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TM 9-2350-258-34-1

TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT

MAINTENANCE MANUAL

TANK, COMBAT, FULL-TRACKED:

105-MM GUN M48A5

NSN 2350-00-582-5595

HULL

HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1977

WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon Monoxide is a colorless, odorless, deadly poisonous 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 muscular control, apparent drowsiness, and coma. Permanent brain damage or death can result from severe exposure. Carbon monoxide 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 wherever the personnel 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 area is ADEQUATELY VENTILATED.

2. DO NOT idle engine for long periods without maintaining ADEQUATE VENTILATION in personnel compartments.

3. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.

4. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm; DO NOT PERMIT PHYSICAL EXERCISE; if necessary, administer artificial respiration.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

TECHNICAL MANUAL
No. 9-2350-258-34-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *4 April 1977*

Direct Support and General Support Maintenance Manual TANK, COMBAT, FULL-TRACKED: 105-MM GUN, M48A5 (HULL)

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 (Test) located in the back of the manual and mail the form direct to Commander, US Army Tank-Automotive Materiel Readiness Command, ATTN: DRSTA-MDP, Warren, MI 48090. A reply will be furnished direct to you.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope
This manual contains maintenance procedures for direct and general support maintenance personnel responsible for maintaining the M48A5 tank. Included in the procedures are removal, disassembly, cleaning, inspection, repair, assembly, installation, and final inspection of hull components allocated to direct and general support maintenance levels.

1-2. Forms and Records
Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintennace levels are listed in and prescribed by TM 38-750.

Section II. DESCRIPTION AND DATA

1-3. Description
Refer to TM 9-2350-258-20-1. Additional components or system description information, where necessary, is contained in the applicable component repair section herein.

1-4. Differences Between Models
Component differences and serial numbers, groups, or models are contained in the applicable component removal, repair, and installation procedures herein.

1-5. Tabulated Data
Refer to TM 9-2350-258-20-1.

CHAPTER 2
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1. General

This section contains information on services to be performed upon issue of the vehicle to the using organization. Where practicable the crew will assist in services described. Some of the services contained herein may not be required, depending upon the degree of preservation provided by the shipper and the planned use of the vehicle.

2-2. Inspection, Servicing, and Installation

a. Preliminary Procedures.

(1) Cut hold-down straps and remove wooden boxes, containers of equipment, and any other components of the tank secured to the exterior.

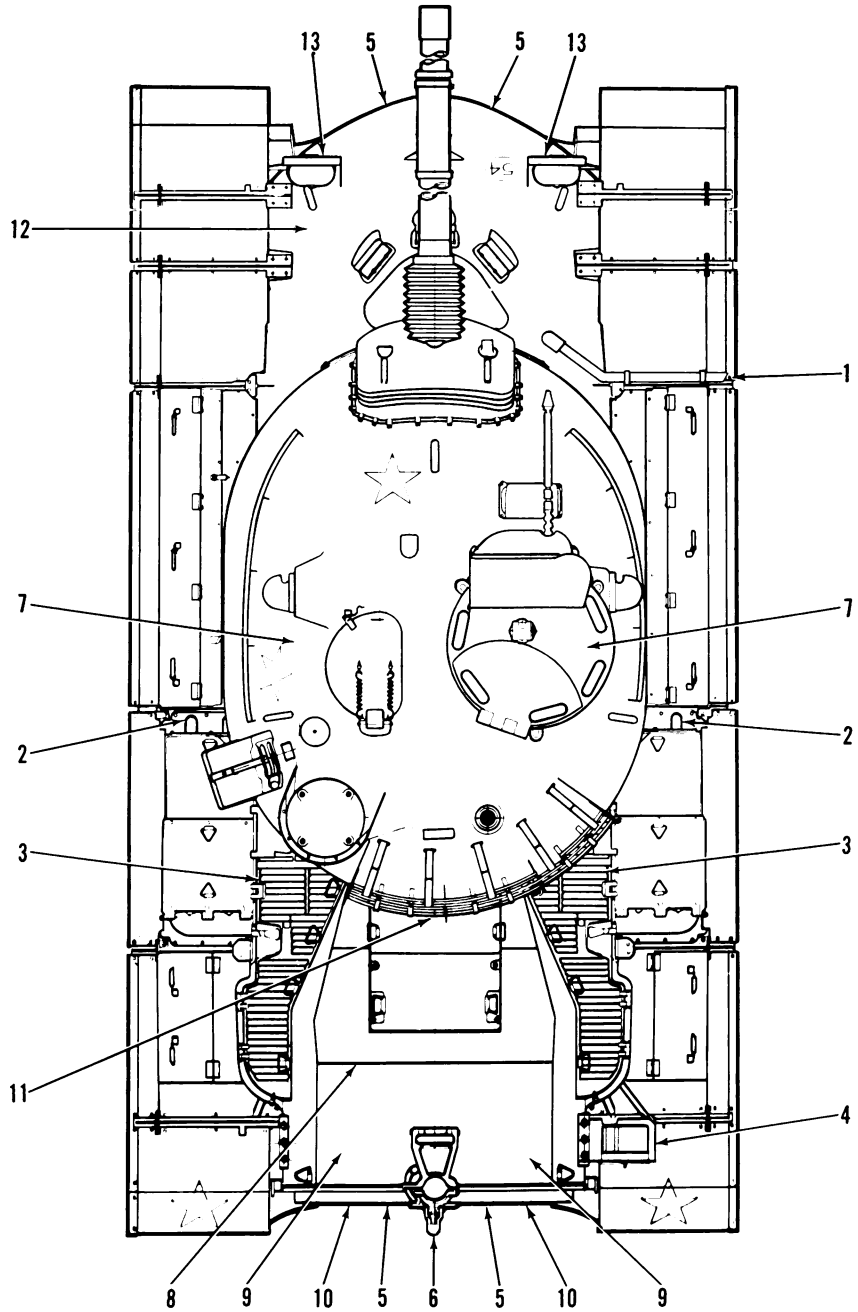
(2) Inspect vehicle for damage.

(3) Open two center and two rear fender stowage boxes. Inspect for water in each box. Remove 1/4-inch headless drain plugs (two for each box), as required, to allow water to drain. Reinstall and tighten plugs.

b. Removal of Preservative Materials (fig 2-1)

(1) Remove wrapping, barrier material, and tape from all hatches, periscope shields and optical glass.

(2) Remove tape from personnel heater exhaust outlet (1).



LEGEND

1. HEATER EXHAUST OUTLET
2. AIR CLEANER EXHAUST ELBOWS AND DRAIN PLUGS
3. AIR CLEANER INLET
4. HANDSET BOX
5. TOW HOOKS
6. TOW PINTLE
7. FUEL TANK DRAIN ACCESS OPENINGS
8. BRAKE CONTROL ACCESS OPENINGS
9. ENGINE EXHAUST PIPES
10. TAILLIGHT LENS
11. DRAIN VALVE OPENINGS
12. FIRE EXTINGUISHER HANDLES PROTECTIVE SHIELD
13. HEADLIGHT MOUNTING RECEPTACLES

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Figure 2-1. Location of preservative materials, drain plug openings, and equipment.

(3) Remove tape and protective barrier plugs from the air cleaner (pre-cleaner) centrifugal fan (blower motor) exhaust elbows (2) (four locations), and allow water to drain. Reinstall and tighten plugs.

(4) Open top deck hatch door assemblies, and remove tape and plugs. Connect tubes to turbosuperchargers. Remove tape from air cleaner inlet screens at bulkhead (3). Refer to TM 9-2350-258-20-1.

(5) Remove tape from external handset box (4). Open cover and check box interior for moisture. Dry box interior, if required.

(6) Remove four tow hooks stowed within vehicle, install two hooks at front and two hooks at rear of vehicle (5). Remove pintle stowed within vehicle, and install at rear of vehicle (6). Refer to TM 9-2350-258-20-1.

(7) Remove screen from fuel tank drain access openings (two locations on underside of hull) (7). Loosen 1/4-inch square head fuel tank drain plug, and allow water in fuel tanks to drain. Tighten drain plugs.

(8) Remove screens from brake control access openings (two locations on underside of hull) (8). Remove 1/4-inch square head drain plugs from brake housing. Allow accumulated water to drain. Reinstall and tighten drain plugs.

(9) Remove brake control access covers and gaskets stowed inside vehicle, and install on access openings.

(10) Remove screens from front and rear drain valve openings (11). Refer to TM 9-2350-258-20-1.

(11) Open rear engine exhaust doors, and remove tape from engine exhaust outlet pipes (9).

(12) Remove wrapping and tape from taillight lens (10).

(13) Remove tape from protective shield (12) of the exterior fire extinguisher handles. Check that the lead seals on both handles are intact. If lead seal is broken, service fire extinguisher cylinders. Install exterior fire extinguisher handle lead seal. Refer to TM 9-2350-258-20-1.

(14) Remove dust covers from hull headlight mounting receptacles (two locations) (13). Remove headlights from stowage brackets in driver's compartment. Install dust covers on stowage brackets, and install headlights on hull mounting receptacles.

c. Servicing of Vehicle.

(1) If any exterior surfaces are coated with rust preventive compound, remove the coating with drycleaning solvent. Paint vehicle in accordance with local camouflage requirements.

(2) Follow the instructions as specified on tag DD Form 1397 regarding the processing record, shipment and stowage of the vehicle and unboxed engines. This tag will be found in the driver's compartment attached to the steering control or transmission shift lever.

(3) Fuel the vehicle. While fueling, check for leaks at filter connections, fuel tank drain plugs, fuel line quick disconnects, fuel value, and filters. Correct if leaks are observed.

(4) Remove covers and gaskets for fuel tank drain access openings stowed inside vehicle. Install covers (7). Refer to TM 9-2350-258-20-1.

(5) Remove six vehicle batteries and electrolyte from wooden equipment boxes. Fill batteries with electrolyte and check specific gravity. Install batteries in vehicle and connect cables. Refer to TM 9-2350-258-20-1.

(6) Check oil level in engine and transmission in accordance with LO 9-2350-258-12. Check processing tag (DD Form 1397) for installed grade of engine oil. Change engine oil only if different type or grade is required.

(7) Service engine air cleaner filters. Refer to TM 9-2350-258-20-1.

(8) Check operation of all controls.

(9) Start engine. Check immediately for fuel and oil leaks. Shut engine down and correct leaks, if observed. The engine may start hard, smoke excessively, and run erratically. However, conditions should generally improve after five minutes of running time. Failure to obtain full engine power will necessitate performing troubleshooting to isolate and correct the problem.

(10) Shut down engine and perform the quarterly (Q) Preventive Maintenance Checks and Services (PMCS), listed in TM 9-2350-258-20-1, including a complete suspension lubrication in accordance with LO 9-2350-258-12.

2-3. Installation and Setting Up of Vehicle

a. General. The following services are performed only if the using organization plans to put the tank into service immediately.

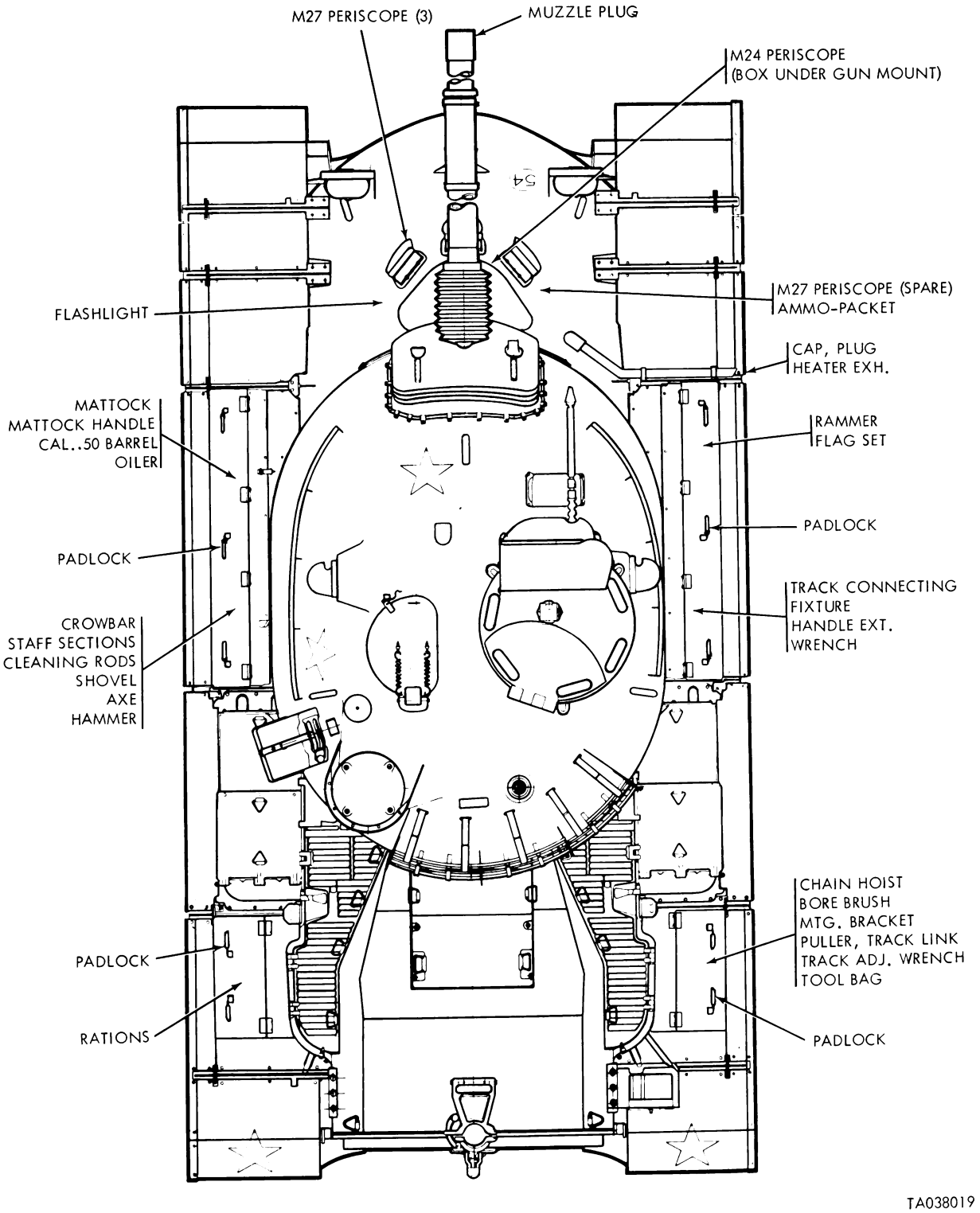


Figure 2-2. Installation of equipment.

b. Deprocessing of Equipment
(Fig 2-3)

(1) Open each wooden box and container. Inventory contents with packing list. Record missing items.

(2) Check packing list to insure that all items indicated have been received.

(3) Open inner packs and remove material.

(4) Degrease equipment such as tools and hardware as required.

Section II. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

2-4. Repair Parts

Repair parts authorized for hull maintenance will be listed in TM 9-2350-258-20P-1 or TM 9-2350-258-34P-1 when published, depending upon the allocated level of maintenance at which the repair will be made. A list of the technical manuals used for maintenance of hull supporting equipment is shown in appendix A.

2-5. Tools and Equipment

a. Common Tools. Standard and common tools having general application to this equipment are authorized for issue by Tables of Allowances and Tables of Organization and Equipment.

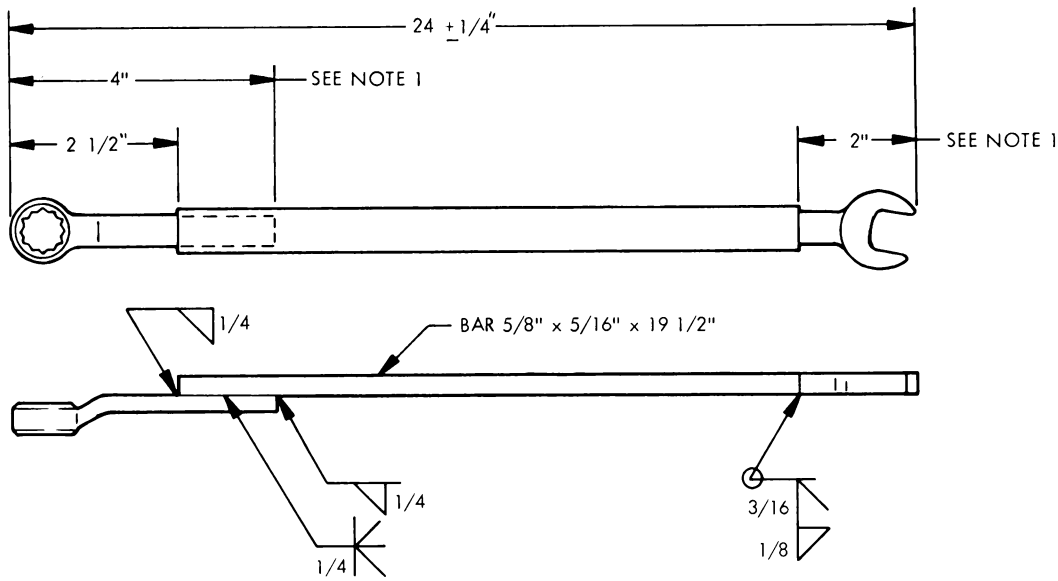
b. Special Tools. Special tools and equipment designed for direct support and general support repair and general use with the materiel are listed in table 2-1. Table 2-1 contains item names and item sequence numbers for identification as used throughout the manual. Table 2-1 also contains references to figures and paragraphs in the manual which describe the use of the tool. Table 2-1 is not to be used for requisitioning replacements. Special tools for direct support and general support maintenance will be listed and illustrated in TM 9-2350-258-34P-1 which, when published, will be the authority for requisitioning replacements.

c. Fabricated Tools. Fabricated tools are contained in table 2-1, and shown in figure 2-3.

Table 2-1. Special Tools, Test, and Support Equipment (Including Fabricated Items)

Item	NSN or reference no.	References		Use	Fig.
		Fig no.	Para no.		
ENGINE					
1. SLING, POWERPLANT	11674362	—	2-17	Lift engine.	
TRANSMISSION					
2. PULLER, SLIDE HAMMER	5120-00-473-7352	2-1 (View D) 2-1 (View D)	2-17 2-18	Disengage transmission input shaft from engine flywheel.	
3. ADAPTER, PULLER	5120-00-708-2774	2-1 (View D) 2-1 (View D)	2-17 2-18	Used with PULLER (item 2) to disengage transmission input shaft from engine flywheel.	
4. SLING, TRANSMISSION	4910-00-473-7556	2-1 (View E) 2-1 (View E)	2-17	Lift transmission.	
5. WRENCH, TRANSMISSION TURNING	5120-00-708-1564	2-1 (View B) 2-1 (View B)	2-17 2-18	Turn transmission gearing.	
FINAL DRIVE					
6. WRENCH, BOX	5120-00-508-1570	— —	3-64 3-67	Remove and install final drive output shaft nut.	
7. TOOL AND CASE ASSEMBLY, BEARING REMOVER	4910-00-906-1005	3-20 (Views J, K, R, S, T, U)	3-64	Remove bearings from final drive output shaft and drive gear.	
FABRICATED TOOL — TRANSMISSION					
1. WRENCH, DOUBLE ENDED Fabricate from	SK6441		2-17 2-18	Used to remove screws from transmission.	2-3 *

* Fabricated drawing in this manual.



NOTES:
1. USE 5/8" WRENCH NSN 5120-00-228-9508 CUT TO PROVIDE 2 PIECES SHOWN.
2. MATERIAL: CARBON OR ALLOY STEEL
3. TOLERANCE: ± 1/8"
4. WELD IN ACCORDANCE WITH MIL-STD-1261 CLASS 3.

TA038020

Figure 2-3. Wrench, double ended.

Section III. GENERAL MAINTENANCE

2-6. General

This section contains cleaning, inspection, and repair instructions which are common methods and are not specific to one component or assembly. Supplemental instructions pertinent to a specific component are given in the appropriate sections.

2-7. Cleaning Agents

WARNING

Cleaning agents specified are flammable. Use only in well ventilated areas. Keep away from flames, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when performing cleaning procedures.

a. Drycleaning solvent (PD-680) is used to remove oil and grease from metal surfaces by brushing, immersion, or wiping. It is used to remove oil, and grease from wood and upholstery. It is not toxic and evaporates quickly without leaving a corrosion-inducing film on metal surfaces. It is also used as a substitute for mineral spirits paint thinner.

b. Naphtha (TT-N-95) is used to clean oil and grease from resin plastics. Since naphtha leaves no residue, or a minimal amount of residue, it is used to clean metal surfaces used in bonding operations.

2-8. Cleaning Methods

a. Remove dirt and other foreign matter from all metal surfaces. This can be done by the dip-tank method or vapor-degreaser method, or by cleaning with cloth soaked in drycleaning solvent (PD-680). In the dip-tank method, agitation for approximately 1 minute in each tank is sufficient. In the vapor degreaser method, treatment for about 2 or 3 minutes is sufficient.

b. Remove foreign matter from recessed areas with a stiff bristled brush. Scrapers can be used only when damage to metal surfaces will not affect use of component part.

c. Dry component part thoroughly by using dry compressed air or wiping with a clean, lint-free cloth.

2-9. Inspection and Repair of Cast Parts and Machined Surfaces

a. Inspect cast parts for cracks or fractures. Inspect interiors for scores and burs.

b. Inspect machined surfaces for cracks, fractures, galling, pitting, scoring, or corrosion.

c. Remove minor scores and burs from machined surfaces and interiors of cast parts with crocus cloth that has been dipped in drycleaning solvent (PD-680). Replace part if cracked, fractured, or excessively scored, worn, or burred.

2-10. Inspection and Repair of Shafts and Splines

a. Inspect shafts for cracks, fractures, scores, and deformation. Remove minor nicks with crocus cloth. Replace shafts if they are cracked, fractured, scored, or deformed.

b. Inspect splines for cracks, fractures, wear, and deformation. Remove minor nicks with crocus cloth. Replace splined parts if splines do not permit fit or are cracked, worn, or fractured.

2-11. Inspection and Repair of Threaded Parts

a. Inspect all threaded parts for worn or damaged threads.

b. Repair by chasing damaged threads with a tap or die.

2-12. Inspection of Retaining Rings

Replace retaining rings if worn, scored, or deformed.

2-13. Inspection and Removal of Dowel Pins

a. Inspect dowel pins for wear and proper fit. Replace if defective.

b. If necessary to remove dowel pins, use one of the following methods:

(1) Grip pin with self-locking pliers, and pull with a twisting motion.

(2) Grind pin off flush with surface, and drill out remainder of pin.

2-14. Removal of Studs

If necessary to remove studs, use one of the following methods:

a. Use stud remover.

b. Apply penetrating oil (VV-P-216) to base of stud. Thread two hex nuts on stud and jam nuts. Sharply tap head of stud several times with a hammer. Turn lower nut to remove stud.

c. Apply penetrating oil (VV-P-216) to base of stud. Sharply tap head of stud several times with a hammer. Unscrew stud with self-locking pliers.

d. Grind stud off flush with surface, and drill out remainder of stud.

2-15. Inspection and Repair of Welds

Inspect and repair welds in accordance with TM 9-237.

2-16. Inspection, Care, and Maintenance of Antifriction Bearings

Refer to TM 9-214.

2-17. Inspection of Bushing Type Bearings

Inspect bushing type bearings, before removal, for wear, cracks, fractures, pitting, or scoring. Replace bearings if worn or damaged.

2-18. Inspection and Replacement of Cushioning Material

a. Inspect cushioning material for punctures, breaks, cracks, or deterioration. Examine parts bonded with rubber adhesive for separation.

b. Replace damaged parts bonded with rubber adhesive (MMM-A-1617, type II) as follows:

(1) Scrape damaged cushioning material, bonded seals, or gaskets from component.

(2) Remove paint from surfaces of area to be bonded.

(3) Remove oil, grease, moisture, or other contaminants by cleaning with a cloth soaked in naphtha (MIL-N-15178, 50 percent, grade B).

NOTE

Bonding should be accomplished at a minimum room temperature of 65°F. Do not use tape to temporarily hold parts together during bonding operation.

(4) Using a brush or suitable applicator, apply a thin coat of adhesive (MMM-A-1617, type II) to the mating surface of each part. Allow adhesive to set for approximately 15 minutes before joining parts.

2-19. Inspection and Repair of Gears

a. Inspect gears for wear, nicks, scores, and burs. Check that gears are securely mounted.

b. Remove minor nicks with crocus cloth. Replace gears if damaged in any way.

Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS AND AUXILIARIES

2-20. Engine

NOTE

In this paragraph, the ends of the engine will be called the damper end (front) and the flywheel end (rear), as viewed from the front end toward the rear. The side to the right will be called the right side and the side to the left will be called the left side.

a. Removal (fig 2-4).

(1) Refer to applicable sections of TM 9-2350-258-20-1 and perform the following:

(*a*) Remove powerplant.

(*b*) Position powerplant on two 10 x 10 x 12 inch wooden blocks. Position blocks under each end of the engine oil pan.

CAUTION

Insure that the powerplant is level and will not move.

(*c*) Remove top shroud from engine.

(*d*) Remove top shroud front and rear supports from the engine, vehicles serial numbered A3001 through A3999.

(*e*) Remove top shroud side supports, -2A engine, vehicles serial numbered A3001 through A3999.

(*f*) Remove temperature and pressure transmitter ground wire from shifting linkage bracket.

(*g*) Disconnect temperature, pressure transmitter, and safety switch.

(*h*) Remove steering and shifting linkage bracket assemblies.

(*i*) Remove transmission breather tube from right exhaust pipe.

(*j*) Remove engine breather tube from left exhaust pipe.

(*k*) Remove transmission oil cooler tubes.

(*l*) Remove exhaust pipe from turbosupercharger.

NOTE

Cover all openings to prevent the entrance of foreign material.

(*m*) Disconnect fuel return tube from fitting at rear engine shroud.

(*n*) Remove air inlet elbow from turbosupercharger.

(*o*) Remove transmission oil cooler tube connectors, -2D engine, vehicles serial numbered A1001 through A1999 or elbows, -2A engine, vehicles serial numbered A3001 through A3999.

(*p*) Remove engine mounts.

(*q*) Remove tachometer right angle drive.

(*r*) Remove accelerator linkage from engine cross-shaft lever.

(*s*) Remove fuel shutoff link from engine cross-shaft lever, -2D engine, vehicles serial numbered A1001 through A1999.

(*t*) Remove fuel hose and quick-disconnect coupler from primary fuel filter.

(*u*) Remove quick-disconnect coupler from fuel check valve.

(*v*) Disconnect transmission wiring harness from engine wiring harness at connector above generator -2D engine only, vehicles serial numbered A1001 through A1999. Remove transmission wiring harness from engine shroud, and temporarily attach to transmission to avoid damage to harness during remaining disassembly procedures.

(*w*) Disconnect wiring harness connector from engine fuel solenoid -2D only, vehicles serial numbered A1001 through A1999.

(*x*) Disconnect wiring harness from transmission -2A engine only, vehicles serial numbered A3001 through A3999. Temporarily attach harness to engine, to avoid damage to harness during remaining disassembly procedures.

(*y*) Remove transmission input shaft plug, gasket, and snapring (view A, fig 2-1).

(2) Attach adapter (3, table 2-1) and puller (2, table 2-1) to transmission input shaft, and pull shaft rearward to disengage from engine flywheel (view D).

(3) Attach transmission sling (4, table 2-1) to transmission lifting eyes. Using a suitable hoist (transmission weighs approximately 3,000 pounds), take up slack until sling supports weight of transmission, without lifting powerplant from blocks.

(4) Remove two screws, washers, and nuts and 17 screws, washers, and lockwashers securing transmission to engine (view E), using fabricated wrench (8, table 2-1).

(5) Carefully move transmission rearward to separate from engine.

(6) Remove and discard transmission-to-engine preformed packing (view F).

b. Installation (fig 2-1).

(1) Using powerplant sling (1, table 2-1) and a suitable hoist (engine weighs approximately 5,000 pounds), remove replacement engine from container, and place on two 10 x 10 x 12-inch wooden blocks. Position blocks under each end of engine oil pan.

(2) Remove shipping caps, plugs, covers, and mounts from replacement engine, as components are installed, and install them on unserviceable engine.

NOTE

Use new mounting screws, if available, when installing replacement transmission.

(3) Position new transmission-to-engine preformed packing on transmission mounting flange (view F, fig 2-1).

(4) Using transmission sling (4, table 2-1) and a suitable hoist (transmission weighs approximately 3,000 pounds), aline transmission with dowel pins attached to engine, and carefully advance transmission onto dowel pins until transmission mounting flange is in contact with engine transmission adapter.

(5) Secure transmission to engine transmission adapter with two screws, washers, and nuts and 17 screws, washers, and lockwashers (view E), using fabricated wrench (8, table 2-1).

(6) Remove transmission sling.

(7) Push transmission input shaft into transmission. If engine and transmission splines do not aline, remove six power takeoff cover screws and lockwashers (view C). Remove cover and gasket. Discard gasket.

(8) Using transmission turning wrench (5, table 2-1), turn transmission (view B) until splines aline and shaft will slide in and seat properly.

(9) Remove transmission turning wrench (view B).

(10) Install transmission input shaft snapring,

gasket, and plug (view A).

(11) Position power-takeoff gasket and cover on transmission housing, and secure with six screws and lockwashers (view C).

(12) Refer to applicable sections of TM 9-2350-258-20-1, and install items removed in step *a*(1) above.

NOTE

Transmission oil cooler lines on the left side of the powerplant are crossed. Care should be taken to insure that oil cooler lines are installed properly.

(13) Check engine oil for proper level and viscosity (refer to LO 9-2350-258-12 and DD Form 1397). Drain and refill if necessary.

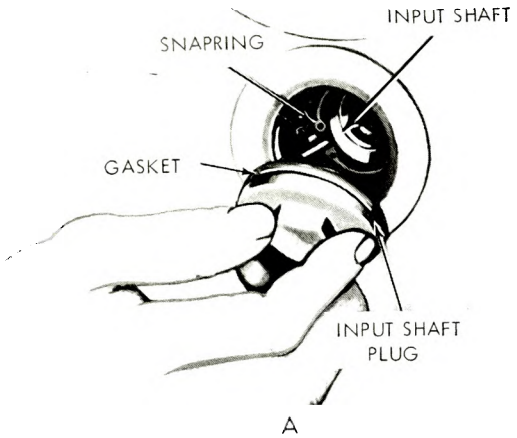
(14) Refer to applicable sections of TM 9-2350-258-20-1 and perform the following:

(*a*) Test run powerplant. Check for oil and fuel leaks during test run.

(*b*) Install powerplant.

(*c*) Road-test vehicle and perform applicable portions of before, during, and after road test inspections, checks, and services.

(15) Install unserviceable engine in container.



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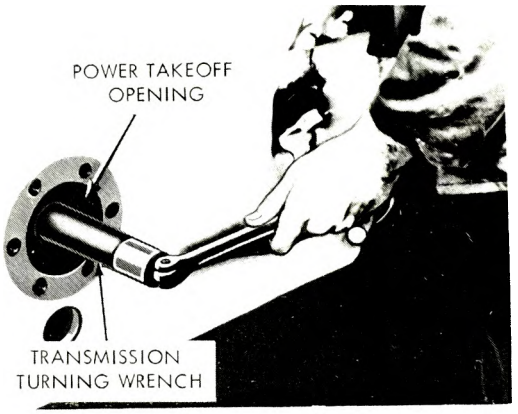

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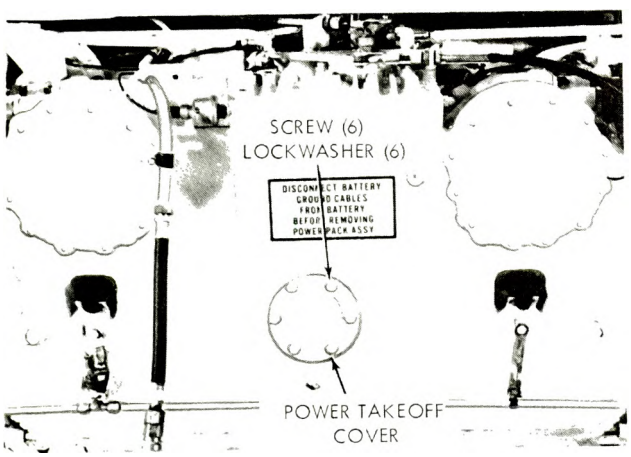

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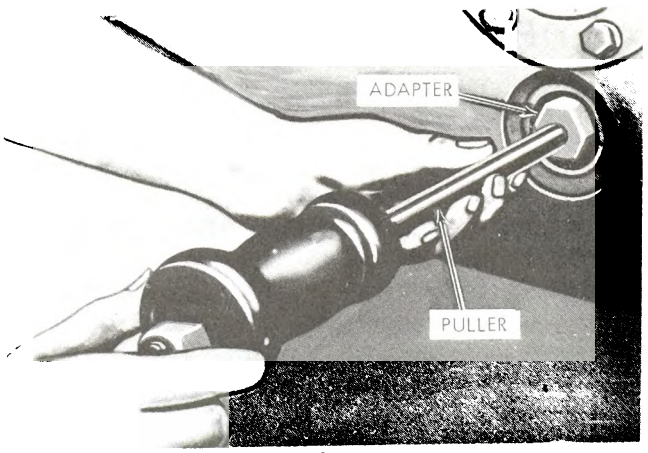

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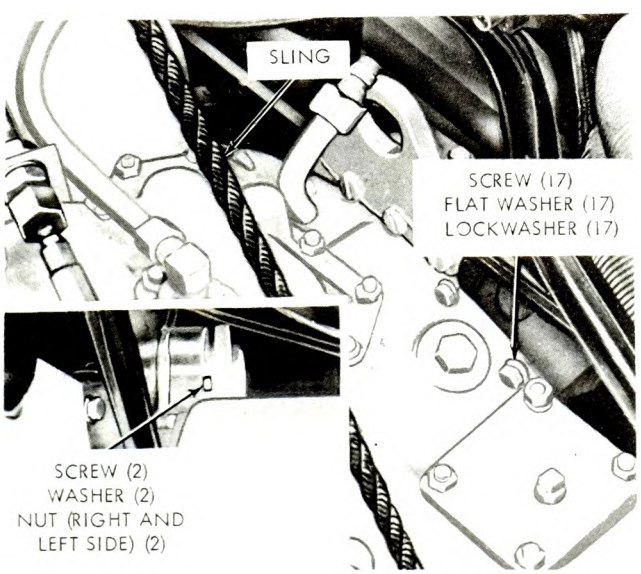


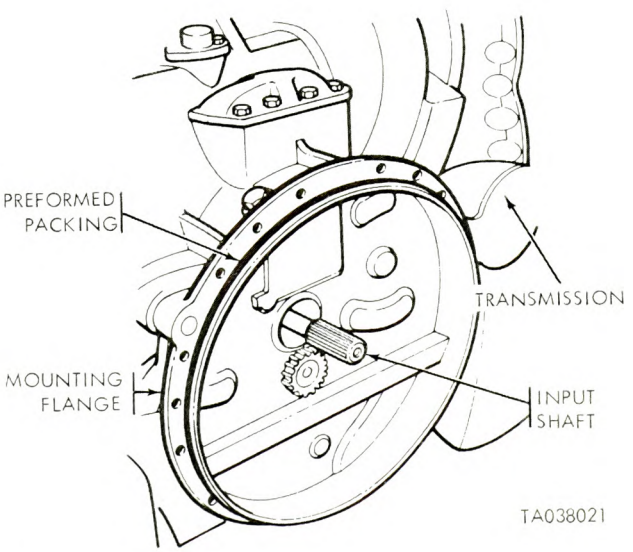


Figure 2-4. Engine removal and installation.

2-21. Transmission

a. Removal (fig 2-4).

(1) Refer to applicable sections of TM 9-2350-258-20-1 and perform the following:

(*a*) Remove powerplant.

(*b*) Drain oil from transmission.

(*c*) Position powerplant on two 10 x 10 x 12-inch wooden blocks with blocks under each end of oil pan. Insure that powerplant is level and will not move.

(*d*) Remove engine top shroud.

(*e*) Remove engine top shroud rear support.

(*f*) Remove steering control linkage and brackets from transmission.

(*g*) Remove shifting control linkage and brackets from transmission.

(*h*) Remove transmission and engine vent tubes from exhaust pipes.

(*i*) Remove exhaust pipes.

(*j*) Remove transmission oil cooler tubes and adapters.

(*k*) Disconnect transmission wiring harness leads from transmitters and neutral shift switch. Disconnect wiring harness clamps from transmission and position harness on engine to prevent damaging harness when separating transmission from engine.

(*l*) Remove transmission oil pressure transmitter protector plate.

(*m*) Remove transmission oil pressure transmitter.

(*n*) Remove engine fuel return hose and tube.

(*o*) Remove transmission mounts.

(*p*) Remove universal joints.

(*q*) Remove brake controls, brackets, and housings.

(*r*) Remove oil filler tube, oil filler vent tube, and oil filler screen assembly. Discard gaskets.

(2) Remove transmission input shaft plug, gasket, and snapring (view A, fig 2-4).

(3) Attach adapter (3, table 2-1) and puller (2, table 2-1) to transmission input shaft, and pull shaft rearward to disengage from engine flywheel (view D).

(4) Attach transmission sling (4, table 2-1) to transmission lifting eyes. Using a suitable hoist (transmission weighs approximately 3,000 pounds), take up slack until sling supports weight of transmission without lifting powerplant from blocks.

(5) Remove two screws, washers, and nuts and 17 screws, washers, and lockwashers securing transmission to engine (view E), using fabricated wrench (8, table 2-1).

(6) Carefully move transmission rearward to separate from engine.

b. Installation (fig 2-4).

(1) Using transmission sling (4, table 2-1) and a suitable hoist (transmission weighs approximately 3,000 pounds), remove replacement transmission from container.

(2) Remove shipping caps, plugs, covers, and mounts from replacement transmission as components are installed, and install them on unserviceable transmission.

(3) Position new transmission-to-engine preformed packing on transmission mounting flange (view F, fig 2-4).

(4) Remove transmission input shaft plug, gasket, and snapring (view A). Push transmission input shaft out rear of transmission.

(5) Aline transmission with dowel pins attached to engine, and carefully advance transmission onto dowel pins until transmission mounting flange is in contact with engine transmission adapter.

(6) Secure transmission to engine transmission adapter with two screws, washers, and nuts and 17 screws, washers, and lockwashers (view E), using fabricated wrench (8, table 2-1).

(7) Remove transmission sling.

(8) Push transmission input shaft into transmission. If engine and transmission splines do not aline, remove six power takeoff cover screws and lockwashers (view C). Remove cover and gasket. Discard gasket.

(9) Using transmission turning wrench (5, table 2-1), turn transmission (view B) until splines aline and shaft will slide in and seat properly.

(10) Remove transmission turning wrench (view B).

(11) Install transmission input shaft snapring, plug, and gasket (view A).

(12) Position power takeoff cover and gasket on transmission housing and secure with six screws and lockwashers (view C).

(13) Refer to applicable sections of TM 9-2350-258-20-1, and install items removed in step *a*(1) above.

(14) Fill transmission to proper level with oil (LO 9-2350-258-12).

(15) Refer to applicable sections of TM 9-2350-258-20-1, and perform the following:

(*a*) Test run powerplant. Check for oil and fuel leaks during test run.

(*b*) Install powerplant.

(*c*) Road-test vehicle and perform applicable portions of before, during, and after road test inspections, checks, and services.

(16) Install unserviceable transmission in container.

2-22. Fuel Tanks

a. Left Fuel Tank Removal (Fig 2-5).

(1) Refer to TM 9-2350-258-20-1 and remove powerplant.

(2) Remove accelerator linkage from engine compartment (para 3-36).

(3) Refer to applicable sections of TM 9-2350-258-20-1, and perform the following:

(*a*) Remove left air cleaner intake elbow and hose.

(*b*) On -2A engines, vehicles serial numbered A3001 through A3999 only, disconnect fuel shutoff ca-

ble from fuel shutoff valve and bulkhead bracket.

(*c*) On -2D engines, vehicles serial numbered A1001 through A1999 only, disconnect fuel shutoff cable from bulkhead bracket.

(*d*) Remove screw and lockwasher securing tachometer cable clamp to engine compartment bulkhead.

(*e*) Drain fuel tanks.

(4) On -2D engines, vehicles serial numbered A1001 through A1999 only, disconnect primer pump fuel supply tube from tee at check valve (view A, fig 2-5, sh 1 of 4).

(5) Remove screw and lockwasher securing fuel hose/tube support bracket to bulkhead (views A and B).

(6) Vehicles serial numbered A1001 through A1999 only, remove screw and lockwasher securing engine fuel supply tube clamp to bulkhead (view A).

(7) Vehicles serial numbered A3001 through A3999 only, remove screw and lockwasher securing fuel supply tube clamp to lower front of fuel tank (view B). Disconnect fuel supply tube from check valve (view B) and elbow at rear of fuel tank (view C, sh 2 of 4). Remove tube.

(8) Disconnect vent hose from crossover tube (view B, sh 1 of 4).

(9) Disconnect electrical lead connector from fuel gage transmitter (view D, sh 2 of 4).

(10) Disconnect electrical lead connector from capacitor at rear of fuel tank (view E).

(11) Disconnect fuel return hose from selector valve, and remove hose from fuel tank (view E).

(12) Remove four screws and lockwashers securing left powerplant guide to hull, and remove guide (view F).

(13) Remove 14 screws and lockwashers securing bulkhead access cover to bulkhead, and remove cover and gasket (view G).

NOTE

Gain access to bulkhead access cover through battery access door in turret floor.

(14) Remove lockwire, 16 screws, and 16 washers securing isolation valve and hose flanges to left and right fuel tanks (view H). Remove isolation valve, gasket, hose, and flanges.

(15) Remove 12 screws and lockwashers securing access cover to left side of bulkhead, and remove cover and gasket (view J, sh 3 of 4). Discard gasket.

(16) Remove nut and lockwasher securing upper front mount bolt to mount plate (view K).

(17) Remove two screws and three lockwashers securing lower rear mount, and ground strap to hull bracket (view M).

(18) Remove screw, nut, lockwasher, three washers, and two rubber bumpers securing upper rear mount bracket to hull bracket (view N).

(19) Loosen screw and nut securing lower front mount upper bracket to lower bracket (view Q, sh 4 of 4). Remove two screws and lockwashers securing lower bracket to hull, and remove mount.

CAUTION

Do not use pry bars to force fuel tank from hull. Do not scrape or damage fuel tanks.

(20) Remove metal hose assembly from fire extinguisher discharge tube.

(21) Pivot fuel tank toward center of hull while gradually moving it rearward until clear of bulkhead. Remove fuel tank from hull.

(22) If fuel tank is being replaced, remove components listed below and all fittings.

(*a*) Upper front mount (para 3-22).

(*b*) Upper rear mount bracket (para 3-23).

(*c*) Lower rear mount (para 3-24).

(*d*) Lower front mount bracket (para 3-25).

(23) Refer to applicable sections of TM 9-2350-258-20-1, and remove following:

(*a*) Capacitor and cover.

(*b*) Fuel pump.

(*c*) Fuel gage transmitter.

(*d*) Condensate removal quick-disconnect.

(*e*) Fire extinguisher tube.

(*f*) Ground strap.

(*g*) Emergency filler filter and cover.

(*h*) Vent hose.

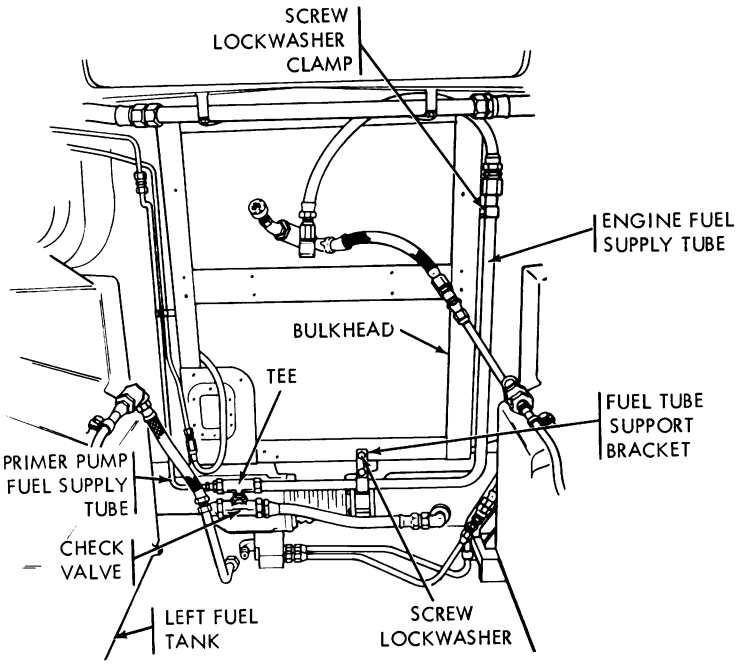
b. Left Fuel Tank Installation (Fig 2-5).

CAUTION

Do not use pry bars to force fuel tank into position in hull. Do not scrape or damage fuel tank.

(1) Coat all male threads with sealing compound (MIL-S-7916, grade CV) prior to installation.

(2) Install left fuel tank in the reverse order of the removal procedure.



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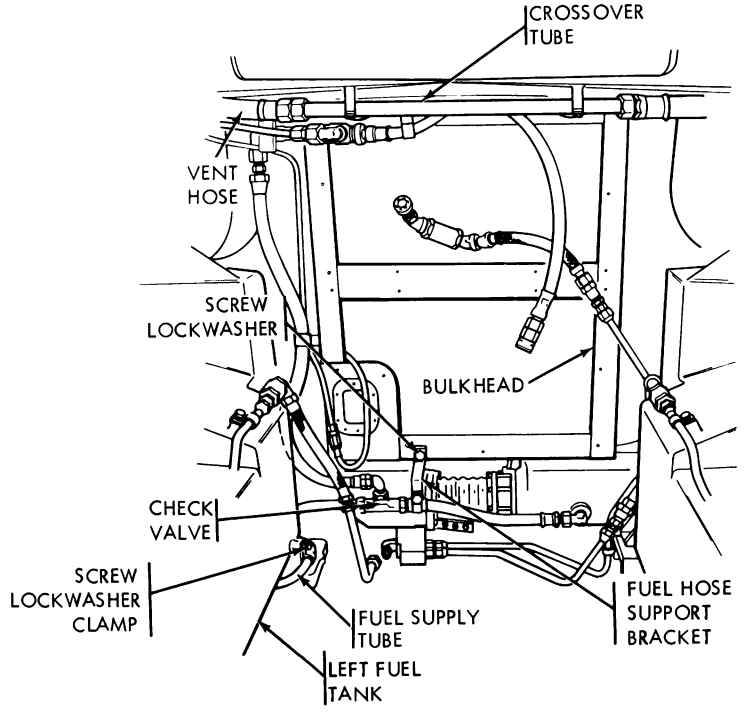
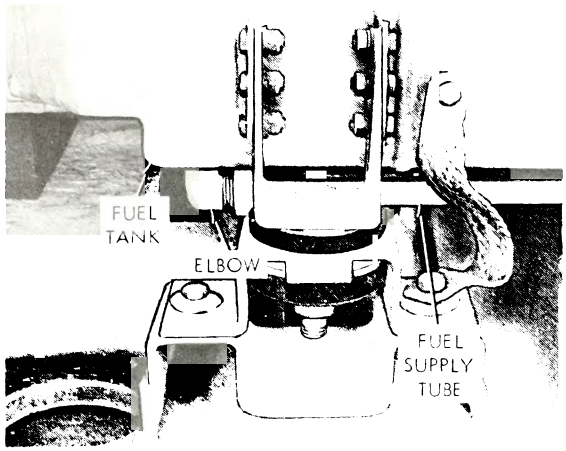


B

TA038022

Figure 2-5. Left fuel tank removal and installation (sheet 1 of 4).



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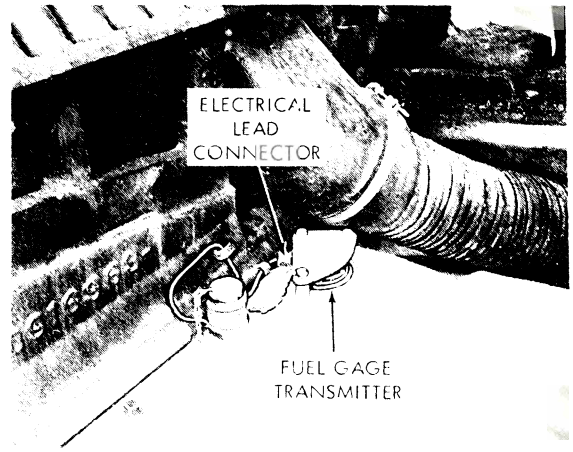

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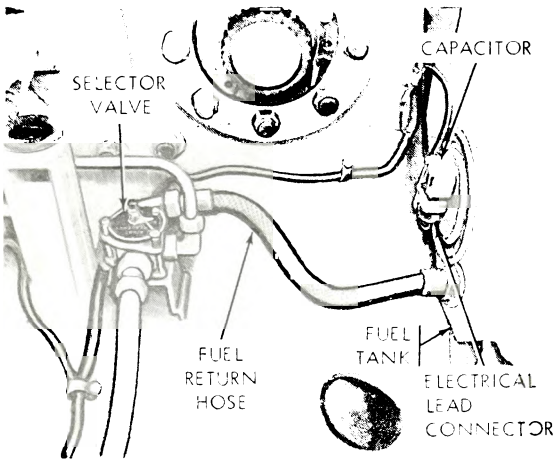

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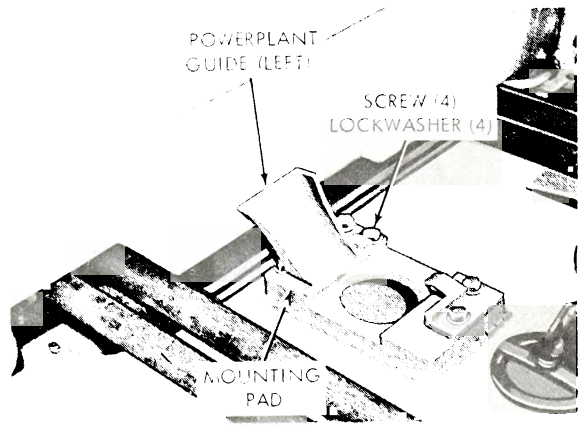

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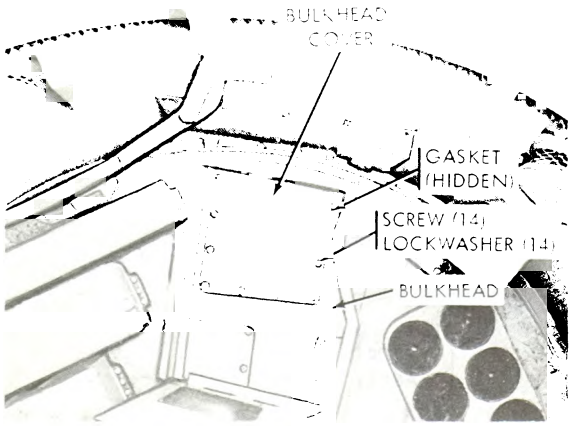

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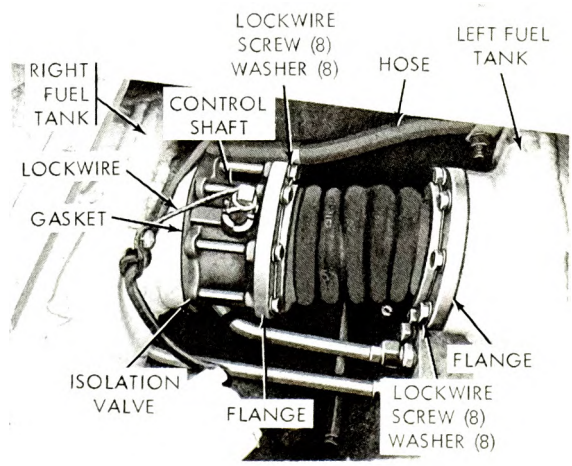
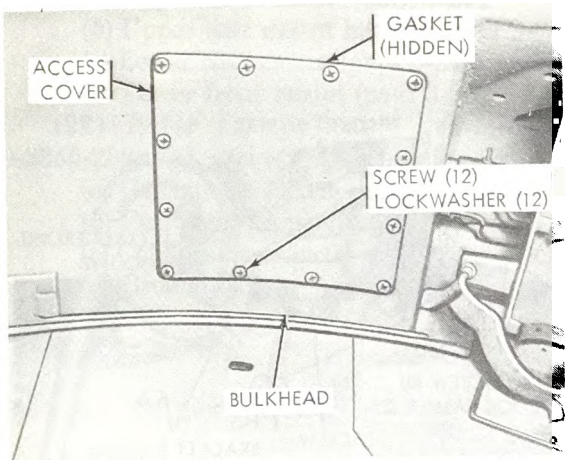


H

TA038023

Figure 2-5. Left fuel tank removal and installation (sheet 2 of 4).



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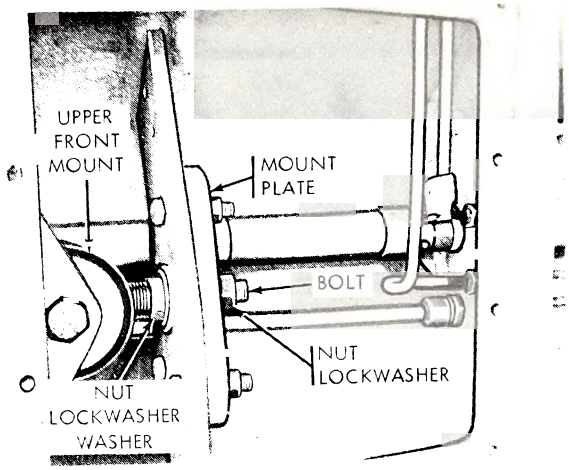

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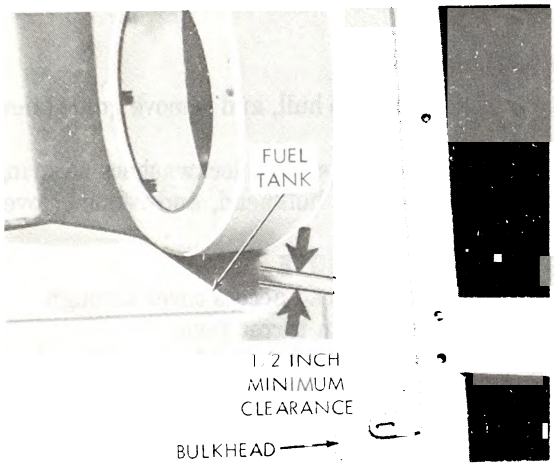

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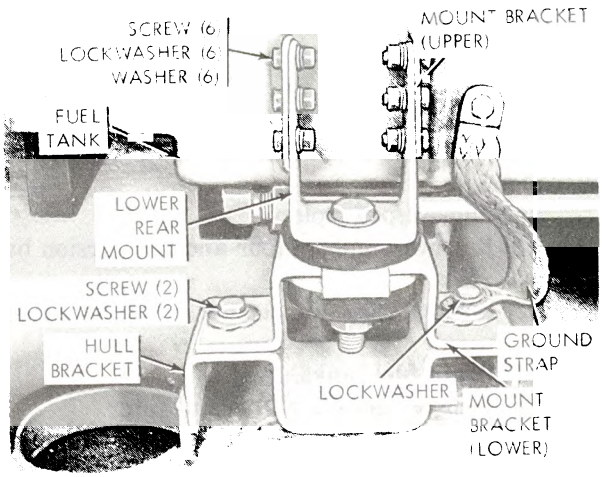

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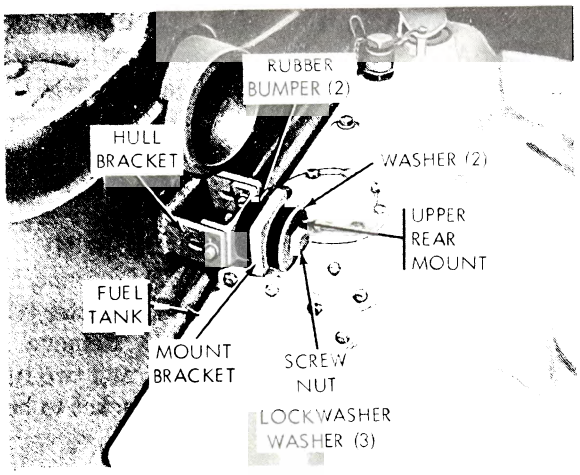

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TA038024

Figure 2-5. Left fuel tank removal and installation (sheet 3 of 4).

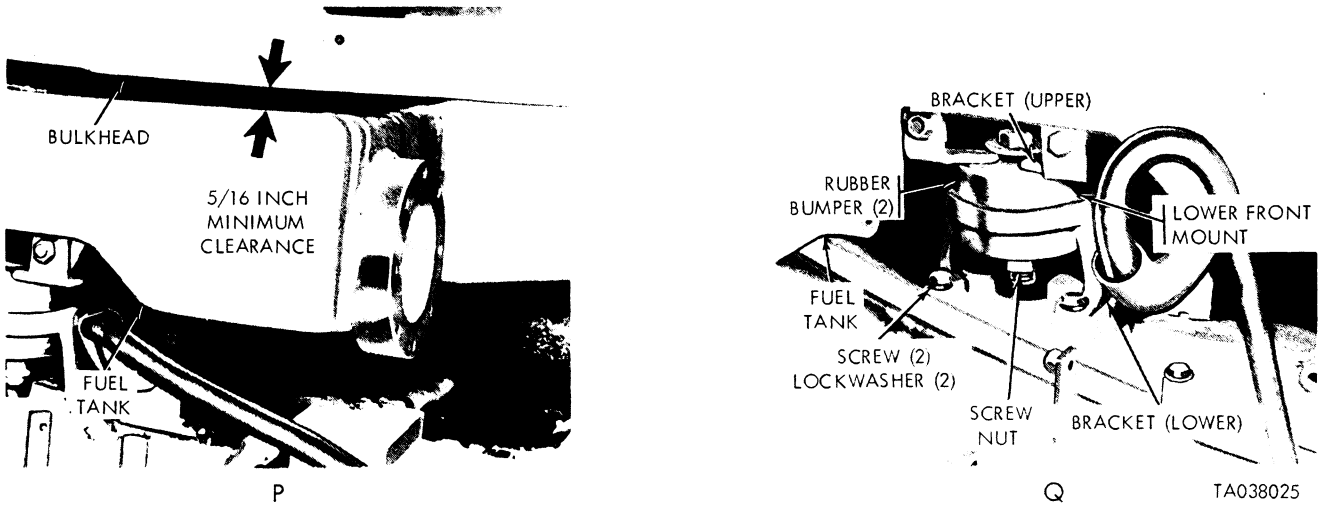


Figure 2-5. Left fuel tank removal and installation (sheet 4 of 4).

c. Right Fuel Tank Removal (fig 2-6).

(1) Refer to TM 9-2350-258-20-1 and perform the following:

(*a*) Remove powerplant.

(*b*) Remove numbers four and five torsion bars from both sides.

(*c*) Remove right air cleaner intake elbow and hose.

(*d*) Drain fuel tanks.

(*e*) Remove fuel filler tube and filter.

(2) On -2D engines, vehicles serial numbered A1001 through A1999 only, perform the following:

(*a*) Disconnect engine fuel supply tube from tee at check valve (view A, fig 2-6, sh 1 of 3).

(*b*) Remove screw and lockwasher securing fuel tube support bracket to bulkhead (view A).

(*c*) Remove screw and lockwasher securing engine fuel supply tube clamp to bulkhead, and remove tube (view A).

(3) Disconnect vent hose from crossover tube (view A).

(4) Disconnect fuel supply tube from right fuel tank (view A).

(5) Disconnect two fire extinguisher tubes from manifold (view A).

(6) Remove four screws and lockwashers securing fire extinguisher tube to fuel tank, and remove tube (view A).

(7) Remove four screws and lockwashers securing fuel tank lower front mount and fire extinguisher tube clamp bracket to hull (view C). Remove fire extinguisher tube.

(8) Remove screw and lockwasher securing fuel return hose clamp to hull (view D, sh 2 of 3).

(9) Disconnect fuel return hose from crossover tube, and remove from fuel tank (view D).

(10) Remove four screws and lockwashers securing right powerplant guide to hull, and remove guide (view E).

(11) Remove 14 screws and lockwashers securing bulkhead access cover to bulkhead, and remove cover (view F).

NOTE

Gain access to bulkhead access cover through battery access door in turret floor.

(12) Disconnect electrical lead connector from capacitor at front of fuel tank (view G).

(13) Remove lockwire, 16 screws, and 16 washers securing isolation valve and hose flanges to left and right fuel tanks (view H). Remove isolation valve, gasket, hose, and flanges.

(14) Remove 12 screws and lockwashers securing access cover to right side of bulkhead, and remove cover and gasket (view J). Discard gasket.

(15) Remove nut and lockwasher securing upper front mount bolt to mount plate (view L, sh 3 of 3).

(16) Remove two screws and three lockwashers securing lower rear mount and ground strap to hull bracket (view M).

(17) Disconnect electrical lead connector from fuel gage transmitter (view N).

(18) Remove screw, nut, lockwasher, three washers, and two rubber bumpers securing upper rear mount bracket to hull bracket (view N).

CAUTION

Do not use pry bars to force fuel tank from hull. Do not scrape or damage fuel tanks.

(19) Remove metal hose assembly from fire extinguisher discharge tube.

(20) Pivot fuel tank toward center of hull while gradually moving it rearward until clear of bulkhead. Remove fuel tank from hull.

(21) If fuel tank is being replaced, remove components listed below and all fittings.

(*a*) Upper front mount (para 3-22).
(*b*) Upper rear mount bracket (para 3-23).
(*c*) Lower rear mount (para 3-24).
(*d*) Lower front mount (para 3-26).

(22) Refer to applicable sections of TM 9-2350-258-20-1, and remove the following:
(*a*) Capacitor and fuel pump.
(*b*) Fuel gage transmitter.
(*c*) Condensate removal quick-disconnect.
(*d*) Ground strap.
(*e*) Vent hose.

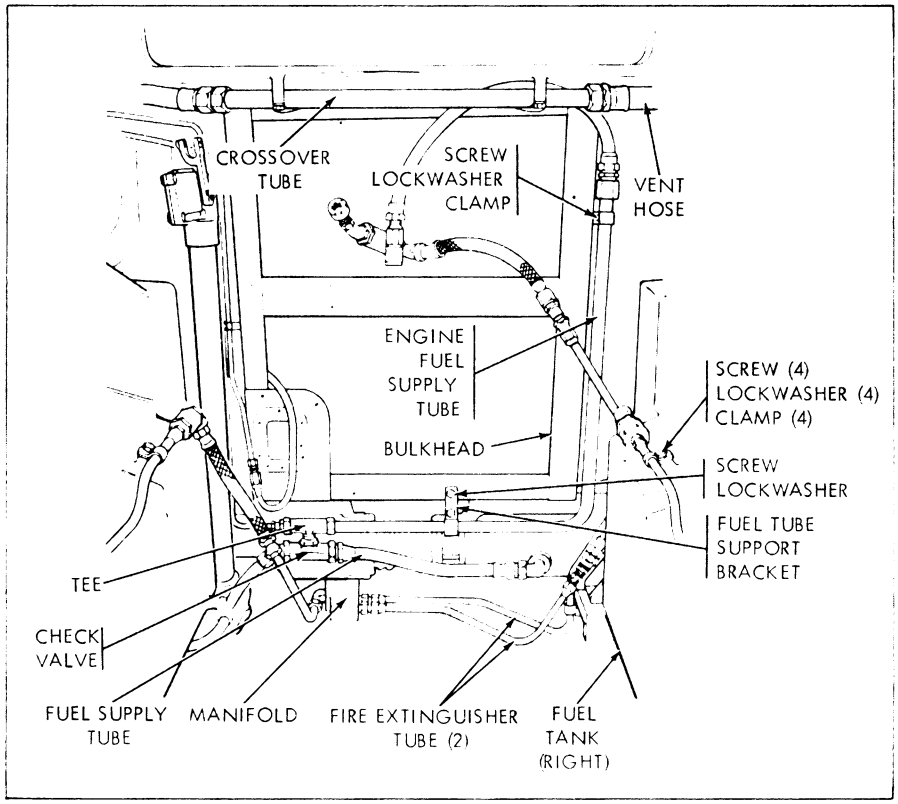
d. Right Fuel Tank Installation (Fig 2-6).

CAUTION

Do not use pry bars to force fuel tank into position in hull. Do not scrape or damage fuel tank.

(1) Coat all male threads with sealing compound (MIL-S-7916, grade CV) prior to installation.

(2) Install right fuel tank in the reverse order of the removal procedure.



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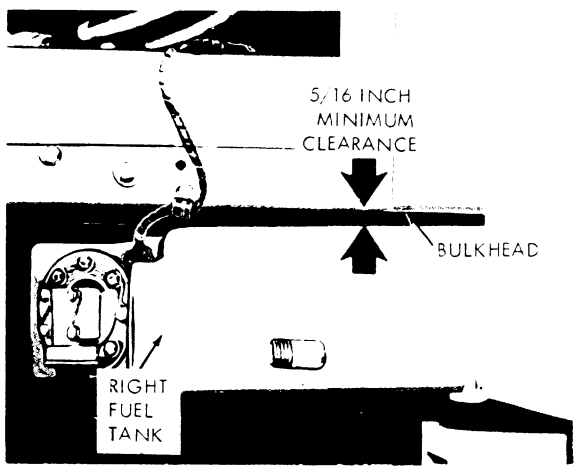

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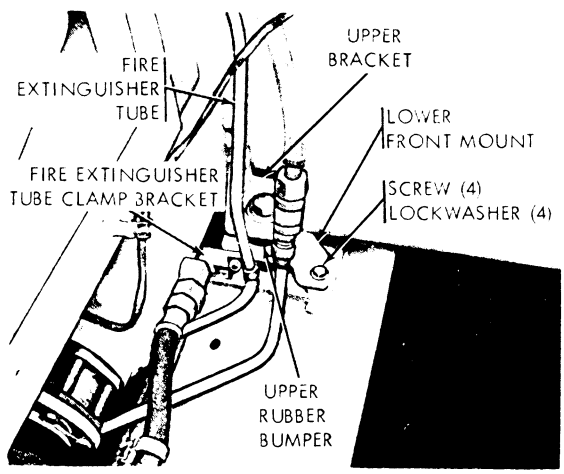
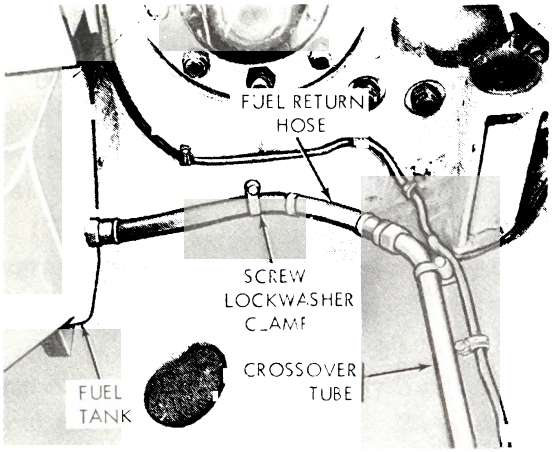


C

TA038026

Figure 2-6. Right fuel tank removal and installation (sheet 1 of 3).



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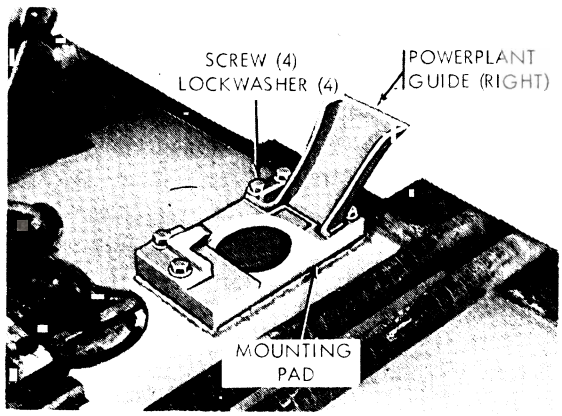

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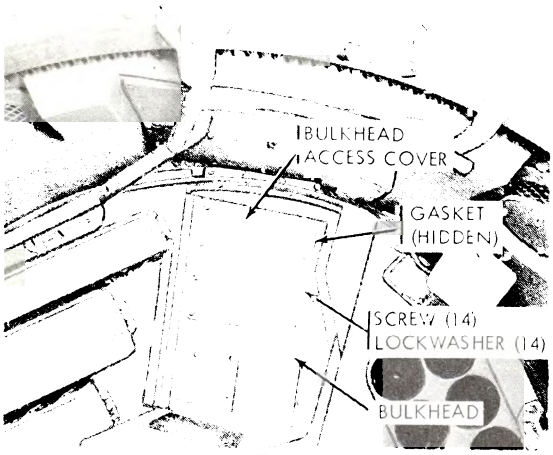

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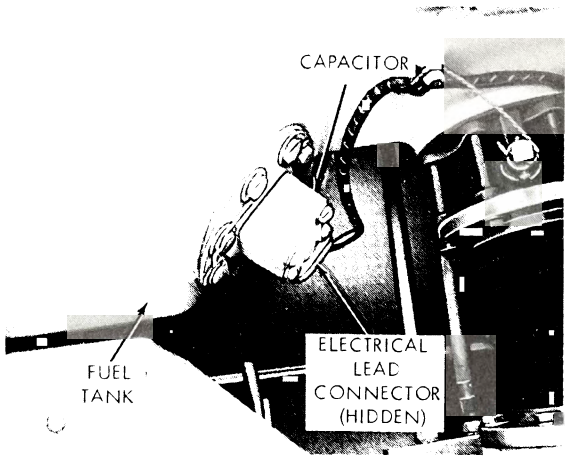

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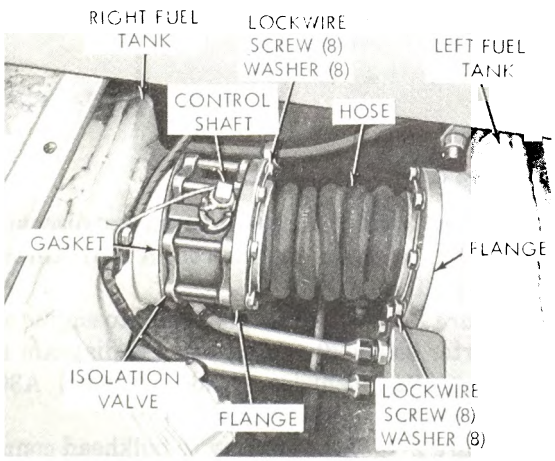

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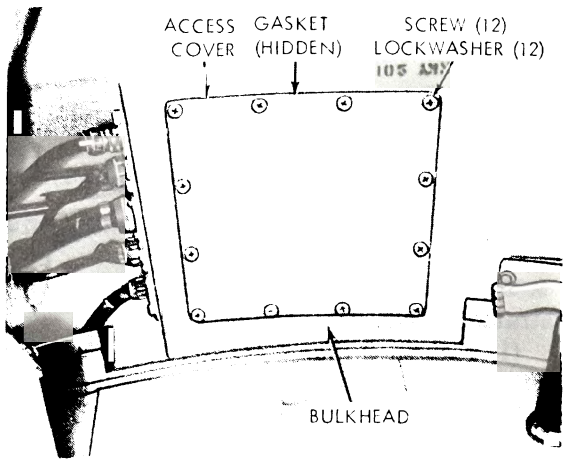
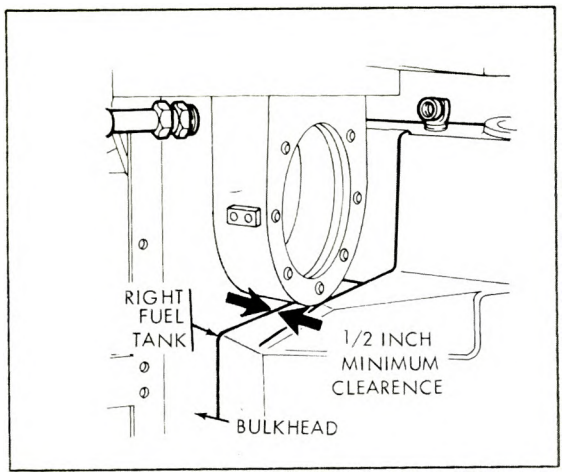
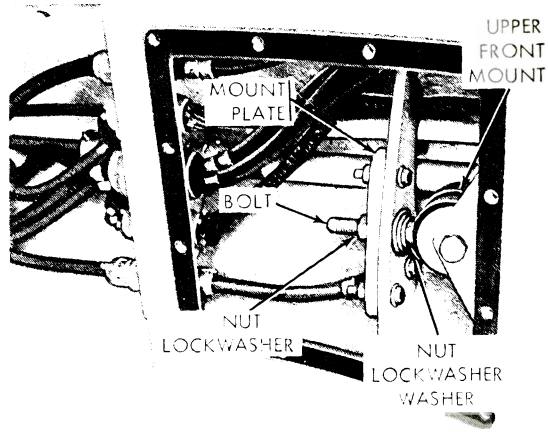


J

TA038027

Figure 2-6. Right fuel tank removal and installation (sheet 2 of 3).





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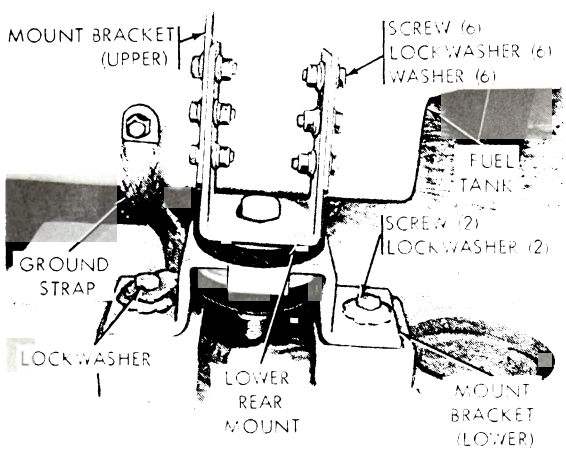

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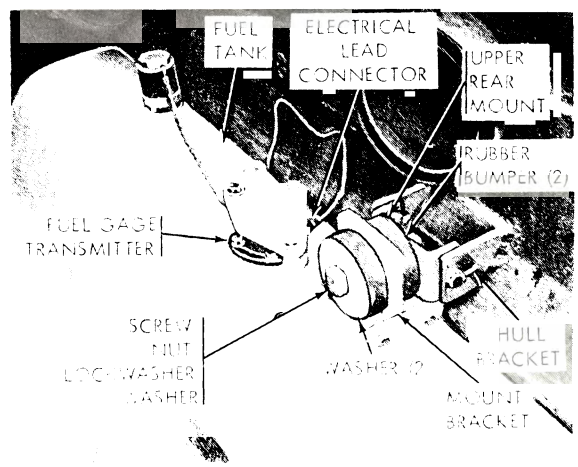

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TA038028

Figure 2-6. Right fuel tank removal and installation (sheet 3 of 3).

2-23. Electrical Harnesses, Leads, and Cables

a. Illustrations. Harnesses, leads, and cables are illustrated as follows:

(1) *Figures 2-7 and FO-1.* Front master wiring harness diagram and disconnect points, (vehicles serial numbered A1001 through A1999 only) -2D engine.

(2) *Figures 2-8 and FO-2.* Front master wiring harness diagram and disconnect points, (vehicles serial numbered A3001 through A3999 only) -2A engine.

(3) *Figure 2-9.* Rear accessory wiring harness diagram and disconnect points (all vehicles).

(4) *Figure 2-10.* Slipring and accessory wiring harness wiring diagram and disconnect points (all vehicles).

(5) *Figure 2-11.* Bulkhead connector to engine connector (starter) wiring harness diagram and disconnect points, (vehicles serial numbered A1001 through A1999 only) -2D engine.

(6) *Figure 2-12.* Bulkhead connector to engine connector (starter solenoid) wiring harness diagram and disconnect points, (vehicles serial numbered A3001 through A3999 only) -2A engine.

(7) *Figure 2-13.* Starter relay to bulkhead connector wiring harness diagram and disconnect points, (vehicles serial numbered A3001 through A3999 only) -2A engine.

(8) *Figure 2-14.* Bulkhead connector to engine connector and right fuel pump wiring harness diagram and disconnect points, (vehicles serial numbered A1001 through A1999 only) -2D engine.

(9) *Figure 2-15.* Bulkhead connector to engine con-

nector and right fuel pump wiring harness diagram and disconnect points, (vehicles serial numbered A3001 through A3999 only) -2A engine.

(10) *Figure 2-16.* Infrared periscope to infrared powerpack wiring harness disconnect points (all vehicles).

(11) *Figure 2-17.* Battery slave cable wiring diagram and disconnect points, (vehicles serial numbered A1001 through A1999 only) -2D engine.

(12) *Figure 2-18.* Battery slave cable wiring diagram and disconnect points, (vehicles serial numbered A3001 through A3999 only) -2A engine.

(13) *Figure 2-19.* Bulkhead connector to interphone intermediate connector cable wiring diagram and disconnect points (all vehicles).

(14) *Figure 2-20.* Bulkhead connector to engine connector (generator) cable disconnect points, (vehicles serial numbered A1001 through A1999 only) -2D engine.

NOTE

Refer to applicable sections of TM 9-2350-258-20-1 for identification of circuits and repair of harnesses, cables, and leads.

b. Removal.

NOTE

Refer to applicable illustration (*a.* above) for harness, cable, and/or lead disconnect points. If rear accessory wiring harness (*a* (3) above) and/or bulkhead connector to interphone intermediate connector cable (*a*(13) above) is being removed, remove right fuel tank (para 2-23).

(1) Disconnect wiring harness, cable, or lead connector(s) and/or terminal(s).

(2) Remove screws and washers securing harness, cable, and/or lead clamp(s), clip(s), and/or strap(s), and remove harness, cable and/or lead.

c. Installation.

(1) Install harness, cables, and/or leads in the reverse order of the removal procedure.

(2) Check applicable electrical components for proper operation.

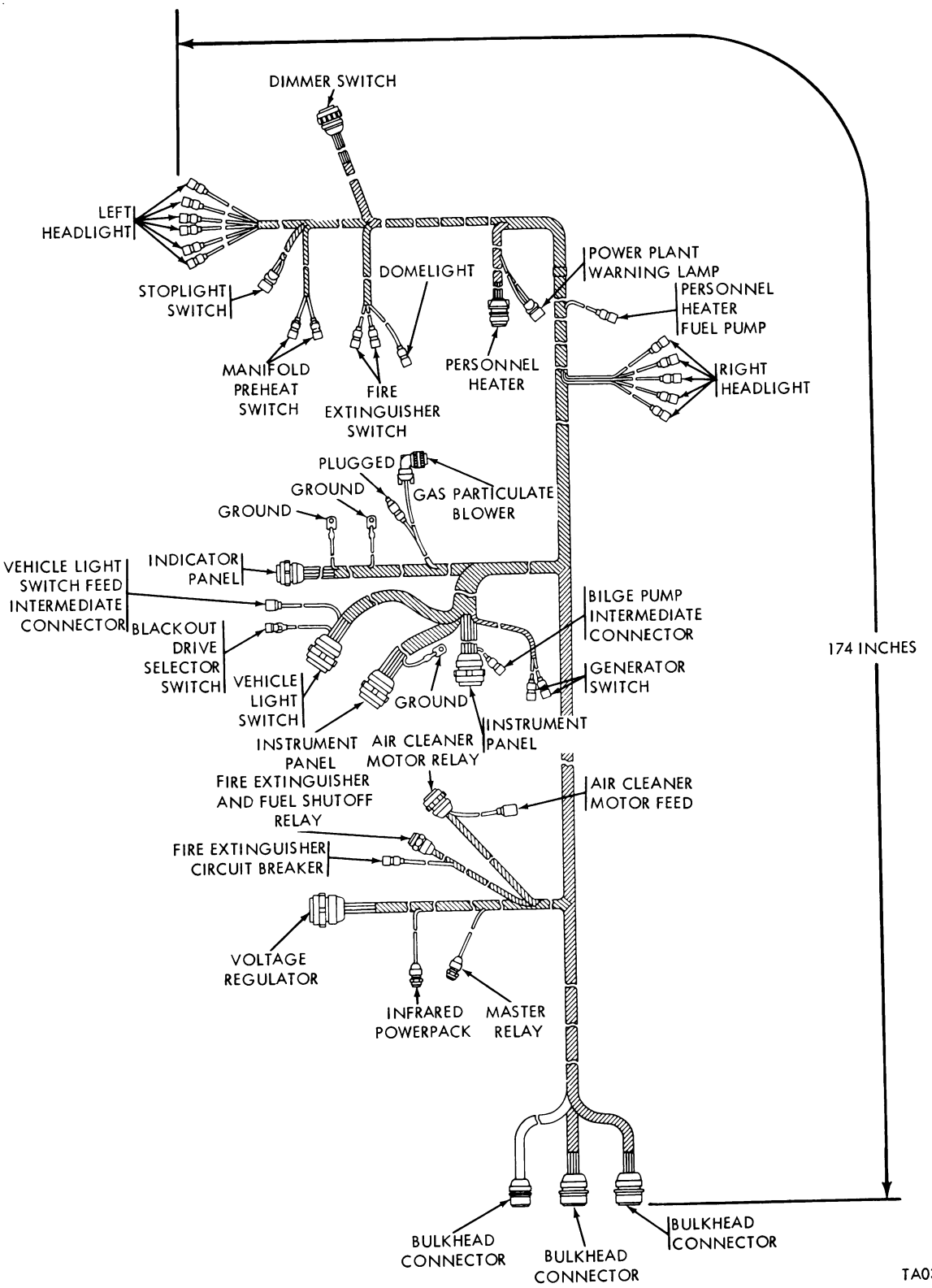


Figure 2-7. Front master wiring harness diagram and disconnect points vehicles serial numbered A1001 through A1999 only -2D engine.

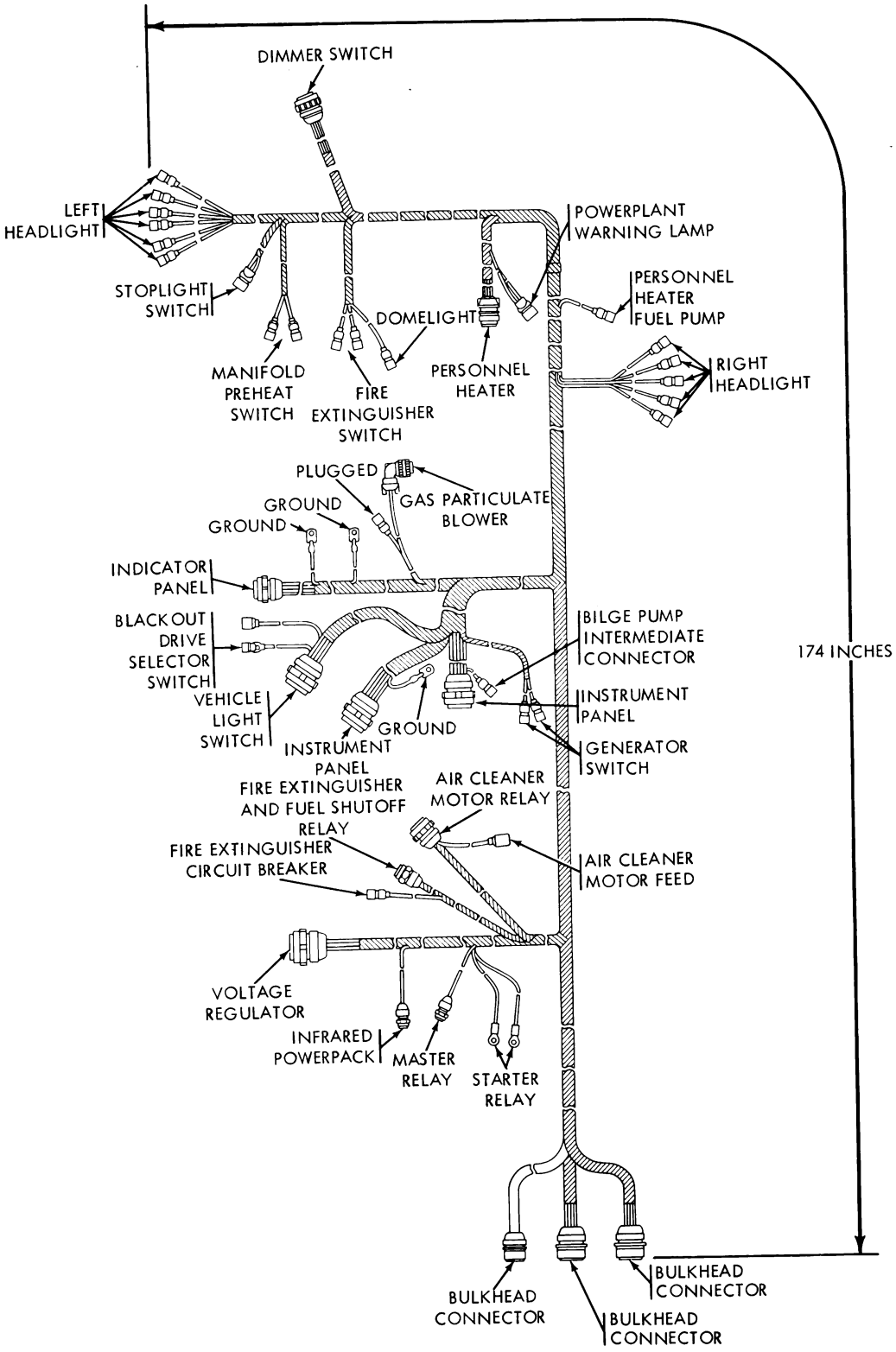
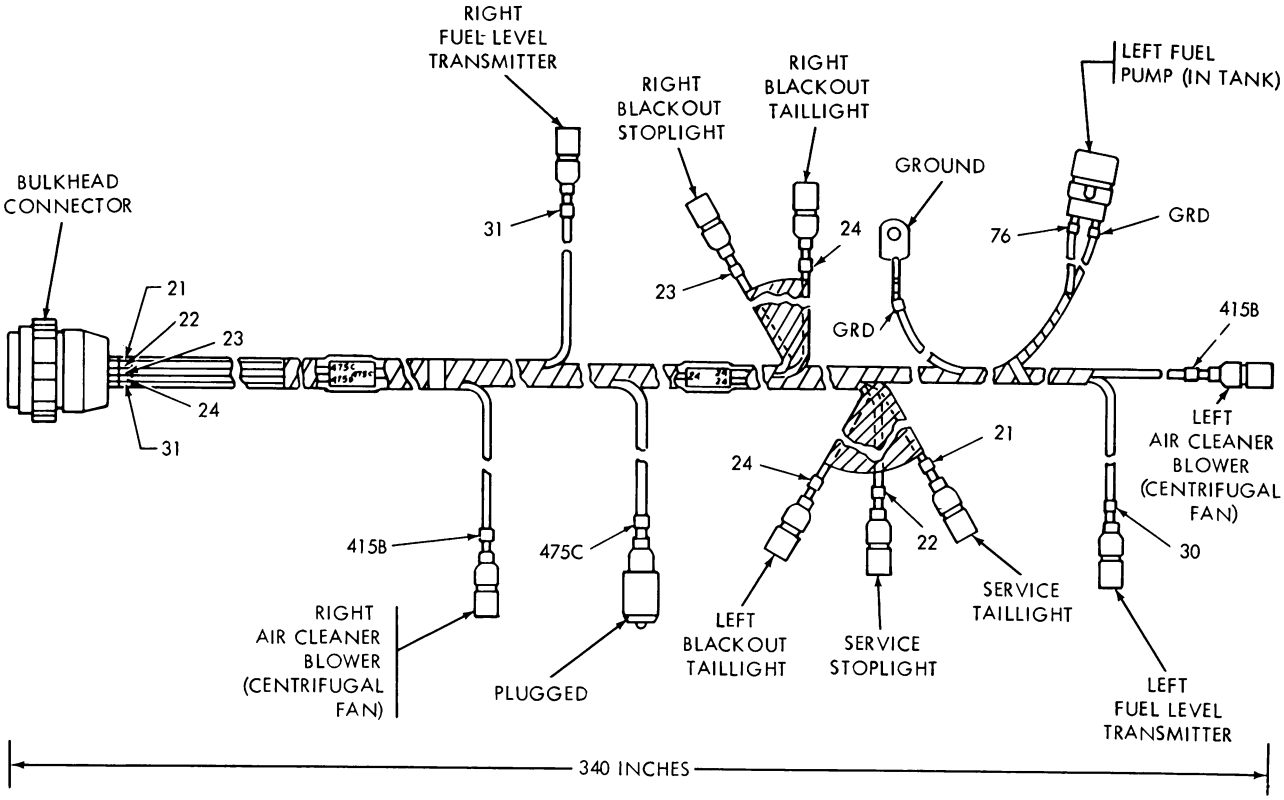


Figure 2-8. Front master wiring harness diagram and disconnect points vehicles serial numbered A3001 through A3999 only -2A engine.



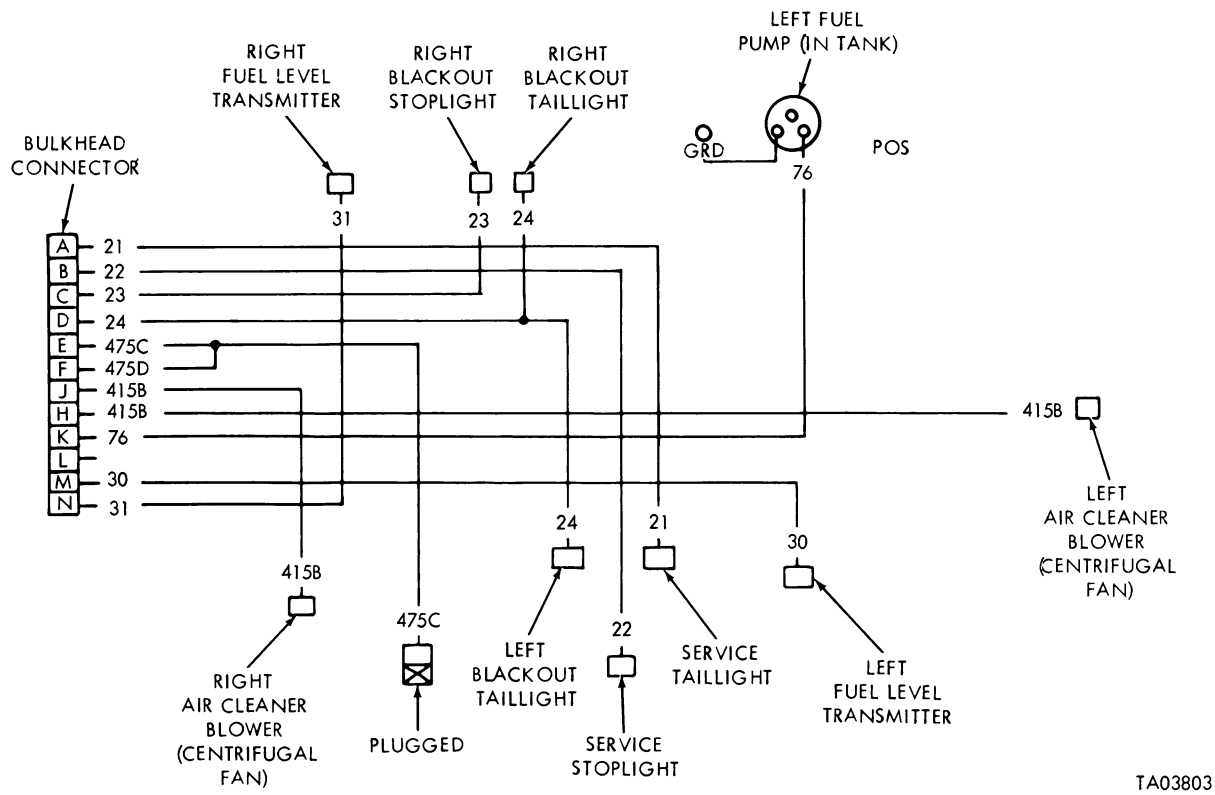
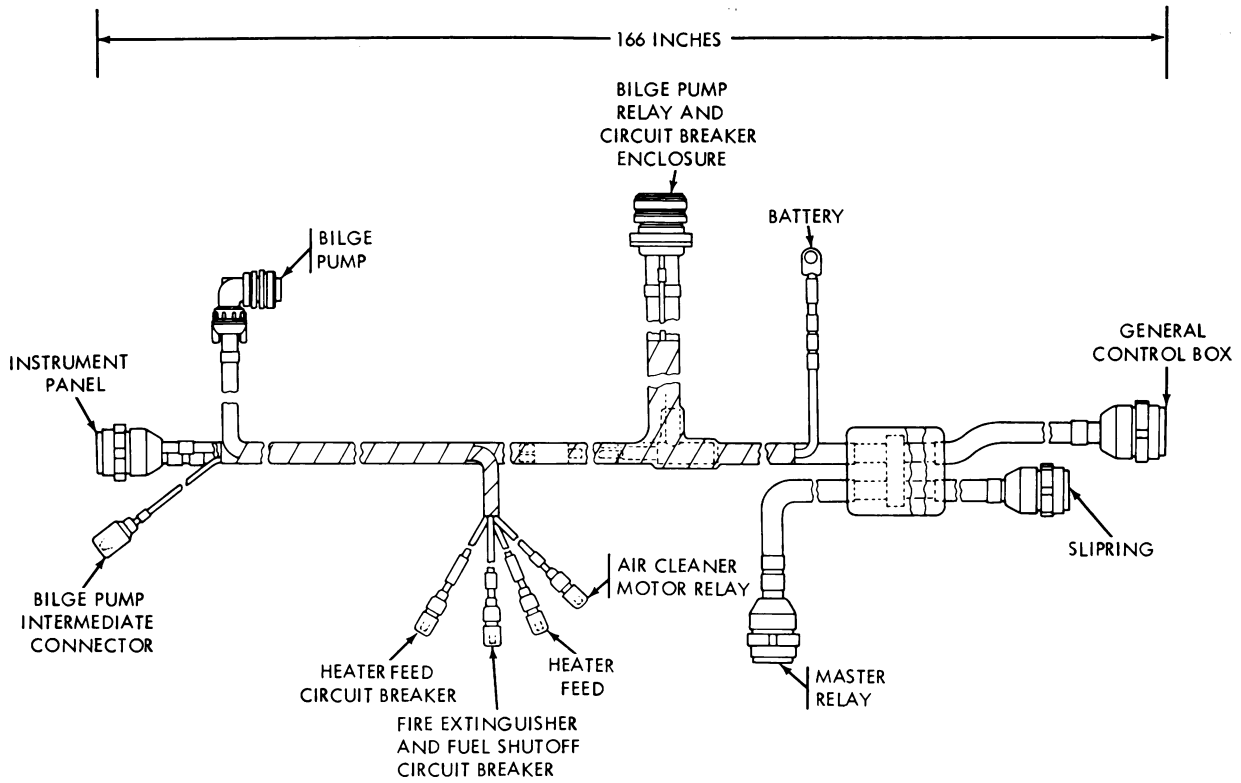
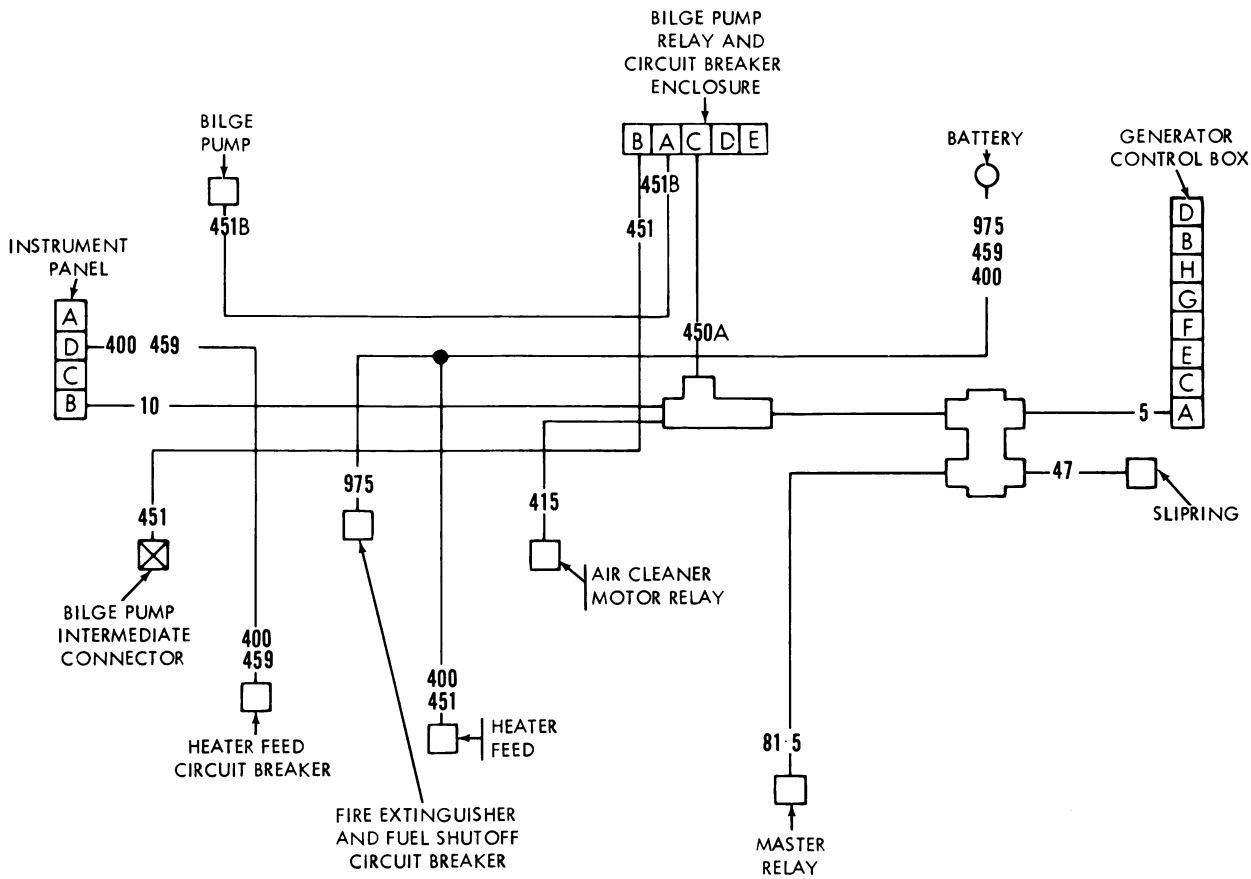


Figure 2-9. Rear accessory wiring harness wiring diagram and disconnect points — all vehicles.



A - HARNESS



B - WIRING DIAGRAM

TA038032

Figure 2-10. Slipring and accessory wiring harness wiring diagram and disconnect points — all vehicles.

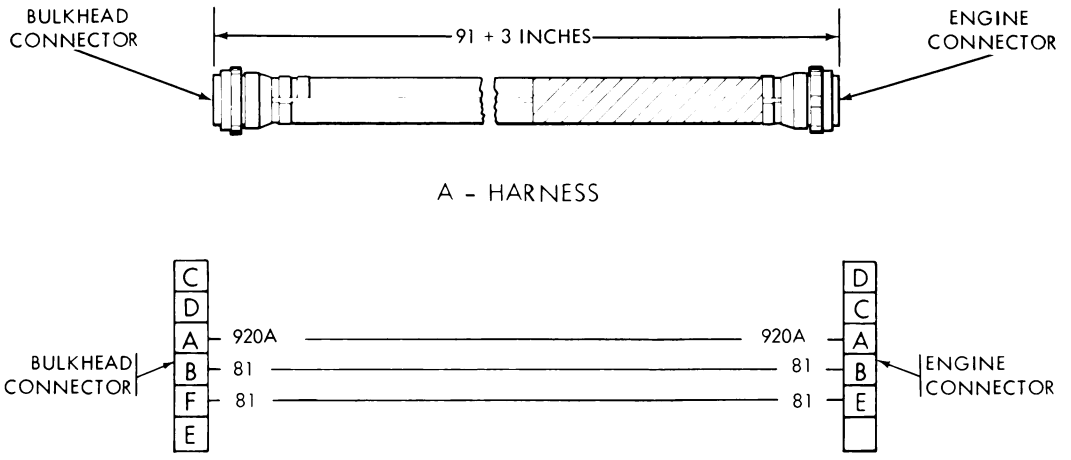


Figure 2-11. Bulkhead connector to engine connector starter wiring harness wiring diagram, and disconnect points vehicles serial numbered A1001 through A1999 only -2D engine.

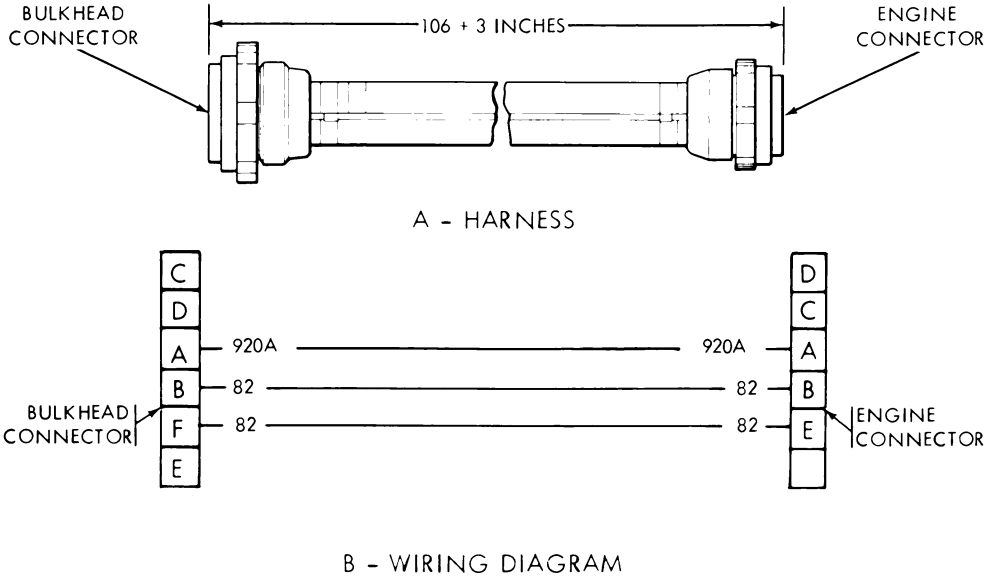


Figure 2-12. Bulkhead connector to engine connector starter wiring harness wiring diagram, and disconnect points vehicles serial numbered A3001 through A3999 only -2A engine.

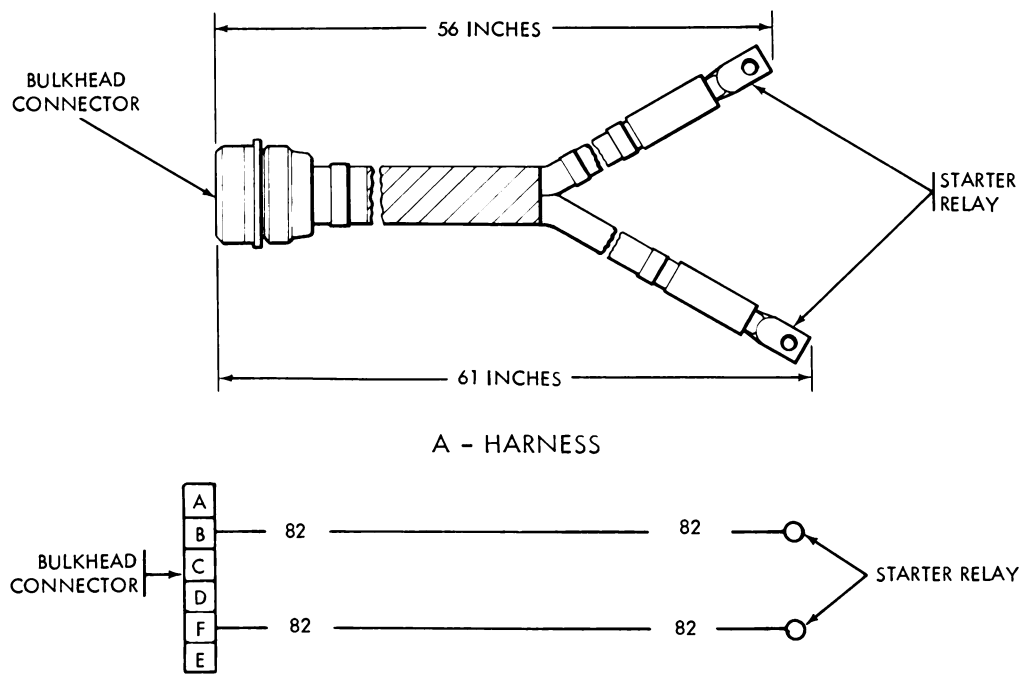


Figure 2-13. Starter relay to bulkhead connector wiring harness wiring diagram, and disconnect points vehicles serial numbered A3001 through A3999 only -2A engine.

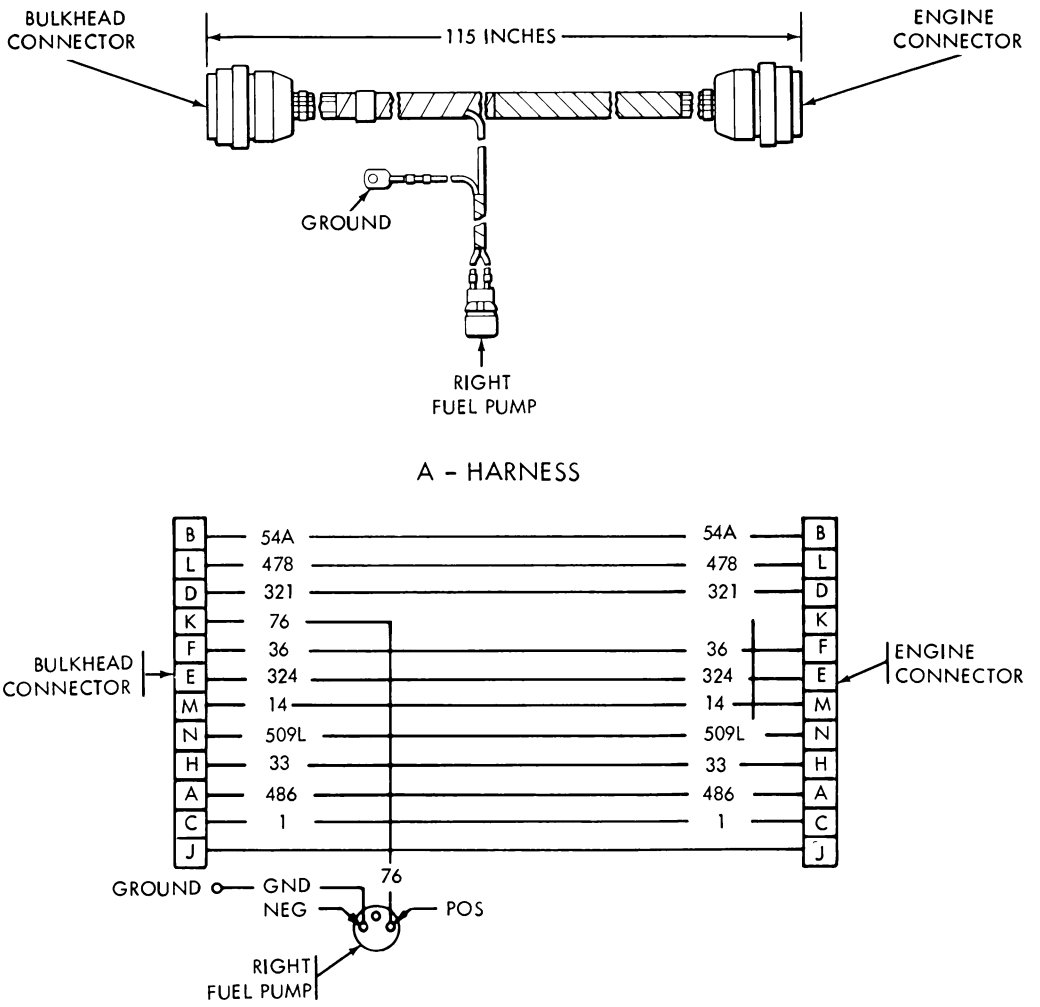


Figure 2-14. Bulkhead connector to engine connector, right fuel pump wiring harness diagram, and disconnect points vehicles serial numbered A1001 through A1999 only -2A engine.

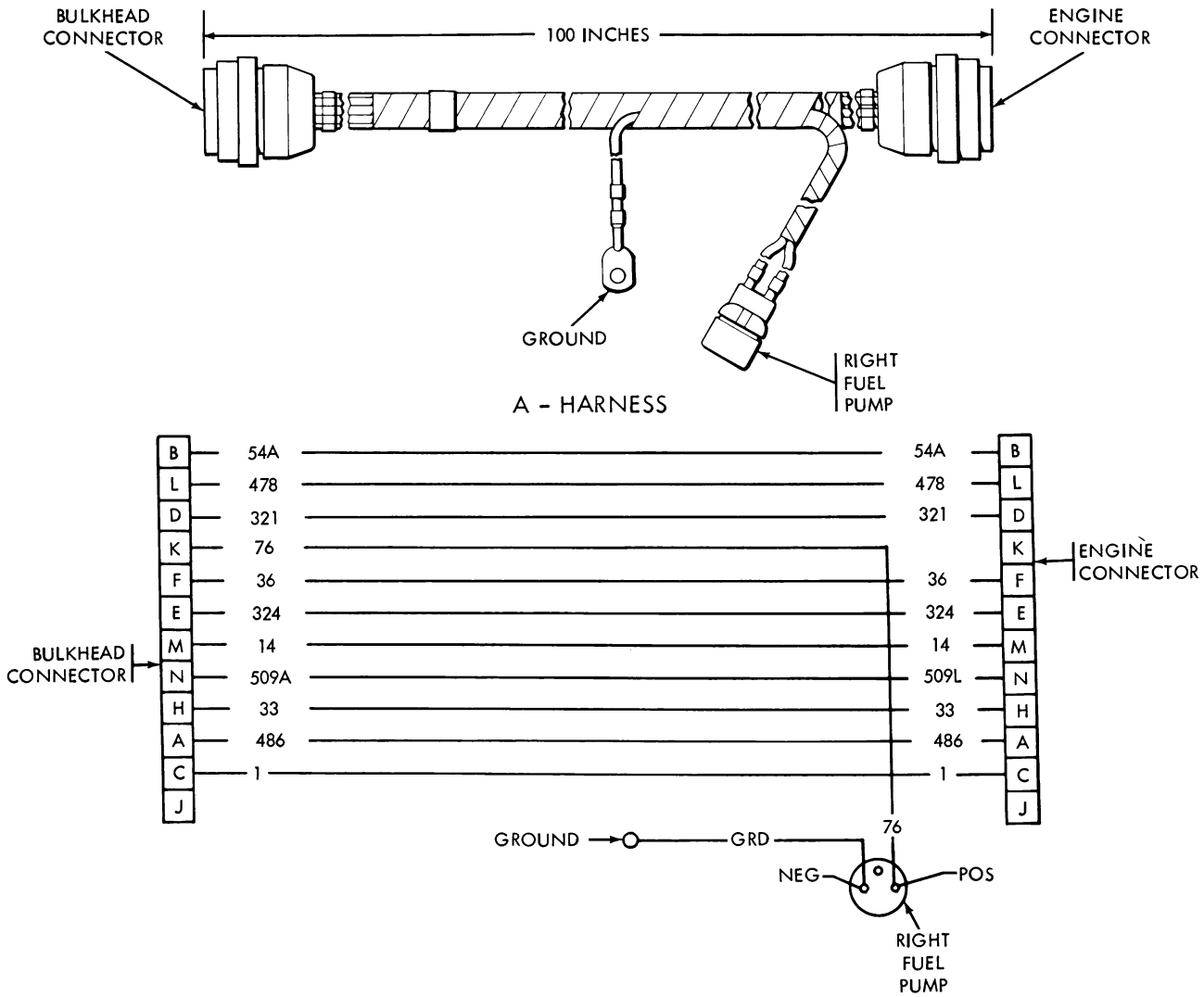


Figure 2-15. Bulkhead connector to engine connector, right fuel pump wiring harness wiring diagram, and disconnect points vehicles serial numbered A3001 through A3999 only -2A engine.

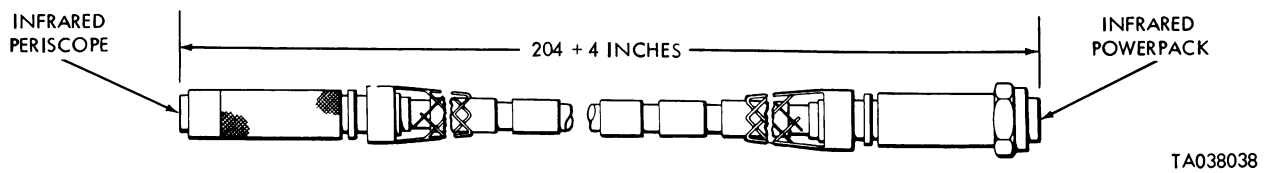


Figure 2-16. Infrared periscope to infrared powerpack wiring harness disconnect points — all vehicles.

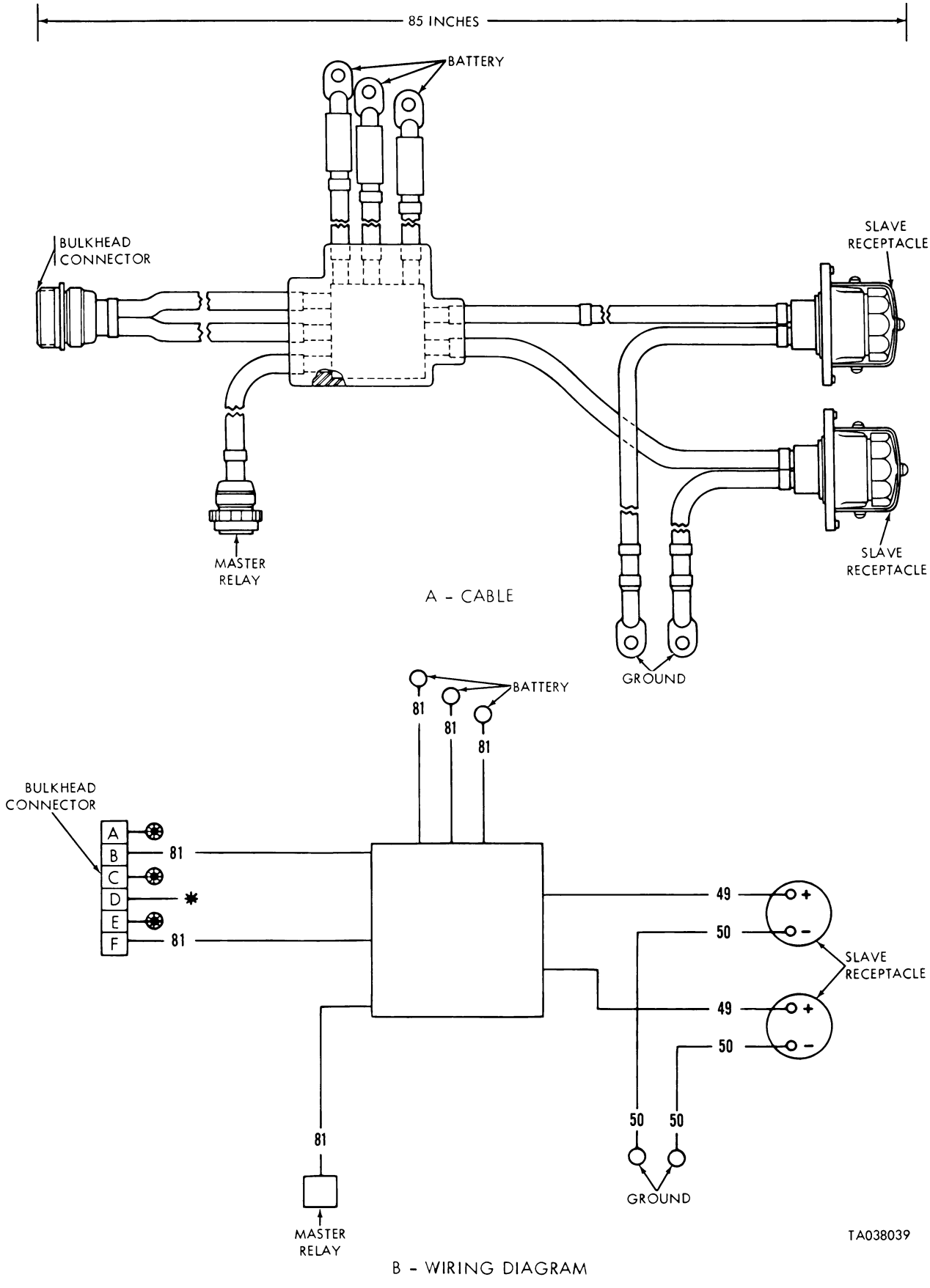
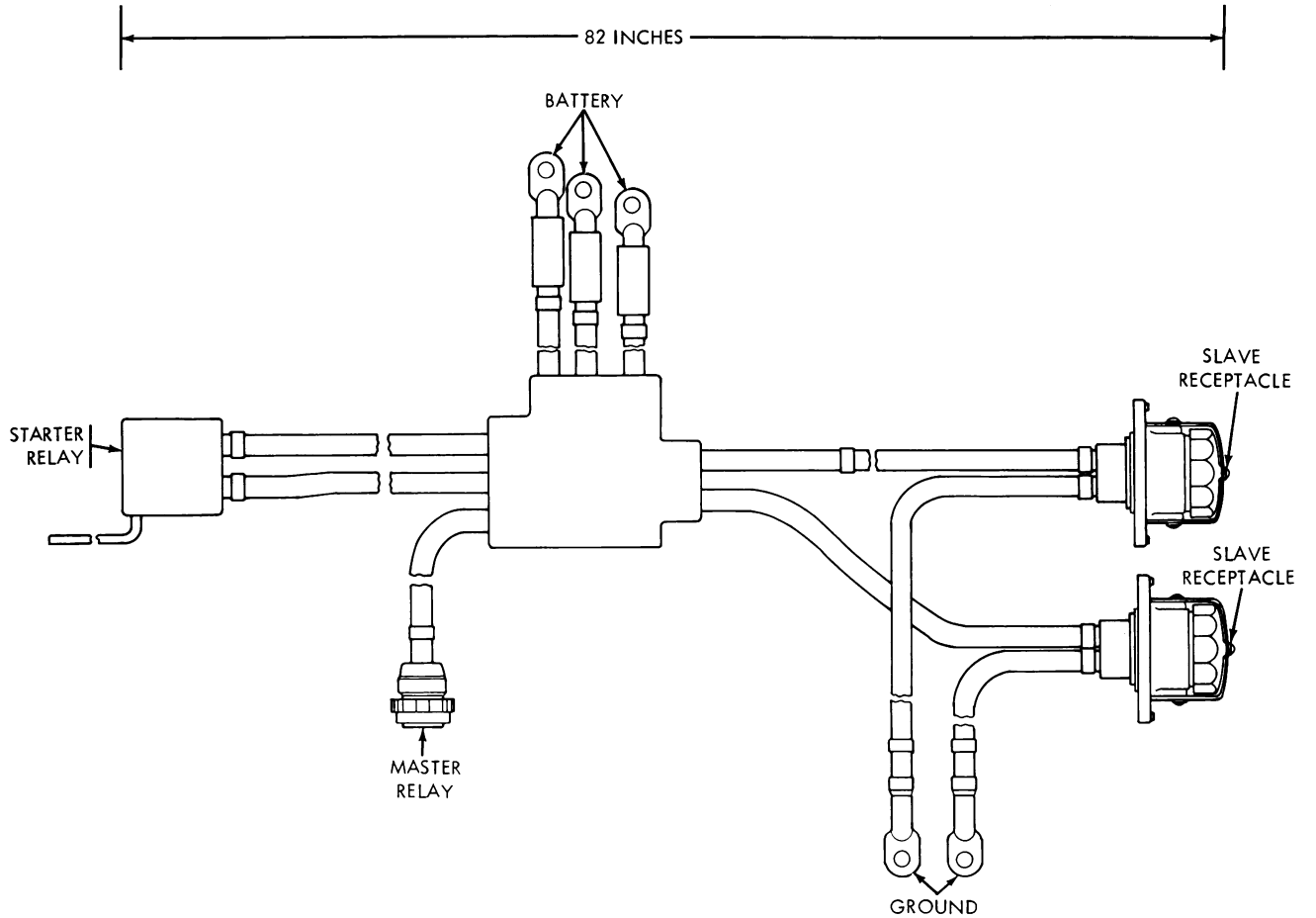
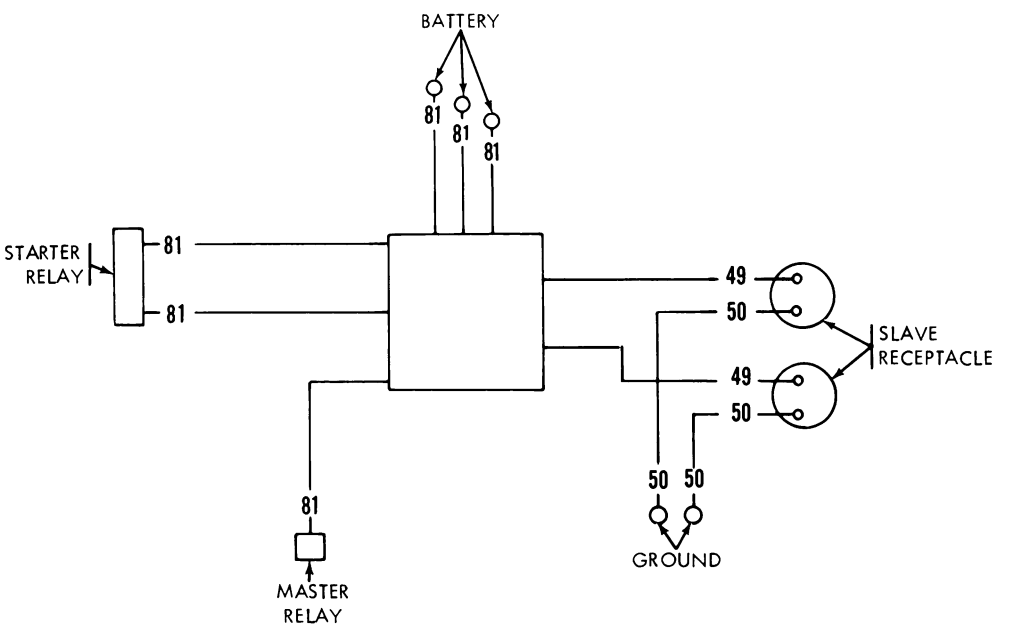


Figure 2-17. Battery slave cable wiring diagram and disconnect points vehicles serial numbered A1001 through A1999 only -2D engine.



A - HARNESS



B - WIRING DIAGRAM

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Figure 2-18. Battery slave cable wiring diagram and disconnect points vehicles serial numbered A3001 through A3999 only -2A engine.

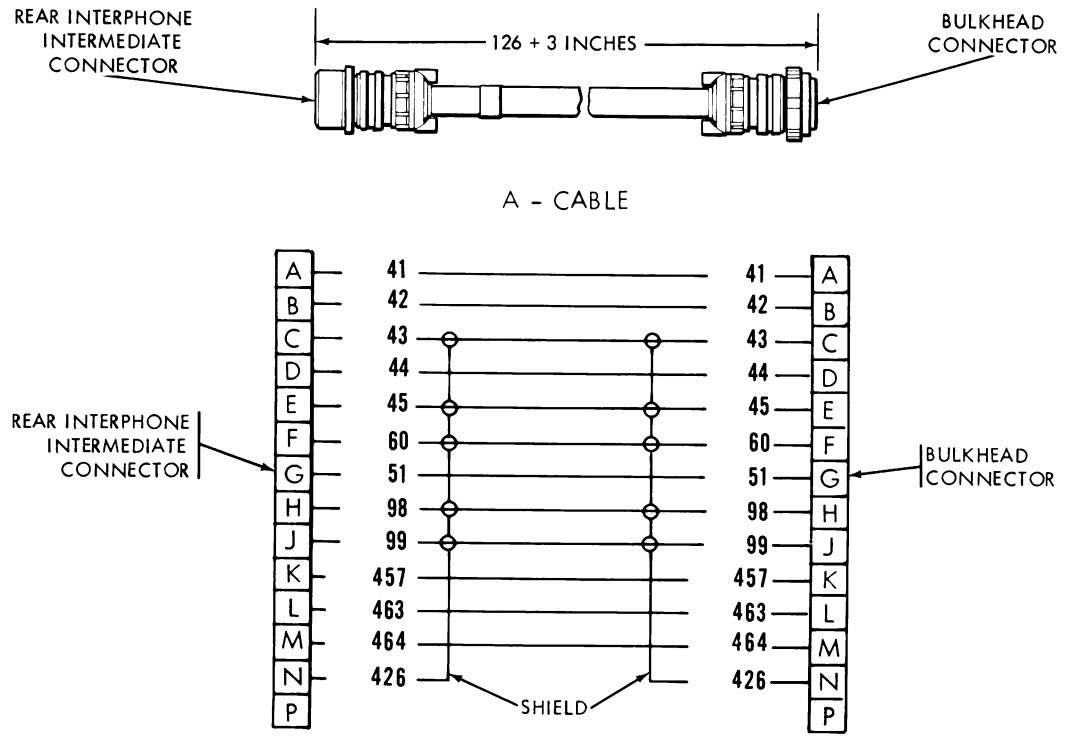


Figure 2-19. Bulkhead connector to interphone intermediate connector cable wiring diagram and disconnect points — all vehicles.

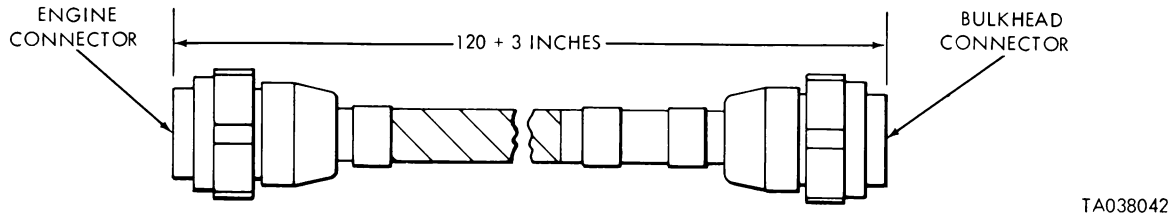


Figure 2-20. Bulkhead connector to engine connector generator cable disconnect points vehicles serial numbered A1001 through A1999 only -2D engine.

2-24. Parking Brake Cable Tube

a. Removal (fig 2-21).

(1) Refer to applicable sections of TM 9-2350-258-20-1, and perform the following:

(*a*) Remove powerplant.

(*b*) Remove connector, connector jamnut, nut and packing, two mounting nuts, two lockwashers, and bracket from transmission end of parking brake cable.

(2) Remove right fuel tank (para 2-23).

(3) Remove screw, lockwasher, and clamp securing parking brake cable to hull (view A, fig 2-21).

(4) Remove two screws, nuts, lockwashers, and clamps securing tube to brackets (view A).

(5) Remove screw, lockwasher, and clamp securing tube to hull (view B).

(6) Remove tube from parking brake cable.

b. Installation (fig 2-21).

(1) Install parking brake cable tube in reverse order of removal procedure.

(2) Refer to applicable sections of TM 9-2350-258-20-1, and install items removed in step *a* (1) above.

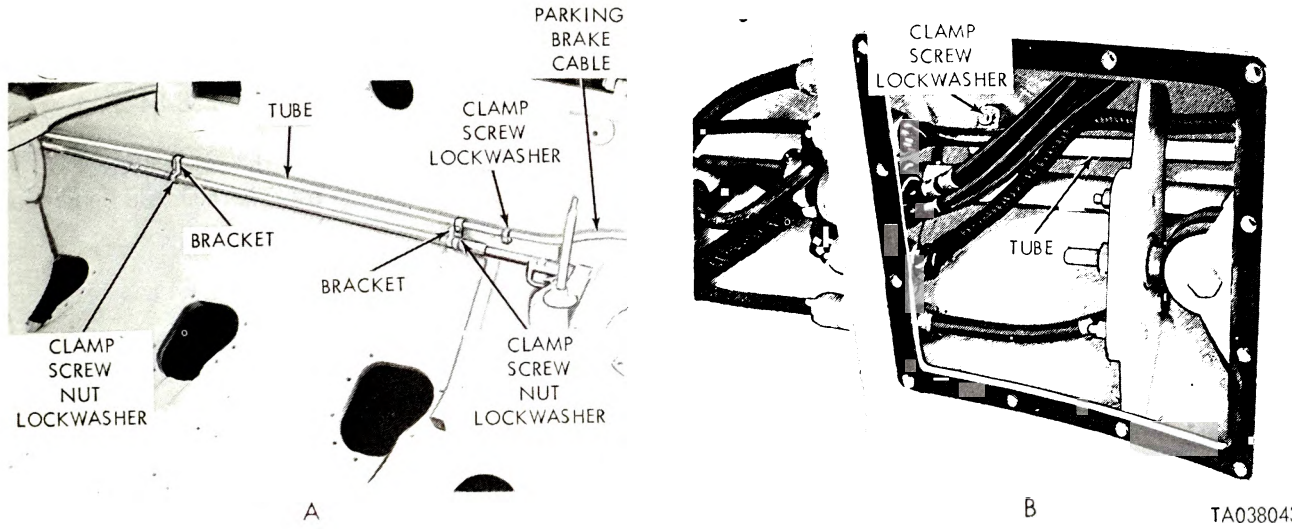


Figure 2-21. Parking brake cable tube removal and installation.

2-25. Hydraulic Brake Tube (Bulkhead to Transmission Hose)

a. Removal (fig 2-32).

(1) Remove powerplant (TM 9-2350-258-20-1).

(2) Remove left fuel tank (para 2-23).

(3) Unscrew tube nut from bulkhead union (view A, fig 2-22).

(4) Remove six screws and lockwashers securing six clamps to hull, and remove clamps from tube (view B).

(5) Disconnect tube nut from elbow (view B) and remove tube.

b. Installation (fig 2-22).

(1) Install hydraulic brake tube (bulkhead to transmission hose) in reverse order of removal procedure.

(2) Refer to TM 9-2350-258-20-1 and install powerplant.

(3) Fill and bleed hydraulic brake system.

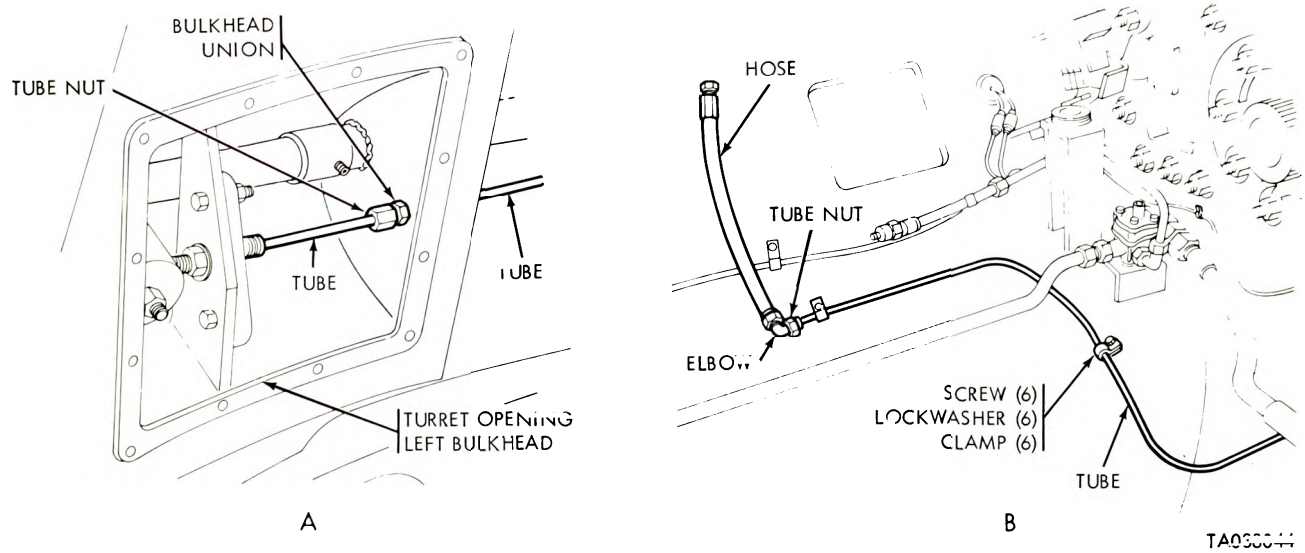


Figure 2-22. Hydraulic brake tube (engine compartment bulkhead to transmission hose) removal and installation.

2-26. Hull-Turret Inflatable Seal

a. Removal (fig 2-23).

(1) Remove turret.

(2) Loosen clamp securing air hose to seal stem, and disconnect hose from stem (view A, fig 2-23).

(3) Pry seal from hull groove with putting knife or other suitable tool (view B).

b. Installation (fig 2-23).

NOTE

Before installation, inflate seal to 25 psi to insure seal is serviceable. There should be no more than 1 psi pressure drop in 4 hours.

(1) Using a wire brush and drycleaning solvent, clean hull groove of all paint, dust, oil, and grease (view C, fig 2-23).

(2) With hull groove clean and dry, apply silicone compound (MIL-S-8660) furnished with seal service kit to hull groove (view E).

(3) Clean seal and install in hull groove starting at stem (view D).

(4) Connect air hose to seal stem and secure with clamp (view A).

(5) Install turret (TM 9-2350-258-34-2).

CAUTION

Do not traverse turret with seal inflated.

(6) Inflate seal to 25 psi. There should be no more than 1 psi pressure drop in 4 hours.

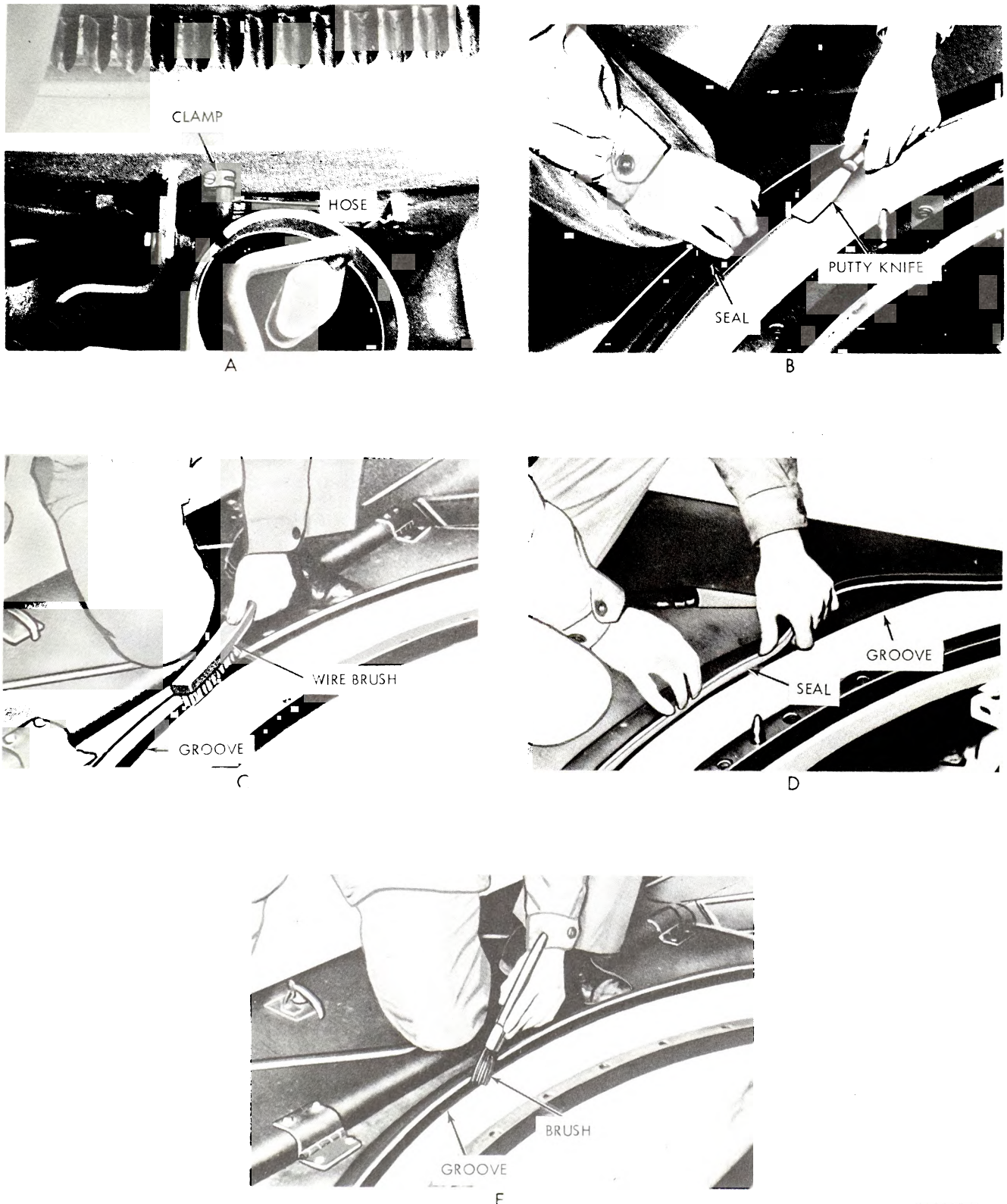


Figure 2-23. Hull-turret seal removal and installation.

2-27. Hull Ammunition Racks (105-MM)

a. Removal.

(1) Remove turret.

(2) Remove rack(s) from hull (TM 9-2350-258-20-1).

b. Installation.

(1) Install rack(s) in hull (TM 9-2350-258-20-1).

(2) Install turret.

2-28. Gas Particulate Test

Refer to TM 3-4240-236-30.

CHAPTER 3
REPAIR INSTRUCTIONS

Section I. GENERAL

3-1. Component or Assembly Repair

This chapter contains instructions for complete disassembly and assembly of each component or assembly. Test and quality assurance instructions have been included in each section as an aid in determining the cause of trouble, extent of repairs, and serviceability/performance standards required after repairs.

Section II. REPAIR OF AIR CLEANER

3-2. Description

Refer to TM 9-2350-258-20-1.

3-3. Removal

Refer to TM 9-2350-258-20-1.

3-4. Repair

(Fig 3-1).

Threaded fasteners (fig 3-1) used in the assembly of the air cleaner are coil thread inserts (helical coils). If fasteners are stripped/damaged, the insert can be replaced using a coil thread insert tool kit for the particular thread size needed. The tool kit can be found in the Field Maintenance Auto Repair Basic Shop Set - SC 4910-95-CL-A31 and the Contact and Emergency Repair Shop Set - SC 4940-95-CL-A21. Repair procedures and all special tools needed are contained in the kit.

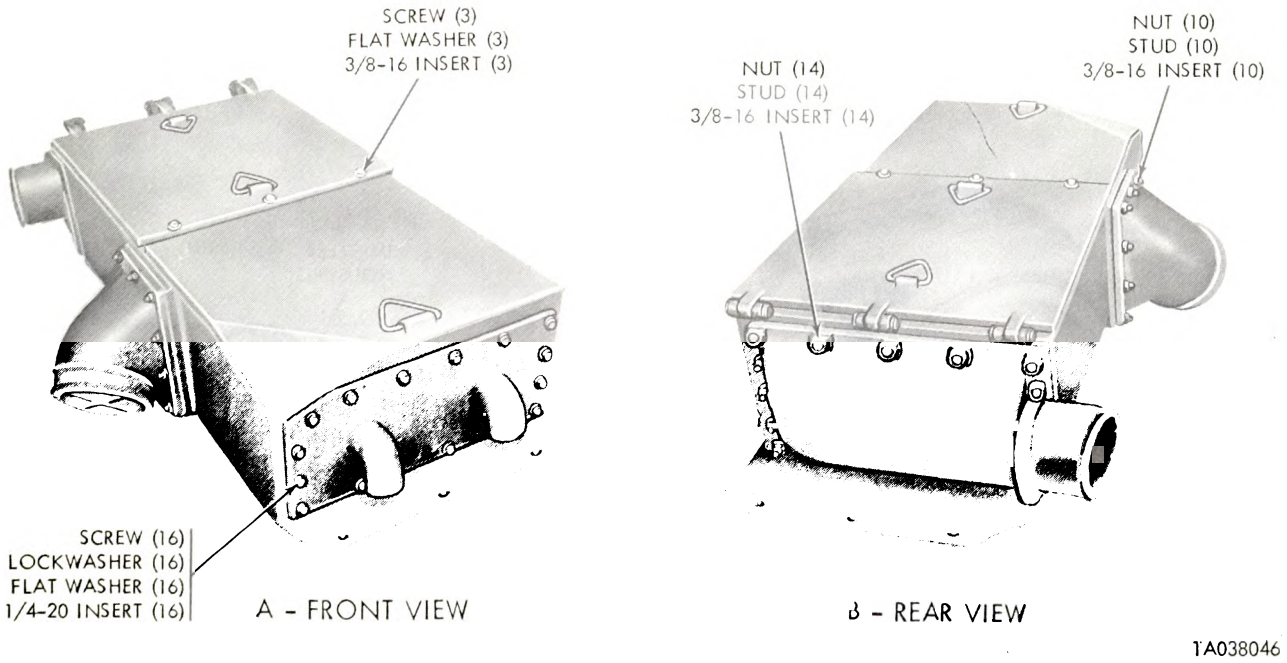


Figure 3-1. Air cleaner coil thread insert locations and sizes.

3-5. Installation

Refer to TM 9-2350-258-20-1.

Section III. REPAIR OF AIR CLEANER (BLOWER MOTOR) CENTRIFUGAL FAN

3-6. Description

Refer to TM 9-2350-258-20-1.

3-7. Removal

Refer to TM 9-2350-258-20-1.

3-8. Blower Motor Removal

(Fig 3-2).

a. Remove 10 assembled washer screws securing motor cover to impeller housing (view A).

b. Remove cover and preformed packing. Discard packing.

c. Remove screw and lockwasher securing ground strap to front head (view C).

d. Disconnect feed lead from field lead (view C).

e. Using an appropriate wheel puller, remove motor and impeller from impeller housing.

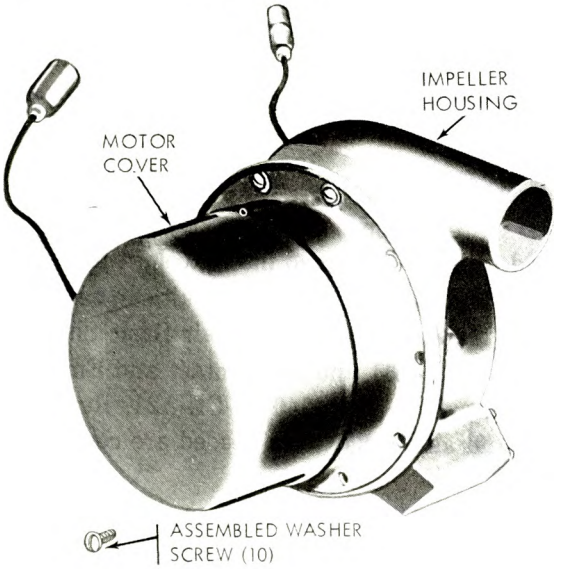
CAUTION

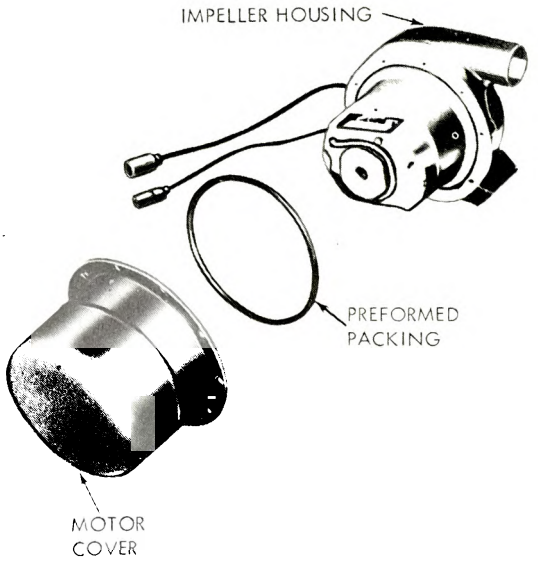
Do not attempt to drive motor and impeller from impeller housing. Motor housing and impeller can be easily damaged.

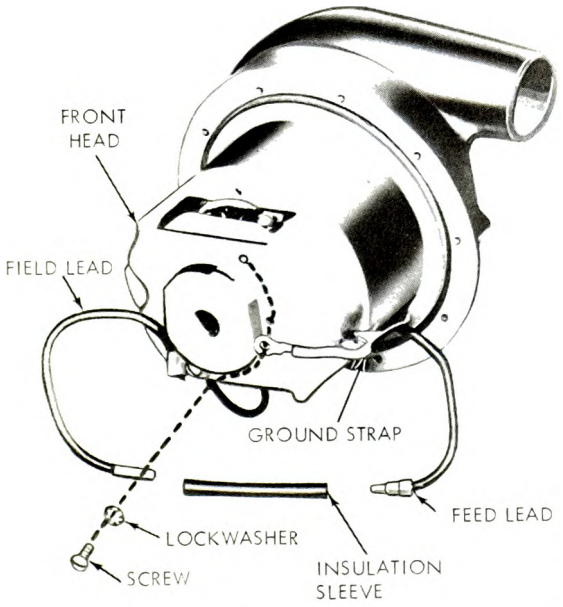
f. Remove nut securing impeller to the motor shaft.

g. Screw impeller from motor shaft.

h. Remove flatwashers, feltwasher, and preformed packing from shaft. Discard packing.







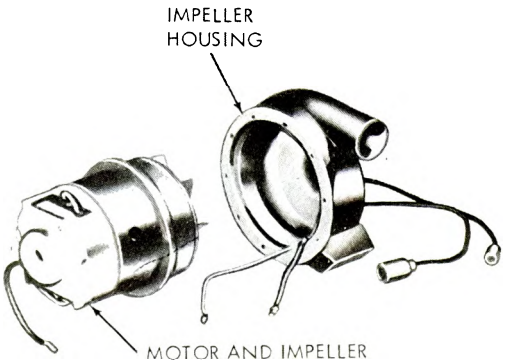


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Figure 3-2. Air cleaner centrifugal fan (blower motor) disassembly and assembly (sheet 1 of 3).

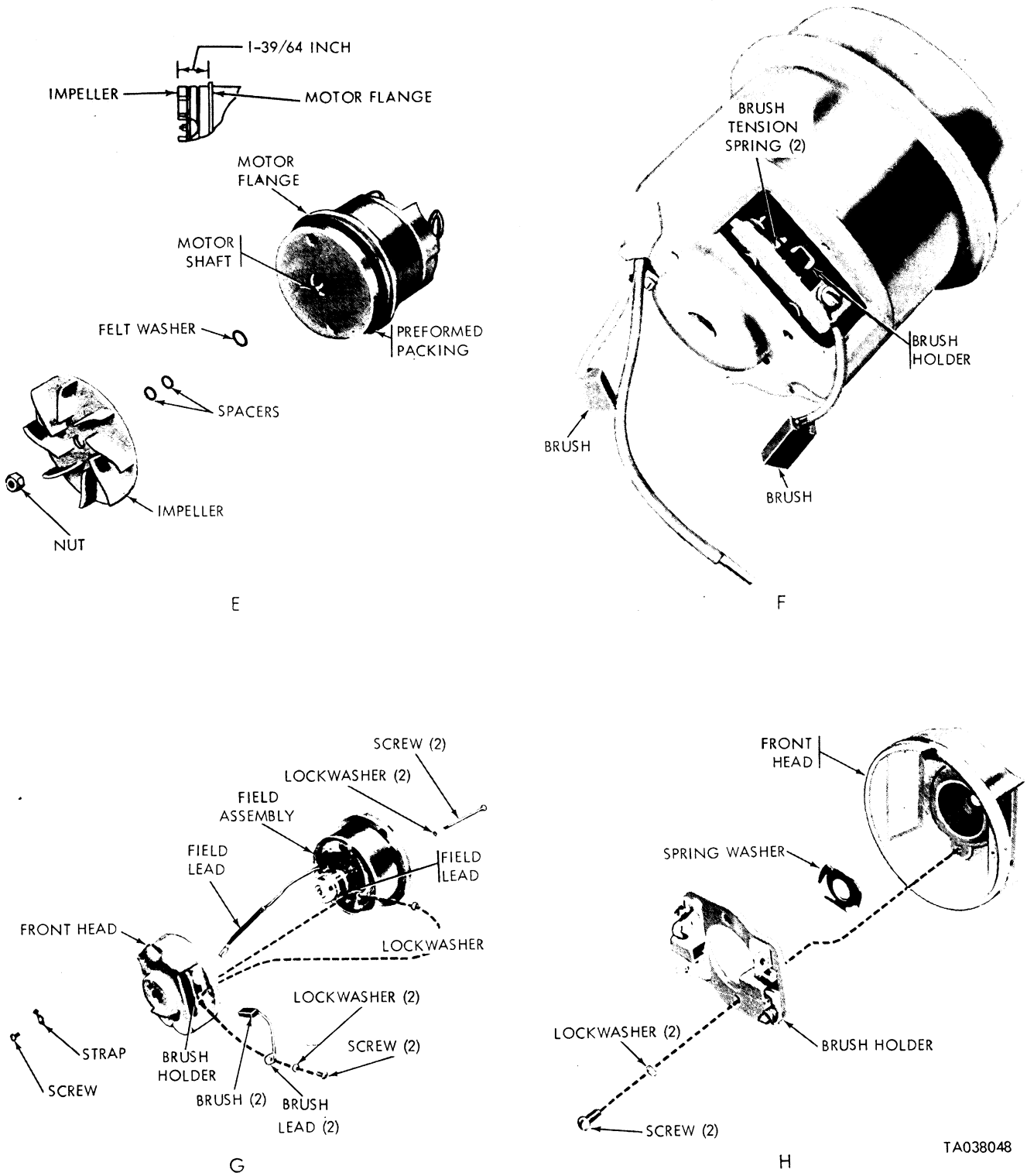


Figure 3-2. Air cleaner centrifugal fan (blower motor) disassembly and assembly (sheet 2 of 3).

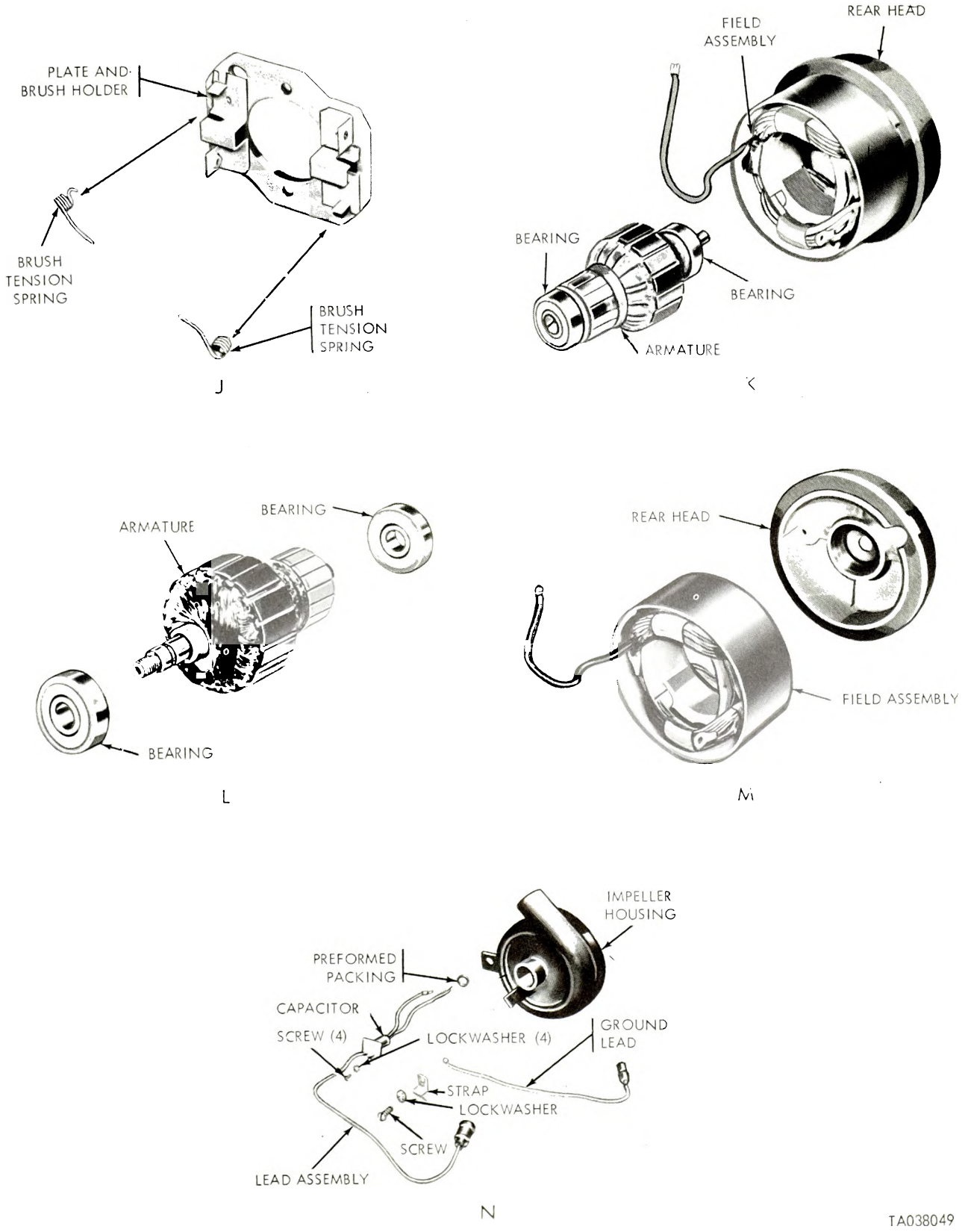


Figure 3-2. Air cleaner centrifugal fan (blower motor) disassembly and assembly (sheet 3 of 3).

3-9. Cleaning and Inspection

a. Clean all parts thoroughly using drycleaning solvent (para 2-8 and 2-9).

b. Dry parts with filtered compressed air.

c. Visually inspect electrical leads and terminals for fraying, torn insulation, or saturation (water or oil).

d. Using an ohmmeter or multimeter, test electrical leads for continuity and intermittent interruption of current flow.

e. Replace or repair unserviceable leads.

3-10. Assembly

a. Install feltwashers and flatwashers (spacers) on new motor shaft, and install impeller.

b. Remove or add flatwashers (spacers), as required, to obtain measurement of 1-39/64-inch from outer edge of impeller vanes to inner surface of motor flange (view E).

c. Secure impeller on motor shaft with nut (view E).

d. Position preformed packing on motor flange, and install impeller housing (view D, sheet 1 of 3 and view E, sheet 2 of 3).

e. Connect feed lead to field lead (view C).

f. Secure ground strap to front head with screw and lockwasher (view C).

g. Position preformed packing and cover on impeller housing.

h. Secure cover with 10 assembled washer screws (views A and B).

3-11. Brush and Spring Removal

a. Removal (fig 3-2).

(1) Remove blower motor (TM 9-2350-258-20-1).

(2) Remove 10 assembled washer screws securing motor cover to impeller housing (view A).

(3) Remove cover and preformed packing (view B). Discard packing.

(4) Release and remove brush tension springs, and withdraw brushes from holder (view F).

(5) Remove screw retaining brush lead to holder. Discard brushes.

b. Inspection.

(1) Visually inspect commutator for glazing, uneven wear, or exposed insulation (mica).

(2) Using a fine emery cloth, polish commutator.

(3) If roughness or high spots cannot be removed with fine emery cloth, replace motor.

c. Installation.

(1) Install screw securing brush lead to brush holder.

(2) Install brush tension springs in brush holder.

(3) Install brushes and secure with tension springs.

(4) Install preformed packing and motor cover on impeller housing, and secure with 10 assembled washer screws (views A and B).

3-12. Test

(Fig 3-3).

a. Secure blower solidly to a bench to prevent its movement.

b. Connect motor to a test circuit as shown in figure 3-3.

c. Turn on power switch and verify satisfactory blower operation. Ammeter should not exceed 7.5 amperes at 24 vdc.

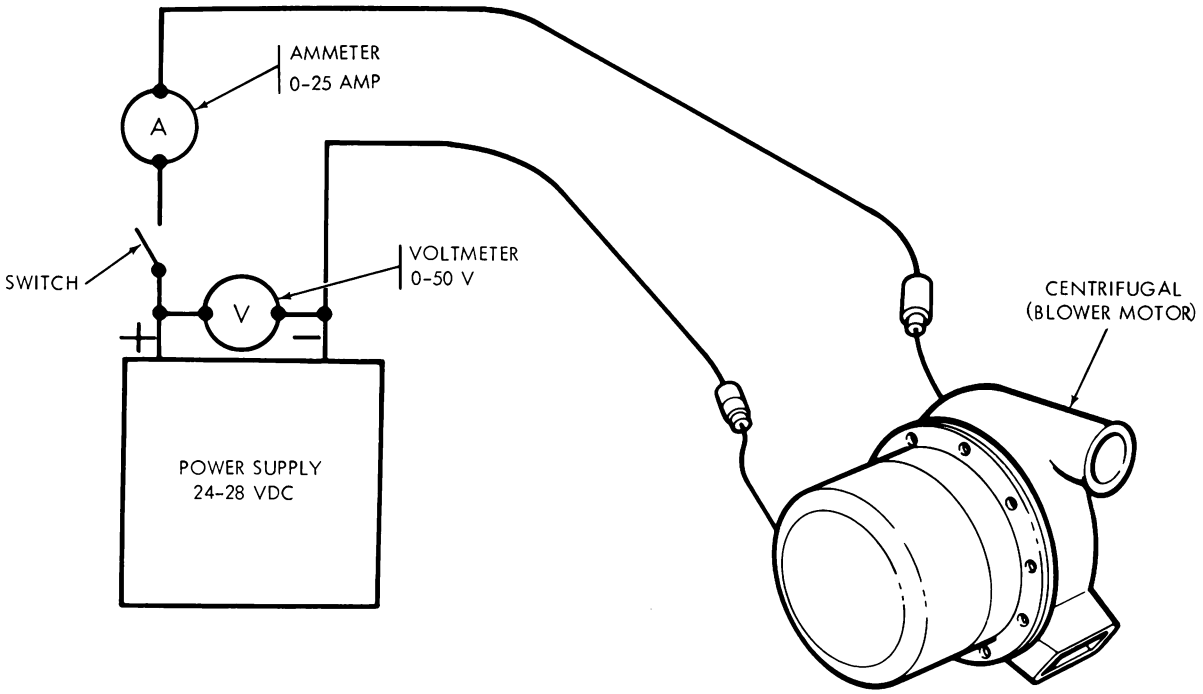


Figure 3-3. Air cleaner centrifugal fan (blower motor) bench test.

3-13. Installation

Refer to TM 9-2350-258-20-1.

Section IV. REPAIR OF FUEL TANKS

3-14. Description

The two interconnected aluminum fuel tanks are located on either side of the powerplant in the engine compartment. Each tank is shock mounted to the hull by four rubber insulated mounts. For description of fuel tank components, refer to TM 9-2350-258-20-1.

3-15. Removal

Refer to paragraph 2-23.

3-16. Cleaning

Clean fuel tanks with a solution of high pressure cleaning compound and water. Apply solution to interior and exterior of fuel tank, by means of a high pressure steam cleaner. Rinse tank thoroughly with hot water after cleaning.

3-17. Inspection

a. Check for cracks, fractures, deformations, and nicks. Fuel tanks must be free of cracks, fractures, and deformation, and must be free of nicks and scores in excess of 1/32-inch deep.

b. Check threaded screw holes for worn or damaged threads.

c. Check for flaked, chipped, or worn paint.

d. Inspect all welds for defects. Remove paint, if necessary.

3-18. Repair

a. Welding. Refer to TM 9-237 to weld cracks, fractures, broken or damaged welds, or nicks and scores.

b. Threads. Repair worn or damaged threads by chasing with a proper size tap, or by installation of a helical-coil insert. Do not allow metal chips to drop inside fuel tank.

3-19. Testing

a. Seal all openings of fuel tank, except one.

b. Install a suitable fitting on the opening, and introduce compressed air into fuel tank, until a pressure of 3 psi has been reached.

c. Hold pressure at 3 psi and inspect all joints for leaks by applying a soap and water solution on the joints.

d. There must be no leakage. Leakage, if present, will be indicated by the presence of air bubbles along soaped connection, or by loss of air pressure as indicated by the gage.

e. Relieve pressure and rinse exterior of fuel tank with hot water. Allow to dry.

f. Cover all openings.

g. Paint fuel tank, as required.

3-20. Installation

Refer to paragraph 2-23.

Section V. REPAIR OF FUEL TANK MOUNTS

3-21. Description

Refer to TM 9-2350-258-20-1.

3-22. Upper Front Mount (Left or Right Side)

a. Removal (fig 3-4).

(1) Refer to TM 9-2350-258-20-1 and remove powerplant.

(2) Remove fuel tank (para 2-23).

(3) Remove lockwire (2, fig 3-4) from eight screws (3).

(4) Remove eight screws (3) and washers (1) securing mount to fuel tank. Remove mount.

b. Disassembly (fig 3-4).

(1) Remove screw (5, fig 3-4), lockwasher (12), and nut (13).

(2) Remove bolt (11), two rubber bumpers (7), and two washers (6) from bracket (4).

(3) Separate two rubber bumpers (7) and two washers (6) from bolt (11).

(4) Remove washer (10), lockwasher (9), and nut (8) from bolt (11).

c. Cleaning.

(1) Clean rubber bumpers with solution of soap and warm water. Rinse thoroughly with clean warm water.

(2) Clean all metal components with drycleaning solvent (paras 2-8 and 2-9). Wipe dry.

d. Inspection.

(1) Visually inspect rubber bumpers for cuts, deterioration, or wear.

(2) Visually inspect all other components for any evidence of damage or wear.

e. Repair. Replace all defective components.

f. Assembly (fig 3-4). Assemble upper front mount (left and right sides) in the reverse order of disassembly procedure.

g. Installation (fig 3-4). Install mount in reverse order of removal procedure.

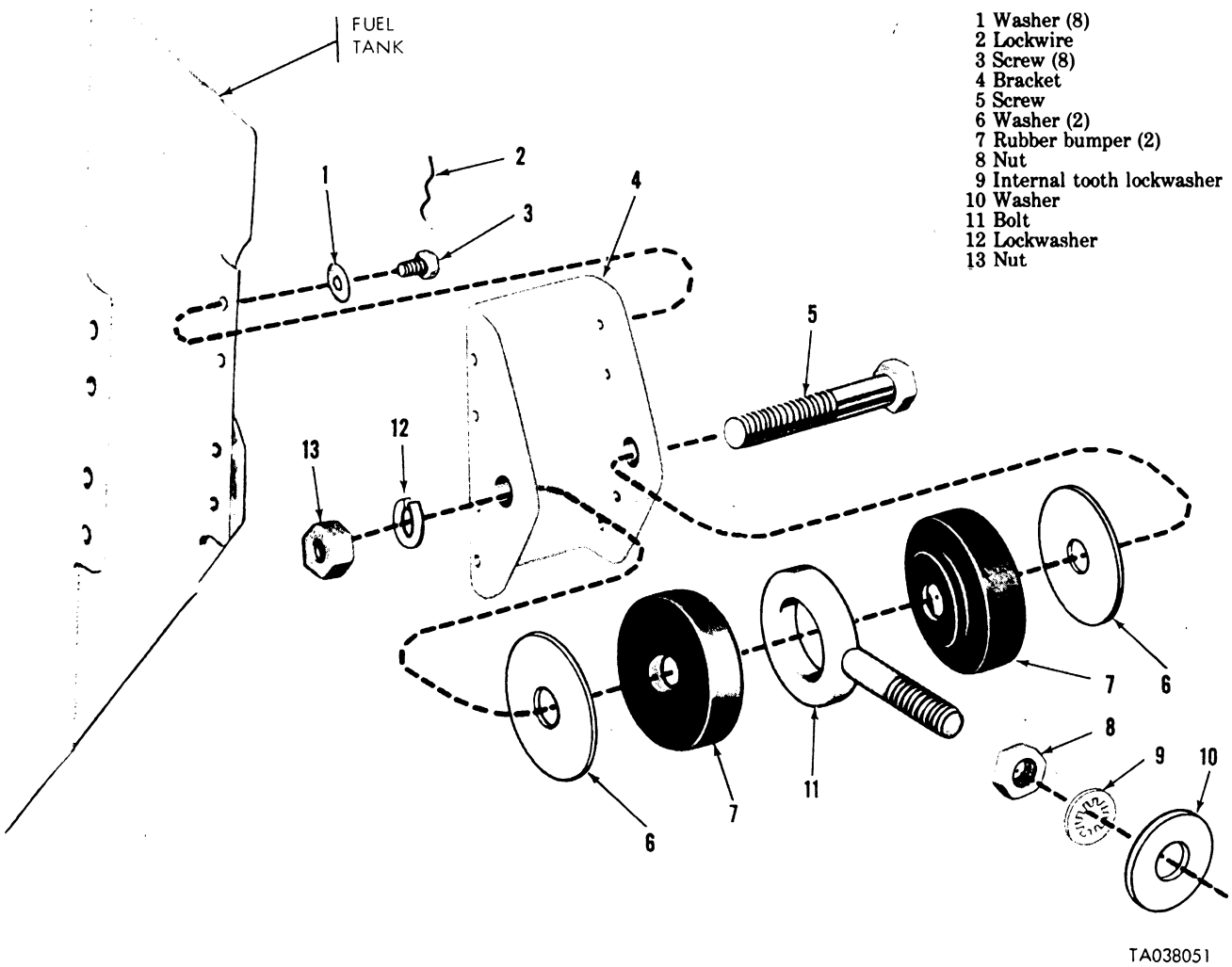


Figure 3-4. Fuel tank upper front mount removal, disassembly, assembly, and installation.

2-23. Upper Rear Mount (Left or Right Side)

a. Removal (fig 3-5).

(1) Remove nut (1, fig 3-5), lockwasher (2), washer (3), screw (9), washer (8), and rubber bumper (7) securing fuel tank bracket (15) to hull bracket (4).

(2) Remove eight nuts (10), lockwashers (11), screws (13), and washers (12) securing fuel tank bracket (15) to fuel tank.

(3) Remove fuel tank bracket (15) and spacer washers (14) from fuel tank.

(4) Separate washer (5) and rubber bumper (6) from fuel tank bracket (15).

b. Cleaning.

(1) Clean rubber bumpers with solution of soap and warm water. Rinse thoroughly with clean warm water.

(2) Clean all metal components with drycleaning solvent (para 2-8 and 2-9). Wipe dry.

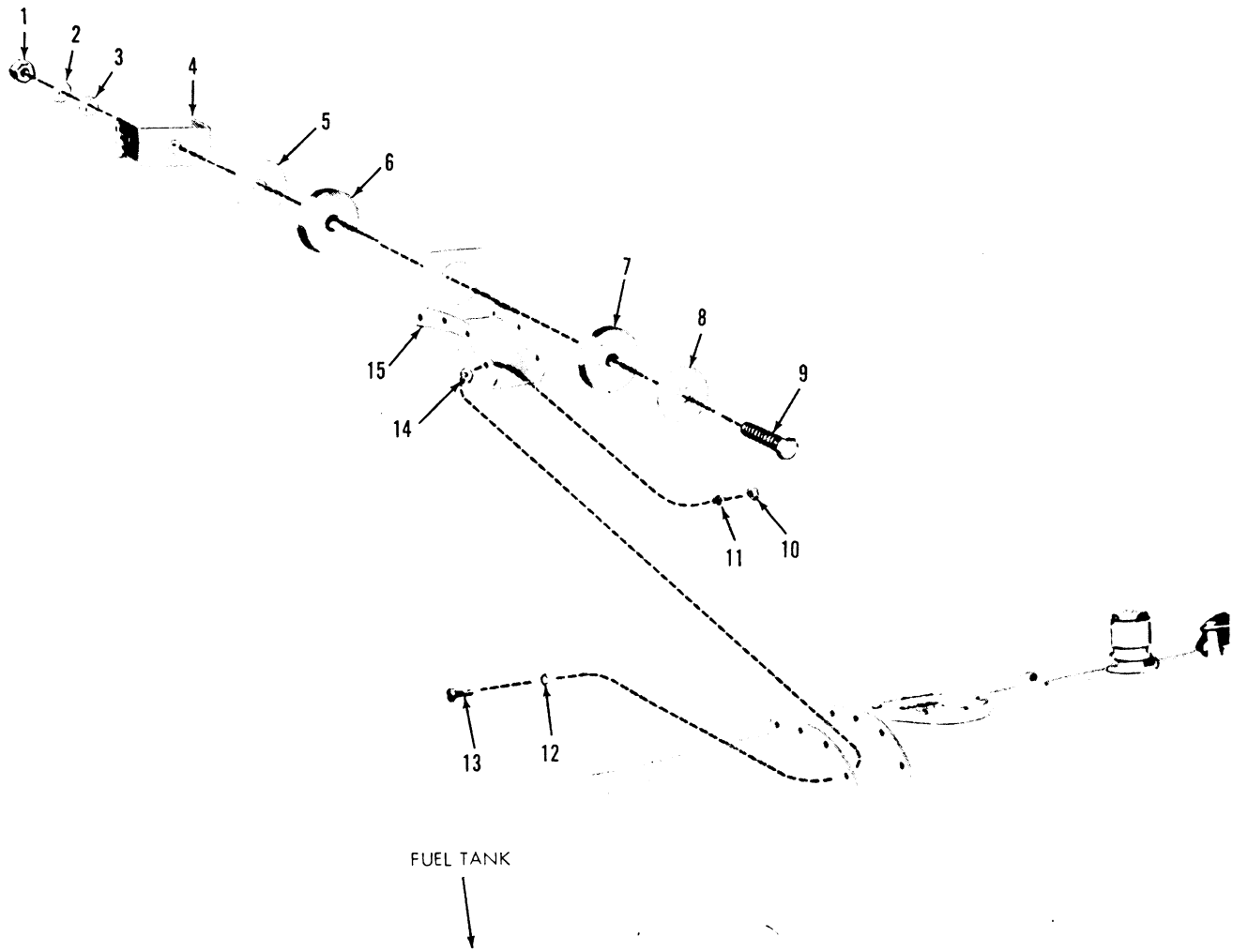
c. Inspection.

(1) Visually inspect rubber bumpers for cuts, deterioration, or wear.

(2) Visually inspect all other components for any evidence of damage or wear.

d. Repair. Replace all defective components.

e. Installation (fig 3-5). Install mount in reverse order of the removal procedure.



1 Nut
2 Lockwasher
3 Washer
4 Hull bracket (welded)
5 Washer
6 Rubber bumper
7 Rubber bumper
8 Washer
9 Screw
10 Nut (8)
11 Lockwasher (8)
12 Washer (8)
13 Screw (8)
14 Spacer washer (as required)
15 Fuel tank bracket

Figure 3-5. Fuel tank upper rear mount removal, disassembly, assembly, and installation.

3-24. Lower Rear Mount (Left or Right Side)

a. Removal (fig 3-6).

(1) Remove powerplant (TM 9-2350-258-20-1).

(2) Drain fuel tank (TM 9-2350-258-20-1).

(3) Remove two screws (7, fig 3-6), external tooth lockwasher (8), and two dished lockwashers (9) securing mount lower bracket (14) to hull.

(4) Remove six screws (15), washers (16), lockwashers (1), and nuts (2) securing mount upper bracket (5) to fuel tank. Remove mount.

b. Disassembly (fig 3-6).

(1) Remove nut (10, fig 3-6), lockwasher (11), screw (3), and washer (4) from mount.

(2) Separate washer (12) and two rubber bumpers (13) from upper and lower mount brackets (5) and (14).

c. Cleaning.

(1) Clean rubber bumpers with solution of soap and warm water. Rinse thoroughly with clean warm water.

(2) Clean all metal components with drycleaning solvent (para 2-8 and 2-9). Wipe dry.

d. Inspection.

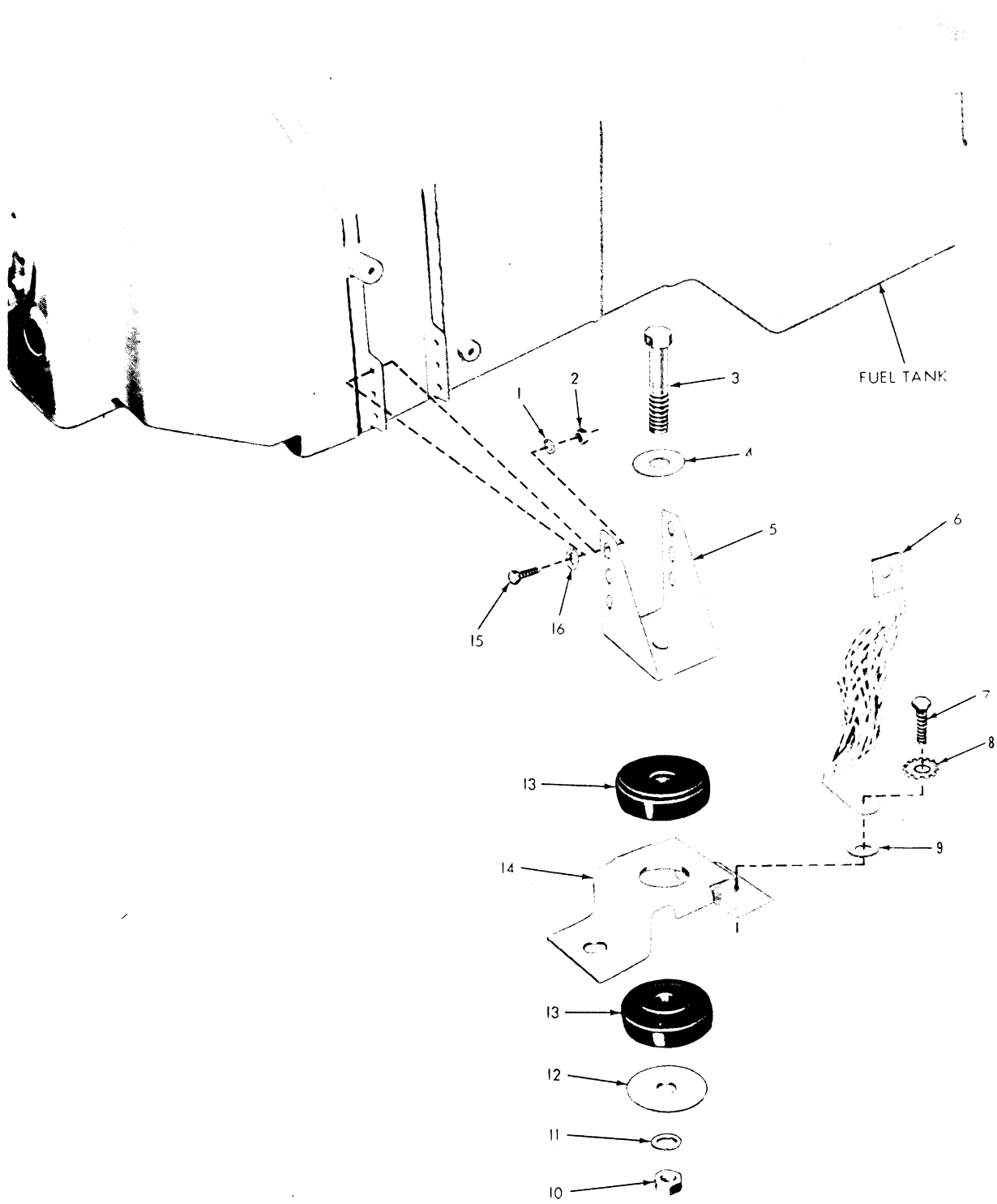
(1) Visually inspect rubber bumpers for cuts, deterioration, or wear.

(2) Visually inspect all other components for any evidence of damage or wear.

e. Repair. Replace all defective components.

f. Assembly (fig 3-6). Assemble lower tear mount (left or right side) in the reverse order of disassembly procedure.

g. Installation (fig 3-6). Install rear mount, (left and right sides) in the reverse order of the removal procedure.



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1 Lockwasher (6)	5 Upper bracket	9 Dished lockwasher (2)	13 Rubber bumper (2)
2 Nut (6)	6 Ground Strap	10 Nut	14 Lower bracket
3 Screw	7 Screw (2)	11 Lockwasher	15 Screw (6)
4 Washer	8 External tooth lockwasher	12 Washer	16 Washer (6)

Figure 3-6. Fuel tank lower rear mount removal, disassembly, assembly, and installation.

3-25. Lower Front Mount (Left Side)

a. Removal (fig 3-7).

(1) Remove powerplant (TM 9-2350-258-20-1).

(2) Drain fuel tank (TM 9-2350-258-20-1).

(3) Loosen screw (1, fig 3-7).

(4) Remove two screws (10) and lockwashers (11) securing lower bracket (12) to hull, and remove mount.

(5) Remove four screws (3), nuts (6), washers (4), and lockwashers (5) securing upper bracket (7) to fuel tank, and remove bracket.

b. Disassembly (fig 3-7).

(1) Remove screw (1, fig 3-7), washer (2), lockwasher (14), and nut (15) from mount.

(2) Separate washers (8) and (13), and two rubber bumpers (9) from lower bracket (12).

NOTE

Washer (8) is an as required item and is used to adjust position of fuel tank within hull. When assembling mount, install the same number of washers as was removed.

c. Cleaning.

(1) Clean rubber bumpers with solution of soap and warm water. Rinse thoroughly with clean warm water.

(2) Clean all metal components with drycleaning solvent (paras 2-8 and 2-9). Wipe dry.

d. Inspection.

(1) Visually inspect rubber bumpers for cuts, deterioration, or wear.

(2) Visually inspect all other components for any evidence of damage or wear.

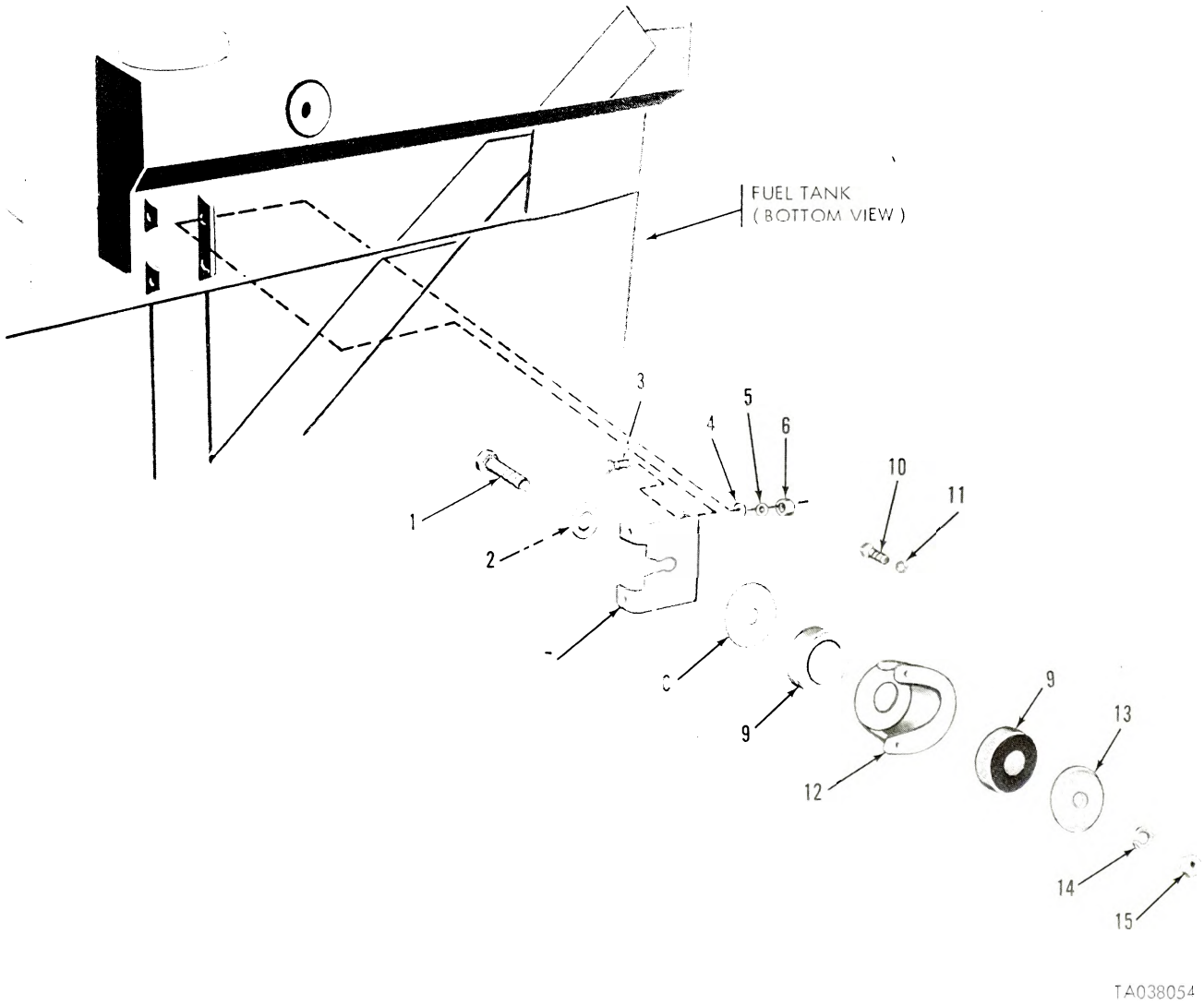
e. Repair. Replace all defective components.

f. Assembly (fig 3-7). Assemble lower front mount (left side) in reverse order of the disassembly procedure.

g. Installation (figs 3-7 and 2-3).

(1) Install lower front mount (left side) in reverse order of removal procedure.

(2) Check clearance between bulkhead and fuel tank (view P, fig 2-2). If necessary, remove washers (8, fig 2-37) to obtain 5/16-inch minimum clearance.



1 Screw
2 Washer
3 Screw (4)
4 Washer (4)
5 Lockwasher (4)
6 Nut (4)
7 Upper bracket
8 Washer (as required)
9 Rubber bumper (2)
10 Screw (2)
11 Lockwasher (2)
12 Lower bracket
13 Washer
14 Lockwasher
15 Nut

Figure 3-7. Fuel tank lower front mount removal, disassembly, assembly, and installation (left fuel tank).

3-26. Lower Front Mount (Right Side)

a. Removal (fig 3-8).

(1) Remove powerplant (TM 9-2350-258-20-1).

(2) Drain fuel tank (TM 9-2350-258-20-1).

(3) Remove four screws (9, fig 3-8) and lockwashers (10) securing lower bracket (11) to hull.

(4) Remove six screws (3), washers (4), lockwashers (6), and nut (5) securing upper bracket to fuel tank. Remove mount.

b. Disassembly (fig 3-8).

(1) Remove screw (1, fig 3-8), washer (2), lockwasher (13), and nut (14).

(2) Separate washers (7) and (12) and two rubber bumpers (8) from brackets (11) and (15).

NOTE

Washer (7) is an as required item and is used to adjust position of fuel tank within hull. When assembling mount, install the same number of washers as was removed.

c. Cleaning.

(1) Clean rubber bumpers with solution of soap and warm water. Rinse thoroughly with clean warm water.

(2) Clean all metal components with drycleaning solvent (para 2-8 and 2-9). Wipe dry.

d. Inspection.

(1) Inspect rubber bumpers for cuts, deterioration, or wear.

(2) Inspect all other components for any evidence of damage or wear.

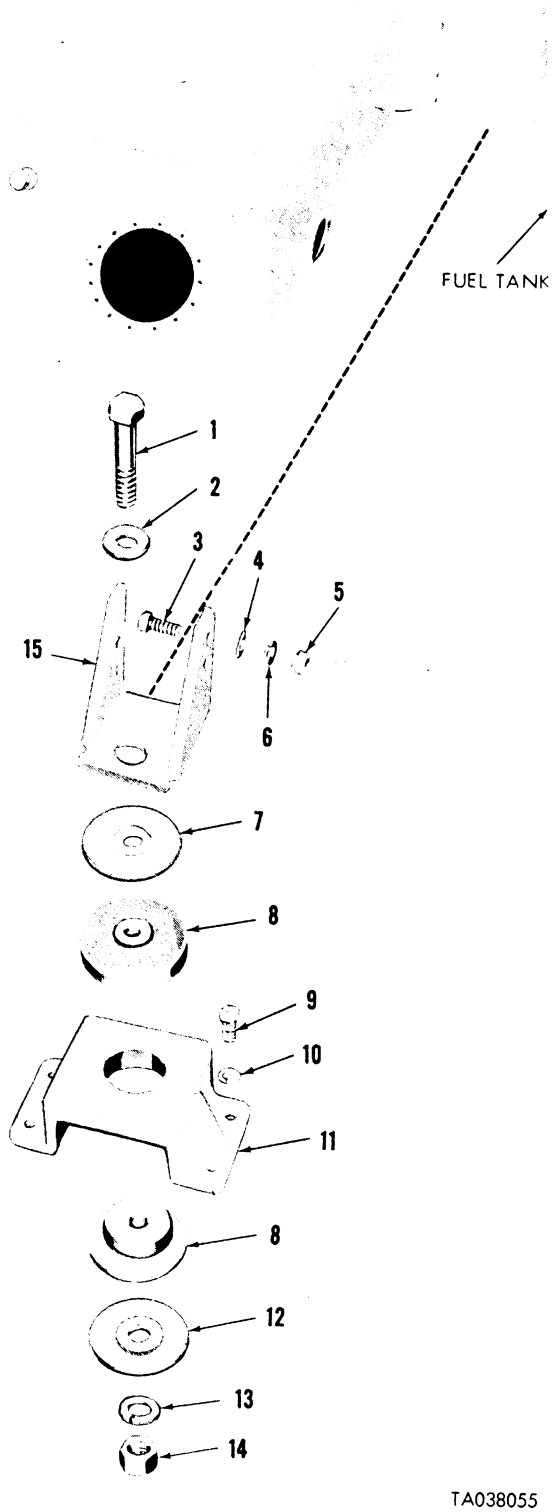
e. Repair. Replace all defective components.

f. Assembly (fig 3-8). Assemble lower front mount (right side) in the reverse order of the disassembly procedure.

g. Installation (figs 3-8 and 2-4).

(1) Install lower front mount (right side) in the reverse order of the removal procedure.

(2) Check clearance between bulkhead and fuel tank (view B, fig 2-3). If necessary, remove washers (7, fig 3-8) to obtain 5/16-inch minimum clearance.



1 Screw
2 Washer
3 Screw (6)
4 Washer (6)
5 Nut (6)
6 Lockwasher (6)
7 Washer (as required)
8 Rubber bumper (2)
9 Screw (4)
10 Lockwasher (4)
11 Lower bracket
12 Washer
13 Lockwasher
14 Nut
15 Upper bracket

Figure 3-8. Fuel tank lower front mount removal, disassembly, assembly, and installation (right fuel tank).

Section VI. REPAIR OF PRIMER PUMP

3-27. Description

Refer to TM 9-2350-258-20-1.

3-28. Removal

Refer to TM 9-2350-258-20-1.

3-29. Disassembly

(Fig 3-9).

a. Disassembly into Subassemblies (fig 3-9).

(1) Remove lockwire from valves (view A, fig 3-9).

(2) Remove inlet valves (view A).

(3) Remove outlet valve retainers and outlet valves (view A).

(4) Remove gland lockwire and unscrew gland. Remove piston and rod from pump (view B).

b. Disassembly of Inlet or Outlet Valve (views C and D, fig 3-9).

NOTE

The inlet valve assembly, and the outlet valve assembly and springs are not interchangeable.

(1) Remove snapring.

(2) Remove spring and ball from valve.

(3) Remove preformed packings and discard.

c. Disassembly of Piston and Rod (view E, fig 3-9).

(1) Remove cotter pin and nut from rod.

(2) Remove washer, piston, piston packings, gland, gland packings, and rod packings from rod. Discard all packings.

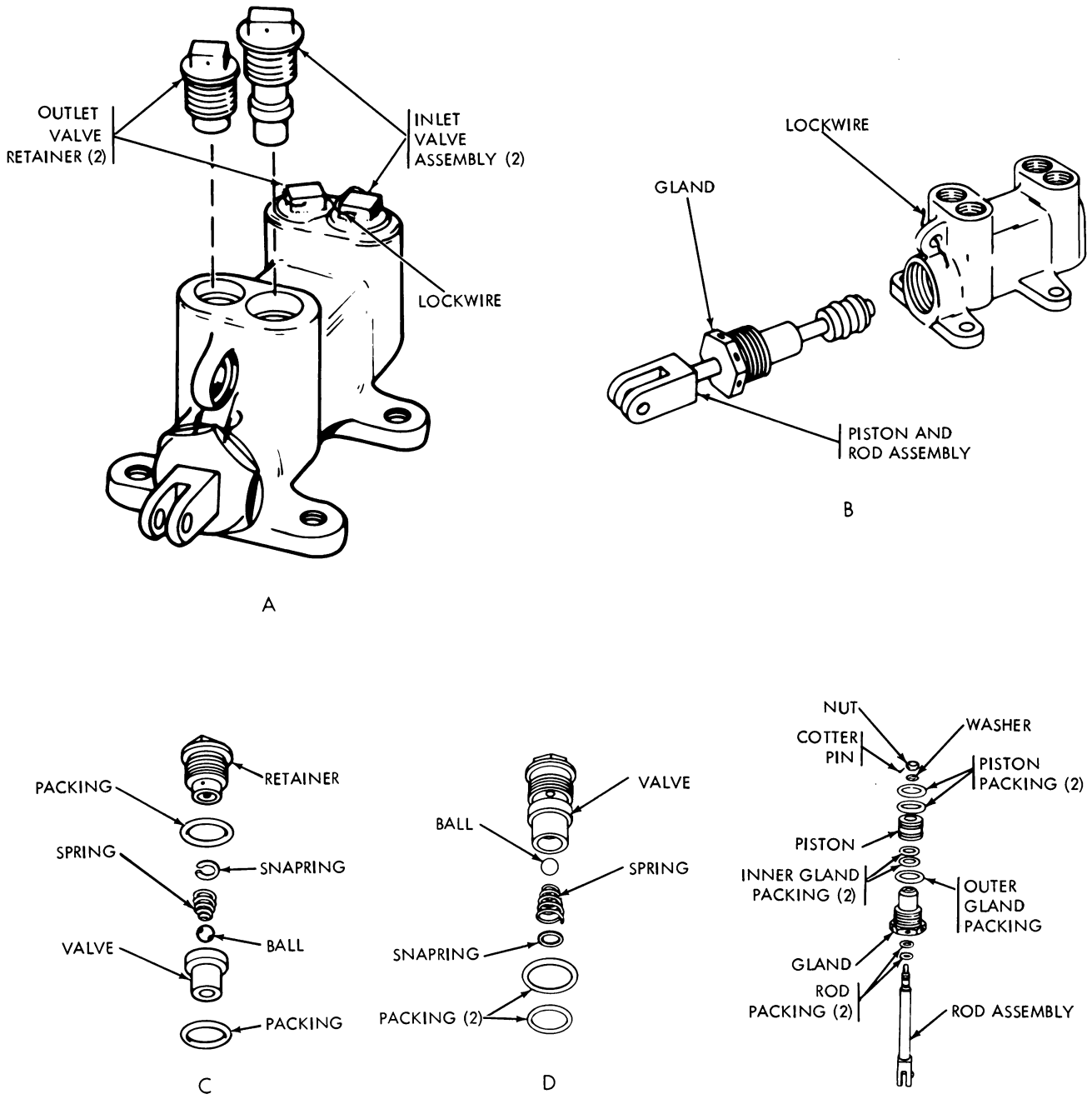


Figure 3-9. Primer pump disassembly and assembly.

3-30. Cleaning

Refer to paragraph 2-4.

3-31. Inspection and Repair

a. Check parts for wear as specified in table 3-1. Replace all parts that do not meet prescribed wear limits.

b. Visually inspect all parts for cracks, deformities, or unusual wear. Replace defective parts.

Table 3-1. Primer Pump Wear Limits

Figure number	Reference letter	Point of measurement	Size and fit of new parts	Wear limits
3-10	A	OD of pin.	0.243 to 0.248	*
3-10	B	ID of yoke bore.	0.248 to 0.253	0.256
3-10	A-B	Fit of pin in yoke.	0.000 to 0.010L	0.008L
3-10	C	OD of piston rod.	0.497 to 0.499	*
3-10	D	ID of gland.	0.505 to 0.507	*
3-10	C-D	Fit of rod in gland.	0.006L to 0.010L	*
3-10	E	OD of piston.	0.990 to 0.995	*
3-10	F	ID of cylinder.	1.000 to 1.002	*
3-10	E-F	Fit of piston in cylinder.	0.005L to 0.012L	*
3-10	G	Free length of spring.	0.790 to 0.810	*

* Indicates part should be replaced when worn beyond limits given in Size and fit of new parts column.

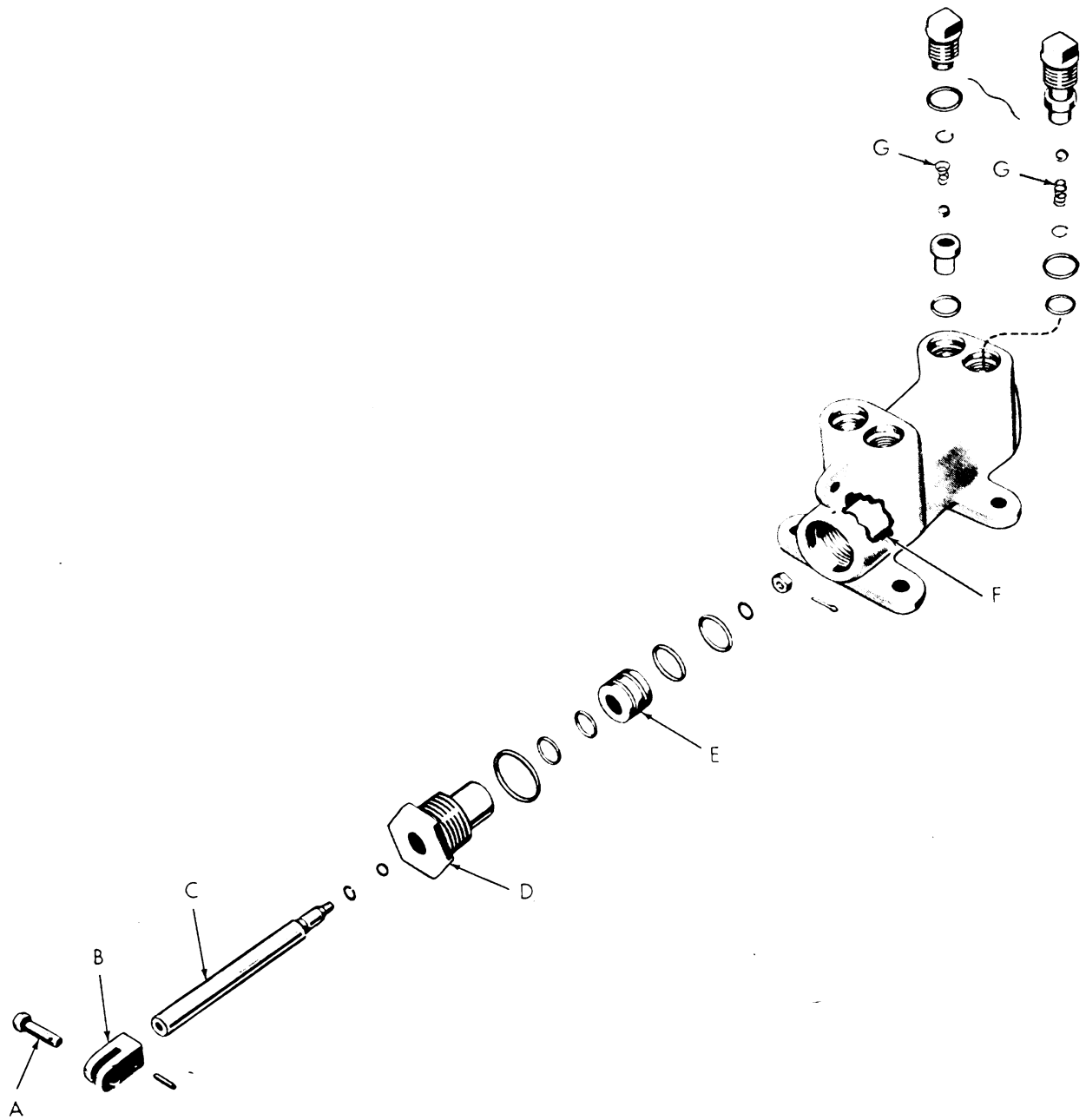


Figure 3-10. Primer pump wear points of measurement.

3-32. Assembly

(Fig 3-9).

(1) Lubricate all preformed packings with diesel fuel oil prior to assembly.

(2) Assemble primer pump in reverse order of the disassembly procedure.

3-33. Tests

a. Vacuum Test.

(1) Connect inlet side of pump to a fuel source, and prime the pump to lubricate internal parts and to purge the system.

(2) Remove line connecting pump to fuel source, and continue to operate pump until no fuel flows from outlet side of pump.

(3) Attach a vacuum gage to inlet side of pump, and operate pump. Pump must maintain a minimum of 12-inches of vacuum while pumping.

b. Pressure Test.

(1) Reconnect inlet side of pump to a fuel source, and attach a suitable pressure gage (wet type, minimum 200 psi) to outlet side.

(2) Bleed air from system and tighten all connections.

(3) Operate pump and observe pressure gage. Pump should develop a minimum pressure of 200 psi, with no external leaks.

c. Leakage Test.

(1) With pressure gage still connected to outlet side of pump, operate pump until a pressure of 30 psi has been obtained.

(2) Disconnect inlet line from fuel source and drain.

(3) Place a drain can under inlet line, and observe for internal leakage. Leakage should not exceed 10-drops per minute.

NOTE

If a pump fails any of the preceding tests, it is unserviceable and must be repaired or replaced.

3-34. Installation

Refer to TM 9-2350-258-20-1.

Section VII. REPAIR OF ENGINE COMPARTMENT ACCELERATOR LINKAGE

3-35. Description

Refer to TM 9-2350-258-20-1.

3-36. Removal

(Fig 3-11).

a. Refer to applicable sections of TM 9-2350-258-20-1, and perform the following:

(1) Remove powerplant.

(2) Remove accelerator linkage flange from bulkhead.

(3) Disconnect engine compartment left fire extinguisher tube from manifold and fuel tank.

(4) Vehicles serial numbered A1001 through A1999 only; isolate, and drain left fuel tank.

(5) Vehicles serial numbered A1001 through A1999 only; remove fuel supply tube from left fuel tank.

b. Remove two screws, washers, and lockwashers securing accelerator linkage upper housing to bulkhead (view A, fig 3-11).

c. Remove two screws, lockwashers, and plate securing accelerator linkage lower housing to hull (view B).

d. Move linkage assembly rearward until clear of fuel tank, and remove from hull.

e. If upper housing is to be replaced, remove two screws, two nuts, two lockwashers, and four washers securing bracket to housing, and remove bracket (view A).

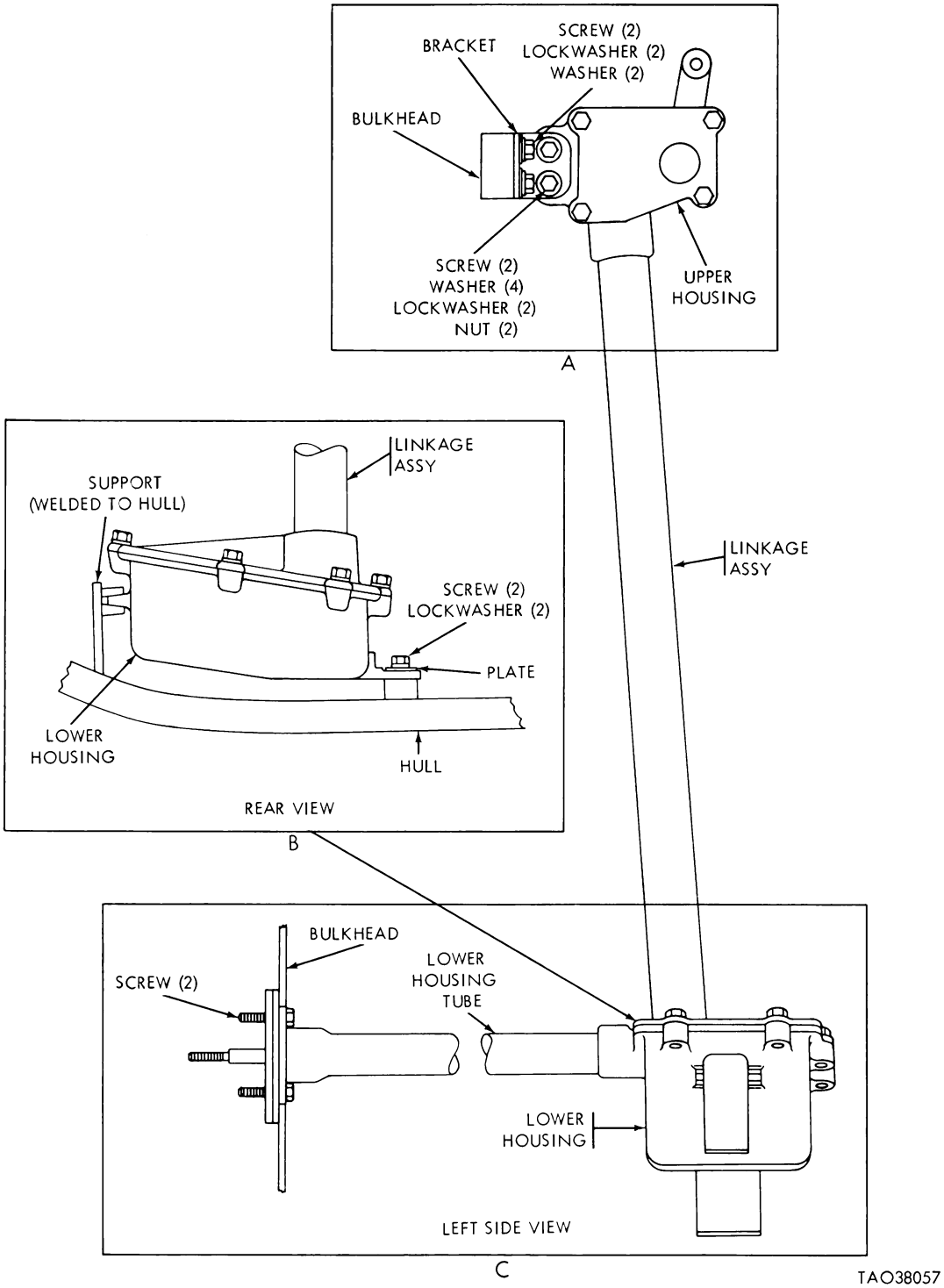


Figure 3-11. Engine compartment accelerator linkage removal and installation.

3-37. Disassembly

a. Linkage Assembly (fig 3-12).

(1) Remove four screws and lockwashers securing cover to upper housing, and remove cover and seal (views A and B, fig 3-12). Discard seal.

(2) Remove bolt securing vertical tube upper rod end to lever (view B).

(3) Remove seven screws and lockwashers securing cover to lower housing, and remove upper housing and lower housing cover (views B and D).

(4) Remove and discard lower housing cover seal (view D).

(5) Remove bolt securing horizontal tube rod end to clevis, and remove tube (view B).

(6) Remove two screws and lockwashers securing clevis shaft housing to linkage housing, and remove clevis shaft housing (views B and D).

(7) Remove screw and lockwashers securing clevis to clevis shaft, and remove clevis and woodruff key from shaft (view D).

(8) Remove clevis shaft from shaft housing (views C and D).

(9) Remove two bearings from clevis shaft housing (press fit), if replacement is required (view C).

(10) Remove bearing from upper housing cover (view A).

(11) Remove pin securing outer lever to upper housing shaft, and remove lever (view A).

(12) Remove shaft and inner lever from upper housing (view A).

(13) Remove pin securing inner lever to upper housing shaft, and remove lever from shaft (view A).

(14) Remove plastic washer and preformed packing from upper housing (view A).

(15) Remove bearing from upper housing (view A).

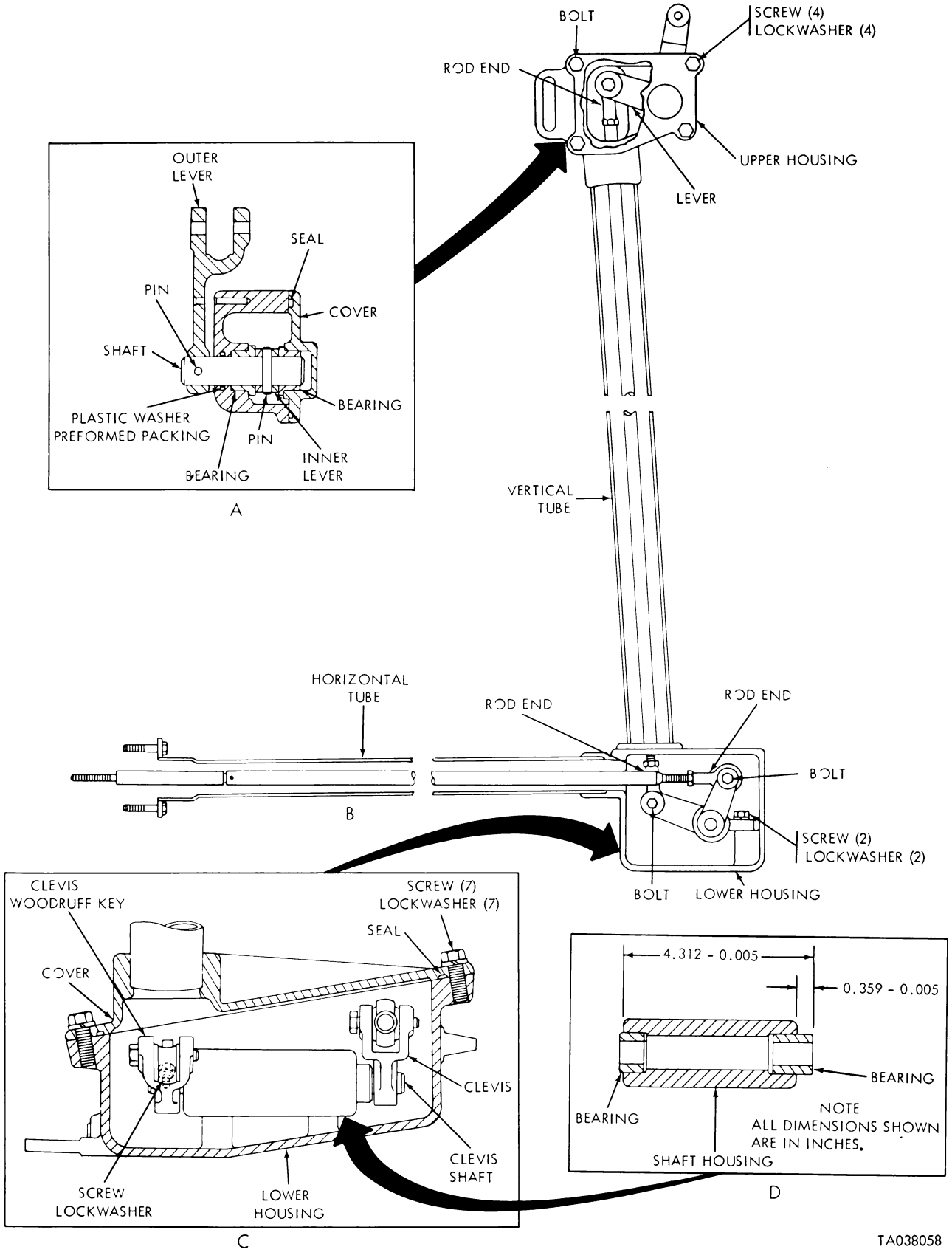


Figure 3-12. Engine compartment accelerator linkage disassembly and assembly — sectional views.

b. Horizontal Tube (view A, fig 3-13).

(1) Remove spring pin securing rod end to tube and unscrew rod end.

(2) Remove spring pin securing tube pin to tube and remove tube pin.

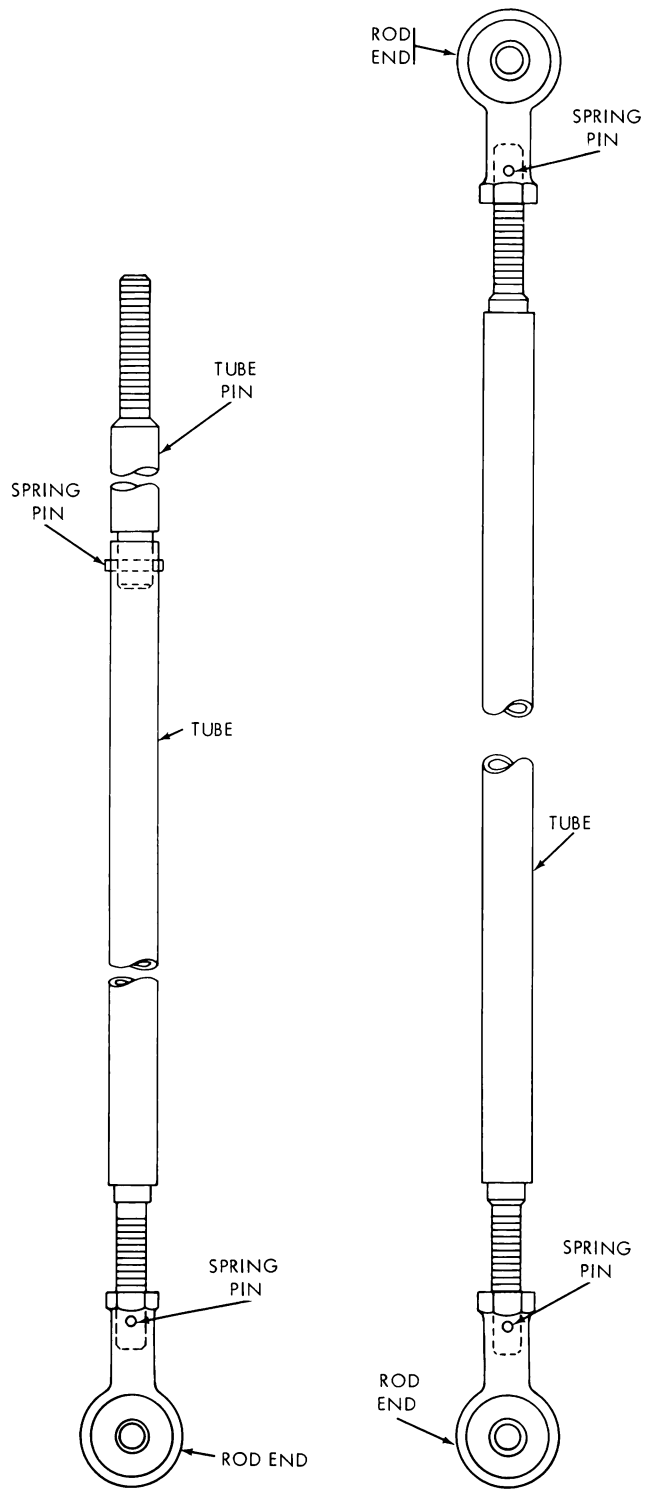


Figure 3-13. Engine compartment accelerator linkage tube disassembly and assembly.

c. Vertical Tube (view B, fig 3-13). Remove two spring pins securing two rod ends to tube, and unscrew rod ends.

3-38. Cleaning

Refer to paragraph 2-8 and 2-9.

3-39. Inspection and Repair

a. Check parts for wear as specified in table 3-2. Replace all parts that do not meet prescribed wear limits.

b. Visually inspect tubes for distortion or bends. Replace tube(s) if defective.

c. Visually inspect shaft, lever, tubes, and rod ends for elongated or cracked pin holes. Replace defective part(s).

d. Check rod end bearings for free movement, nicks, or burs. Replace rod end(s) if burs or nicks cannot be removed with a fine stone, or if free movement is impaired.

e. Refer to paragraphs 2-9, 2-11, and 2-17. Replace parts not reparable, as specified.

Table 3-2. Accelerator Linkage Wear Limits

Figure number	Reference letter	Point of measurement	Size and fit of new parts	Wear limits
3-14	A	ID of bore in cover and housing.	0.875 to 0.876	*
3-14	B	OD of bearings.	0.876 to 0.878	*
3-14	A-B	Fit of bearing in cover and housing.	0.000 to 0.003T	*
3-14	C	ID of bearings.	0.626 to 0.627	0.632
3-14	D	OD of shaft.	0.618 to 0.620	*
3-14	C-D	Fit of shaft in bearings.	0.006L to 0.009L	0.014L
3-14	E	ID of bore in housing.	0.875 to 0.876	*
3-14	F	OD of bearings.	0.877 to 0.878	*
3-14	E-F	Fit of bearing in bore.	0.001T to 0.003T	*
3-14	G	ID of bearings.	0.503 to 0.504	0.509
3-14	H	OD of shaft.	0.4955 to 0.5005	*
3-14	G-H	Fit of shaft in bearings.	0.003L to 0.009L	0.014L

* Indicates parts should be replaced when worn beyond limited given in Size and fit of new parts column.

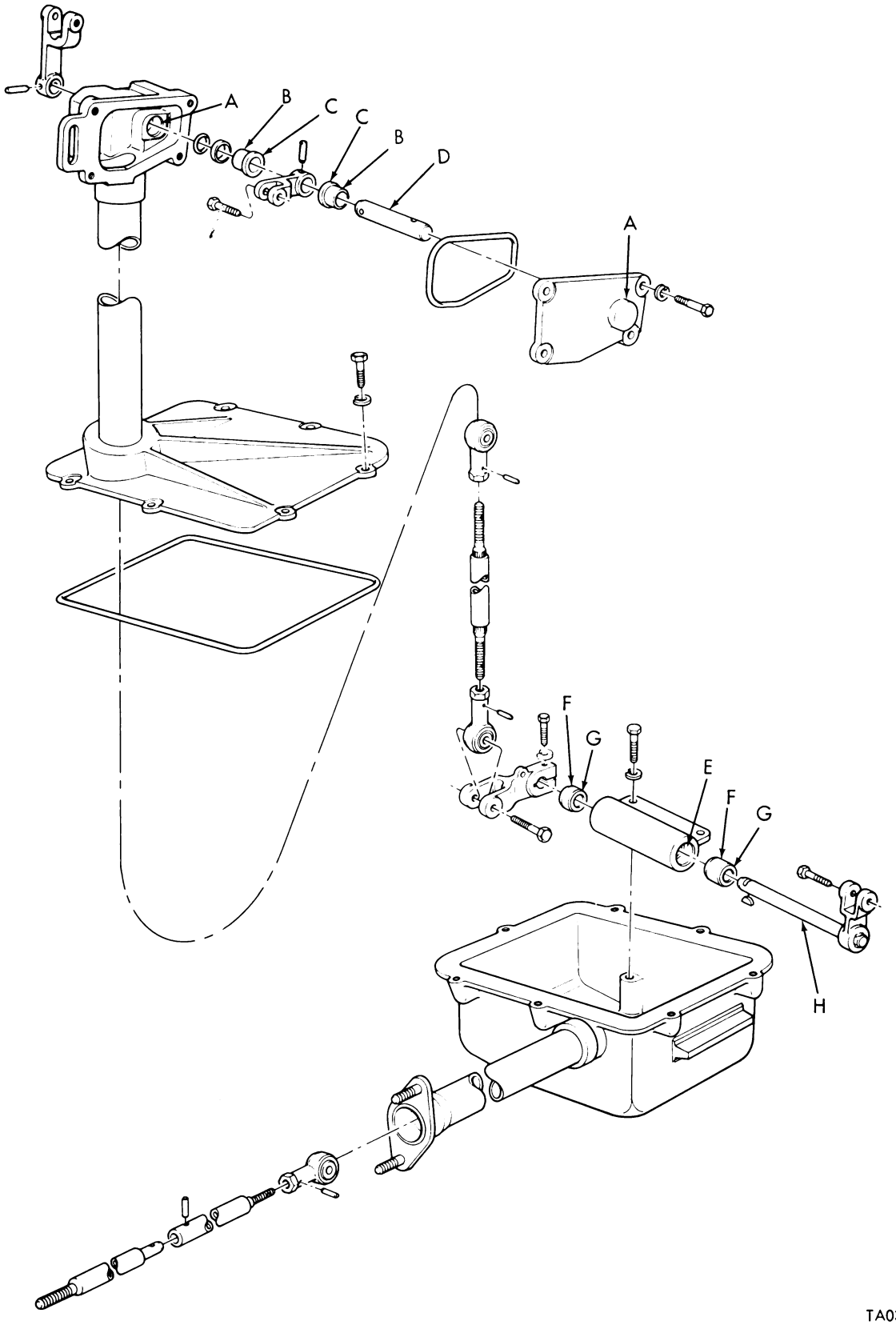


Figure 3-14. Accelerator linkage wear points of measurement.

3-40. Assembly

a. Vertical Tube (view B, fig 3-13). Thread two rod ends onto tube until pin holes in rod ends are alined with pin holes in tube. Secure rod ends on tube with two spring pins.

b. Horizontal Tube (view A, fig 3-13).

(1) Insert tube pin into tube, and aline pin hole in tube pin with pin hole in tube. Secure tube pin in tube with spring pin.

(2) Thread rod end onto tube until pin hole in rod end is alined with pin hole in tube. Secure rod end on tube with spring pin.

c. Linkage Assembly (fig 3-12). Assemble linkage assembly in the reverse order of the disassembly procedure.

3-41. Installation

(Fig 3-11).

Install linkage assembly in the reverse order of the removal procedure.

Section VIII. REPAIR OF ENGINE GENERATOR REGULATOR

3-42. Description

Refer to TM 9-2350-258-20-1.

3-43. Removal

Refer to TM 9-2350-258-20-1.

3-44. Cleaning

Clean housing with drycleaning solvent (PD-680) (para 2-8 and 2-9). Dry with compressed air.

3-45. Inspection and Repair

a. Test Equipment. Test stand and serviceable generator are required to test regulator (*b* below). Refer to test stand operator's manual for test stand operating procedures.

b. Tests.

(1) After installation of regulator test stand, reset overvoltage circuit breaker by pressing reset button on front of regulator.

NOTE

A voltage adjustment rheostat is not required to test regulator. If a rheostat is used, it will have no effect on regulator voltage.

(2) Stabilize equipment temperature by operating for 30 minutes with generator speed adjusted to 2,400 rpm and external load adjusted to 175 amperes. If load cannot be adjusted to obtain 175 amperes, increase generator speed to 4,000 rpm and return to 2,400 rpm. If load still cannot be adjusted to obtain 175 amperes, replace regulator.

(3) The regulator should maintain a voltage of 28 ± 0.7 volts at the load, with generator speed and load adjusted to values below. If voltage is not within limits, replace regulator. If voltage is within limits, regulator is not defective and can be returned to service.

(*a*) Adjust generator speed to 2,400 rpm and load to 25 amperes.

(*b*) Adjust generator speed to 2,400 rpm and load to 350 amperes.

(*c*) Adjust generator speed to 8,000 rpm and load to 25 amperes.

(*d*) Adjust generator speed to 8,000 rpm and load to 350 amperes.

3-46. Installation

Refer to TM 9-2350-258-20-1.

Section IX. REPAIR OF INFRARED POWER SUPPLY

3-47. Description

Refer to TM 9-2350-258-20-1.

3-48. Removal

Refer to TM 9-2350-258-20-1.

CAUTION

High voltage — discharge unit prior to removal or disassembly.

3-49. Disassembly

(Fig 3-15).

a. Remove eight screws and lockwashers securing two connectors to base (view A, fig 3-15).

b. Pull connectors away from base and unsolder leads (view A).

c. Remove two connector gaskets (view A).

d. Unscrew four captive screws securing cover to base, and remove cover (view B).

e. Remove and discard cover seal (view B).

f. Remove two tube caps from tubes (view C).

g. Pull three tubes and vibrator from sockets (view C).

h. Remove three screws securing potting assembly to base, and remove potting assembly (view D).

3-50. Cleaning

Clean parts with drycleaning solvent (para 2-4 and 2-5). Dry with compressed air.

3-51. Inspection and Repair

(Fig 3-15).

a. Inspect cover (view B, fig 3-15) for any defects that may cause leaks. If cover is defective and not reparable, replace power supply assembly.

b. Inspect tube and vibrator holddown springs (located inside of cover) for serviceability. If springs are defective, replace power supply assembly.

c. Inspect base (view D) in accordance with paragraphs 2-9 and 2-11.

d. Using a tube tester, test tubes and vibrator (view C). Replace tube(s) and/or vibrator if defective.

e. Inspect resistor (view D) for cracks and indications

of overheating. Replace potting assembly if resistor is defective.

f. Inspect tube sockets for damaged or corroded pins. If socket pins are damaged and not reparable, replace potting assembly (view D). Clean socket pins if corroded.

g. Inspect potting assembly (view D) for damage and indications of overheating. Replace potting assembly, if defective.

h. Depress and release interlock switch (view D). If switch is sluggish in returning to the released position, replace potting assembly.

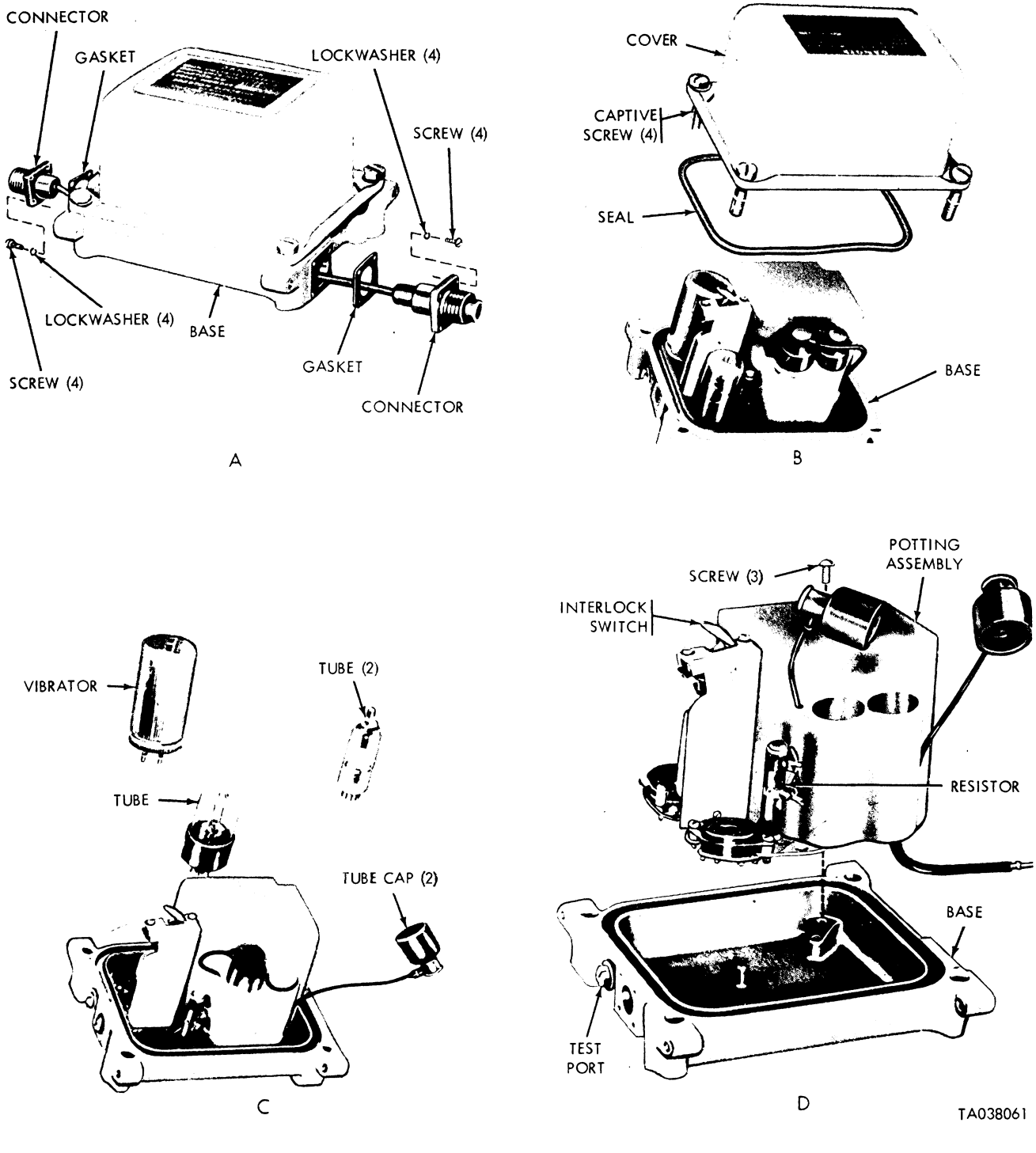


Figure 3-15. Infrared power supply disassembly and assembly.

3-52. Assembly

Fig 3-15.

Assemble infrared power supply in the reverse order of the disassembly procedure.

3-53. Tests

a. Leakage Test (fig 3-15).

(1) Remove screw from test port (view D, fig 3-15).

(2) Using a ⅛-inch pipe thread fitting, connect an air source and pressure gage to test port (view D).

CAUTION

Do not exceed 6 psi pressure when leakage testing power supply.

(3) Apply 6 psi pressure to test port and submerge power supply in water. If bubbles are present, repair leak and retest.

(4) Dry power supply with compressed air, remove fitting from test port, and install test port screw (view D).

b. Electrical Test (fig 3-16).

WARNING

Use high voltage components in test circuit. Do not touch high voltage components while power is on.

(1) Connect power supply to test circuit as shown in figure 3-15.

(2) Perform tests specified in table 3-3. Output voltage should not exceed 16 kilovolts during tests.

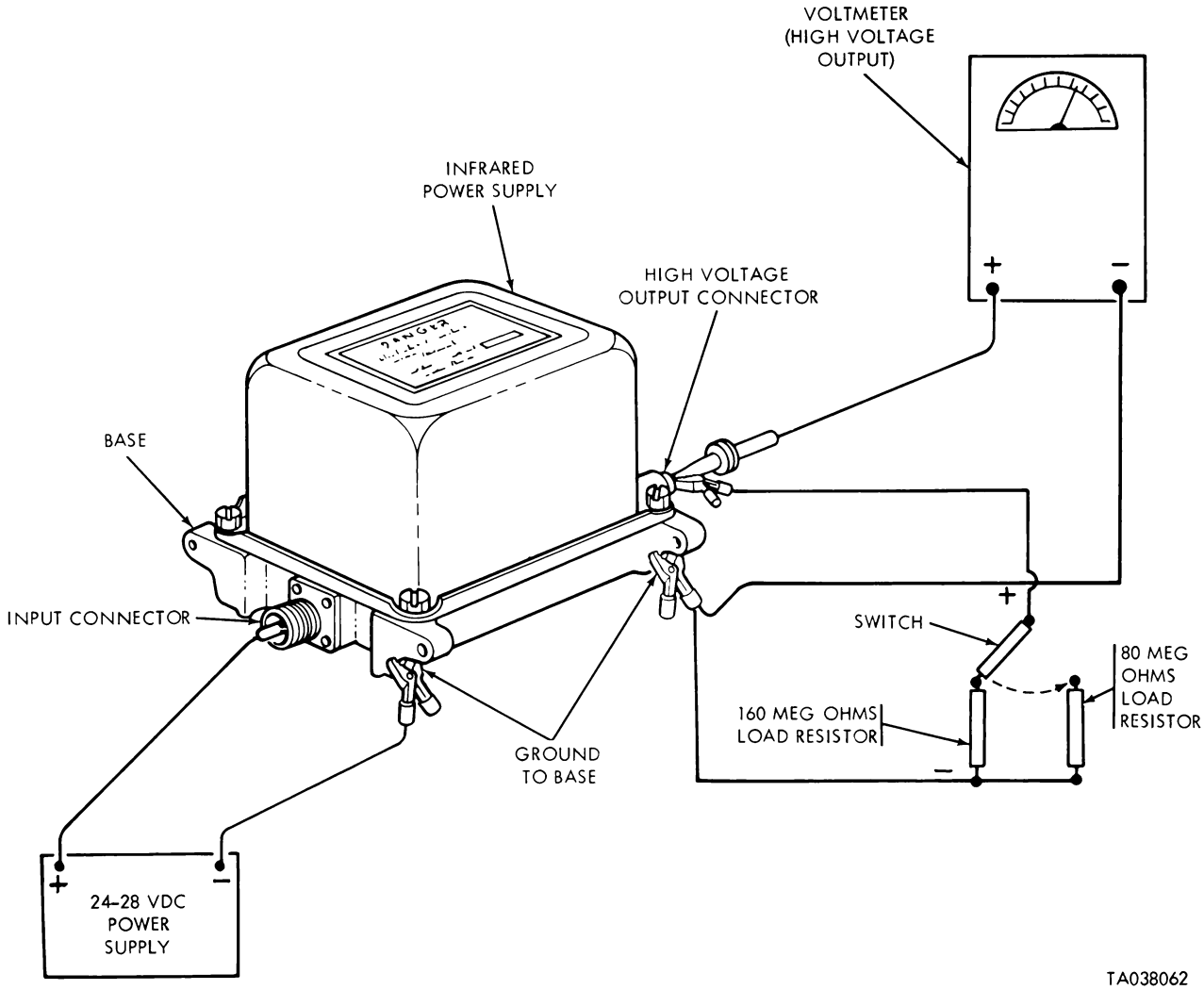


Figure 3-16. Infrared power supply output voltage test.

Table 3-3. Infrared Power Supply Output Voltage Test

Vdc input	Load resistors	High voltage output (minimum kilovolts)
24	160 megohms	15.2
28	160 megohms	15.5
24	8 megohms	13.8
28	80 megohms	14.0

3-54. Installation

Refer to TM 9-2350-258-20-1.

Section X. REPAIR OF SHIFTING CONTROL LINKAGE

3-55. Description

Refer to TM 9-2350-258-20-1.

3-56. Removal

(Fig 3-17).

a. Remove powerplant (TM 9-2350-258-20-1).

b. Remove right fuel tank (para 2-23).

c. Remove two screws, lockwashers, and washers securing rear hull link seal, and remove seal.

d. Remove bolt securing front intermediate rod to bulkhead shaft rod end.

e. Remove rod end and jamnut from bulkhead shaft.

f. Loosen two jamnuts and screws securing bulkhead sleeve to bulkhead, and remove sleeve.

g. Remove bolt securing rod end to rear hull link.

h. Remove pin securing rear universal joint to rear rod, and remove universal joint.

i. Remove four screws and two straps securing shields to supports.

j. Turn rear shield counterclockwise and disconnect from front shield.

k. Disconnect rear rod from rear intermediate rod, and remove rod from shield.

l. Turn front shield counterclockwise and disconnect from bulkhead. Remove shield, rear intermediate rod, and bulkhead shaft. Remove shield from rod.

m. Disconnect bulkhead shaft from rear intermediate rod.

n. Remove four screws, washers, lockwashers, and nuts securing two supports to hull plates, and remove supports.

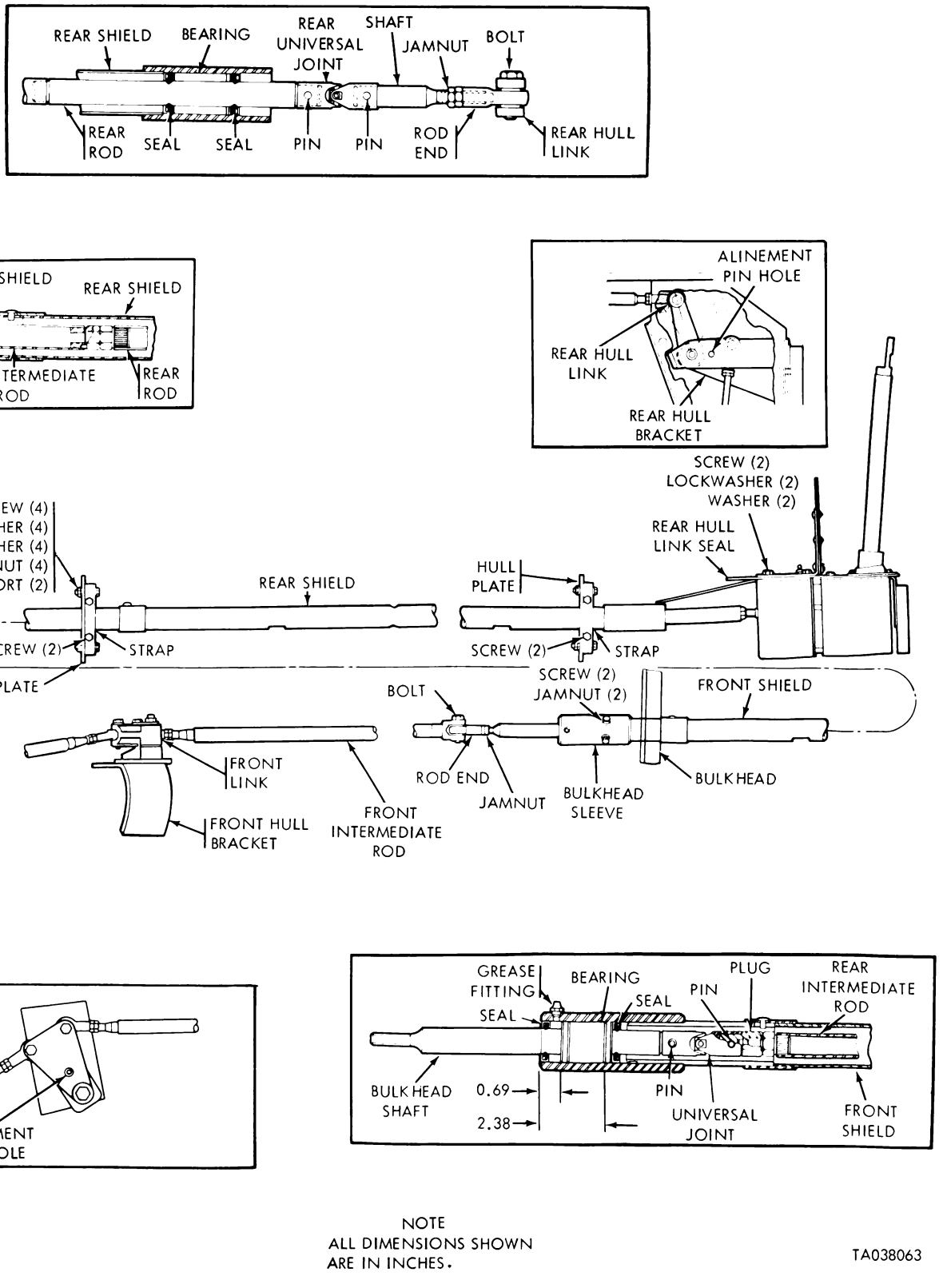


Figure 3-17. Shifting control linkage removal and installation.

3-57. Disassembly

a. Bulkhead Sleeve (fig 3-17). Remove two seals and bearing from sleeve.

b. Rear Shield (fig 3-17). Remove two seals and bearings from shield.

c. Front Universal Joint and Bulkhead Shaft (fig

3-17).

(1) Remove pin securing universal joint to bulkhead shaft, and remove shaft.

(2) Remove pin securing plug to universal joint, and remove plug.

d. Rear Universal Joint and Shaft (fig 3-17).

(1) Remove rod end and jamnut from shaft.

(2) Remove pin securing universal joint to shaft, and remove shaft.

3-58. Cleaning

Refer to paragraphs 2-8 and 2-9.

3-59. Inspection and Repair

a. Check parts for wear as specified in table 3-4. Replace parts that do not meet prescribed wear limits.

b. Refer to paragraphs 2-9 and 2-11.

c. Replace all defective components not reparable, as specified in paragraphs 2-9 and 2-11.

Table 3-4. Shifting Control Linkage Wear Limits

Figure number	Reference letter	Point of measurement	Size and fit of new parts	Wear limits
3-18	A	OD of shaft.	0.746 to 0.749	0.7455
3-18	B	ID of bearing.	0.750 to 0.752	0.7525
3-18	A-B	Fit of shaft in bearing.	0.001L to 0.006L	0.0070L
3-18	C	OD of bearing.	1.248 to 1.250	*
3-18	D	ID of sleeve.	1.2475 to 1.2480	*
3-18	C-D	Fit of bearing in sleeve.	0.000 to 0.0025T	*
3-18	E	OD of shaft rod.	0.746 to 0.749	0.745
3-18	B-E	Fit of rod in bearing.	0.001L to 0.006L	0.0008L
3-18	F	OD of pin.	0.2495 to 0.2505	0.2485
3-18	G	ID of pin bore in shaft and plug.	0.2475 to 0.2480	0.2482
3-18	F-G	Fit of pin in shaft and plug.	0.0015T to 0.0030T	0.0003T

* Indicates part should be replaced when worn beyond limited given in Size and fit of new parts column.

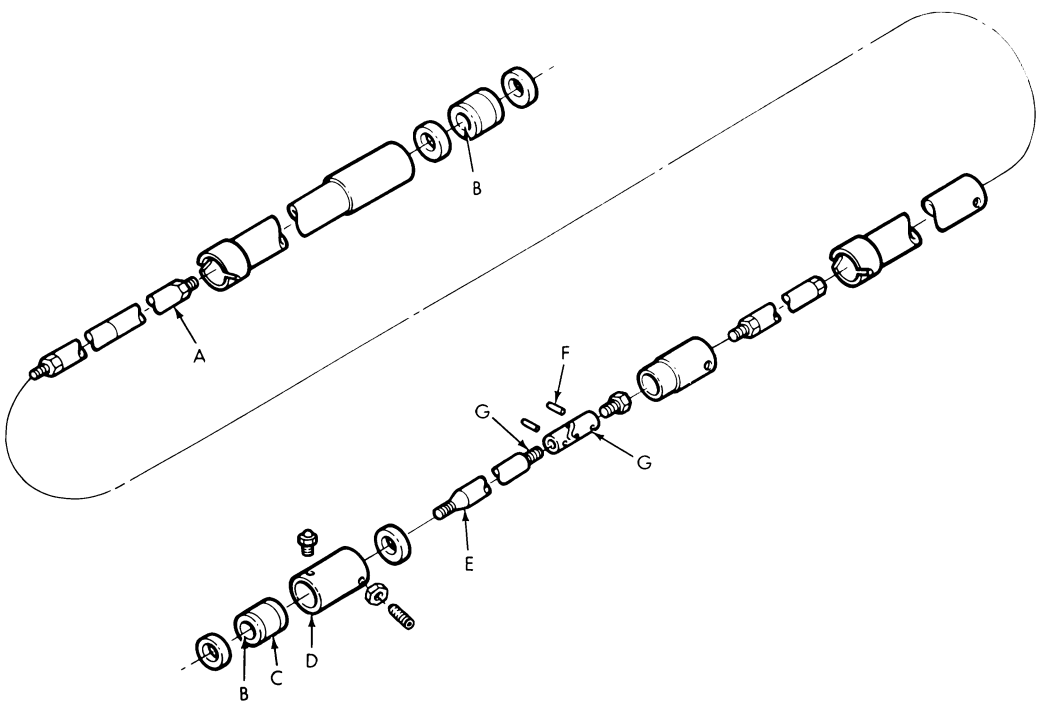


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Figure 3-18. Shifting control linkage wear points of measurement.

3-60. Assembly

a. Rear Universal Joint and Shaft (fig 3-17). Position universal joint on shaft, and secure with pin.

b. Front Universal Joint and Bulkhead Shaft (fig 3-17).

(1) Position universal joint on bulkhead shaft, and secure with pin.

(2) Insert plug into universal joint, and secure with pin.

c. Rear Shield (fig 3-17).

(1) Install inner seal into shield with lip of seal facing inward. Press seal into shield until it bottoms.

(2) Press bearing into shield far enough to provide adequate exposed surface for proper seating of outer seal.

(3) Install outer seal into shield, with lip of seal

facing outward.

d. Bulkhead Sleeve (fig 3-17). Install two seals and bearing into sleeve as shown in figure 3-17. Lips of seals must face outward (away from bearing).

3-61. Installation

(Fig 3-17).

NOTE

Refer to figure 3-17 unless otherwise indicated.

a. Position two supports on hull plates, and secure with four screws, flat washers, lockwashers, and nuts.

b. Insert a 1/8-inch diameter alinement pin through rear hull bracket, and link alinement holes.

c. Assemble bulkhead shaft to rear intermediate rod.

NOTE

Install shields with slots at bottom.

d. Position bulkhead shaft through bulkhead, and install front shield over rod. Turn shield clockwise to secure to bulkhead.

e. Insert rear rod into rear shield, and connect rear rod to read intermediate rod.

f. Position rear shield on front shield. Turn rear shield clockwise, to secure to front shield.

g. Secure shields to supports with two straps and four screws.

h. Thread rod end and jamnut onto rear universal joint shaft.

i. Position rear universal joint on rear rod, and secure with pin.

j. Insert a 0.06-inch diameter pin into rod end thread engagement check opening, to check minimum thread engagement (fig 3-19). Pin must not pass through rod end.

k. Secure rear rod end to rear hull link with bolt, and tighten rod end jamnut.

l. Lubricate bulkhead sleeve bearing with grease (MIL-G-10924), and position sleeve on bulkhead shaft. Secure sleeve to bulkhead with two screws and jamnuts.

m. Insert a 1/8-inch diameter alinement pin through front intermediate rod link and front hull bracket alinement pin holes.

n. Thread jamnut and rod end onto bulkhead shaft.

o. Adjust rod end to aline with front intermediate rod, and check rod end thread engagement (*j.* above).

p. Secure front intermediate rod to bulkhead shaft rod end with bolt, and tighten rod end jamnut.

q. Remove alinement pin from front intermediate rod link and bracket.

r. Remove alinement pin from rear hull bracket and link.

s. Position rear hull link on rear hull bracket, and secure with two screws, lockwashers, and flat washers.

t. Install fuel tank (para 2-23).

u. Install powerplant (TM 9-2350-258-20-1).

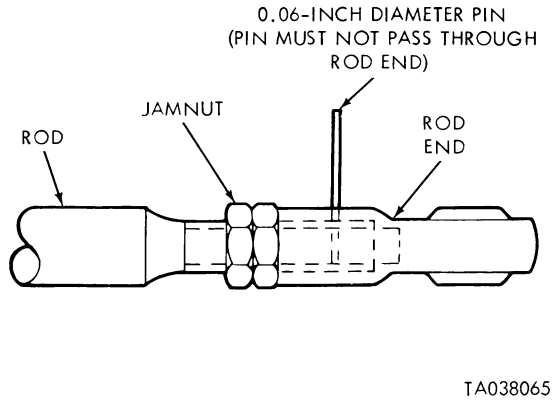


Figure 3-19. Rod end thread engagement check.

Section XI. REPAIR OF FINAL DRIVE

3-62. Description

Refer to TM 9-2350-258-20-1.

3-63. Removal

Refer to TM 9-2350-258-20-1.

3-64. Disassembly

(Fig 3-20).

a. Remove four drain/fill plugs from case (view A, fig 3-20, sh 1 of 4), and drain oil from case.

b. Remove vent valve from case (view A).

c. Remove 17 studs from case and 10 studs from output shaft flange (para 2-11), only if replacement is required (view A).

d. Remove drive adapter from pinion (view B).

e. Remove lockwire and eight bolts securing pinion bearing cap to case using three 5/8 x 4-inches jackscrews. Remove cap (view B). Remove and discard gasket.

f. Remove oil seal from pinion bearing cap (view B). Discard seal.

NOTE

To prevent cap from binding in carrier, keep surfaces parallel during removal.

g. Remove 20 bolts securing carrier to case (view C, sh 2 of 4).

h. Remove four setscrews from jackscrew holes (view D).

i. Thread four 5/8 x 4-inches bolts into carrier jackscrew holes (view E). Tighten bolts alternately until case is separated from carrier. Remove and discard gasket (view F). Remove four bolts from jackscrew holes.

NOTE

To prevent cap from binding in carrier, keep surfaces parallel during removal.

j. Bend output shaft nut lockwasher away from nut. Use a bar between output shaft stud to prevent shaft from turning, and remove nut (view G) using box

wrench (6, table 2-1). Remove and discard lockwasher.

k. Remove drive gear from output shaft and pinion with bearings from carrier simultaneously (view H).

NOTE

Due to two types of pinion bearings used (bearings are interchangeable), slightly different disassembly and assembly procedures are required. One type is configured with the roller bearings attached to the outer race. With this type, the roller bearings and outer races must be removed from the final drive case and carrier. The inner races must be pressed or driven from the pinion shaft. The second type is configured with the roller bearings attached to the inner race. With this type, the roller bearings and inner races must be pressed from the pinion shaft. The outer races must be removed from the final drive case and carrier.

l. Remove spacer from output shaft (view H).

m. Assemble three short pins (3-½ inches long) and washers (view J, sheet 3 of 4) into holes marked C in bearing remover (7, table 2-1).

n. Position bearing remover on drive gear as shown in view K. Using an arbor press, apply pressure to center of bearing remover to push bearing from gear (views K and L). Release press and remove remover.

o. Using an arbor press and appropriate blocks (see note, *k* above), remove bearings from pinion (view M).

p. Remove lockwire from output shaft bearing cap retainer bolts (view N).

q. Loosen eight bolts securing bearing cap retainer to carrier until bolt heads bottom against output shaft flange (view N).

r. Using a heavy brass bar or block of wood, drive output shaft from carrier far enough to permit disengagement of bearing cap retainer bolts from carrier (views N and P).

s. After disengaging bearing cap retainer bolts, drive output shaft from carrier (views P, sh 3 of 4 and Q, sh 4 of 4). Remove and discard gasket (view Q).

t. Remove seal ring from carrier only if replacement is required (view Q).

u. Assemble three short pins (3-½ inches long) and washers (view R) into holes marked B in bearing remover (7, table 2-1). If pins do not mate with holes in output shaft flange (view S), remove pins from holes marked B, and install in holes marked A. Check alinement between pins and holes in output shaft flange. If pins do not aline with holes, remove pin closest to hole marked A-1, and install pin in hole A-1.

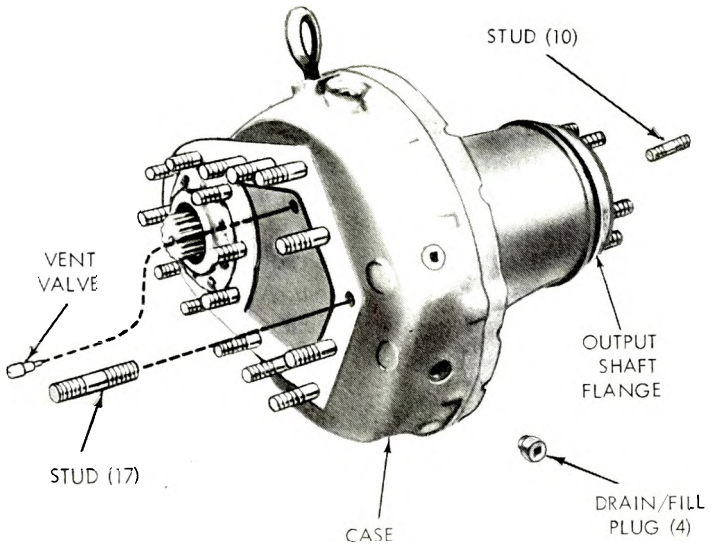
v. Position bearing remover pins through holes in output shaft flange (view S). Using an arbor press, apply pressure to center of bearing remover until remover contacts face of output shaft. Remove bearing remover from shaft.

w. Remove short pins (3-½ inches long) from bearing remover, and install long pins (5-inches long) and washers (view T).

x. Position bearing remover pins through holes in output shaft flange (view U). Using an arbor press, apply pressure to center of bearing remover to push bearing from output shaft.

y. Remove bearing remover, bearing, bearing cap, bearing cap retainer, eight bolts, and spacer from output shaft (view V).

z. Remove oil seal from bearing cap (view V). Discard seal.



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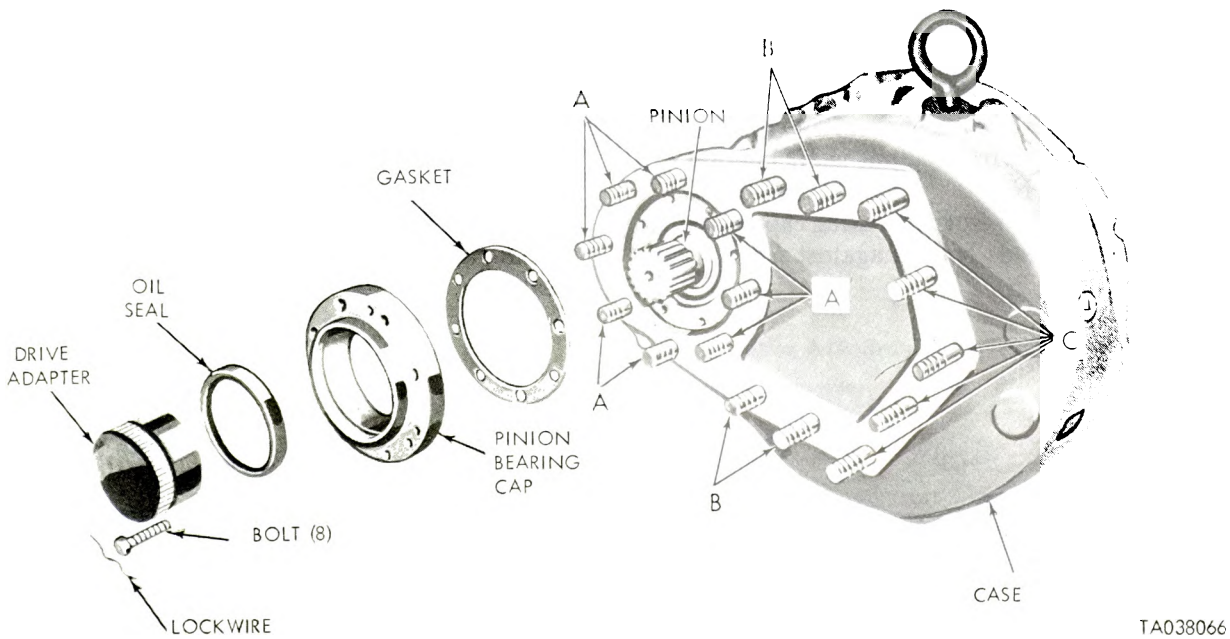


Figure 3-20. Final drive disassembly and assembly (sheet 1 of 4).

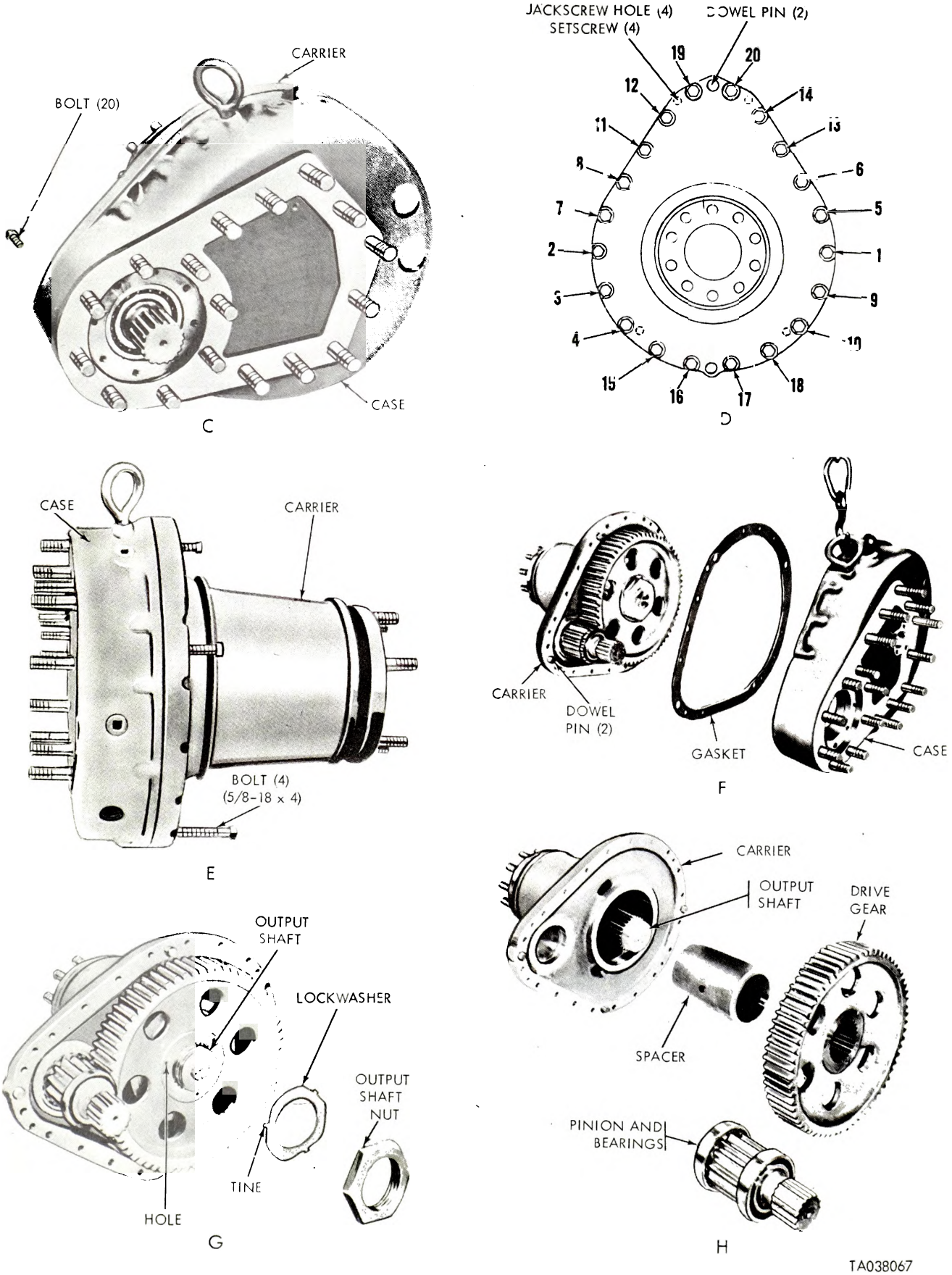
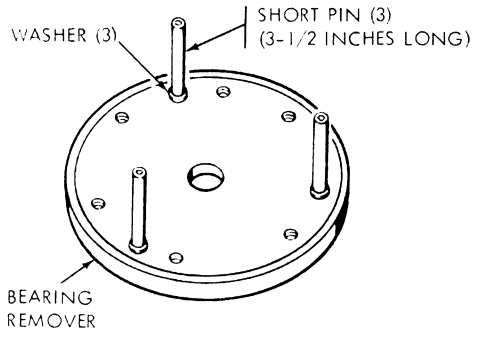


Figure 3-20. Final drive disassembly and assembly (sheet 2 of 4).



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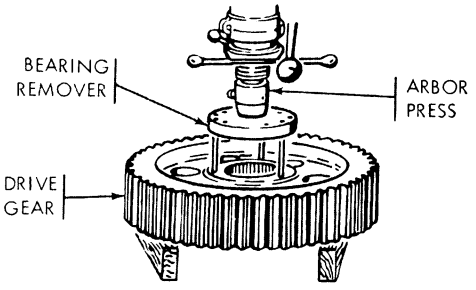

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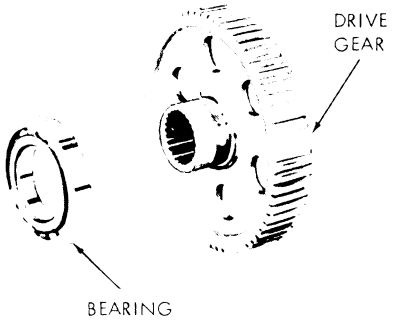

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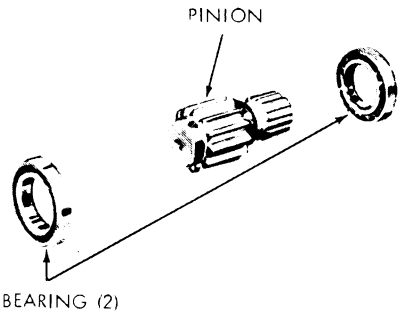

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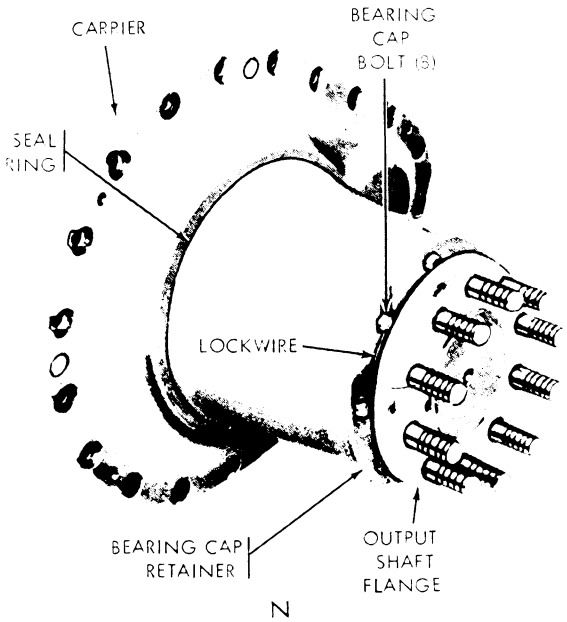

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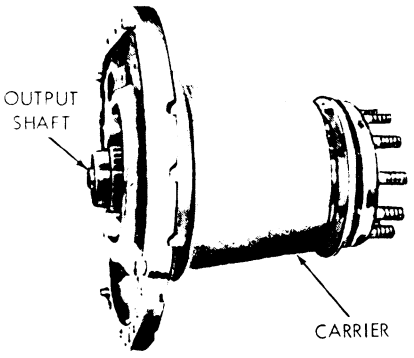

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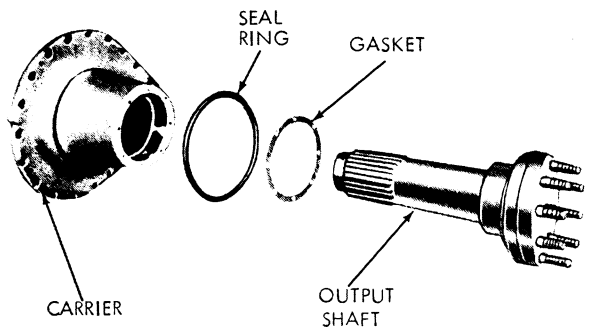
Figure 3-20. Final drive disassembly and assembly (sheet 3 of 4).



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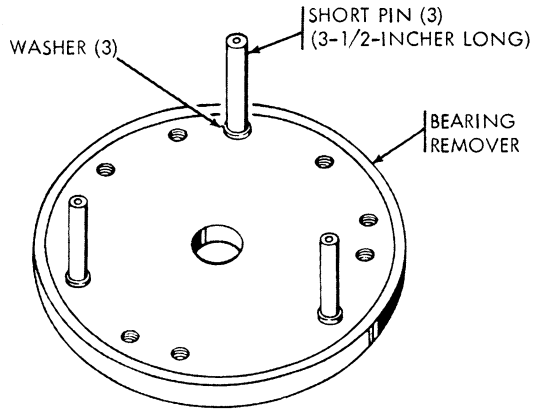

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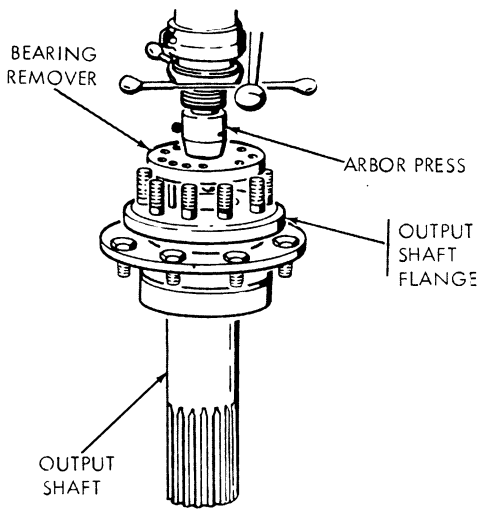

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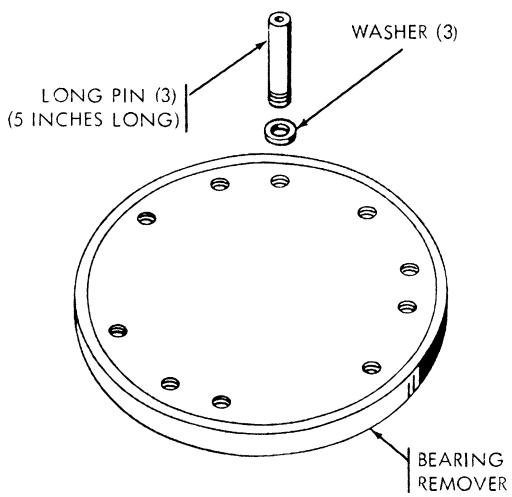

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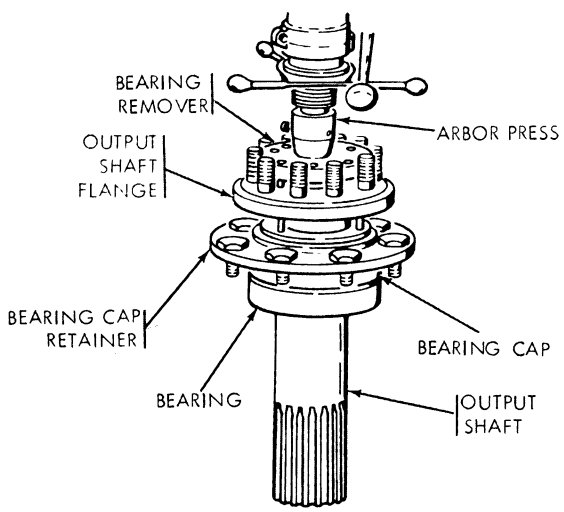

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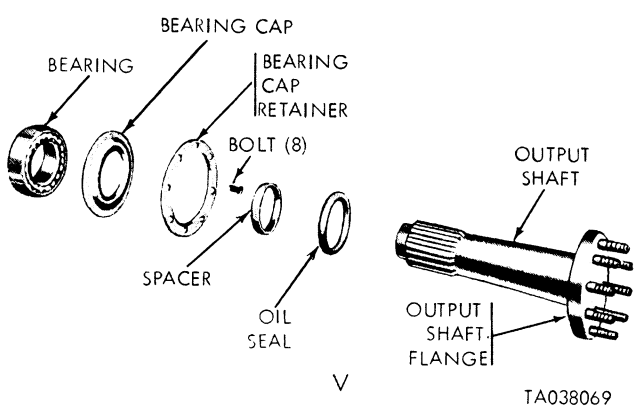

V

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Figure 3-20. Final drive disassembly and assembly (sheet 4 of 4).

3-65. Cleaning

Refer to paragraphs 2-8 and 2-9.

3-66. Inspection and Repair

a. Refer to paragraphs 2-9, 2-10, 2-11, 2-13, and 2-16. Replace parts not reparable as specified.

b. Check parts for wear as specified in table 3-5. Replace parts that do not meet prescribed wear limits.

c. Use dye penetrant (MIL-I-25135) to inspect output shaft at flange for cracks and fractures.

Table 3-5. Final Drive Wear Limits

Figure number	Reference letter	Point of measurement	Size and fit of new parts	Wear limits
3-21	A-B	Fit of bearing in case.	0.0004L to 0.0022L	*
3-21	C-D	Fit of bearing on pinion.	0.0004T to 0.0022L	*
3-21	E-Q	Fit of bearing in carrier.	0.0004L to 0.0022L	*
3-21	F-L	Fit of spacer on output shaft.	0.002L to 0.006L	*
3-21	G-J	Fit of bearing on drive gear.	0.008T to 0.0035T	*
3-21	H-R	Fit of bearing in carrier.	0.0010L to 0.0042L	*
3-21	J-K	Fit of spacer on drive gear.	0.000 to 0.007L	*
3-21	L-M	Fit of bearing on output shaft.	0.0006T to 0.0023T	*
3-21	N-P	Fit of bearing in carrier.	0.0030L to 0.0000L	0.0040

* Indicates part should be replaced when worn beyond limits given in Size and fit of new parts column.

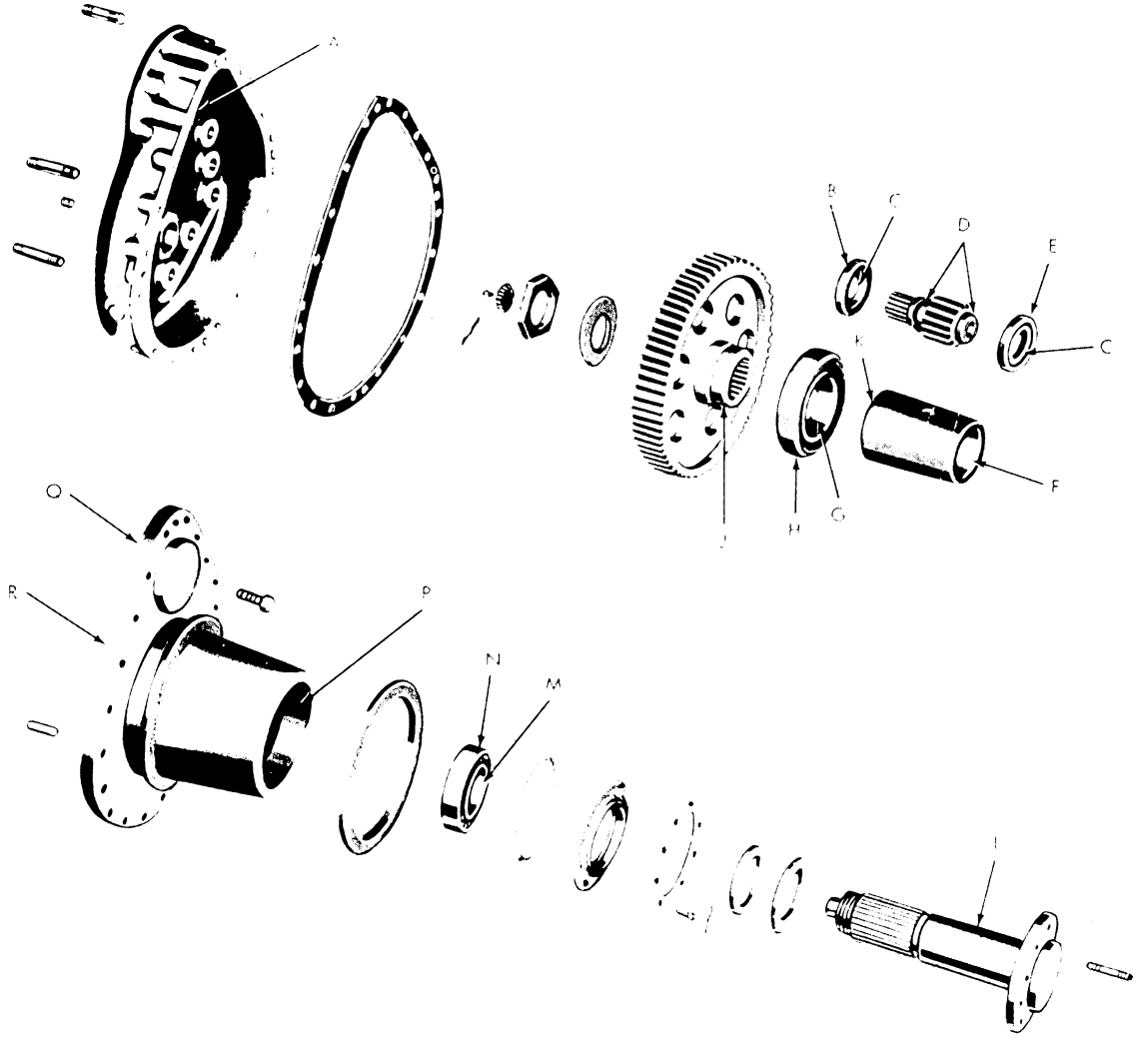

Figure 3-21. Final drive wear points of measurement.

3-67. Assembly

(Fig 3-20).

a. Lubricate output shaft and seal with clean engine oil. Position oil seal and spacer on output shaft (view V, fig 3-20, sh 4 of 4), keeping the seal centered on the shaft.

b. Install eight bearing cap bolts through bearing cap retainer and bearing cap (view V). Position bearing cap retainer and bearing cap over seal on output shaft.

c. Position bearing on output shaft and using an arbor press, press bearing on shaft until seal, spacer, and bearing until seated against output shaft flange (view V). Insure bearing cap bolts do not fall out during pressing operation.

d. Install seal ring on carrier if removed (views Q, sh 4 of 4 and N, sh 3 of 4).

e. Oil threads of output shaft and drive gear retaining nut. Position gasket on carrier (view Q, sh 4 of 4).

f. Using an arbor press, press output shaft into carrier until the eight bearing cap retainer bolts can be engaged in carrier bolt holes (view N, sh 3 of 4). Continue to tighten alternately bearing cap retainer bolts, and press shaft into carrier until bearing cap retainer is seated against carrier and bolts are tight. Install lockwire through bolts.

NOTE

The final drive pinion and drive gear are matched sets and marked with the word "SET" followed by a set number. Set numbers on pinion and drive gear must match.

g. Using an arbor press and appropriate blocks, install bearings on pinion (view M).

h. Using an arbor press and appropriate blocks, install bearing on drive gear (view L).

i. Install spacer on output shaft (view H, sh 2 of 4).

j. Position drive gear on output shaft. Mesh pinion with drive gear, and install drive gear on output shaft splines and pinion bearing into carrier simultaneously (view H). Using an arbor press and appropriate blocks, press drive gear on output shaft removing all clearances.

k. Position new lockwasher on output shaft, with washer tines seated in holes in drive gear (view G).

l. Install output shaft nut (view G), and tighten nut. Bend lockwasher against nut flats at three places.

m. Position new gasket on carrier (view F).

n. Position case on carrier dowel pins (view F), and apply pressure evenly to mate case with carrier.

o. Secure case to carrier with 20 bolts (view C). Tighten bolts to 110-120 lb-ft (149-163 N.m) in sequence shown in view D. Repeat sequence, and tighten bolts to 190-220 lb-ft (258-298 N.m).

p. Apply sealer (MIL-S-1103D) to setscrew threads, and thread setscrews into four carrier jackscrew holes (view D).

q. Install oil seal in pinion bearing cap (view B, sh 1 of 4).

r. Position gasket and pinion bearing cap on case, and secure with eight bolts (view B). Install lockwire through bolts.

s. If studs were removed from case during disassembly or repair, apply sealing compound (MIL-S-22473, Grade AV) to stud threads and primer (MIL-S-22473, Grade T) to threads in case (view A). Thread studs into case so that remaining length above case surface is per: (1), (2), and (3) below and view B.

(1) Studs A - 2.25 ± 0.06 in.
(2) Studs B - 2.88 ± 0.06 in.
(3) Studs C - 3.12 ± 0.06 in.

t. Apply sealing compound (MIL-S-22473, Grade HV) to drain/fill plug threads and primer (MIL-S-22473, Grade T) to threads in case (view A). Install plugs.

u. Thread vent valve into case (view A).

v. Install drive adapter on pinion (view B).

3-68. Installation

Refer to TM 9-2350-258-20-1.

Section XII. REPAIR OF BRAKE MASTER CYLINDER

3-69. Description

Refer to TM 9-2350-258-20-1.

3-70. Removal

Refer to TM 9-2350-258-20-1.

3-71. Disassembly

(Fig 3-22).

a. Remove filler cap and gasket (view A, fig 3-22).

b. Remove bleeder valve (view A).

c. Remove two plugs and one gasket from outlet ports (view B).

d. Remove boot from piston end of cylinder.

e. Remove piston retaining ring and washer (view A).

f. Remove piston, two cups, two springs, retainer, valve, and valve seat from cylinder bore (view A).

g. Discard piston, two cups, two springs, retainer, valve, valve seat, and piston retaining ring. These items are supplied in repair kit.

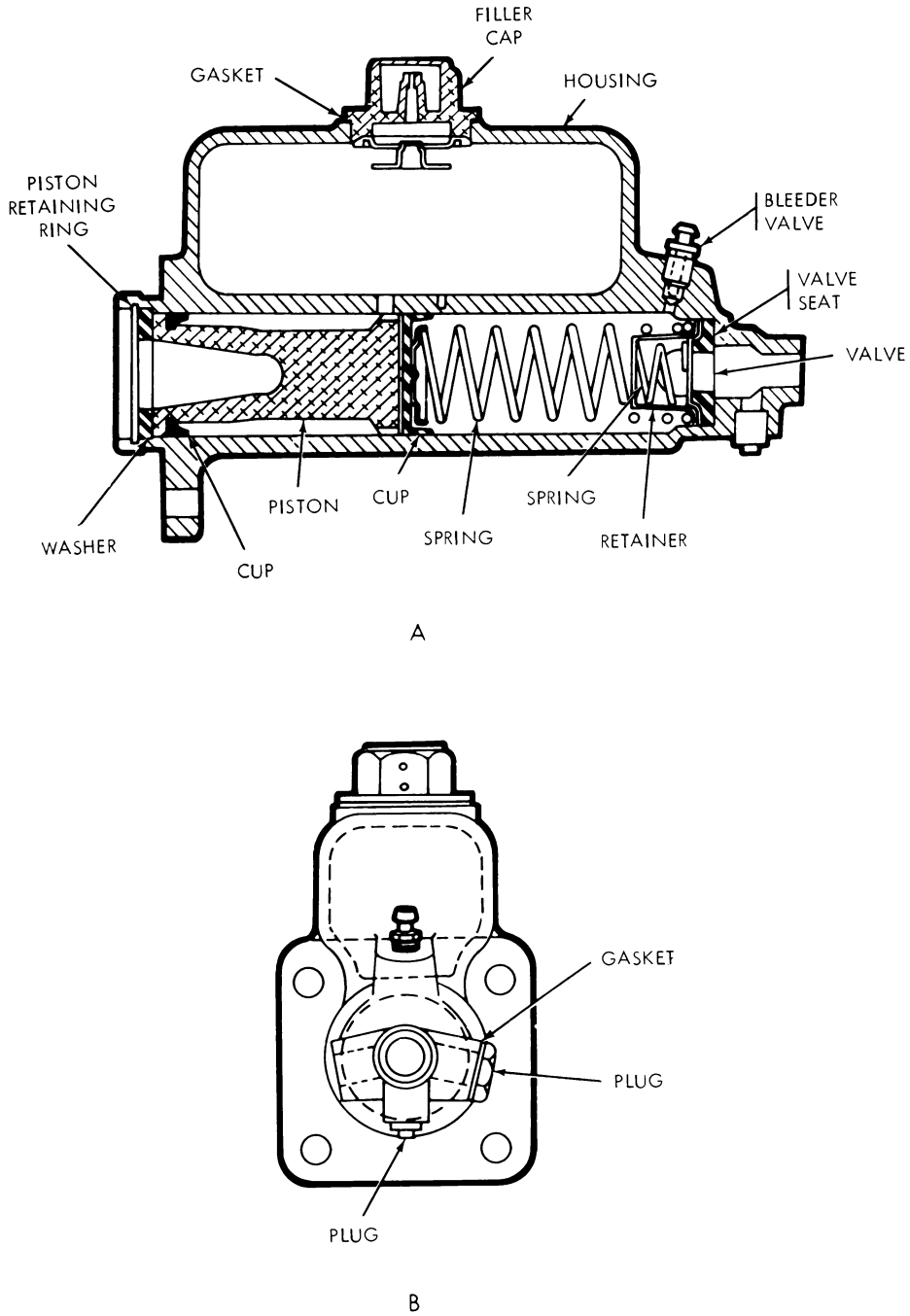

Figure 3-22. Brake master cylinder disassembly and assembly.

3-72. Cleaning

Refer to paragraphs 2-8 and 2-9.

3-73. Inspection and Repair

a. Visually inspect cylinder bore for scratches or pitting. If bore is pitted or damaged, replace master cylinder assembly.

b. Hone cylinder bore to remove surface scratches and glazing. Reinspect for pits and surface damage that could cause failure of cups.

NOTE

Honing must be kept to a minimum to prevent appreciable change in cylinder bore inside diameter.

c. If cylinder is serviceable, install repair kit (para 3-74).

3-74. Assembly

(Fig 3-22).

Assemble master brake cylinder in reverse order of disassembly procedure.

3-75. Installation

Refer to TM 9-2350-258-20-1.

Section XIII. REPAIR OF BRAKE SLAVE CYLINDER

3-76. Description

Refer to TM 9-2350-258-20-1.

3-77. Removal

Refer to TM 9-2350-258-20-1.

3-78. Disassembly

(Fig 3-28).

a. Remove bleeder valve from cylinder.

b. Drive pin from cylinder retaining nut, and remove nut from cylinder.

c. Remove two bolts securing tube to cylinder, and remove two tubes, retainer, and spring. Hold tube in position while removing bolts, as spring is compressed in cylinder.

d. Remove inlet plug and O-ring seal. Discard seal.

e. Push piston from cylinder bore.

f. Discard spring, inner tube, and piston with rings and seals. These items are supplied in repair kit.

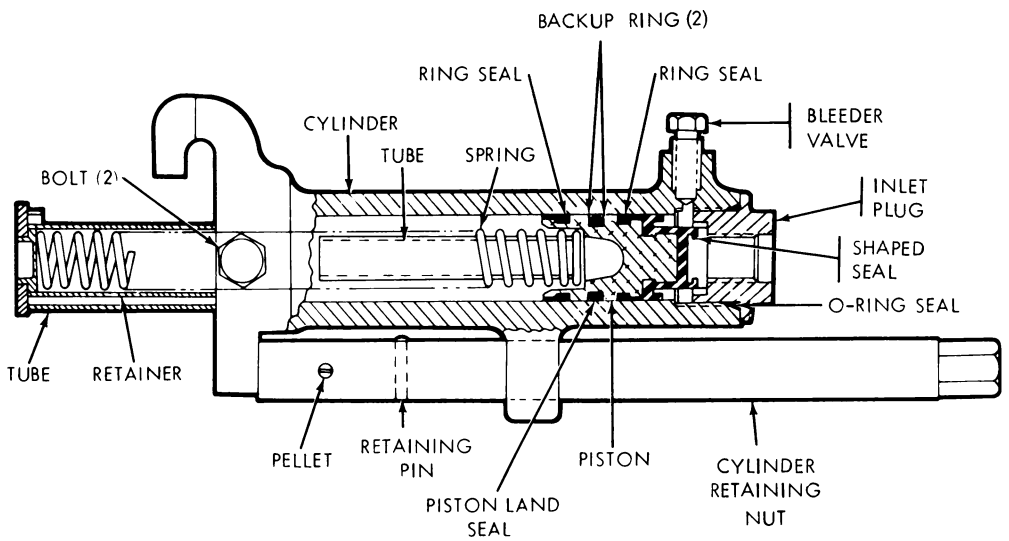

Figure 3-23. Brake slave cylinder disassembly and assembly.

3-79. Cleaning

Refer to paragraphs 2-8 and 2-9.

3-80. Inspection and Repair

a. Visually inspect cylinder bore for scratches or pitting. If bore is pitted or damaged, replace slave cylinder assembly.

b. Hone cylinder bore, to remove surface scratches and glazing. Reinspect for pits and surface damage that could cause failure of seals or rings.

NOTE

Honing must be kept to a minimum to prevent appreciable change in cylinder bore inside diameter.

c. If cylinder is serviceable, install repair kit (para 3-81).

3-81. Assembly

(Fig 3-23).

a. Coat piston, cylinder bore, and all seals with hydraulic brake fluid (VV-B-680).

b. Install piston and seal and two back-up rings on piston.

c. Install two ring seals on piston.

d. Install shaped seal (rubber seal and steel disk) on top of piston.

e. Carefully insert piston into cylinder bore from spring end of cylinder. Do not damage seals. Damaged seals must be replaced.

f. Install inlet plug with new O-ring seal.

g. Install two tubes, spring, and retainer. Compress spring as required to aline outer tube with cylinder, and secure tube to cylinder with two bolts.

h. Thread a 3/8-16 UNC -2B screw into cylinder retaining nut. Tighten pellet until 12 ± 4 lb-in (1.356 ± 0.452 N.m) torque is required to remove screw from nut.

i. Position cylinder retaining nut on cylinder and in-

stall retaining pin.

j. Install bleeder valve.

k. If slave cylinder will not be installed immediately, seal open port.

3-82. Installation

Refer to TM 9-2350-258-20-1.

Section XIV. REPAIR OF STEERING CONTROL LINKAGE

3-83. Description

Refer to TM 9-2350-258-20-1.

3-84. Removal

(Fig 3-24).

a. Removal powerplant (TM 9-2350-258-20-1).

b. Remove left fuel tank (para 2-23).

c. Remove screw, washer, cotter pin, and nut securing rear link shield, and remove shield. Reinstall nut on link spindle.

d. Remove bolt securing rear rod to rear link.

e. Remove bolt securing front intermediate rod to bulkhead shaft.

f. Remove rod end and jamnut from bulkhead shaft.

g. Loosen two jamnuts and screws securing bulkhead sleeve to bulkhead, and remove sleeve.

h. Remove four screws and two straps securing shields to supports.

i. Turn rear shield counterclockwise and disconnect from front shield.

j. Disconnect rear rod from rear intermediate rod, and remove rod from shield.

k. Turn front shield counterclockwise and disconnect from bulkhead. Remove shield, rear intermediate rod, and bulkhead shaft. Remove shield from rod.

l. Disconnect bulkhead shaft from rear intermediate rod.

m. Remove rod end and jamnut from rear rod.

n. Remove four screws, washers, lockwashers, and nuts securing two shield supports to hull plates, and remove supports.

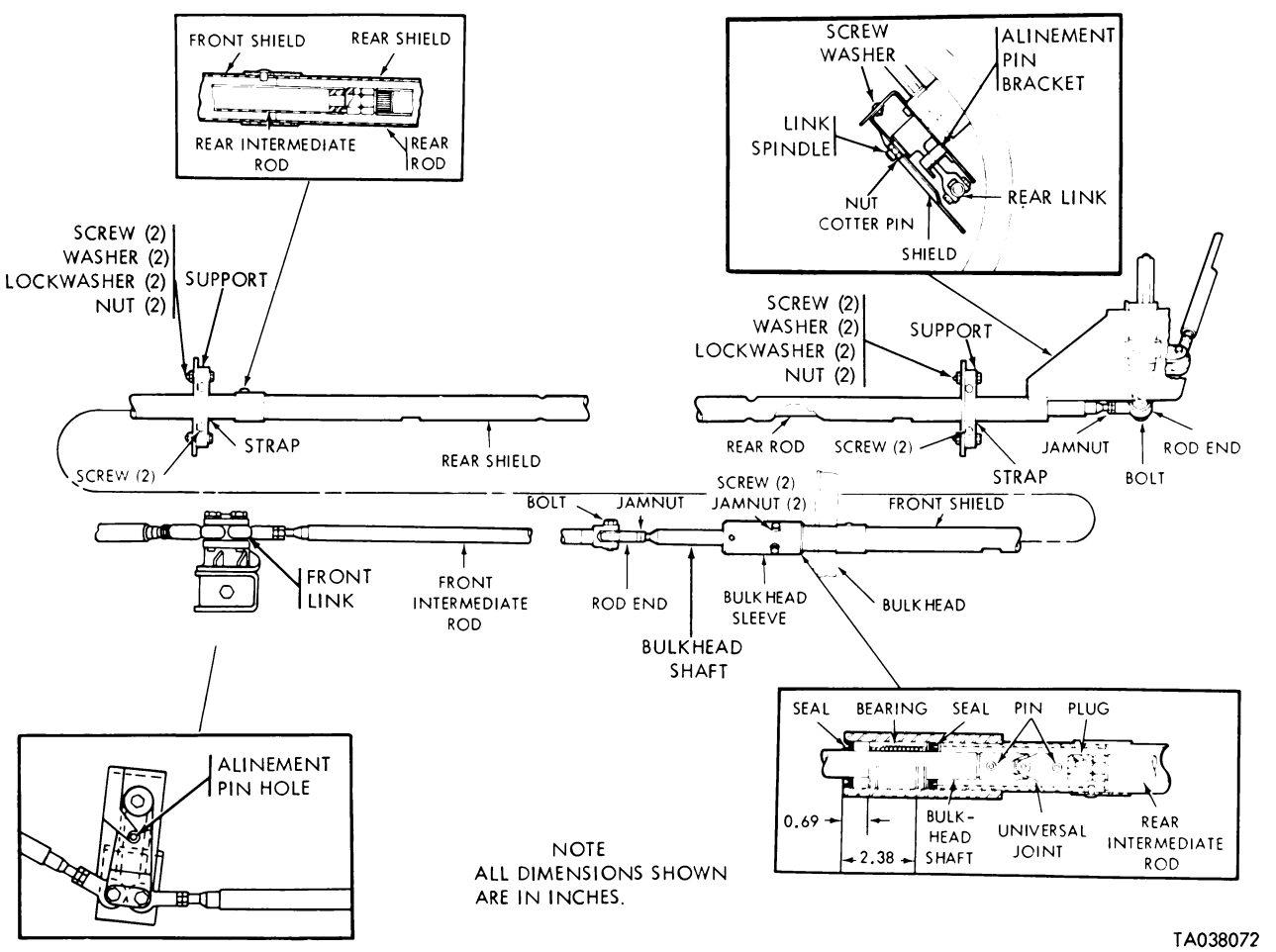

Figure 3-24. Steering control linkage removal and installation.

3-85. Disassembly

a. Bulkhead Sleeve (Fig 3-24). Remove two seals and bearing from sleeve.

b. Universal Joint and Shaft (Fig 3-24).

(1) Remove pin securing universal joint to shaft, and remove shaft.

(2) Remove pin securing plug in universal joint, and remove plug.

3-86. Cleaning

Refer to paragraphs 2-8 and 2-9.

3-87. Inspection and Repair

a. Check parts for wear as specified in table 3-6. Replace parts that do not meet prescribed wear limits.

b. Refer to paragraphs 2-9 and 2-11.

c. Replace defective components not reparable as specified in paragraphs 2-9 and 2-11.

Table 3-6. Steering Control Linkage Wear Limits

Figure number	Reference letter	Point of measurement	Size and fit of new parts	Wear limits
3-25	A	OD of pin.	0.2495 to 0.2505	0.2485
3-25	B	ID of pin hole in shaft.	0.2475 to 0.2480	0.2482
3-25	A-B	Fit of pin in shaft.	0.0015T to 0.0030T	0.0003T
3-25	C	ID of pin holes in universal joint.	0.250 to 0.253	*
3-25	A-C	Fit of pin in universal joint.	0.0035L to 0.0005T	0.0045L
3-25	D	OD of shaft.	0.743 to 0.745	0.742
3-25	E	ID of pin hole in plug.	0.2475 to 0.2480	0.2482
3-25	A-E	Fit of pin in plug.	0.0015T to 0.0030T	0.0003T
3-25	F	ID of sleeve.	1.2475 to 0.2480	*
3-25	G	OD of bearing.	1.248 to 1.2500	*
3-25	F-G	Fit of bearing in sleeve.	0.0025T to 0.000	*
3-25	H	ID of bearing.	0.750 to 0.752	0.753
3-25	D-H	Fit of shaft in bearing.	0.005L to 0.009L	0.010L

* Indicates part should be replaced when worn beyond limits given in Size and fit of new parts column.

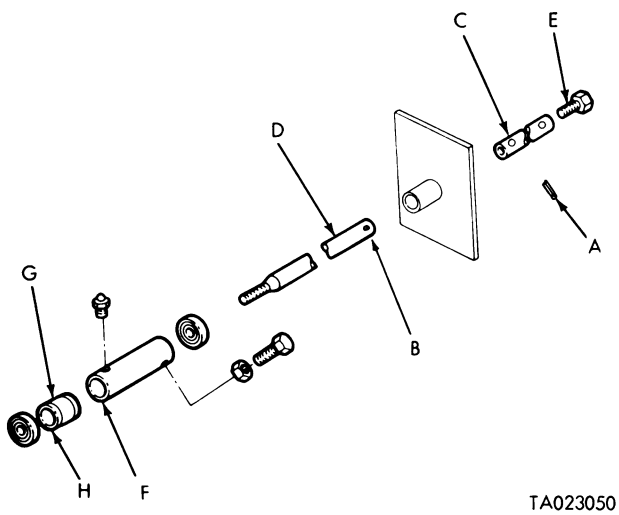

Figure 3-25. Steering control linkage wear points of measurement.

3-88. Assembly

Assemble universal joint and shaft in the reverse order of the disassembly procedure.

NOTE

Seals and bearing must be installed in bulkhead sleeve with seals lips facing outward away from bearing.

3-89. Installation

(Fig 3-24).

NOTE

Refer to figure 3-24 unless otherwise indicated.

a. Position two shield supports on hull plates and secure with four screws, washers, lockwashers, and nuts.

b. Insert a 1/8-inch diameter alinement pin through rear hull bracket and link alinement holes.

c. Assemble bulkhead shaft to rear intermediate rod.

NOTE

Install shields with slots at bottom.

d. Position bulkhead shaft through bulkhead, and install front shield over rod. Turn shield clockwise to secure to bulkhead.

e. Insert rear rod into rear shield, and connect rear rod to rear intermediate rod.

f. Position rear shield on front shield. Turn rear shield clockwise to secure to front shield.

g. Secure shields to hull brackets with two straps and four screws.

h. Thread rod end and jamnut onto rear rod. Insert a 0.06-inch diameter pin into rod end thread engagement; check opening to check minimum thread engagement (fig 3-19). Pin must not pass through rod end.

i. Secure rear rod end to link with bolt, and tighten rod end jamnut.

j. Lubricate bulkhead sleeve bearing with grease (MIL-G-10924), and position sleeve on bulkhead shaft. Secure sleeve to bulkhead with two screws and jamnuts.

k. Insert a 1/8-inch diameter alinement pin through front intermediate rod link, and bracket alinement pin holes.

l. Thread jamnut and rod end onto bulkhead shaft.

m. Adjust rod end to aline with front intermediate rod, and check rod end thread engagement (*h.* above).

n. Secure front intermediate rod to bulkhead shaft rod end with bolt, and tighten rod end jamnut.

o. Remove alinement pin from front intermediate rod link and bracket.

p. Remove alinement pin from rear hull bracket and link.

q. Remove nut from rear hull link spindle.

r. Position rear link shield on link spindle, and secure with nut, cotter pin, screw, and nut.

s. Install fuel tank (para 2-23).

t. Install powerplant (TM 9-2350-258-20-1).

Section XV. REPAIR OF ENGINE COMPARTMENT DRAIN VALVE LINKAGE

3-90. Description

Refer to TM 9-2350-258-20-1.

3-91. Removal

(Fig 3-26).

a. Remove slipring.

b. Remove six screws and lockwashers securing linkage access plate to bulkhead below slipring, and remove plate and gasket.

c. Remove cotter pin and clevis pin securing front control rod to control arm. If front control rod is being replaced, remove clevis and clevis jamnut from rod.

d. Remove pin securing front universal joint to front control rod, and remove rod.

e. Remove pin securing front universal joint to front intermediate control rod, and remove universal joint.

f. Remove two screws, lockwashers, and washers securing front guide to support, and remove guide.

g. Remove 14 screws and lockwashers securing center cover plate to bulkhead, and remove cover (view F, fig 2-6).

NOTE

Gain access to bulkhead cover through battery access cover in turret floor.

h. Loosen rear intermediate control rod jamnut at coupling, and unscrew rod from coupling. Remove jamnut from rod.

i. Remove two screws, lockwashers, and washers securing rear guide to support, and remove rear intermediate control rod, rear guide, rear universal joint, and front intermediate control rod.

j. Remove two pins securing rear universal joint to rear intermediate control rod and front intermediate control rod. Pull rods from universal joint.

k. Using a suitable remover, remove two seals from block.

l. Using a suitable remover, remove bushing from block.

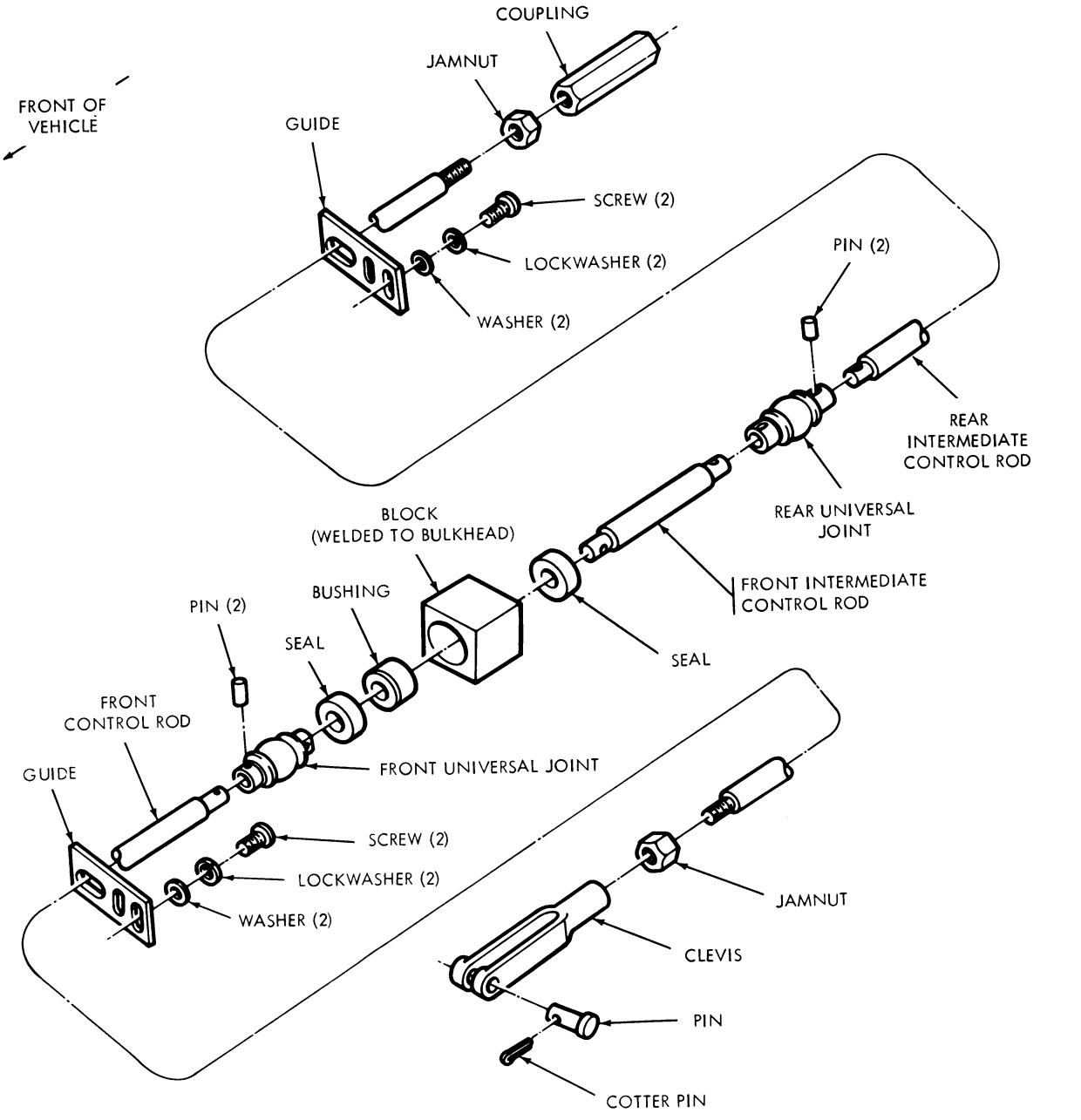

Figure 3-26. Drain valve linkage removal and installation.

3-92. Cleaning

Refer to paragraphs 2-8 and 2-9.

3-93. Inspection and Repair

a. Inspect universal joint rubber covers for any evidence of damage or deterioration. If covers are defective, replace universal joint(s).

b. Check universal joints for wear. If universal joints are worn, replace.

c. Refer to paragraphs 2-11 and 2-17.

3-94. Installation

(Fig 3-26).

NOTE

Refer to figure 3-26 unless otherwise indicated.

a. Using a suitable driver, drive new bushing into block until centered.

b. Using a suitable driver, drive new seals into block with seals lips facing out until lips are flush with ends of block.

c. Insert front intermediate control rod and rear intermediate control rod into rear universal joint, and secure with two pins.

d. Position assembled rods under bulkhead and insert front intermediate control rod through seals and bushing.

e. Install rear control rod guide over rod and secure to support with two screws, washers, and lockwashers.

f. Thread coupling jamnut onto rear intermediate control rod.

g. Thread rear intermediate control rod into coupling until approximately 3/4-inch of rod thread remains exposed. Tighten coupling jamnut.

h. Insert a 1/8-inch diameter alinement pin through alinement pin holes in drain valve lever and bracket (fig 3-27).

i. Position front universal joint on front intermediate control rod, and secure with pin.

j. Insert front control rod into front universal joint, and secure with pin.

k. Install front control rod guide over control rod, and secure to support with two screws, lockwasher, and washers.

l. Position rear drain valve control lever in the closed position.

m. Thread jamnut and clevis onto front control rod until clevis pin can be .nstalled through clevis and control arm without interference. If more than 1-inch of rod thread is exposed, loosen rear intermediate control rod coupling jamnut, and adjust rod until approximately equal threads are exposed at the clevis and coupling.

n. Secure clevis to control arm with clevis pin and cotter pin.

o. Tighten clevis and coupling jamnuts.

p. Remove 1/8-inch pin from drain valve lever and bracket.

q. Lubricate bushing (LO 9-2350-258-12).

r. Operate control lever to insure drain valve opens without interference and closes completely when control lever is in the closed position.

s. Position access cover on bulkhead, and secure with 14 screws and lockwashers.

t. Position linkage access cover and gasket on bulkhead (below slipring), and secure with six screws and lockwashers.

u. Install slipring.

v. Install powerplant (TM 9-2350-258-20-1).

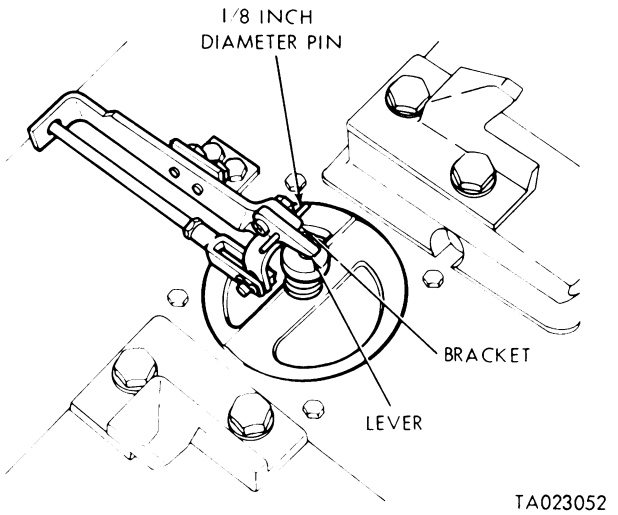

Figure 3-27. Drain valve linkage alinement pin location.

Section XVI. REPAIR OF PERSONNEL HEATER FUEL PUMP

3-95. Description

Refer to TM 9-2350-258-20-1.

3-96. Removal

Refer to TM 9-2350-258-20-1.

3-97. Disassembly

(Fig 3-28).

a. Remove lower cover with wrench applied to welded hex nut on bottom of cover.

b. If screen does not come off with cover, remove from plunger spring cup.

c. Remove gasket from cover.

d. Remove two screws securing plunger spring cup to pump subassembly. Remove plunger spring cup, plunger spring, plunger, and plunger spring cup gasket. Discard gasket.

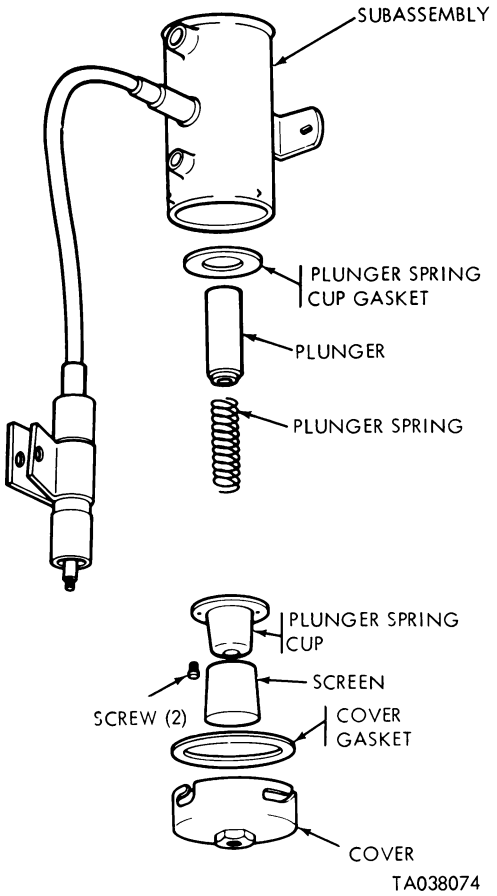

Figure 3-28. Personnel heater fuel pump disassembly and assembly.

3-98. Cleaning

(Fig 3-28).

a. Wash screen, cover, plunger spring cup, plunger spring, and plunger in drycleaning solvent (paras 2-8 and 2-9).

CAUTION

Do not apply air pressure to plunger or plunger spring cup, this may damage sensitive valves in these components.

b. Apply air pressure to center of cover, and remove any foreign particles that may have collected in the small magnetic separator chamber. Also, apply air pressure to cylinder of pump subassembly, and clean with a clean cloth.

3-99. Inspection and Repair

(Fig 3-28).

a. Visually inspect screen and replace if distorted or collapsed.

b. Visually inspect plunger spring cup, spring, and plunger. Make sure valves in cup and plunger work easily and they are free of dirt or gum.

c. Visually inspect subassembly for cracks, dents, broken or frayed electrical lead components, and inlet/outlet port thread condition. Ground subassembly, and apply 24 vdc from a suitable power source to the electrical lead terminal; check solenoid for proper function. If subassembly is cracked or dented to the point that it restricts movement of the plunger or interrupts electrical operation of the solenoid, replace pump.

d. Insert plunger into cylinder with valve end facing out. Check fit by raising and lowering plunger in subassembly cylinder. It should move freely without any tendency to stick. The plunger is designed to work freely within the cylinders; a loose fit does not necessarily indicate wear.

3-100. Assembly

(Fig 3-28).

Assemble personnel heater fuel pump in the reverse order of the disassembly procedure.

3-101. Tests

a. General. The personnel heater fuel pump develops a fuel pressure of 7 psi, and a delivery rate (flow) of approximately 30 gph.

b. Pressure Test (fig 3-29).

(1) Connect pump to fuel and electrical sources as shown in figure 3-29.

(2) Open adjustable flow valve and operate pump to purge air from system.

(3) Close valve and observe fuel pressure. Fuel pressure should be 6.5 ± 0.5 psi at zero fuel flow.

c. Flow Test (fig 3-29).

(1) With pump operating, adjust flow valve to obtain 4 psi reading on pressure gage.

(2) Using a suitable container, measure fuel delivery for 40 seconds. Minimum acceptable fuel flow is 1 pint. If flow is less than 1 pint, replace pump.

(3) Disconnect pump from fuel and electrical sources.

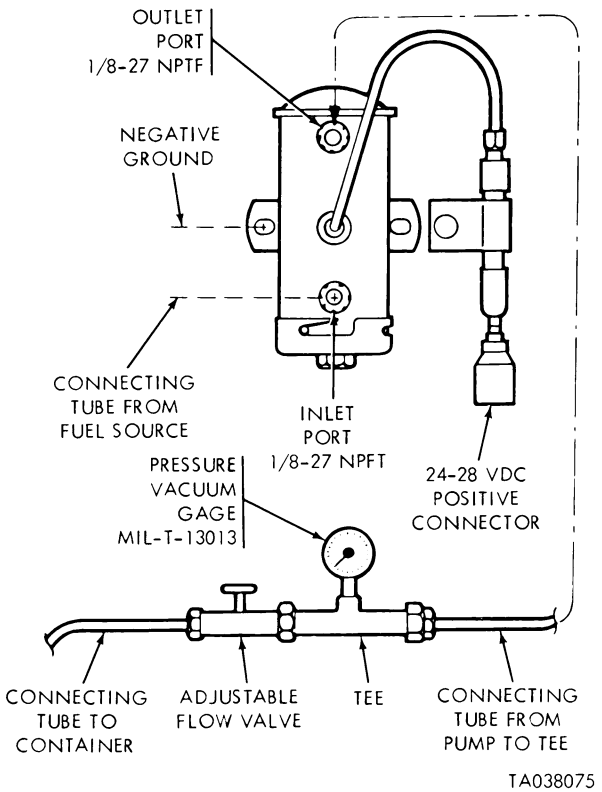

Figure 3-29. Personnel heater fuel pump bench test.

3-102. Installation

Refer to TM 9-2350-258-20-1.

Section XVII. REPAIR OF BILGE DISCHARGE PUMPING UNIT

3-103. Description

Refer to TM 9-2350-258-20-1.

3-104. Removal

Refer to TM 9-2350-258-20-1.

3-105. Disassembly

(Fig 3-30).

a. Remove four brush caps, preformed packings, and brushes from commutator end bell (view A, fig 3-30, sh 1 of 3).

b. Remove four screws and washers securing inlet screen to impeller housing, and remove screen (view B).

c. Unscrew outlet adapter from impeller housing (view B).

d. Remove four bolts, lockwashers, and spacers securing mounting plate and impeller cover to impeller housing (view C). Remove mounting plate and impeller cover.

e. Remove nut and lockwasher securing impeller to shaft, and remove impeller (view D).

f. Tap impeller housing with a plastic or leather mallet to loosen, and remove from seal plate (view E, sh 2 of 3).

g. Remove key from shaft (view F).

h. Remove four screws and lockwashers securing seal plate to motor, and remove seal plate and gasket (view F).

i. Remove three seals from seal plate (view F).

j. Remove four nuts, lockwashers, washers, and gaskets from four thru-studs (view G).

k. Tap drivehead with a plastic or leather mallet, and remove drivehead, armature, and gasket from frame (view H).

l. Remove four glass sleeves from four thru-studs (view H).

m. Remove lockwire and four screws securing shim plate to drivehead, and remove shim plate (view J, sh 3 of 3).

n. Remove snapring from shaft (view J).

o. Remove drivehead from shaft (view J).

p. Remove bearing from drivehead (view J).

q. Remove bearing from commutator end of shaft (view K).

r. Remove eight screws and lockwashers securing four field poles to frame, and remove field poles and insulators (view L).

s. Remove commutator end bell, field coils, and gasket from frame (view M).

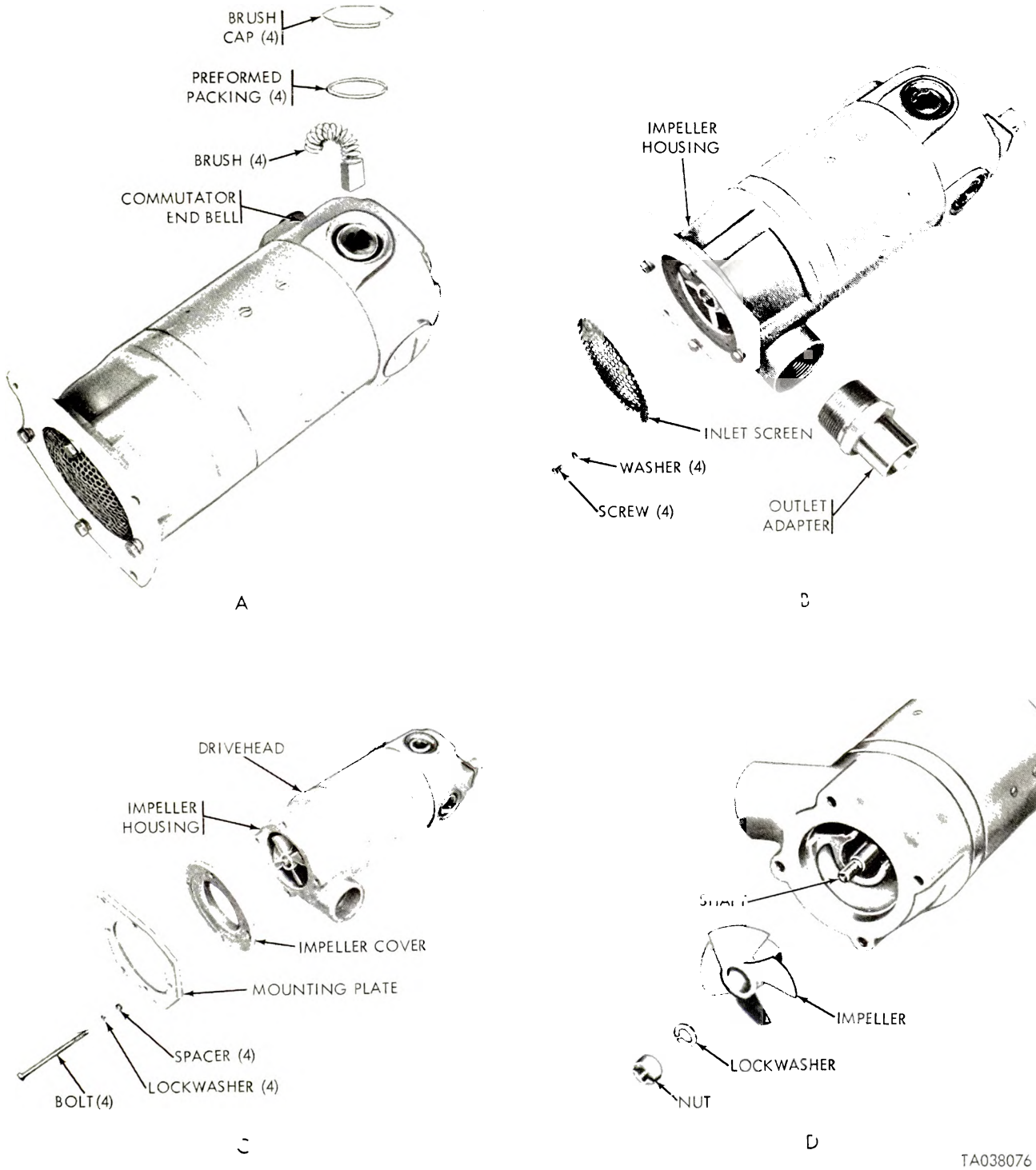

Figure 3-30. Bilge discharge pumping unit disassembly and assembly (sheet 1 of 3).

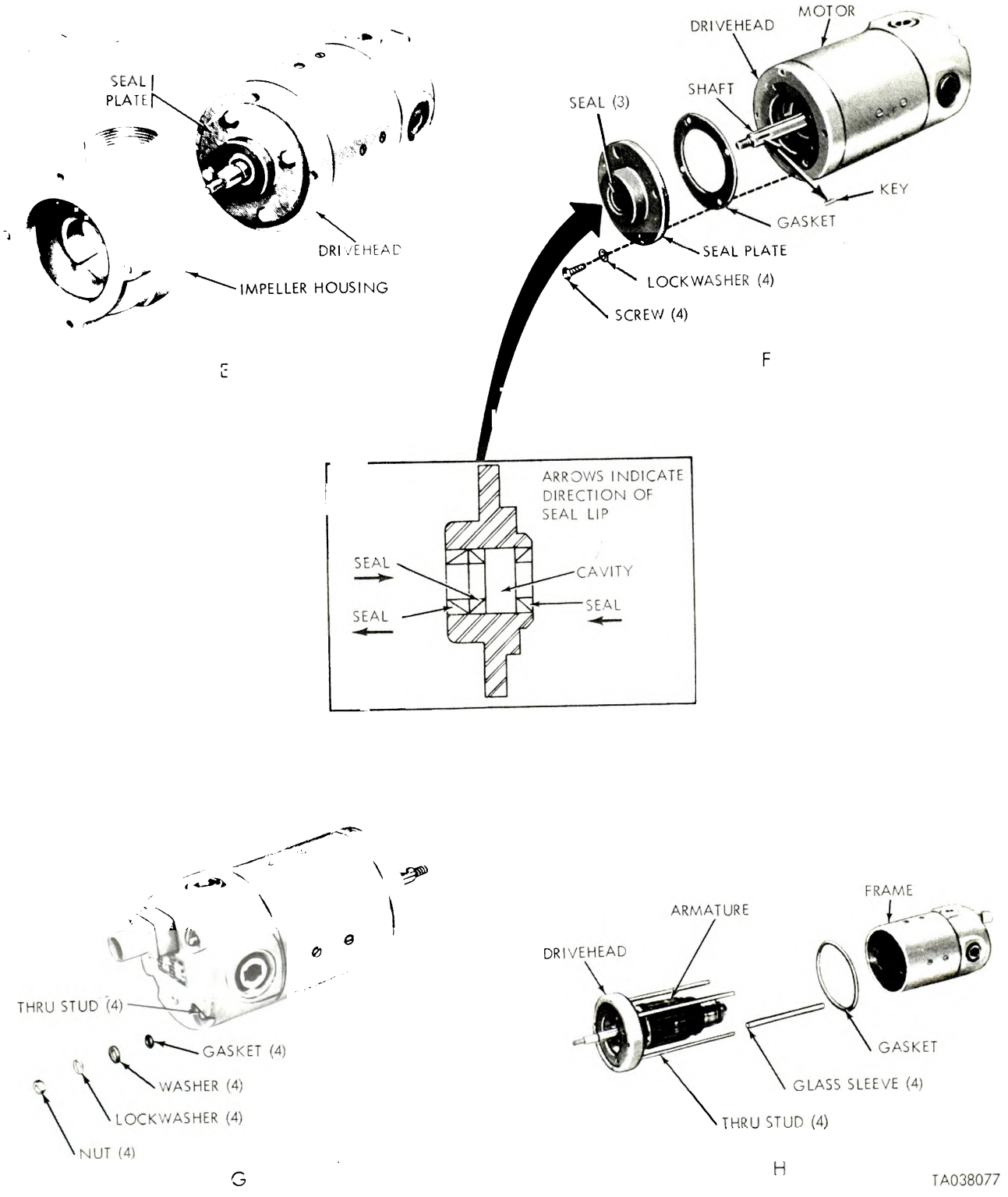

Figure 3-30. Bilge discharge pumping unit disassembly and assembly (sheet 2 of 3).

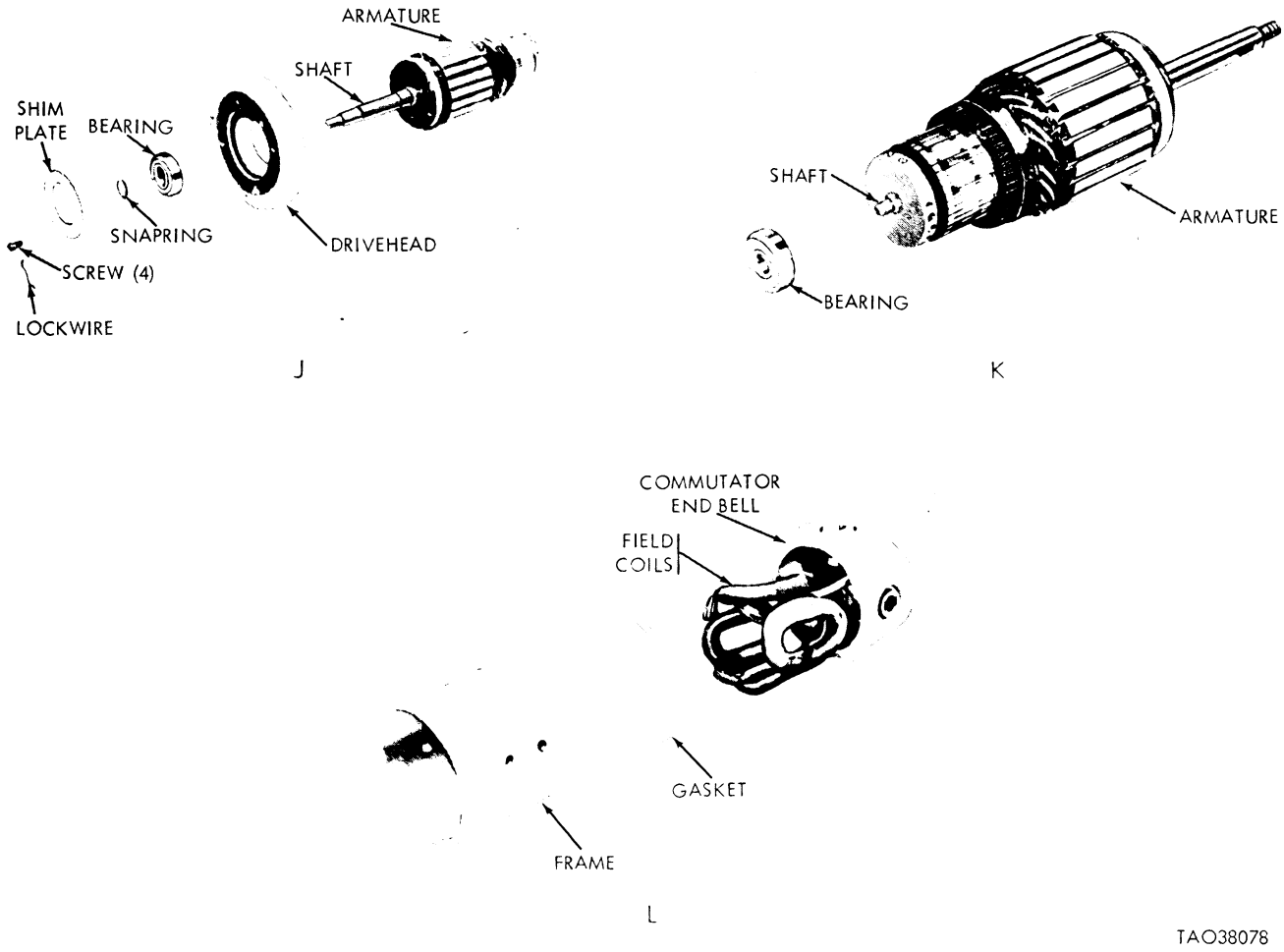

Figure 3-30. Bilge discharge pumping unit disassembly and assembly (sheet 3 of 3).

3-106. Cleaning

a. General. Special cleaning instructions for electrical parts are detailed in the following instructions. All other parts are to be cleaned using drycleaning solvent (paras 2-8 and 2-9). After cleaning, dry parts with filtered compressed air.

b. Field Coils. Wipe outer surfaces of field coils with a cloth dampened with drycleaning solvent (paras 2-8 and 2-9). Exercise care to avoid damaging the protective coating on field coil windings. Dry all parts thoroughly with compressed air.

NOTE

Do not clean armature prior to inspection (para 3-107).

c. Armature. Remove loose particles from armature with compressed air, and wipe outer surfaces with a clean cloth dampened with drycleaning solvent (paras 2-8 and 2-9). Clean commutator lightly with number 4/0 sandpaper, and remove all traces of sanding dust with compressed air.

3-107. Inspection and Repair

a. Impeller. Visually inspect impeller for evidence of damage. If any broken or cracked blades are found, replace bilge pump assembly.

b. Armature Bearings. Hold bearing inner race with the thumb and forefinger of one hand while rotating outer race slowly with the other hand. Bearing should rotate smoothly and evenly without feel of roughness or tight spots. A slight resistance to rotation, due to lubricant, is normal. The bearing should not feel or sound gritty or dry. Replace bearings that exhibit any abnormal characteristics, however slight.

c. Armature.

(1) Inspect brush contact surfaces. A satisfactory condition is indicated by a highly burnished dark copper color. When contact surface is rough, pitted, scored, burned in areas, or coated with hardened varnish or carbon accumulations, (not removed by the cleaning process) the commutator must be resurfaced, provided it is in good mechanical and electrical condition. A short circuited or open circuited armature coil will leave adjacent commutator bars burned or extremely dark in color. A test with an ohmmeter or test lamp and a growler will determine either of these conditions. The

bilge pump assembly must be replaced for any armature electrical fault. A short circuit could be caused by particles of copper and/or carbon bridging the space between commutator bars. Determine whether or not an indicated fault is definitely in the coil insulation before rejecting the armature.

(2) When a series of adjacent commutator bars are burned, the trouble may be due to eccentricity or grease deposits on the surface. When burned areas are present, the commutator must be resurfaced. Support armature on its bearings, and use a dial indicator to check for concentricity.

d. Field Coils. Test field coils for continuity. If continuity exists, visually examine coils for evidence of burned or charred insulation. If coil insulation is damaged or continuity is not present, replace coil.

e. Brushes. Inspect brushes for excessive wear. If brushes are worn through to conductor or armature commutator has been reconditioned, replace brushes.

3-108. Assembly

(Fig 3-30).

a. Assemble bilge discharge pumping unit in the reverse order of the disassembly procedure.

b. Pack the cavity between seals with grease (GAA).

c. Coat seals lips with grease (GAA).

3-109. Test

(Fig 3-31).

a. Secure pump solidly, to a bench, to prevent its movements.

b. Connect motor to a test circuit as shown in figure 3-31.

c. Turn on switch and verify satisfactory pump operation. Ammeter should not exceed 55 amperes.

3-110. Installation

Refer to TM 9-2350-258-20-1.

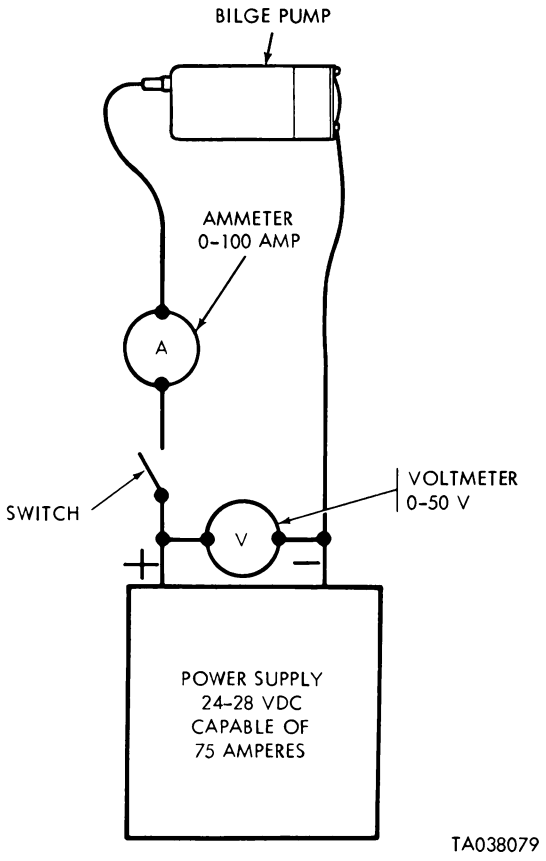

Figure 3-31. Bilge discharge pumping unit bench test.

CHAPTER 4
FINAL INSPECTION

4-1. General

A final inspection will be performed on all items repaired or replaced to determine whether all necessary work has been accomplished and to determine whether repairs have been performed satisfactorily. This inspection involves visual checks, checks with test instruments, operational checks, safety checks, or any combination thereof; to insure that the equipment has been restored to a completely serviceable condition for return to the user or to stock.

4-2. Specific Procedures

Specific checks to be performed on items repaired or replaced are contained, where necessary, in the compartment repair or installation instructions.

APPENDIX A
REFERENCES

A-1. Publication Indexes

The following indexes should be consulted frequently for latest changes or revisions of references given in this Appendix and for new publications relating to material covered in this Technical Manual:

DA PAM 310-1..... Index of administrative publications
DA PAM 310-2..... Index of blank forms
DA PAM 310-4..... Index of technical manuals, technical bulletins, supply manuals, supply bulletins, and lubrication orders
DA PAM 310-6..... Index of supply catalogs and supply manuals
DA PAM 310-7..... US Army equipment index of modification work orders

A-2. Publication References

The following is a list of publications and forms referenced in this manual and/or likely to be required by the manual user:

DA Form 2028..... Recommended changes to publications and blank forms
DD Form 1397..... Processing and deprocessing record for shipment, storage, and Issue of Vehicles and Spare Engines
TB 9-2300-278-20 ..... Vehicle protection closures: use and disposition
TM 3-4240-280-10..... Operator's manual: mask, chemical-biological, aircraft, ABC-M24 and accessories and mask, chemical-biological, tank, M25/M25A1 and accessories
TM 3-4240-236-30..... Direct support maintenance manual (including repair parts and special tools lists): filter unit, gas-particulate, tank, three-man, 12 CFM, M8A2, FSN 4240-691-1505 and filter unit, gas-particulate, tank, four-man, 12 CFM, M8A3 FSN 4240-853-3201
TM 3-4240-280-10..... Operator's manual: mask, chemical-biological, aircraft, ABC-M24 and accessories and mask, chemical-biological, tank, M25/M25A1 and accessories
TM 9-214 ..... Inspection, care, and maintenance of antifriction bearings
TM 9-237 ..... Welding: theory and application
LO 9-2350-258-12 ..... Tank, combat, full-tracked, 105-mm gun, M48A5
TM 9-2350-258-ESC..... Equipment serviceability criteria for tank, combat, full-tracked, 105-mm gun, M48A5 (2350-00-587-5595)
TM 9-2350-258-20-1..... Organizational Maintenance Manual-Hull: Tank, Combat, Full-Tracked, 105-MM Gun M48A5
TM 9-2350-258 series ..... (To be published)
TM 9-2520-223-34..... Direct support, general support, and depot maintenance manual (including repair parts and special tools lists): transmission, with container, model CD850-5 and model CD850-6A
TM 9-2815-220-34..... DS and GS maintenance manual for engine with container: turbosupercharged, diesel, fuel injection, 90-degree "V" type, air-cooled, 12-cylinder, assembly, models AVDS-1790-2C, 2815-00-410-1203 and AVDS 1790-2D, 2815-00-410-1204
TM 9-2815-220-34P ..... Direct support and general support, repair parts and special tools lists: (including depot maintenance repair parts and special tools): engine with container: turbosupercharged, diesel, fuel injection, 90-degree "V" type, air-cooled, 12-cylinder, assembly, models AVDS-1790-2C, 2815-00-410-1203 and AVDS 1790-2D, 2815-00-410-1204
TM 9-2815-200-35..... DS, GS, and depot maintenance manual: (including repair parts and special tools lists) for engine, with container: turbosupercharged, diesel, fuel injection, 90-degree "V" type, air-cooled, 12-cylinder, assembly, models AVDS-1790-2M, (2815-856-2996), and AVDS-1790-2AM (2815-856-9005)
TM 38-750 ..... The Army maintenance management system (TAMMS)

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6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders
81		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN

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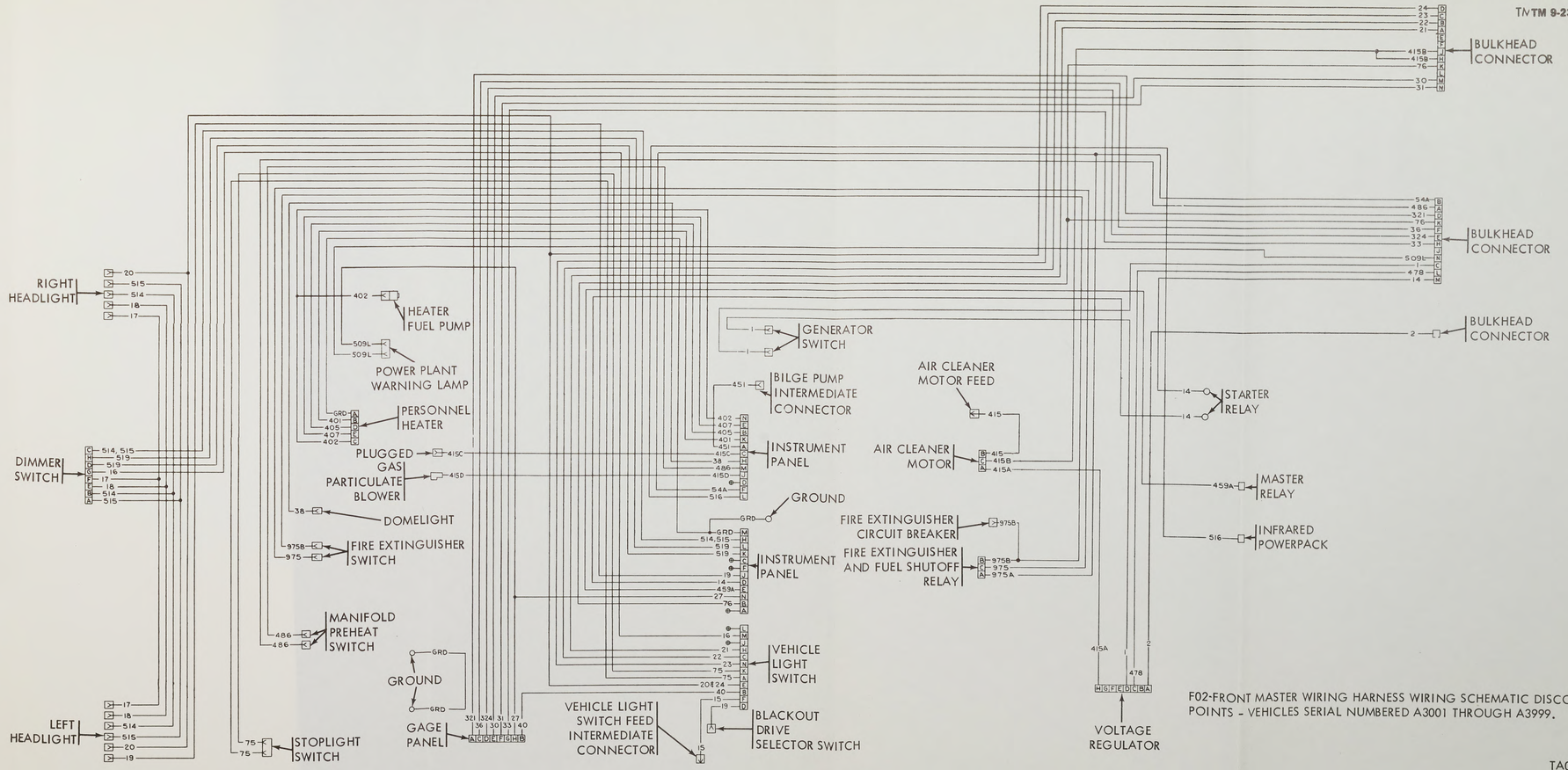

FO-2. Front master wiring harness schematic disconnect points — vehicles serial numbered A3001 through A3999.

FO2-FRONT MASTER WIRING HARNESS WIRING SCHEMATIC DISCONNECT POINTS - VEHICLES SERIAL NUMBERED A3001 THROUGH A3999.

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