolthole and track pinholes must not be out of round.			
f	ID of end connector.	1.24000 to 1.25300		
c,f	Fit of end connector on pin.	0.00100L to 0.00650L		
g	Guide cap hole must not be out of round.			
h	Inside radius of guide cap.	0.63200 to 0.63700		
c,g	Fit of guide cap on pin.	0.00750L to 0.013750L		

Figure 234. Track inspection points - wear limits

<u>a. Removal.</u> Refer to TM 9-2350-224-20 for removal of the shock absorbers.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning instructions.

c. Inspection and Repair. Figure 235 identifies repair and rebuild standards, points of measurement and inspection data.

d. Installation. Refer to TM 9-2350-224-20 for installation of the shock absorbers.



- A Bearing assembly 8382078
- B Pin 7699609
- C Cylinder and eye assembly 8380724

D - Shoe assembly 8380723 E - Yoke assembly 8380725 F - Cotter pin 96906-24665-426

Reference	The second se	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a	Bearing must not be chipped or cracked.			
b	ID of bearing.	1.2475 to 1.2505		
c	Width of key in bearing.	0.245 to 0.252		
d	OD of pin.	1.237 to 1.240		
e	Must not be cracked, broken or galled.			
f	Width of keyway in pin.	0.255 to 0.260		
g	Welds must not be broken. Must not be bent,			
	twisted out of line or bound in position.			
h	Must be in line and bored true.			
1	OD of bored hole.	1.2475 to 1.2505		
k	Must be concentric.			

Figure 235. Shock absorber points of inspection - wear limits

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110. Track Drive Sprocket and Hub

a. <u>Removal.</u> Refer to TM 9-2350-224-20 for removal of the track drive sprockets and hub.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

c. Inspection and Repair. Figure 236identifies repair and rebuild standards, points of measurement and specific inspection data.

 $\underline{d.}$ Installation. Refer to TM 9-2350-224-20 for installation of the track drive sprockets and hub.



A - Sprocket 8671597 B - Hub 7364134

Reference		Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a	Teeth must not be burred, nicked, or worn beyond the limits of the sprocket wear checking gage.			
a	OD of sprocket.	27.65625 to 27.71875		
b	Pitch diameter of sprocket	24.47275 to 24.53525		
c	Root diameter of sprocket	19.6875 to 19.8125		
d	Must not be cracked or deformed			

Figure 236. Track drive sprockets and hub - inspection points - wear limits

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111. Track Tension Adjusting Link

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for removal of the track tension adjusting link.

b. Disassembly. Figure 237 identifies the components of the track tension adjusting link. Follow the alphabetical sequence of the views in figure 238 for the proper disassembly procedure. The procedure is the same for both the left and right track tension adjusting links.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

d. <u>Inspection and Repair</u>. Figure 237 identifies repair and rebuild standards, points of measurement, and specific inspection data.

e. Assembly. Figure 237 identifies the components of the track tension adjusting link. Follow the numerical sequence of the views in figure 238 for the proper assembly procedure. The procedure is the same for both the left and right track tension adjusting links.

 $\underline{f}.$ Installation. Refer to TM 9-2350-224-20 for installation of the track tension adjusting link.



A - Bearing 7974760 C - Lockwasher 120382 B - Screw 120758 D - Lubrication fitting 172-0028

Reference		Size and fit of	Wear	limits
letter	Inspection data and points of measurement	new parts	Field	Depot
a a e b c	Bearing must not be chipped or cracked. ID of bearing. Width of key in bearing Must not be cracked or have broken welds. Must turn freely in barrel. Must not be cracked, broken, or distorted. Barrel must turn freely until secured with	1.4990 to 1.5020 0.2490 to 0.2510		
d a,d da,e	locking screw. OD of pin. Fit of bearing on pin. Width of keyway in pin. Fit of key in keyway.	1.4940 to 1.4960 0.0030L to 0.0080L 0.2550 to 0.2600 0.0040L to 0.0110L		

Figure 237. Track tension adjusting link - points of inspection-wear limits

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Figure 238. Disassembly and assembly of track tension adjusting link

112. Compensating Idler Wheel and Road Wheel

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for removal of the compensating idler wheel and road wheel.

 <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

c. Inspection and Repair. Figure 239 shows repair and rebuild instructions.

d. Installation. Refer to TM 9-2350-224-20 for installation of the compensating idler wheel and road wheels.

113. Compensating Idler Wheel and Road Wheel, and Road Wheel Support Arms and Hubs

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for removal of the compensating idler wheel and road wheel support arms and hubs.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

c. Inspection and Repair. Figures 240 through 252 show repair and rebuild standards, points of measurement and specific inspection data.



A - Wheel 7013976

Reference		Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a	Must not be chipped or cracked and must be free of imbedded material. Rubber must not be separated from rim.			

Figure 239. Compensating idler wheel and road wheel inspection points - wear limits

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- A Arm assembly 8335107
- B Oil Seal 593485
- C Bearing 8686314 or 8686311

D - Bearing 8686312 or 8686313 E - Washer 6295381

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
	OD of upper grindle motor bearing gurfage	E 4985 to E 4995		
a	OD of upper spindle major bearing surface.	4 4095 to 3.4555		
0	OD of upper spinole minor bearing surface.	4.4985 10 4.4995		
c	damaged.			
d	Inspect in accordance with TM 9-214.			
d	ID of outer bearing (8686314).	5.5055 to 5.5075		
d	ID of outer bearing (8686311).	5.5020 to 5.5030		
a-d	Fit of bearing (8686314) on spindle.	0.0060L to 0.0090L		
a-d	Fit of bearing (8686311) on spindle.	0.0025L to 0.0045L		
e	Inspect in accordance with TM 9-214.			
e	ID of inner bearing (8686312).	4.5040 to 4.5060		
e	ID of inner bearing (8686313).	4.5020 to 4.5030		
b-e	Fit of bearing (8686312) on spindle.	0.0045L to 0.0075L		
b-e	Fit of bearing (8686313) on spindle.	0.0025L to 0.0045L		
f	Tangs must not be cracked or fractured. Washer must have no burs.			

Figure 240. Compensating idler wheel support arm inspection points-wear limits (1 of 2)



A - Spacer 8381709 C - Spindle 8381712 B - Arm 8335108 D - Spacer 8381708

Reference	ference letter Inspection data and points of measurement ID of spacer. 3. OD of lower spindle major bearing cone surface. 3. DD of lower spindle major bearing cone surface. 3.		Wear limits	
letter	Inspection data and points of measurement	new parts	Field	Depot
a b d a-d f e-f	ID of spacer. OD of lower spindle minor bearing cone surface. OD of lower spindle major bearing cone surface. OD of lower spindle spacer surface. Fit of spacer on spindle, ID of spacer. Fit of spacer on spindle.	3.2765 to 3.2775 1.9988 to 1.9998 3.2488 to 3.2498 3.2790 to 3.2810 0.0015T to 0.0045T 5.4985 to 5.4995 5.5130 to 5.5150 0.0135L to 0.0165L		

Figure 241. Compensating idler wheel support arm inspection points - wear limits - (2 of 2)



A - Cone 705795	D - Cup 706905
B - Cup 706704	E - Cone 705519
C = Hub 7364248	

Reference	· · · · · · · · · · · · · · · · · · ·	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a b b-c d d-e f	ID of hub inner bearing cone. Fit of come on spindle (c, fig. 241). OD of inner bearing cup. ID of hub bore for inner bearing cup. Fit of cup in hub. ID of hub bore for outer bearing cup. Fit of cup in hub. ID of hub outer bearing cone. Fit of cone on spindle (b, fig. 241).	3.2500 to 3.2510 0.0002L to 0.0022L 5.9090 to 5.9100 5.9020 to 5.9030 0.0060T to 0.0080T 3.9950 to 3.9960 0.0040T to 0.0060T 2.0000 to 2.0005 0.0002L to 0.0017L		

Figure 242. Compensating idler wheel hub assembly - inspection points - wear limits



А	-	Spring	7379067
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B - Cone 705519

E - Cup 706704

F - Hub assembly 7364260

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- C Arm assembly 8734642 or 8734643 G Cup 706905
- D Cone 705795

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
$\begin{array}{c} a , \dots , \\ b , \dots , \\ c , \dots , \\ c , \dots , \\ c , \dots , \\ d , \dots , \\ b - d \dots , \\ e , \dots , \\ e , \dots , \\ f , \dots , \\ j , \dots , \\ h - j , \dots , \\ h - j , \dots , \\ \end{array}$	Must not be distorted or fatigued. Inspect in accordance with TM 9-214. ID of hub outer bearing cone. OD of lower spindle major bearing cone surface. OD of lower spindle minor bearing cone surface. Fit of cone on spindle. Inspect in accordance with TM 9-214. ID of hub inner bearing cone. Fit of cone on spindle. Inspect in accordance with TM 9-214. OD of inner bearing cup. ID of hub bore for inner bearing cup. Fit of cup in hub. ID of hub bore for cutor bearing cup. Inspect in accordance with TM 9-214. OD of outer bearing cup. Inspect in accordance with TM 9-214. OD of outer bearing cup. Fit of cup in hub.	2.0000 to 2.0005 3.2488 to 3.2498 1,9988 to 1.9998 0.0002L to 0.0017L 3.2500 to 3.2510 0.0002L to 0.002L 5.9000 to 5.9100 5.9020 to 5.9030 0.0060T to 0.0080T 3.9500 to 3.9500 4.0000 to 4.0100 0.0040T to 0.0060T		

Figure 243. Front road wheel hub and arm inspection points - wear limits (1 of 2)

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- A Oil seal 500282 or 500207
- E Arm 8671020 or 8671021
- B Bearing 708265
- F Bearing 7974760
- C Washer 6295381
- G Spindle 7997610
- D Spindle 7355371 or 7985573 H Spacer 7997607

Reference letter	Inspection data and points of measurement	Size and fit of new parts	Wear Field	limits Depot
a	Spring loaded lip must not be deformed or			
b	Inspect in accordance with TM 9-214.			
b	ID of outer bearing.	4.4990 to 4.5000		
c	Inspect in accordance with TM 9-214.			
c	ID of inner bearing.	4.4990 to 4.5000		
d	Tangs must not be cracked or fractured.			
e	Splines must not be damaged.			
e	OD of upper spindle bearing surface.	4.4985 to 4.4995		
b-e	Fit of bearing on spindle.	0.0015L to 0.0005T		
с-е	Fit of bearing on spindle.	0.0015L to 0.0005T		
f	Splines must not be damaged,			
g	Inspect in accordance with TM 9-214.			
h	OD of lower spindle spacer surface.	3.7510 to 3.7530		
j	ID of spacer.	3.7495 to 3.7505		
h-j	Fit of spacer on spindle.	0.0005T to 0.0035T		

Figure 244. Front road wheel hub and arm inspection points - wear limits (2 of 2)



ORD E43949

- A Cone 705519
- B Cup 706905
- C Hub 7364248
- D Cup 706704
- E Cone 705795
- F Spring 7379067
- G Seal assembly 7364672
- H Excluder 8703570
- J Arm and hub assembly 8369879
 - or 8369878

Reference	Townships and a state of a second state of	Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a b b c b-c d d-e f g	Inspect in accordance with TM 9-214. ID of hub outer bearing cone. Inspect in accordance with TM 9-214. OD of outer bearing cup. ID of hub bore for outer bearing cup. Fit of cup in hub. ID of hub bore for inner bearing cup. Inspect in accordance with TM 9-214. OD of inner bearing cup. Fit of cup in hub. Inspect in accordance with TM 9-214. ID of hub inner bearing cone. Must not be distorted or fatigued.	2.0000 to 2.0005 4.0000 to 3.9960 0.0407 to 0.0060T 5.9020 to 5.9030 5.9090 to 5.9100 0.0060T to 0.0080T 3.2500 to 3.2510		
h j	Replace.			
k	OD of lower spindle minor bearing cone surface.	1.9988 to 1.9998		
a-k	Fit of cone on spindle.	0.0002L to 0.0017L		
1	OD of lower spindle major bearing cone surface.	3.2488 to 3.2498		
f-1	Fit of cone on spindle,	0.0002L to 0.0022L		

Figure 245. Intermediate road wheel hub and arm inspection points - wear limits (1 of 2)

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ORD E43950

- A Spacer 7379071
- B Spindle 8710271

- E Seal 96906-51000-76, 500207 or 500282
- F Bearing 708265 G - Washer 6295381
- C Arm and hub assembly 8369876 or 8369877
- D Spindle 7355384, 7355383 or 7985573

Reference	Inspection data and points of measurement	Size and fit of	n data and points of measurement Size and fit of		r limits	
letter	inspection data and points of measurement	new parts	Field	Depot		
a b a-b	ID of spacer. OD of lower spindle spacer surface. Fit of spacer on spindle.	3.7495 to 3.7505 3.7510 to 3.7530 0.0005T to 0.0035T				
c d e	Splines must not be damaged. OD of upper spindle bearing surface. Spring loaded lip must not be deformed or damaged.	4.4989 to 4.4999				
f f d-f g	Inspect in accordance with TM 9-214. ID of outer bearing. Fit of bearing on spindle. Must not be burred, Tangs must not be cracked or fractured.	4.4990 to 4.5000 0.0011L to 0.0009T				
h h d-h	Inspect in accordance with TM 9-214. ID of inner bearing. Fit of bearing on spindle.	4.4990 to 4.5000 0.0011L to 0.0009T				

Figure 246. Intermediate road wheel hub and arm inspection points - wear limits (2 of 2)



 A - Washer 6295381
 E - Arm 8369857 or 8369858

 B - Bearing 708265
 F - Spindle 7355383 or 7355384

 C - Spindle 7997610
 G - Seal 500282 or 500207

 D - Spacer 10863571
 Karakarana

Reference	Increation data and points of measurement	Size and fit of	Wear	limits	
letter	inspection data and points of measurement	new parts	Field	Depot	
a	Must not be burred. Tangs must not be cracked or fractured.				
b	Inspect in accordance with TM 9-214.	4 4000 1 4 5000			
D	ID of inner bearing.	4.4990 to 4.5000			
c	OD of lower spindle spacer surface.	3.7510 to 3.7530			
d	ID of spacer.	3.7495 to 3.7505			
c-d	Fit of spacer on spindle.	0.0005T to 0.0035T			
e	Splines must not be damaged.				
f	OD of upper spindle bearing surface.	4.49895 to 4.49995			
b-f	Fit of bearing on spindle.	0.00105L to 0.00095T			
g	Spring loaded lip must not be deformed or damaged.				
h	Inspect in accordance with TM 9-214.				
h	ID of outer bearing.	4.4990 to 4.5000			
f-h	Fit of bearing on spindle.	0.00105L to 0.00095T			

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Figure 247. Rear road wheel hub and arm inspection points - wear limits (1 of 2)

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- A Spring 7396076
- B Cone 705519

- F Cone 705795
- G Cup 706704
- C Arm assembly 8763002 or 8763003 H Hub 8763015
 - J Cup 706705

- D Excluder 8703570 E - Seal 8703569
- o = Cup A

Reference	Transition data and points of measurement	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
	Must not be fatimized			
h	Inspect in accordance with TM 9-214			
b	ID of hub outer bearing cone	2 0000 to 2 0005		
0	OD of lower snindle major hearing cone surface	3 2488 to 3 2498		
d	OD of lower spindle minor bearing cone surface.	1 9998 to 1 9998		
u	Fit of come on amindle	0.00021 to 0.00171		
0-u	Pit of cone on spinule.	0.00021 10 0.00171		
e	Replace.			
1	Keplace.			
g	inspect in accordance with 1M 9-214.	0.0500 4- 0.0510		
g	ID of hub inner bearing cone.	3.2500 to 3.2510		
c-g	Fit of cone on spindle.	0.00021 to 0.00221		
h	Inspect in accordance with TM 9-214.			
h	OD of inner bearing cup.	5.9090 to 5.9100		
1	ID of hub bore for inner cup.	5.9020 to 5.9030		i I
h-j	Fit of cup in hub.	0.0060T to 0.0080T		
k	ID of cup bore for outer bearing cup.	3.9950 to 3.9960		
1	Inspect in accordance with TM 9-214.			
1	OD of outer bearing cup.	4.0000 to 4.0010		
k-1	Fit of cup in hub.	0.0040T to 0.0060T		

Figure 248. Rear road wheel hub and arm inspection points and wear limits (2 of 2)

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114. Torsion Bars

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for removal of the torsion bars.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning, inspection, and repair instructions.

c. Inspection and Repair. Figures 249 and 250 show repair and rebuild standards, points of measurement and specific inspection data.

d. Installation. Refer to TM 9-2350-224-20 for installation of the torsion bars.



A - Cover 7363832 D - Gasket 5380884 B - Anchor 7384879 E - Plug 8688986 C - Torsion bar 7035899 or 7035900

Reference	Inconstion data and points of measurement	Size and fit of	Wear	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot	
a b	Cover must not be burred, cracked, or fractured. Pins must not be bent. Inspect for cracks and fractures using the mag- netic particle method. Splines must not be				
c d e	burred. Inspect for cracks and fractures using the mag- netic particle method. Bar must not be bent. Tape must be intact and secure. Splines must not be damaged. Replace. Must not be burred, cracked, or fractured.				

Figure 249. Front road wheel torsion bar - inspection points - wear limits



А	-	Cover 7363832	
в	-	Anchor 7384879	
С	-	Torsion bar 7035899 o	r
		7035900	

D - Gasket 5380884
E - Plug 8688986

Reference	Inspection data and points of measurement	Size and fit of	Wear	Limits
Tetter		new parts	Fleid	Depot
a	Cover must not be burred, cracked, or fractured. Pins must not be bent.			
b	Inspect for cracks and fractures using the mag- netic particle method. Splines must not be burred.			
c	Inspect for cracks and fractures using the mag- netic particle method. Bar must not be bent. Tape must be intact and secure. Splines must not be damaged.			
d e	Replace. Must not be burred, cracked, or fractured.			

Figure 250. Intermediate and rear road wheel torsion bars - inspection points-wear limits

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115. Torsion Bar Support Housings

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for removal of the torsion bar support housings.

b. <u>Cleaning</u>. Refer to paragraphs 27through 30 for general cleaning and refinishing instructions.

c. Inspection and Repair. Figures 251 and 252 show repair and rebuild standards, points of measurement and specific inspection data.

d. Installation. Refer to TM 9-2350-224-20 for installation of the torsion bar support housing.



A - Housing 8671092 or 8671093 C - Plug 117243 B - Pin 8364404 D - Fitting 1720028

Reference		Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a b c d	Surface must not be nicked or burred. Must not be bent. Must not be cracked or fractured. Threads must not be damaged.			

Figure 251. Front torsion bar support housing - inspection points-wear limits

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A - Housing 8364436 B - Pin 8364404 C - Plug 117243 D - Fitting 1720028

Reference	Transation data and points of measurement	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a b c d	Machined surfaces must not be nicked or burred. Must not be bent. Must not be cracked or fractured. Threads must not be damaged.			



- A Housing 7379499 (Left Rear) 7379685 (Right Rear) B - Pin 8364404 C - Plug 117243
- D Fitting 1720028

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter	hispection data and points of measurement	new parts	Field	Depot
a b c d	Machined surfaces must not be nicked or burred. Must not be bent. Must not be cracked or fractured. Threads must not be damaged.			

Figure 252. Intermediate and rear torsion bar supports housing - inspection points-wear limits

116. Track Support Rollers

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for removal of the track support rollers.

b. <u>Cleaning</u>. Refer to paragraphs 27through 30 for general cleaning and refinishing instructions.

c. Inspection and Repair. Figures 253 through 257show repair and rebuild standards, points of measurement and specific inspection data.

d. Installation. Refer to TM 9-2350-224-20 for installation of the track support rollers.

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A - Axle 8762155	E - Cone 705321
B - Spacer 8762153	F - Cone 705519
C - Guard 7014042	G - Spring 7379067
D - Seal 545222	

Reference	* A & A & A & A	Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a b c a,d a,d e d,e f g b,g	OD of axle. OD of axle. OD of axle. DD of spacer. Fit of spacer on axle. Must not be deformed. ID of guard. Fit of guard on spacer. Replace if damaged. Inspect in accordance with TM 9-214. ID of inner bearing one. Fit of bearing on axle.	1.690 parts 2.5320 to 2.5330 2.4988 to 2.4998 1.9988 to 1.9998 3.4220 to 3.4330 0.0010T to 0.0030T 3.4230 to 3.4270 0.0020T to 0.0100T 2.5000 to 2.5005 0.0002L to 0.0017L	Field	Depot
h h c,h j k	Inspect in accordance with TM 9-214. ID of outer bearing cone Fit of bearing on axle Must not be distorted or fatigued. ID of spacer.	2.0000 to 2.0005 0.0002L to 0.0017L 2.5300 to 2.5310		

Figure 253. Track support roller assembly (all except left front)- inspection points-wear limits



A - Axle 8762154	D - Seal 545222
B - Spacer 8762153	E - Cone 705321
C - Guard 7014042	F - Cone 705519

letter new parts Field De a OD of axle. 2,5320 to 2,5330 b b 0D of axle. 2,4988 to 2,4998 b 0D of axle. b 0D of axle. 1.99988 to 1,9998 b 0D of spacer. 3,4290 to 3,4330 c Field De a OD of spacer. 3,4290 to 3,4330 c Field De a DD of spacer. 2,5300 to 2,5310 c Field De
a OD of axle. 2.5320 to 2.5330 b OD of axle. 2.4988 to 2.4998 c OD of axle. 1.9988 to 1.9998 d OD of spacer. 3.4290 to 3.4330 e ID of spacer. 2.5300 to 2.5310 e Fit of spacer on axle. 0.0007 to 0.0030T
DD of xule. 2.4998 to 2.4998 c OD of xule. 2.4998 to 1.9998 d OD of spacer. 1.9988 to 1.9998 e DD of spacer. 3.4290 to 3.4330 e ID of spacer. 2.5300 to 2.5310 e Fit of spacer on axle. 0.0017 to 0.00307
Dot Dot Dot c OD of state. 1,9988 to 1,9998 d OD of spacer. 3,4290 to 3,4330 e ID of spacer. 2,5300 to 2,5310 a-e Fit of spacer on axle. 0.0010T to 0,0030T
d OD of spacer. 3, 4290 to 3, 4330 e ID of spacer. 2, 5300 to 2, 5310 -e Fit of spacer on axle. 0.00107 to 0, 00307
a-e Fit of spacer, axle. 2,5300 to 2,5310
a-e Fit of spacer on axle. 0.0010T to 0.0030T
f ID of guard. 3, 4230 to 3, 4270
d-f Fit of guard on spacer. 0.0020T to 0.0100T
g Replace if damaged.
h Inspect in accordance with TM 9-214.
h ID of inner bearing cone. 2,5000 to 2,5005
b-h Fit of bearing on axle. 0.0002L to 0.0017L
j Inspect in accordance with TM 9-214.
j ID of outer bearing cone. 2.0000 to 2.0005
c-j Fit of bearing on axle. 0.0002L to 0.0017L

Figure 254. Left front support roller assembly - inspection points - wear limits

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A - Bushing 7971760

- B Cup 7971761
- C Spring 8734228

Reference	Size and fit of Wear 1		limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a a b c a-c d	Must not be cracked or burred. OD of bushing. Must not be dented or distorted. ID of bushing hole in cup. Fit of bushing in hole. Must not be cracked, fractured, or distorted. Must not be loose under rivet.	0.8410 to 0.8520 0.8460 to 0.8500 0.0090L to 0.0060T		

Figure 255. Speedometer drive cap assembly - inspection points and wear limits

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ORD E43960

Reference		Size and fit of	Wear	limits
letter inspection data and points of measurement		new parts	Field	Depot
a Must not be chipped or cracked and must be free of inbedded material. Rubber must not be separated from rim.				

A - Wheel 8706067

Figure 256. Track support roller wheel and hub assembly inspection points - wear limits (1 of 2)



A - Cup 706905 C - Insert 452764 or 452696 B - Hub 7058223 D - Cup 706771

Reference		Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a a b a-b c	Inspect in accordance with TM 9-214. OD of outer bearing cup. Hub bore for outer bearing cup. Fit of cup in hub bore. Must not be cracked, nicked, or fractured. Threads must not be damaged. Who hove for learns bearing real.	4.0000 to 4.0010 3.9950 to 3.9960 0.0040T to 0.0060T		
f f d-f	Must not be cracked, fractured, distorted, or fatigued. Inspect in accordance with TM 9-214. OD of inner bearing cup. Fit of cup in hub bore.	4.4375 to 4.4385 0.0045T to 0.0065T		

Figure 257. Track support roller wheel and hub assembly inspection points - wear limits (2 of 2)

117. Track Support Roller Axle

<u>a.</u> <u>Removal</u>. Follow the alphabetical sequence of the views in figure 258 for the proper removal procedure.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning instructions.

c. Inspection and Repair. Figures 253 and 254 show repair and rebuild standards, points of measurement and special inspection data.

d. <u>Installation</u>. Follow the numerical sequence of views in figure 258 for the proper installation procedure.



Figure 258. Removal and installation of track support roller axle

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118. Bumper Springs

a. Removal. Refer to TM 9-2350-224-20 for removal of bumper springs.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

c. Inspection and Repair. Figure 259 shows specific points for inspection and repair.

d. Installation. Refer to TM 9-2350-224-20 for installation of the bumper springs.



A - Tannet 7058328	C - Bracket intermediate left 7379567
D Coming 7007497	Dracket, intermediate, reft 1015001
B = Spring (33/46/	Bracket, Intermediate, right 1319566
C - Bracket (front - left) 8671028	H - Lockwasher 96906-35339-71
Bracket (front - right) 8671029	J – Cap screw 96906-35229-211
D - Washer 5380829	K - Bracket (rear - left) 8382028
E - Lockwasher 103325	Bracket (rear - right) 8382029
F - Can screw 223735	L - Tappet - seat and spring assembly 8370068

Reference Inspection data and points of measurement		Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a	Use magnetic particle test to check for cracks or fatigue. Welds must not be cracked.			
b	Tappet must be held securely in spring.			

Figure 259. Bumper springs - inspection points - wear limits

286
119. Bearing Adjustments

adjustment procedure for the idler wheel, track support rollers, and road wheels.

Follow the alphabetical sequence of views in figure 260 for the recommended bearing





CHAPTER 12

FINAL DRIVES

120. Scope

This chapter contains instructions for field and depot maintenance of the final drives (fig. 4) of the 90-mm Gun Full Tracked Combat Tank M48A3. It contains descriptions of and procedures for disassembly, cleaning, inspection, repair and assembly of the final drives.

121. Description

The two final drives (left and right) are identical single-stage, 5 to 1 gear ratio, speed reduction units. The gears operate in a closed housing and are splash lubricated. The housing has cast baffles on the inner surfaces to direct lubrication splash to the bearings. Seals are provided where the shafts pass through the housing.

122. Rebuild

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for the removal of the final drive units.

b. Disassembly. Figures 262 and 263 identify the components of the final drive. Follow the alphabetical sequence in figures 264 through 268 for the proper disassembly procedures.

<u>c. Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

<u>d. Inspection and Repair.</u> Figures 262 and 263 provide repair and rebuild standards, specific inspection data and points of measurement.

e. <u>Assembly</u>. Figures 262 and 263 identify the components of the final drive. Follow the numerical sequence of the views in figures 264 through 268 for the proper assembly procedures.

<u>f. Installation</u>. Refer to TM 9-2350-224-20 for the installation of the final drive units.



Figure 261. Final drive assembly



- A 3/4-16 x 3 Cap screw 571153
- B Lockwire 22-W-1642-125
- C Lockwire 22-W-1642-100
- D 3/8-24 x 1-1/4 Cap screw 571150
- E Cover 8689173
- F Gasket 8689172
- G 1 x 1,343 Magnetic drain plug 502399
- H Vent assembly 5378931
- J Eve 8686297
- K Gasket 7379209
- L Cap 7364127

- M-1/2-13 x 2 Machine bolt 215100
- N 4 id x 5.256 od Oil seal 500238
- P Ring assembly 8365023
 - 1 Clasp 8365021
 - 2 Lock 8365022
 - 3 Pin 7379212
- Q Adapter assembly 7364001
 - 1 Adapter 7379231
 - 2 Plug 7398119
- R Flange 7379233

Reference		Size and fit of	Wear limits Field Depot	
letter	inspection data and points of measurement	new parts	Field	Depot
a b c d b-d e	Must not be distorted. Major OD of spline of pinon gear. Replace if damaged. Major ID of internal spline of adapter. Fit of gear shaft to adapter. Must not be deformed or leak oil.	2.9930 to 3.0000 2.095 to 3.005 0.0120L to 0.0050L		

Figure 262. Final drive - partial exploded view - wear limits (1 of 2)



Figure 263. Final drive - partial exploded view (2 of 2)

- A Lockwire 22-W-1642-100
- B 1/4-28 x 1/2 Hex head bolt 596294
- C Speedometer drive gear 7364132
- D Nut 7379217
- E Lockwasher 7364143
- F Final drive gear set 8705731 1 - Gear 7364141
 - 2 Gear 7364142
- G Bearing 713344
 - H Spacer 8689162
 - J 5/8-18 x 2 Self-locking hex head bolt 96906- V Gasket 8694076 35764-505
 - K Bearing 713468 Bearing 709807 (optional)
 - L Gasket 7379221
 - M Cap 7379224
- N Ring 7379220
- P 1/2-13 x 1-1/4 Hex head bolt 214839
- Q Lockwire 22-W-1642-125

- R Spacer 7379205
- S Seal 7379218
- T Shaft assembly 7364000
 - 1 Shaft 7364138
 - 2 Stud 5196384
- U Case and carrier assembly 8689176
 - 1 Ring 7364137
 - 2 Carrier 7364135
 - 3 Dowel 8689080
 - 4 Case 8689180
- W Stud 10864060
- X 1/8-27 x 0.310 Square socket headless plug 444651
- Y Stud 7379203
- Z Nut 10870133
- AA Stud 7364133
- BB 114 Self-locking hex nut 503367
- CC Bearing 7364140

Reference	Transition data and minto of many mount	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a	ID of speedometer drive gear.	1.750 to 1.752		
b	Major ID of gear spline.	4.5000 to 4.5012		
b-c	Back lash of final drive gear with final drive pinion gear at operating center distance.	0.0090 to 0.0253		
d	ID of spacer, larger end.	5.507 to 5.512		
d-0	Fit of spacer on gear hub.	0.002L to 0.012L		
e	See TM 9-214.			
e	OD of bearing.	5.5110 to 5.5118		
f	ID of spacer, tapered end.	5.1210 to 5.1250		
g	ID of bearing bore to carrier.	5.5122 to 5.5132		
e-g	Fit of bearing in carrier.	0.0004L to 0.0022L		
h	See TM 9-214.			
h	ID of bearing.	5.1171 to 5.1181		
j	Replace.			
j	ID of seal.	5.1187 to 5.1194		
k	OD of gear end of final drive shaft.	1.746 to 1.748		
a-k	Fit of speedometer drive gear on final drive shaft.	0.002L to 0.006L		
1	Major OD of shaft spline.	4.4985 to 4.4990		
1-0	Fit of gear spline to shaft spline.	0.0010L to 0.0027L		
m	OD of final drive shaft.	5.1187 to 5.1194		
f-m	Fit of spacer on final drive shaft.	0.0016L to 0.0063L		
h-m	Fit of bearing on final drive shaft.	0.0006T to 0.0023T		
j-m	Fit of seal on final drive shaft.	Interference fit		
n	See TM 9-214.			
n	ID of bearing.	5.5108 to 5.5118		
n-0	Fit of bearing on gear hub.	0.0058T to 0.0118T		
	OD of more both	5 500 to 5 505		

Figure 263. Final drive - partial exploded view - wear limits (2 of 2) (continued)

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sotmaiwfc@comcast.net 12 Feb 2016
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Figure 264. Disassembly and assembly of final drive (1 of 5)

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Figure 265. Disassembly and assembly of final drive (2 of 5)



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Figure 267. Disassembly and assembly of final drive (4 of 5)





123. Scope

This chapter contains instructions for field and depot maintenance of the slipring box, shown in figure 10, used in the 90-mm gun full tracked combat tank M48A3. It contains a description of, and procedures for disassembly, inspection, repair, and assembly of the slipring box.

124. Description

a. <u>Mechanical</u>. The slipring box is located in the center opening of the turret platform. It provides electrical power and interphone connections between the hull and the turret. The assembly consists of a lower section which is secured to the hull and an upper section which is fastened to and rotates with the turret platform.

b. <u>Electrical</u>. A system of rings and brushes provides a path for the flow of electrical current from the stationary section through the rotating section to the various electrical components of the turret.

c. Automatic Deck Clearance. To assure clearance between the gun tube and the deck, fenders and air cleaners when traversing with the gun depressed, a deck clearance switch is mounted on the slipring box. It operates in conjunction with the elevation interference switch (mounted on the ballistic drive) to actuate the gun elevating and turret traversing system to automatically raise the gun tube to zero degrees elevation during power traversing. Two identical circuits control the action of the micro-switches. When both the elevation and traverse switches are closed, the vehicle batteries energize the solenoid of the deck clearance valve (TM 9-2350-215-35/2) which actuates the elevating mechanism.

125. Rebuild

<u>a.</u> <u>Removal</u>. Refer to TM 9-2350-224-20 for removal of the slipring box.



Figure 269. Slipring box

b. Disassembly. Figures 270 through 278 identify the components of the slipring box. Follow the alphabetical sequence of the views in figures 279 through 285 for the proper disassembly procedure.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

<u>d. Inspection and Repair.</u> Figures 270 through 278 provide repair and rebuild standards, specific inspection data and points of measurement.

e. Assembly. Figures 270 through 278 identify the components of the slipring box. Follow the numerical sequence of the views in figures 279 through 285 for the proper assembly procedure.

<u>f. Installation</u>. Refer to TM 9-2350-224-20 for installation of the slipring box.



Figure 270. Slipring box - partial exploded view (1 of 9)

- A Switch assembly 10863733
- B Bracket 8364663
- C 5/16 Lockwasher 96906-35337-26
- D 5/16 x 18 x 7/8 Cap screw 96906-35291-33
- E Box assembly 7389389
- F 5/16 x 18 x 5/8 Cap screw 96906-35291-31
- G Cam 8335384
- H Bolt 8387315

2

- J Cam follower 8364660
- K No. 10 lockwasher 96906-35337-24
- L No. 10 -32 hex nut 96906-35650-102
- M Arm 8364664
- N No. 10-32 x 7/8 set screw 140850
- P Bushing 8365032
- Q 5/16 x 18 Hex nut 96906-35690-502
- R No. 8-32 x 7/16 assembled washer screw 420496

Reference	Increation data and points of measurement	Size and fit of	Wear limits Field Depot	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a	Switch not bent or broken. Replace if found defective.			
b	Not cracked, broken, distorted or frozen.			

Figure 270. Slipring box - partial exploded view - wear limits (1 of 9) (continued)



Figure 271. Slipring box - partial exploded view (2 of 9)

1

- A No. 8-32 x 1/2 Fillister head screw 224566 B - No. 8 Lockwasher 131182 L - Bolt 8377422
 - C Receptacle assembly 7389392
 - D No. 6 Lockwasher 190669
 - E No. 6-32 Hex nut 113102
 - F 1/4-20 x 3/8 Assembled washer screw 423435
- G Receptacle assembly 7716636
- H Gasket 7716562
- J Cover gasket 7718084

- K Cover 7718085
- M-5/16 Lockwasher 190676
- N Bolt ring 7056738
- P Receptacle assembly 7389508
- Q 5/16-18 Hex nut 220075
- R Receptacle assembly 7716587
- S Cover gasket 7713461
- T Cover 7713323

letter inspection data and points of measurement new parts Field Depo a, b, d, e Wires must be securely soldered to pins and securely crimped to terminals. Solder wires to pins and realize terminals if processory. Coded Image: Code of the secure of the secur	Reference	Increation data and points of measurement	Size and fit of	Wear	limits
a, b, d, e Wires must be securely soldered to pins and se- curely crimped to terminals. Solder wires to pins and realized terminals if pagesary. Coded	letter	inspection data and points of measurement	new parts	Field	Depot
c	a,b,d,e c f	Wires must be securely soldered to pins and se- curely crimped to terminals. Solder wires to pins and replace terminals if necessary. Coded insulating sleves over wire terminals must not be ripped or torn, and coded letters must be legible. Replace insulating sleves, if nec- essary, by removing crimped terminals and re- moving damaged sleve; slip replacement sleve on wire and install new terminal. Con- tact pins must be clean, and must not be bent or broken. The four captive screws must be securely re- tained on cover by the four rings. The five captive screws must be securely re- tained on cover by the four rings.			

Figure 271. Slipring box - partial exploded view - wear limits (2 of 9) (continued)



A - No. 10-24 x 7/16 fillister head screw 132500	G – Gasket retainer 7718083
B - 1/2-13 Hex nut 422957	H - No. 6 washer 190669
C - No. 10 lockwasher 190672	J - No. 6-32 hex nut 113102
D - 1/2 Lockwasher 424229	K - Block 7398431
E - Block assembly 7398436	L - 1/4 Lockwasher 228834
F - Housing assembly 7398434	M - 1/4-20 x 3/4 Cap screw 213618
1 - Housing 7398402	N - Insulating Sleeve 7718098
2 - Caskot 7718089	P = 5/16 Lockwasher 190676

3 - Bushing 7718090

Q - 5/16-18 Hex nut 220075

Reference	T	Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a	Each stud must be secure in the block and identified by a clear and legible letter.			
b	Thickness of bushing shoulder Outside diameter of bushing Inside diameter of retainer Thickness of retainer Each stud must be secure in the block and identified by a clear and lerible letter	1.682 to 1.692 2.542 to 2.544 2.546 to 2.548 0.310 to 0.318		

Figure 272. Slipring box - partial exploded view - wear limits (3 of 9)

.



- A 5/16-18 Hex nut 220075
- B 5/16 Lockwasher 190676
- C = 5/16 Washer 116092
- D Clamping plate 7718039
- E 3/8-16 Hex nut 220076
- F 3/8 Lockwasher 228847
- G Washer 7351450
- H Ring insulator 7351536
- J Stud 7351460
- K Brush spacer 7351457
- L Bearing ring 7351512
 - M Housing 7398403
 - N Gasket 7351468
 - P Seal 7351458
 - Q Terminal 506201
 - R Sleeve 7392290

Reference	The second se	Size and fit of	l fit of Wear 1	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a b	Inside diameter of lower housing. Must not be cracked, fractured, deformed, or deteriorated. Check that all old grease has been completely removed.	2.546 to 2.548		

Figure 273. Slipring box - partial exploded view - wear limits (4 of 9)



Figure 274. Slipring box - partial exploded view (5 of 9)

- A Washer 7049984
- B Ground brush assembly 7351511
- C Insulating sleeve 7351461
- D Ring insulator 7351497
- E Ring assembly 7718099
- F Ring insulator 7049987
- G Shim 7351541
- H Ground ring 7351495
- J Ring insulator 7351496
- K 3/8 Lockwasher 228847
- L Rotor shaft 7351514
- M Shaft key 7351462
- N Power brush assembly 7713459
- P Ring insulator 7351537
- Q Shim 7351452
- R Brush separator 7351474

- S Brush insulator 7351476
- T Brush assembly 7398421
 - 1 Tape 7726056
 - 2 Terminal assembly 8377791
 - 3 Cable MIL-C-3078
 - 4 Brush 7718082
- U Ring assembly 7398414
- V Separator assembly 7049975
- W Ring assembly 7398415
- X Brush insulator 7351475
- Y Brush assembly 7398427
 - 1 Brush 7718082
 - 2 Tape 7726056
 - 3 Terminal assembly 8377791
 - 4 Cable MIL-C-3078

Reference		Size and fit of	Wear	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a	Stud must be securely riveted and soldered to ring. Polish ring with crocus cloth if nec- essary.			
a	Outside diameter of power ring.	2.120 to 2.130		
b b c d e	Polish ring with crocus cloth if necessary. Outside diameter of ground ring. Key must fit snugly into keyway in shaft. Contacts must not be pitted or corroded. Soldered connections must be tight. Coded insulating sleeves must not be ripped or torn. Polish contacts with crocus cloth if necessary. Replace brush assembly if pitted, corroded, or otherwise diamaged. Soldered connections must be tight. Coded insulating sleeves must not be ripped or torn. Polish rine with crocus cloth if nec-	2.120 to 2.130		
	essary. Replace ring assembly if pitted, corroded, or excessively scored.			

Figure 274. Slipring box - partial exploded view - wear limits (5 of 9) (continued)



Figure 275. Slipring box - partial exploded view (6 of 9)

.

- A Brush insulator 7351476
- B Brush assembly 7398426
- C Brush insulator 7351475
- D Ring assembly 7398413
- E Separator assembly 7049974
- F Ring assembly 7398412
- G Brush assembly 7398420
- H Brush separator 7351474
- J Shim 7351452
- K Ring insulator 7351537

- L Brush assembly 7398425
- M Ring assembly 7398411
- N Separator assembly 7351428
- P Ring assembly 7398410
- Q Brush assembly 7398419
- R Brush assembly 7398424
- S Ring assembly 7398409
- T Ring assembly 7398408
- U Brush assembly 7398418

Reference		Size and fit of	Wear	ear limits	
letter	inspection data and points of measurement	new parts	Field	Depot	
a b	Contacts must not be pitted or corroded. Soldered connections must be tight. Coded insulating sleeves must not be ripped or torn. Polish contacts with crocus cloth if necessary. Replace brush assembly if pitted, corroded, or otherwise damaged. Soldered connections must be tight. Coded in- sulating sleeves must not be ripped or torn. Polish ring with crocus cloth if necessary. Replace ring assembly if pitted, corroded, or excessively scored.				

Figure 275. Slipring box - partial exploded view - wear limits (6 of 9) (continued)





.

- A Brush insulator 7351476
- B Brush assembly 7398423
- C Brush insulator 7351475
- D Ring assembly 7398407
- E Separator assembly 7049974
- F Ring assembly 7398406
- G Brush assembly 7398417
- H Brush separator 7351474
- J Shim 7351452
- K Ring insulator 7351537

- L Brush assembly 7398422
- M Ring assembly 7398405
- N Separator assembly 7049975
- P Ring assembly 7398404
- Q Brush assembly 7398416
- R Ring insulator 7351535
- S Washer 7049984
- T Shim 7351477
- U Brush insulator 7351478

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter	жаар	new parts	Field	Depot
a	Contacts must not be pitted or corroded. Sol- dered connections must be tight. Coded in- sulating sleeves must not be ripped or torn. Polish contacts with crocus cloth if neces- sary. Replace brush assembly if pitted, corroded or otherwise damaged			
b	Soldered connections must be tight. Coded insulating sleeves must not be ripped or torn. Polish ring with crocus cloth if necessary. Replace ring assembly if pitted, corroded, or excessively scored.			

Figure 276. Slipring box - partial exploded view - wear limits (7 of 9) (continued)



- A Brush spring assembly 7072301
- B Brush insulator 7351456
- C No. 10-24 x 1/4 Roundhead screw 110581
- D No. 10 Lockwasher 190672
- E Contact brush 7351453
- F Ground brush frame 7351493
- G Brush guide 7351454
- H Tubular rivet 136028

Reference	Increation data and points of measurement	Size and fit of	Wear li Field	limits
letter	inspection data and points of measurement	new parts	Field	Depot
a , b c d	Must exert sufficient pressure to keep each brush in firm contact with ground ring. Replace: If damaged. Replace. Must not be cracked, fractured or deformed. Brush guides must be securely riveted to frame.			

Figure 277. Slipring box - partial exploded view - wear limits (8 of 9)



- A Brush spring assembly 7072301
- B Brush insulator 7351456
- C No. 10-32 x 1/4 Roundhead screw 101126
- D No. 10 Lockwasher 190672
- E Contact brush 7351453
- F Power brush frame 7713460
- G Terminal 7718037
- H Tubular rivet 136028
- J Brush guide 7351454

Reference	Inspection data and points of measurement	Size and fit of	Wear	limits
letter	hispection data and points of measurement	new parts	Field	Depot
a b c d	Must exert sufficient pressure to keep each brush in firm contact with power ring. Replace if damaged. Replace. Must not be cracked, fractured, or deformed. Threaded terminal must be securely brazed in frame, and brush guides must be securely riveted to frame.			

Figure 278. Slipring box - partial exploded view - wear limits (9 of 9)







Figure 280. Disassembly and assembly of slipring box (2 of 7)





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Figure 282. Disassembly and assembly of slipring box (4 of 7)

NOTE. TO AID IN ASSEMBLY, PLACE AN IDENTIFYING MARK ON EACH PART AS IT IS REMOVED





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Figure 284. Disassembly and assembly of slipring box (6 of 7)



Figure 285. Disassembly and assembly of slipring box (7 of 7)

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CHAPTER 14

TURRET ELECTRICAL SYSTEM COMPONENTS

Section I. GENERAL

126. Scope

This chapter contains replacement instructions for the turret wiring harnesses and rebuild instructions for the turret ventilating blower motor.

127. Reference

Removing and installing instructions for the following components of the turret electrical systems are provided in TM 9-2350-224-20: Commander's gun ready light Loader's safety switch Searchlight switch Turret power relay box Auxiliary firing box Gunner's switch box Gun firing relay box Accessories control box

Instructions for repair of the turret wiring harnesses and replacement of the turret ventilating blower motor are contained in TM 9-2350-224-20.

Table VIII. Turret Electrical Circuit Numbers

Section II. TURRET WIRING HARNESSES

128. Description

The turret wiring harnesses used to interconnect the various turret electrical components consist of the following cable assemblies, lead assemblies, and wiring harness assemblies:

Wiring Harness Assembly	10870485
Wiring Harness Assembly	10916839
Wiring Harness Assembly	10916918
Wiring Harness Assembly	10916855
Cable Assembly	10916838
Cable Assembly	10870483
Lead Assembly	10864133
Lead Assembly	10864134
Lead Assembly	10884268
Strap	7407965

129. Replacement of Harnesses

a. Identifying Circuits. Markers carrying identifying circuit numbers are at each end of the electrical harnesses and cables. Table VIII lists the circuit numbers and gives the harness names. Circuits are further identified byhull, turret and individual circuit schematic drawings.

Circuit No.	Circuit Name		
100	Turret feed		
100A	Accessory box feed		
101	Impulse relay feed (L terminal on impulse relay)		
103	Small caliber gun firing solenoid to firing switch		
103A	Machine gun firing relay feed		
103B	Machine gun firing solenoid feed		
104	Traverse motor feed		
111	Gun firing switch feed from circuit breaker (including safety switch)		
111A	Commander's firing switchtogun- ner's control handle cable		
113	Firing switch to large gun firing solenoid or impulse relay (F term.)		
113A	Gunner's switch box to firing relay		
113B	Main gun firing solenoid feed		
115	Firing relay feed		
137	Outlet socket		
138	Dome lamp, spot light and reel circuit		
141	Interphone #1		
142	Interphone #2		
143	Interphone #3		

518

518A

518B

518C

518D

518E

518F

518G

518H

623

Table VIII. Turret Electrical Circuit Numbers - Continued

puter

Searchlight feed

Flood lamp or work lamp feed

Searchlight circuit breaker feed

Commander's override circuit

Searchlight relay control

Searchlight control feed

Searchlight shutter feed

Searchlight overdrive feed

Searchlight filter feed

Searchlight lens feed

Table VIII. Turret Electrical Circuit Numbers - Continued

Circuit		Circuit	
No.	Circuit Name	No.	Circuit Name
144	Interphone #4	624	Commander's overrideswitchfeed
145	Interphone #5	625	Main positive feed to turret control
147	Light for periscope and sighting de-		box
	vices	625A	Turret motor relay control circuit
148	24-volt radio feed		feed
151	Interphone #7	645	Turret relay control circuit
159	Turret vent, fan	809	Traverse magnetic brake feed
160	Interphone #6 (extra when used)	809A	Palm switch lead
198	Interphone #8	810	Radiation detector feed
199	Interphone #9	894	Breech switch feed
415	Feed to special ventilating fan or	895	Traversing interference switch
40.0	rotocione (extra)	000	Ieed
420	Ground, auxiliary telephone	890	Oil gear elevation solehold valve
457	Interphone #10		
463	Interphone #11	b. Rewiring or Installing Harnesses. Re-	
464	Interphone #12	moval and installation of the harnesses can be	
465	Range finder, feed	effected through the use of the wiring diagrams	
465A	Range finder to ballistics computer lead	(fig. 331), and the installation diagrams (figs. 287 through 298) for identification, location.	
465B	Computer switch to ballistics com-	and routing. To simplify installation, tag each	

(fig. 331), and the installation diagrams (figs. 287 through 298) for identification, location, and routing. To simplify installation, tag each clamp as the harness, lead, or cable is removed. When installing a harness, lead or cable, first connect each branch or end to the proper electrical components, routing the cable as shown in the appropriate figure (figs. 287 through 296). Arrange cables under the cable clamps, which were tagged during removal, then secure the clamps. Use caution and avoid pinching cables under clamps or kinking them at bends. Before applying electrical power, check to be sure that cable plugs are secure.

.



Figure 286. Turret wiring harness - locator



Figure 287. Disassembly and assembly of turret electrical harnesses (1 of 4)



Figure 288. Disassembly and assembly of turret electrical harnesses (2 of 4)


Figure 289. Disassembly and assembly of turret electrical harnesses (3 of 4)



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Figure 294. Cupola power, domelights, radiation detector, and telescope power unit (turret) - schematic



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Figure 296. Turret blower circuit - schematic

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Section III. TURRET VENTILATING BLOWER MOTOR

130. Description

The turret ventilating blower motor (Motor Assembly 7727524), shown in figure 15, is a 1-1/2 hp, 24-volt, 55 ampere, 5,800 rpm submersible motor.

131. Repair of Blower Motor

a. <u>Removal</u>. Refer to TM 9-2350-224-20 for removal of the turret ventilating blower motor.

b. <u>Disassembly</u>. Figure 300 identifies the components of the turret ventilating blower motor. Observe the alphabetical sequence of

the views in figures 301 and 302 for the proper disassembly procedure.

c. Cleaning, Inspection, and Repair. Refer to paragraphs 27 through 30 for general cleaning, inspection, repair, and refinishing instructions. Figure 300 shows specific points for inspection and repair.

d. <u>Assembly</u>. Observe the numerical sequence of the views in figures 301 and 302 for the proper assembly procedure.

e. Installation. Refer to TM 9-2350-224-20 for installation of the turret ventilating blower motor.



Figure 299. Turret ventilating blower



- A Plug 103885
- B Screw 7974422
- C Washer BOE-A12736-2
- D Screw 131894
- E Receptacle assembly 8682956
- F Gasket 7722223
- G Cap 7729560
- H Gasket 7729564
- J Brush assembly 7729568
- K Head assembly BOE-C6727
- L Cable assembly BOE-A3236
- M-No. 10 lockwasher 120217
- N Screw 132892
- P Capacitor BOE-B4081
- Q Gasket 7729565
- R Screw 120216
- S Washer BOE-A12736-1

- T Frame BOE-B6920
- U Pole assembly BOE-A8335
- V Coil assembly 7974425
- W-Screw 132259
- X Cap BOE-A4316
- Y Gasket 7729562
- Z Seal assembly 7729569
 - 1 Seal assembly CPH-J-SC-P139 Seal assembly CPH-L-SC-T10V (optional)
 - 2 Gasket CPH-1820-21
 - 3 Gasket CPH-1820-12
 - 4 Spacer CPH-SCFS-62-5B
- AA Head BOE-A12463
- BB Bearing 710198
- CC Armature assembly 7974424
- DD Bearing BOE-A3220A

Note inspection data on page 330.

Figure 300. Turret ventilating blower motor - exploded view

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Reference	Turne time data and mainta of more summary	Size and fit of	Wear limits	
letter	hispection data and points of measurement	new parts	Field	Depot
a b c f g h-j k g-k l	Pins not bent, loose, broken, or corroded. Replace. ID of bearing bore in head assembly. Lead must not be oil soaked. Replace. Replace. ID of spacer. ID of bearing bore in head. See TM 9-214. OD of field end bearing. Fit of bearing in bore. Commutator must not be undercut less than 1/32 inch. Impeller blades must be free of burs and not broken. Armature shaft diameter at spacer location. Fit of shaft in spacer. See TM 9-214. OD of commutator end bearing.			
c-1	Fit of bearing in bore.			

Figure 300. Turret ventilating blower motor - exploded view - wear limits (continued)

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Figure 301. Disassembly and assembly of turret ventilating blower motor (1 of 2)



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CHAPTER 15

TURRET COMPONENTS

Section I. GENERAL

132. Scope

This chapter contains instructions for field and depot maintenance of the commander's, gunner's, and loader's seats, the turret traverse lock, and the turret race of the 90-mm full-tracked combat tank M46A3. It contains descriptions of, and procedures for removal, disassembly, cleaning, inspection, repair, assembly, and installation of the commander's, gunner's, and loader's seats, the turret traverse lock, and the turret race.

133. References

Repair and replacement instructions for the other turret components are contained in TM 9-2350-224-20, except the Gun Elevating and Turret Traversing System Components which are in TM 9-2350-215-35/2.

Section II. COMMANDER'S SEAT AND BACKREST

134. Description

The commander's seat, shown in figure 16. consists of a base assembly, a platform assembly, an upper bracket assembly, and a tube assembly. The base assembly is mounted on the turret platform, and the platform assembly is fastened to the upper part of the base assembly. The tube assembly is adjustable in height; it mounts in the base assembly and passes through the upper bracket assembly. The seat assembly is mounted on the top of the tube assembly. The upper bracket mounts to the turret race ring. The commander's backrest consists of a padded backrest mounted on a slide which in turn is mounted on a mounting bracket attached to the turret wall.

135. Rebuild

a. <u>Removal</u>. Follow the alphabetical sequence of the views in figure 304 for the proper removal procedure.

b. Disassembly. Figures 305 through 307 identify the components of the commander's seat and backrest. Follow the alphabetical sequence of the views in figures 308 and 309 for the proper disassembly procedure.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

d. Inspection and Repair. Figures 305 through 307 show repair and rebuild standard points of measurement and specific inspection data. e. Assembly. Figures 305 through 307 idenity the components of the commander's seat and backrest. Follow the numerical sequence of the views in figures 308 and 309 for the proper assembly procedure.

<u>f. Installation.</u> Follow the numerical sequence of the views in figure 304 for the proper installation procedure.



Figure 303. Commander's seat and backrest in position

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REMOVE OR INSTALL BACKREST



Figure 304. Removal and installation of commander's seat and backrest

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A - Seat 7985183 C - X-Washer 7404624 E - Washer 120394 B - Base 7985167 D - Screw 214269 F - Pin 8369957

Reference letter Inspection data and points of measurement	Transition data and minte of manufacture	Size and fit of Wear lin		limits	
	new parts	Field	Depot		
a b	Must aline with seat and base. Must not be torn, cut or damaged.				

Figure 305. Commander's seat - partial exploded view - wear limits (1 of 2)



A - Tube assembly	8382448
B - Bolt	7992406
C - Retainer	7985182
D - Helical compression spring	7985147
E - 1/4-28 x 1-3/8 Cap screw .	106277
F - Handle	8382442
G - Shaft	7985181
H = 1/4 Washer	120392
J = 1/4-28 Hex nut	114492
K - Pin	7365030
L - Base assembly	8364370
M = 1/4-20 Hex nut	422871
N = 1/4 Lockwasher	121637
P - Plunger assembly	8335016
Q - Platform	8382449
R = 1/4=20 x 5/8 Pan head	
screw	157728
S - Cotter pin	108630
T = 0.187 x 1/2 Spring pin	585960
U = 1/2 Lockwasher	106500
V - Pin	7985180

Reference	Town the data addressing of an and the	Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a b c d	Must not be fatigued. Holes not worn out of round. Must be free of corrosion or spring failures. Must operate freely. Must level when in the down position.			

Figure 306. Commander's seat - partial exploded view - wear limits (2 of 2)

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A - Backrest assembly 7985156	E - Guide 7985163	J - Nut 225831
3 - Support 7985158	F - Bracket 7985161	K - Screw 104475
C - Slide 7985160	G - Washer 120394	L - Screw 169521
D - Screw 100028	H - Washer 108580	

Reference		Size and fit of	Wear limits	
letter	inspection data and points of measurement	new parts	Field	Depot
a b c	Must aline with support. Must swivel freely in bracket and must engage stop pawl at outboard end of slide. Must slide freely and fit snugly in guide.			

Figure 307. Commander's backrest - exploded view - wear limits

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Section III. GUNNER'S SEAT

136. Description

The gunner's seat, shown in figure 18, consists of a backrest support assembly, a backrest angle adjuster assembly, a seat base support assembly, and a pedestal and locking latch assemblies. The backrest support and backrest angle adjuster assemblies are mounted on the seat base assembly. The angle and height of the backrest are adjustable, and the backrest may be locked in the desired position.

The pedestal assembly is fastened to the turret platform, and the base support assembly mounts to the seat support, which is part of the pedestal assembly. The base support is adjustable forward and aft by using the several bolt holes in the support assembly. The height of the seat is adjustable, and it may be locked in the desired position.

137. Rebuild

a. <u>Removal</u>. Refer to figure 311 for the proper removal procedure.

b. Disassembly. Figures 312 and 313 identify the components of the gunner's seat. Follow the alphabetical sequence of the views in figures 314 and 315 for the proper disassembly procedure.

c. Cleaning. Refer to paragraphs 27 thru 30 for general cleaning and refinishing instructions.

d. Inspection and Repair. Figures 312 and 313 show repair and rebuild standard points of measurement and specific inspection data.

e. Assembly. Figures 312 and 313 identify the components of the gunner's seat. Follow the numerical sequence of the views in figures 314 and 315 for the proper assembly procedure.

f. Installation. Refer to figure 311 for the proper installation procedure.



Figure 310. Gunner's seat

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Figure 311. Removal and installation of gunner's seat



- A Screw 106277
- ${\rm B}$ Handle 7985121
- C Washer 106500
- D Pin 7985102
- E Tube 7985141
- F Spring 7985148
- G Washer 96906-15795-215
- H Lockwasher 96906-35337-27
- J Screw 96906-35292-61
- K Shaft 7985111
- L Spring 7985147
- M Retainer 7985182
- N Pin 585960
- P Nut 114492
- Q Washer 120392

Reference	Size and fit of	Wear	Wear limits	
letter	letter inspection data and points of measurement	new parts	Field	Depot
a b	Must not be fatigued, broken or damaged. Must not be fatigued, broken or damaged.			

Figure 312. Gunner's seat - partial exploded view - wear limits (1 of 2)

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A – Lacing 7985116	6 - Screw 106629	E - Spring, assembly 8364186
B - Cover, assembly 7985187	7 - Adjuster, assembly 7985193	2 1 - Pin 8364188
C - Pad 7985143	8 - Washer 106261	2 - Spring 8364187
D - Backrest, assembly 8364185	9 - Nut 126000	F - Bearing 7985103
1 - Cushion 7404675	10 - Spring 7985125	G - Screw 436750
2 - Tube 7985146	11 - Support 7985134	H - Washer 131096
3 - Nut 126032	12 - Nut 451007	J - Washer 446152
4 - Screw 595798	13 - Washer 106261	K - Base 8364182
5 - Spring 7985124	14 - Screw 122181	L – Body 7985142
		M - Screw 106326

Reference Inspection data and points of measurement		Size and fit of Wear		limits	
letter	proposition and only points of inconstrainent	new parts	Field	Depot	
a b c	Material and padding must not be torn or frayed. Must not be broken, twisted or deformed. Must not be broken, twisted, deformed or sec- tions missing.				
d	Must not be twisted, deformed, broken or have weak tension. Must not be broken, bent, twisted or deformed. Must not be bent, twisted.deformed or broken.				
e f	Must not be broken, bent, twisted or deformed. Must not be bent, twisted, deformed or broken.				

Figure 313. Gunner's seat - partial exploded view - wear limits (2 of 2)

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Figure 315. Disassembly and assembly of gunner's seat (2 of 2)

138. Description

The loader's seat, shown in figure 15, consists of a plate assembly, to which is mounted a seat back pad assembly, and a springloaded hinge plate to which the seat support assembly is attached. The spring-loaded hinge plate is secured to the plate assembly by a hinge pin. The seat assembly is nonadjustable and mounts on two pins on the turret race. When not in use, the seat assembly is stowed in a bracket on the left ade of the turret.

139. Rebuild

<u>a. Removal.</u> Figure 317 shows the removal procedure for the loader's seat.

b. Disassembly. Figure 318 identifies the components of the loader's seat. Follow the

alphabetical sequence of the views in figures 319 through 320 for the proper disassembly procedure.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

d. Inspection and Repair. Figure 318 shows repair and rebuild standard points of measurement and provides specific inspection data.

e. Assembly. Figure 318 identifies the components of the loader's seat. Follow the numerical sequence of the views in figures 319 through 320 for the proper assembly procedure.

f. Installation. Figure 317 shows the installation procedure for the loader's seat.



Figure 316. Loader's seat



Figure 317. Removal and installation of loader's seat



A - Cushion 8734793
B - Screw 214269
C - Plate 7985126
D - Pad 7985739
E - Bracket 7985127
F - X-Washer 7404624

G - Washer 120394 H - Support 8335266 J - Spring 8335267 K - Pin 8369956

- L Nut 120367
- M Washer 174916

Reference		Size and fit of new parts	Size and fit of	Wear	Vear limits	
letter Inspection data and points of measurement	new parts	Field	Depot			
a b c	Seat must aline with plate. Must not be fatigued or distorted. Padding not damaged or worn.					

Figure 318. Loader's seat - exploded view - wear limits

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140. Description

The turret traverse lock shown in figure 15 is a positive acting screw type, self-indicating device used to lock the turret in place at any azimuth position with respect to the hull. It is located to the left of the traversing mechanism and is secured to the turret inner raceassemby. The lock consists of a locking handle and toothed bolt assembly, support housing assembly and mounting bracket assembly. When the 90-mngun is placed in the external gun travel lock, the lock bolt teeth and the turret ring gear teeth are alined to permit engagement, thereby locking the turret in place.

141. Replacement of Lock

a. <u>Removal</u>. TM 9-2350-224-20 contains instructions for removal of the turret traverse lock. b. Installation. TM 9-2350-224-20 contains instructions for installation of the turret traverse lock.

142. Rebuild

a. Disassembly. Figure 322 identifies the components of the turret traverse lock. Follow the alphabetical sequence of the views in figures 323 and 324 for the proper disassembly procedure.

b. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

c. Inspection and Repair. Figure 322 provides repair and rebuild standards, points of measurement and specific inspection data.

d. Assembly. Figure 322 identifies the components of the turret traverse lock. Follow the numerical sequence of the views in figures 323 and 324 for the proper assembly procedure.



Figure 321. Turret traverse lock





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A - Handle 8382169	J - Housing 7353607
B - Pin 14250	K - Screw 96906-35304-164
C - Support 7364213	L - Washer 96906-35333-29
D - Rod 7353606	M - Cover 7353533
E - Bolt 7353605	N - Pad 7353532
F - Guide 7364212	P - Spacer 7353536
G - Guide 7353537	Q - Bracket 7353603
H - Pin 141248	R - Pin 443767

Reference	Inspection data and points of measurement	Size and fit of	Wear limits	
letter		new parts	Field	Depot
a b c d e	 ID of pin hole in turret lock handle. Pin must be pressed securely in handle. Remove pin if necessary by drilling out pinhole with a 15/64 drill. ID of pinhole in rod. Must be free of burs, nicks, galling, breaks and scratches. Must be free of scratches, breaks, chips, cracks and sheared teeth. 	0.250 to 0.265 Check for size with thread gage - both internal and external. Check threads with .500 dia wire gage - must fit		
f g h	Aust not be broken, cracked, distorted or bent. All machined surfaces must be true. Must not be twisted, distorted or broken. All bolt holes will be in the correct position. Must not be bent, broken or twisted and all machined surfaces shall be true.	freely in support without binding.		
j k	Must not be torn, twisted or deformed. Must not be cracked, broken, distorted or twisted. All surfaces for alinement purposes shall be true.			
m	Must not be Stripped. OD of pin. Must not be bent, broken or out of line. Must not be cracked, broken, distorted or twisted. All surfaces for alinement purposes shall be true.	0.374 to 0.376		
r s t a-b-c	Must be free of burs, nicks, scratches and breaks. Corresponding parts at each end must be parallel to each other within 0.005. Must be concentric and smooth. ID of hole in support. Fit of pin in handle and rod.	21/32 ±1/64 001T to .003T		

Figure 322. Turret traverse lock - exploded view - wear limits (continued)



TURRET TRAVERSE LOCK ASSEMBLY



NOTE: ON INSTALLATION, ADD SPACERS AS REQUIRED TO GIVE 1/32-3/32 INCH PAD COMPRESSION WHEN COVERS ARE DRAWN TIGHT ì

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REMOVE OR INSTALL END COVERS



REMOVE OR INSTALL PADS AND SPACERS





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Figure 324. Disassembly and assembly of turret traverse lock (2 of 2)

Section VI. TURRET RACE

143. Description

The outer race of the assembly is bolted to the hull of the vehicle and the inner race is bolted to the turret. The turret rotates on 180 bearing balls separated by 180 springs which are contained within the turret race (fig. 14). The inner race has an access hole for assembling the balls and springs as shown in figures 327 and 329.

144. Replacement of Race Components

a. Removal of Race. Follow the alphabetical sequence of the view in figure 326 for the proper removal procedure.

b. <u>Disassembly of Race.</u> Figures 327 and 323 identify the components of the turret race.

Follow the alphabetical sequence of the views in figure 329 for the proper disassembly procedure.

c. <u>Cleaning</u>. Refer to paragraphs 27 through 30 for general cleaning and refinishing instructions.

d. Inspection and Repair. Figures 327 and 328 show repair and rebuild standard points of measurement and specific inspection data.

e. Assembly of Race. Figures 327 and 328 identify the components of the turret race. Follow the numerical sequence of the views in figure 329 for the proper assembly procedure.

<u>f.</u> Installation of Race. Follow the numerical sequence of the views in figure 326 for the proper installation procedure.



Figure 325. Turret race installed

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- A Screw 7407642
- B Turret race seal 7363976
- C Inner oil lube plug 8364290
- D Inner race assembly 7953851
- E Ball 5212907
- F Helical compression spring 8346341
- G Outer race 7364006

Reference	Inspection data and points of measurement	Size and fit of new parts	Wear limits	
letter			Field	Depot
a b c d d e f b-f	Must not be cracked, broken, torn, brittle, or deformed. OD of inner face Diameter of inner race assembly over 1.250 gage balls. Must not be pitted, overoded, or worn. Just not be pitted, overoded, or worn. Just overoded, distorted, or fatigued. Free length of ball retainer spring. ID at top of race. Root diameter of gear. Measurement between two 0.432 dis pis. Clearance of inner race assembly to outer race.	88.970 to 89.000 89.735 to 89.741 0.812 to 0.842 89.125 to 89.155 86.6498 min. 85.4034 to 85.4104 0.125L to 0.185L		

Figure 327. Turret race - partial exploded view - wear limits - (1 of 2)



- A Inner race 7953852 B - Lockwire 22-W-1630 C - Screw 596239
- D Plug 7364180

Reference	Inspection data and points of measurement	Size and fits of new parts	Wear limits	
letter			Field	Depot
a b	Must be free of cracks, nicks, burs, scores and damaged threads. Must not be deformed. Plug and race are not inter- changeable and must be serviced as an assembly.			

Figure 328. Turret race - partial exploded view - wear limits -(2 of 2)


Figure 329. Disassembly and assembly of turret race

CHAPTER 16

REPAIR AND REBUILD STANDARDS

145. General

a. The repair and rebuild standards are included with the exploded views in the repair and rebuild chapters 6 through 15. Paragraph 146 contains cross references to the repair and rebuild standards.

b. The repair and rebuild standards provide the minimum, maximum, and key clearances of new or rebuilt parts. They also provide wear limits to which a part or parts may be worn before replacement, in order to receive maximum service with minimum replacement. Normally, all parts which have not been worn beyond the dimensions shown in the wear limits column, or damaged from corrosion, will be approved for service. An asterisk (*) in the wear limits column indicates that the part or parts should be replaced when worn beyond the limits given in the sizes and fits of the new parts column, the letter "L' indicates a loose fit (clearance) and the letter "T" indicates a tight fit (interference).

146. Repair and Rebuild Standard References

a. <u>Fuel Primer Pump.</u> Refer to chapter 6, section II (figs. 29-30).

b. Steering Controls and Linkage. Refer to chapter 8 (figs. 132-138).

c. Shifting Controls and Linkage. Refer to chapter 8 (figs. 144-150).

d. Accelerator and Throttle Controls and Linkage. Refer to chapter 8 (figs. 157-160).

e. <u>Brake Controls and Linkage.</u> Refer to chapter 8 (figs. 167-173).

<u>f. Infrared Periscope Mount.</u> Refer to chapter 9 (fig. 200).

g. <u>Driver's Seat.</u> Refer to chapter 9, section VII (figs. 209-212). h. Track. Refer to chapter 11 (fig. 234).

i. <u>Track Drive Sprockets and Hub.</u> Refer to chapter 11 (fig. 236).

j. Track Tension Adjusting Link and Related Parts. Refer to chapter 11 (fig. 237).

k. Compensating Idler Wheel, Hub, and Arm. Refer to chapter 11 (figs. 239-242).

l. Front Road Wheel Hub and Arm. Refer to chapter 11 (figs. 243-244).

m. Intermediate Road Wheel Hub and Arm. Refer to chapter 11 (figs. 245-246).

n. <u>Rear Road Wheel Hub and Arm.</u> Refer to chapter 11 (figs. 247-248).

o. Left Front Track Support Roller Assembly. Refer to chapter 11 (fig. 254).

p. <u>Speedometer Drive Cup Assembly.</u> Refer to chapter 11 (fig. 255).

q. <u>Track Support Roller Assembly.</u> Refer to chapter 11 (fig. 253).

r. <u>Track Support Roller Hub</u> Assembly. Refer to chapter 11 (figs. 256-257).

<u>Final Drive.</u> Refer to chapter 12 (figs. 262-263).

t. <u>Slipring Box</u>. Refer to chapter 13 (figs. 270-278).

u. <u>Turret Ventilating Blower Motor</u>. Refer to chapter 14 (fig. 300).

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v. <u>Turret Traverse Lock.</u> Refer to chapter 15, section V (fig. 322).

w. Turret Race Components. Refer to chapter 15, section VI (figs. 327-328).

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Figure 330. Hull electrical system - wiring diagram - M48A3 This PDF file created by Merriam Press. Many more PDFs at merriam-press.com.





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Figure 331. Turret electrical system - wiring diagram - M48A3 This PDF file created by Merriam Press, Many more PDFs at merriam-press.com.



iring diagram - M48A3

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APPENDIX 1

REFERENCES

The following constitutes a listing of publications especially applicable to field and depot maintenance of the materiel covered by this technical manual. Consult TM 38-750 "The Army Equipment Record System and Procedures," and appropriate indexes listed in paragraph 1 of Appendix 1, TM 9-2350-224-10 for latest changes, revisions, deletions or additions to the following publications:

Safety: Report of Accidents AR 385-40
Report of Malfunctions and Accidents Involving Ammunition
and Explosives AR 700-1300-8
Recommended Changes to DA Technical Manuals DA Form 2028
Maintenance Request DA Form 2407
Equipment Modification RecordDA Form 2408-5
Equipment Maintenance Record (Support Echelons Field & Depot)DA Form 2408-6
Ordnance Direct Support Service FM 9-3
Ordnance General and Depot Support Service FM 9-4
General Packaging Instructions for Ordnance General Supplies TM 9-200
Cleaning Ordnance Materiel
Cleaning, Drying and Abrading Equipment for Cleaning Ordnance Materiel TM 9-208-2
Inspection, Care and Maintenance of Antifriction Bearings
Welding: Theory and Application TM 9-237
Material Used for Cleaning, Preparing, Abrading, and Cementing
Ordnance Materiel TM 9-247
Cooling System Vehicular and Powered Ground EquipmentTM 9-2858
Army Equipment Record Systems and Procedures
Solder and Soldering TB SIG-222
Processing of Unboxed Self-Propelled and Towed Class II Ordnance
General Supplies and Related Material for Shipment and Storage TB 9-299/1

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