TM 9-2320-211-34-2-1
T.O. 36A12-1C-422-2-2

TECHNICAL MANUAL

VOLUME 2 OF 2

PART 1 OF 4

MAINTENANCE

DIRECT SUPPORT AND GENERAL SUPPORT LEVEL

5-TON, 6X6, M39 SERIES TRUCKS (MULTIFUEL)

TRUCK, CHASSIS: M40A2C, M61A2, M63A2; TRUCK, CARGO: M54A2, M54A2C, M55A2; TRUCK, DUMP: M51A2; TRUCK, TRACTOR: M52A2; TRUCK, WRECKER, MEDIUM: M543A2

NOTE:

THE STYLE OF THIS TM IS EXPERIMENTAL. IT IS BEING TRIED BY THE ARMY ONLY ON A LIMITED BASIS

Chapter 1
General Maintenance Information

Chapter 2
Engine System

Chapter 3
Clutch System

Chapter 4
Fuel System

Chapter 5
Cooling System

Chapter 6
Electrical System

Chapter 7
Transmission System

Chapter 8
Transmission Transfer System

Chapter 9
Front Axle

Chapter 10
Rear Axle

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

FEBRUARY 1981

*TM 9-2320-211-34-2-1
T.O. 36A12-1C-422-2-2

TECHNICAL MANUAL
NO. 9-2320-211-34-2-1
TECHNICAL ORDER
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DEPARTMENTS OF THE ARMY
AND
THE AIR FORCE
WASHINGTON, DC, 25 February 1981

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DIRECT SUPPORT AND GENERAL SUPPORT LEVEL

5-TON, 6X6, M39 SERIES TRUCKS
(MULTIFUEL)

Model		NSN without Winch	NSN with Winch
Truck, Chassis	M40A2C	2320-00-969-4114	
	M61A2	2320-00-055-9264	2320-00-965-0321
	M63A2	2320-00-226-6251	2320-00-285-3757
Truck, Cargo	M54A2	2320-00-055-9266	2320-00-055-9265
	M54A2C	2320-00-926-0874	2320-00-926-0874
	M55A2	2320-00-073-8476	2320-00-055-9259
Truck, Dump	M51A2	2320-00-055-9262	2320-00-055-9263
Truck, Tractor	M52A2	2320-00-055-9260	2320-00-055-9261
Truck, Wrecker, Medium	M543A2		2320-00-055-9258

Current as of 25 Jul 80.

* This manual together with TM 9-2320-211-34-1, 25 February 1981; TM 9-2320-211-34-2-2, 25 February 1981; TM 9-2320-211-34-2-3, 25 February 1981 and TM 9-2320-211-34-2-4, 25 February 1981 supersedes so much of TM 9-2320-211-35, 13 September 1964 as pertains to multifuel vehicles including all changes.

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedure, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MB, Warren, Michigan 48090. A reply will be furnished to you.

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WARNING

EXHAUST GASES CAN BE DEADLY

Exposure to exhaust gases 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 whenever fuel burning heater(s) or engine of any vehicle is operated for maintenance purposes or tactical use.

Do not operate heater or engine of vehicle in an enclosed area unless it is adequately ventilated.

Do not idle engine for long periods without maintaining adequate ventilation in personnel compartments.

Do not drive any vehicle with inspection plates or cover plates removed unless necessary for maintenance purposes. .

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,

If exposed, seek prompt medical attention for possible delayed onset of acute lung congestion. Administer oxygen if available.

The best defense against exhaust gas poisoning is adequate ventilation.

WARNING

Serious or fatal injury to personnel may result
if the following instructions are not complied with.

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

Eye shields must be worn when using compressed air. Eye injury can occur if eye shields are not used.

Smoking, flames, sparks and glowing or hot objects are not allowed within 50 feet of work area during maintenance of fuel system components. Fuel can explode, causing injury to personnel and damage to equipment.

Do not repair fuel tank unless tank has been cleaned and properly treated to get rid of all inflammable or explosive fumes. Merely draining tank does not make it safe for welding. An “empty” tank can be more dangerous than a full one. Before repairing, thoroughly steam clean tank or use other approved methods to completely take out all fumes.

WARNING - Cont

Do not dry bearings with compressed air. Spinning bearings may explode and cause serious injury to personnel.

Transfer input shaft assembly is heavy. Be careful when working on it to avoid injury.

When working on front axle assembly, weight of vehicle must be supported by floor jacks or motor vehicle trestles at all times. Do not attempt to support weight of truck on hydraulic jack.

Do not use a wire brush or compressed air to clean clutch disk facings. There may be asbestos dust on the disk facings which can be dangerous to your health if you breathe it in.

Use extreme care when handling heated ring gear to prevent being injured.

CHAPTER 1

GENERAL MAINTENANCE INFORMATION

1-1. SCOPE. This manual contains the direct support and general support maintenance instructions for the trucks listed below. This manual includes procedures for disassembly, cleaning, inspection, repair, test, adjustment and overhaul as authorized by the maintenance allocation chart.

Truck, Cargo:	5 ton, 6 x 6, M54A2, M54A2C and M55A2
Truck, Dump:	5 ton, 6 x 6, M51A2
Truck, Tractor:	5 ton, 6 x 6, M52A2
Truck, Wrecker, Medium:	5 ton, 6 x 6, M543A2

Information is provided on maintenance of trucks which is beyond the scope of tools, equipment, personnel, or supplies normally available to operator or using organization.

1-2. GENERAL MAINTENANCE . The general maintenance and repair covered by other manuals and called out in this manual are as follows:

TM 9-214 Inspection, Care and Maintenance of Antifriction Bearings.
TM 9-237 Operator's Manual: Welding Theory and Application (TO 34W4-1-5).
FM 43-3 General Repair for Canvas and Webbing.
TM 9-247 Materials Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel and Related Materials Including Chemicals.
FM 43-2 Metal Body Repair and Related Operations.
TB 750-254 Cooling Systems: Tactical Vehicles Changes 1, 2.
TB 43-0212 Purging, Cleaning and Coating Interior Ferrous and Terne Sheet Vehicle Fuel Tanks.
TM 43-0139 Painting Instructions for Field Use.
TB 43-0209 Color, Marking and Camouflage Painting of Military Vehicles, Construction Equipment, and Materials Handling Equipment.
TB 43-0213 (Rustproofing)
TM 9-2300-422-20 Security of Tactical Wheeled Vehicles.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well–ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

1-3. CLEANING. All parts must be cleaned before inspection and assembly and after repair. Clean inner and outer surfaces of metallic parts and all areas subject to oil or grease with dry cleaning solvent, type II (SD-2), FED. SPEC P-D-680. Clean out sludge and gum with a stiff brush. Use steam cleaning to take off accumulated grease and dirt after dry cleaning solvent has been applied. Dry with clean rags. To clean bearings refer to TM 9-214. The general cleaning covered by other manuals and references called out in this manual are as follows:

TM 9-247	Materials Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel and Related Materials Including Chemicals.
TM 9-214	Inspection, Care and Maintenance of Antifriction Bearings.

1-4. PAINTING. Instructions for the preparation of the material for painting, how to paint and material to be used are in TM 43-0139. Instructions for camouflage painting are contained in TB 43-0209. Stenciling and marking must be done periodically due to weathering or repainting. Instructions for marking military trucks is called out in TB 746-93-1.

1-5. TORQUE VALUES. Critical torque values for a particular component are given in the maintenance procedures. When torque values are not given, bolts, screws and nuts are to be tightened as given in table 1-1.

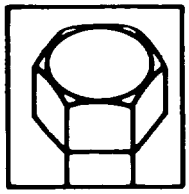
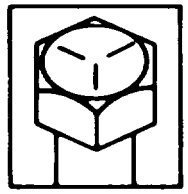
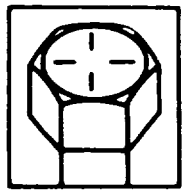
1-6. SPECIAL TOOLS AND EQUIPMENT. Speical tools and equipment are provided to make it easier to do particular maintenance tasks and to keep the truck in good repair. Table 1-2 lists the special tools and equipment and gives a reference to the maintenance paragraph where they are used and what they are used for.

1-7. SAFETY INSPECTION AND TESTING OF LIFTING DEVICES. Refer to TB 43-0142 for safety inspection and testing of lifting devices used in this manual.

1-8. FORMS AND RECORDS. Maintenance forms, records, and reports which are to be used by maintenance personnel at all levels are listed in and prescribed by TM 38-750.

1-9. EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE DIGEST (EIR MD) AND EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE SUMMARY (EIR MS). The quarterly Equipment Improvement Report and Maintenance Digest, TB 43-0001-39 series, contains valuable field information on the equipment covered in this manual. The information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that you prepared on the vehicles covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that you submitted to the EIR program. The TB 43-0001-39 series contains information on equipment improvement, minor alterations, proposed Modifi–cation Work Orders (MWO's), warranties (if applicable), actions taken on some of your DA Form 2028's (Recommended Changes to Publications), and advance information on proposed changes that may affect this manual. In addition, the more maintenance significant articles, including minor alterations, field–fixes, etc., that have a more permanent and continuing need in the field are republished in the Equipment Improvement Report and Maintenance Summary (EIR MS) for TARCOM Equipment (TM 43-0143). Refer to both of these publications (TB 43-0001-39 series and TM 43–0143) periodically, especially the TB 43-0001-39 series, for the most current and authoritative information on your equipment. The information will help you in doing your job better and will help in keeping you advised of the latest changes to this manual. Also refer to DA Pam 310-4, Index of Technical Publications, and Appendix A, References, of this manual.

Table 1-1. Standard Torque Specifications

USAGE	MUCH USED	MUCH USED	USED AT TIMES	USED AT TIMES
CAPSCREW DIAMETER AND MINIMUM TENSILE STRENGTH PSI [KG/SQ CM]	To 1/2–69,000 [4850.7000] To 3/4–64,000 [4499.2000] To 1 –55,000 [3866.5000]	To 3/4–120,000 [8436.0000] To 1 –115,000 [8084.5000]	To 5/8–140,000 [9842.0000] To 3/4–133,000 [9349.9000]	150,000 [10545.0000]
QUALITY OF MATERIAL	INDETERMINATE	MINIMUM COMMERCIAL	MEDIUM COMMERCIAL	BEST COMMERCIAL
SAE GRADE NUMBER	1 or 2	5	6 or 7	8
CAPSCREW HEAD MARKINGS Manufacturer's marks may vary These are all SAE Grade 5 (3 line)				

CAPSCREW BODY SIZE (INCHES)–(THREAD)	TORQUE FT-LB [KG M]	TORQUE FT-LB [KG M]	TORQUE FT-LB [KG M]	TORQUE FT-LB [KG M]
1/4–20	5 [0.6915]	8 [1.1064]	10 [1.3830]	12 [1.6596]
–28	6 [0.8298]	10 [1.3830]		14 [1.9362]
5/16–18	11 [1.5213]	17 [2.3511]	19 [2.6277]	24 [3.3192]
–24	13 [1.7979]	19 [2.6277]		27 [3.7341]
3/8–16	18 [2.4894]	31 [4.2873]	34 [4.7022]	44 [6.0852]
–24	20 [2.7660]	35 [4.8405]		49 [6.7767]
7/16–14	28 [3.8132]	49 [6.7767]	55 [7.6065]	70 [9.6810]
–20	30 [4.1490]	55 [7.6065]		78 [10.7874]
1/2–13	39 [5.3937]	75 [10.3725]	85 [11.7555]	105 [14.5215]
–20	41 [5.6703]	85 [11.7555]		120 [16.5960]
9/16–12	51 [7.0533]	110 [15.2130]	120 [16.5960]	155 [21.4365]
–18	55 [7.6065]	120 [16.5960]		170 [23.5110]
5/8–11	83 [11.4789]	150 [20.7450]	167 [23.0961]	210 [29.0430]
–18	95 [13.1385]	170 [23.5110]		240 [33.1920]
3/4–10	105 [14.5215]	270 [37.3410]	280 [38.7240]	375 [51.8625]
–16	115 [15.9045]	295 [40.7985]		420 [58.0860]
7/8–9	160 [22.1280]	395 [54.6285]	440 [60.8520]	605 [83.6715]
–14	175 [24.2025]	435 [60.1605]		675 [93.3525]
1–8	235 [32.5005]	590 [81.5970]	660 [91.2780]	910 [125.8530]
–14	250 [34.5750]	660 [91.2780]		990 [136.9170]

1. Always use the torque values listed above when specific specifications are not available.

   Note: Do not use above values in place of those specified in the engine groups of this manual. special attention should be observed in case of SAE Grade 6, 7 and 8 capscrews.

2. The above is based on use of clean and dry threads.

3. Reduce torque by 10% when engine oil is used as a lubricant.

4. Reduce torque by 20% if new plated capscrews are used.

   Caution: Capscrews threaded into aluminum may require reductions in torque of 30% or more, unless inserts are used.

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Table 1-2. Special Tools and Equipment

Item	Part No.	National Stock No.	Reference Paragraph	Use
ADAPTER , PULLER:(Transfer Case Front Drive Rear Bearing Cone)	7950090	5120-00-795-0090	8-4	Used with puller to take off front drive rear bearing cone.
BRACKET, ANGLE	7010362	5340-00-610-0919	8-4	Used to adapt left side of transfer to transfer stand.
BRACKET, ANGLE	7010363	5340-00-610-0920	8-4	Used to adapt right side of transfer to transfer stand.
BURNISHER, SLEEVE: (Steering Gear Housing Bushing)	7950139	5120-00-795-0139	13-5	Used to burnish steering knuckle sleeve.
FIXTURE : (Transfer Case)	8708898	5120-00-341-4974	8-4	Used to transport transfer.
GAGE , PINION SETTING: (Differential Pinion Setting)	7950104	4910-00-795-0104	9-4	Used to check adjustment on bevel pinion gear.
HOISTING UNIT	8387771	4910-00-448-0254	7-3	Used to take out and put in transmission.
PLUG	10899178	5120-00-870-6914	2-9	Used with puller 5120-00-338-6721 to take off crank-shaft clamps and pulley assembly.

Table 1-2. Special Tools and Equipment - Cont

Item	Part No.	National Stock No.	Reference Paragraph	Use
PULLER KIT	8708724	5120-00-338-6721	2-9	Used with plug 5120-00–870–6914 to take off crankshaft clamps and pulley assembly
			7-6 8-4 9-4	Used to take off transmission companion flange, transfer companion flange, and differential carrier companion flange.
REAMER , HAND: (Steering gear Housing Bushing)	7950248	5110–00-795-0248	13-5	Used to ream steering gear housing bushings.
REMOVER: (Front Axle Spindle Inner Bushings)	7950127	5120-00-378-4301	9-5	Used to take off front axle inner bushings.
REMOVER AND REPLACER , BEARING CUP: (Differential Rear Gearing Cage Bearing Cap)	7950159	5120-00-795-0159	8-4	Used to take off and put on differential forward bearing gage bearing cap.
REMOVER AND REPLACER , BUSHING: (Steering Gear Housing Bushing)	7950137	5120-00-795-0137	13-5	Used to remove and replace steering gear housing bushings.
REMOVER AND REPLACER, OIL SEAL: (Front Axle Oil Seal)	7950129	5120-00-795-0129	9-5	Used to put on front axle oil seal.
			13-5	Used to put pitman arm shaft seal into steering gear housing

Table 1-2. Special Tools and Equipment - Cont

Item	Part No.	National Stock No.	Reference Paragraph	Use
REMOVER AND REPLACER: (Steering Knuckle Bushing)	7950130	5120-00–795-0130	9-5	Used to take off and put on steering knuckle bushing.
REPLACER, FLANGE :	7950147	5120–00–795-0147	7-3 7-6 8-4	Used to put back transmission companion flange and transfer companion flange.
REPLACER, GEAR: (Crankshaft gear)	10899179	5120-00-870-6920	2-9	Used to put on crankshaft gear.
REPLACER, OIL SEAL: (Transfer Case Front Drive Gear Oil Seal)	7950152	5120-00–795-0152	8-4	Used to put on transfer case front drive gear oil seal.
SCALE, DML INDICATING: (Differential Pinion Bearing Preload)	7950157	6670–00-347-5922	9-4	Used to check preload of differential pinion bearing.
SLING ASSEMBLY: (Engine and Transmission Sling)	11595523	4910-00-168-2388	7-3	Used to transport transmission.
TOOL, HOLDING	ST 384	5120-00-104-1795	11-7	Used to hold air hydraulic cylinder air pak piston assembly.

1-10. REPORTING IMPROVEMENT RECOMMENDATIONS. If your truck needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Tank Automotive Material Readiness Command, ATTN: DRSTA-MT, Warren, Michigan 48090. We'll send you a reply.

1-11. METRIC SYSTEM. The equipment/system described herein is nonmetric and does not require metric common or special tools. Therefore, metric units are not supplied. Tactical instructions, for sake of clarity, will also remain nonmetric.

1-12. DESTRUCTION TO PREVENT ENEMY USE. Follow procedures given in TM 750-244-6 for destruction of Army material to prevent enemy use.

1-13. ADMINISTRATIVE STORAGE. See TM 740-90-1 for truck storage procedures.

1-14. TABULATED DATA. TM 9-2320-211-20 has data for the trucks covered in this manual. Additional data can be found in paragraphs dealing with individual vehicles or components.

1-15. DESCRIPTION. TM 9-2320-211-10 and TM 9-2320-211-20 have general descriptions of the 5 ton, 6 x 6 trucks.

1-16. GENERAL SHIPPING INSTRUCTIONS. When shipping 5 ton, 6 x 6 trucks, the officer in charge of preparing shipments will be responsible for the materiel being shipped in a serviceable condition. Also, the trucks must be properly processed for shipment, including the preparation of shipping documents.

1-17. TRANSPORTABILITY GUIDANCE. Transportability guidance for logistic handling and movement of 5 ton, 6 x 6 trucks is contained in TM 55-2320-211-15-1.

1-18. MAINTENANCE REPAIR PARTS. Repair parts for direct and general support maintenance are listed and illustrated in TM 9-2320-211-34P.

CHAPTER 2

ENGINE SYSTEM GROUP MAINTENANCE

Section I. SCOPE

2-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for the engine assembly, crankcase, block, and cylinder head, crankshaft, flywheel, valves, camshaft, and timing system, engine lubricating system and manifolds for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels.

2-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. ENGINE ASSEMBLY

2-3. FRONT ENGINE MOUNT AND BRACKET REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES : None

PERSONNEL: Two

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

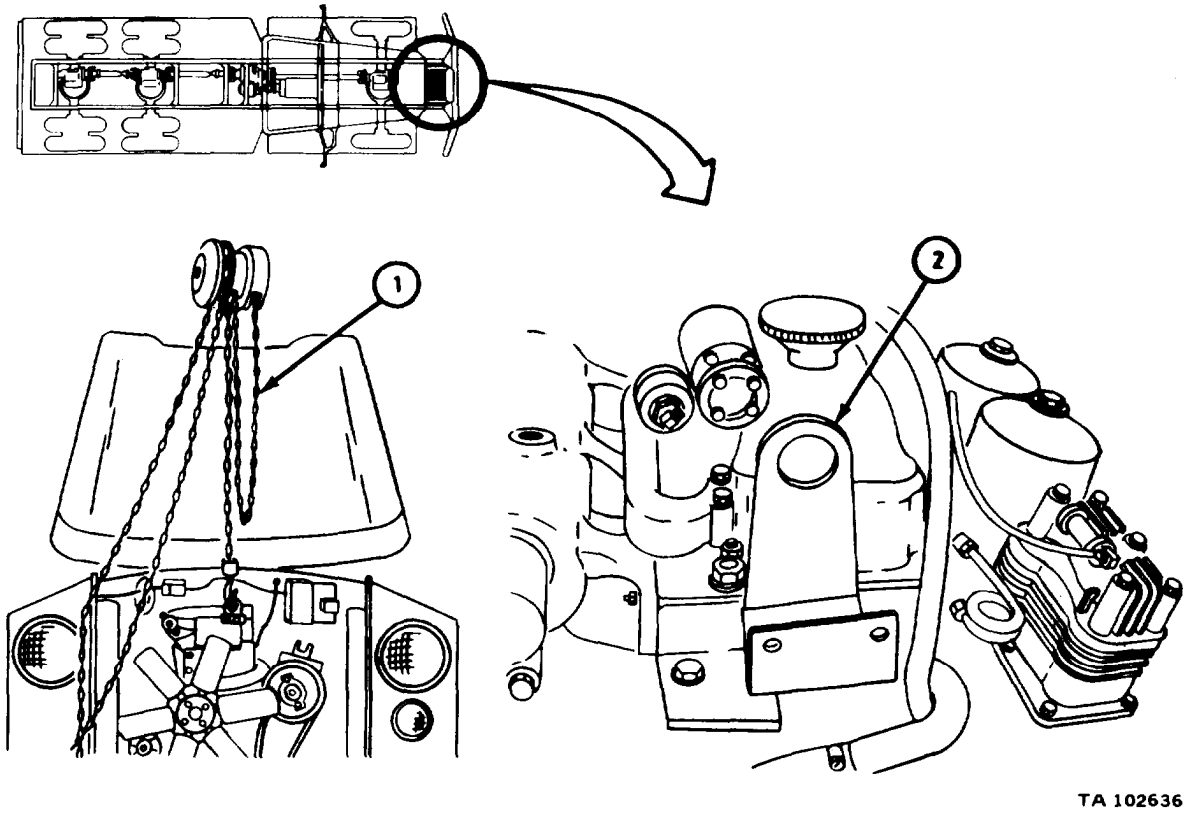
(2) Remove radiator. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Hook hoist chain (1) into truck engine lifting eye (2).
2. Using hoist, lift engine to release pressure on motor mounts.

GO TO FRAME 2



TA 102636

FRAME 2

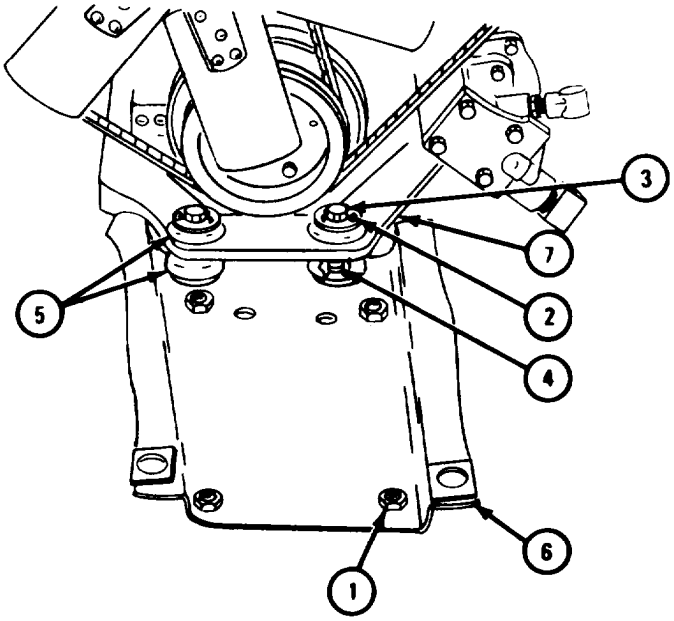
Soldier A 1. Working under engine, take out five capscrews (1).

Soldier B 2. Take out two cotter pins (2) and take off two nuts (3).

Soldier A 3. Take out two screws (4).

Soldier B 4. Take out four insulators (5) . Slide mount (6) forward to clear bracket (7) and take it out.

GO TO FRAME 3

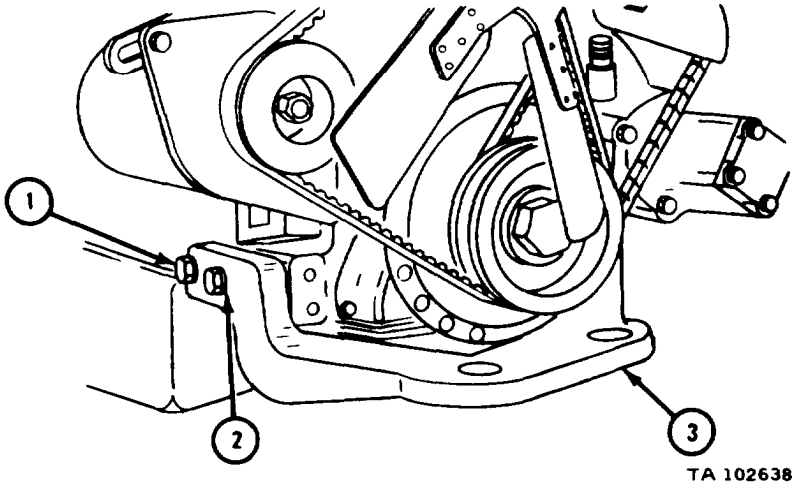


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FRAME 3

1. Take out two bolts (1) and washers (2).
2. Do step 1 again on other side of engine.
3. Take out bracket (3).

END OF TASK



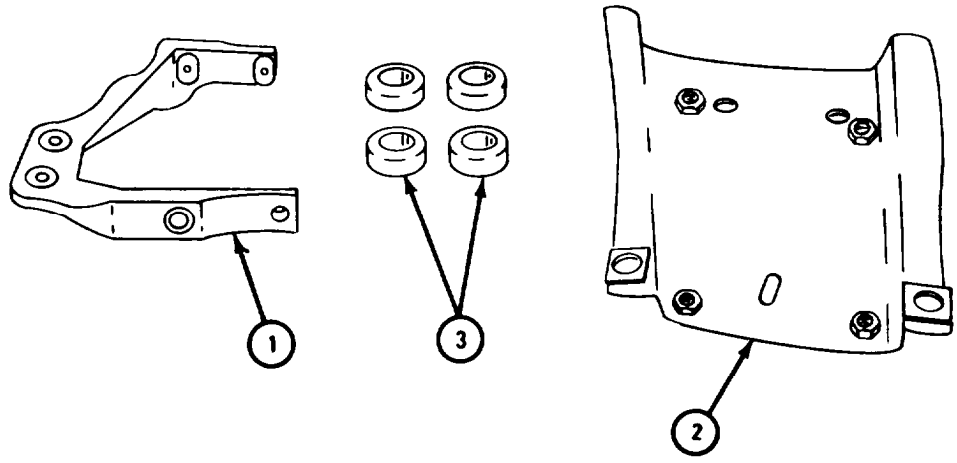
c. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in para 1–3.

d. Inspection and Repair.

FRAME 1

1. Check that bracket (1) and mount (2) have no cracks. If parts are cracked , get new ones in their place.
2. Check that insulators (3) are not cracked and do not have holes. If insulators are damaged, get new ones in their place.

END OF TASK



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e. Replacement.

FRAME 1

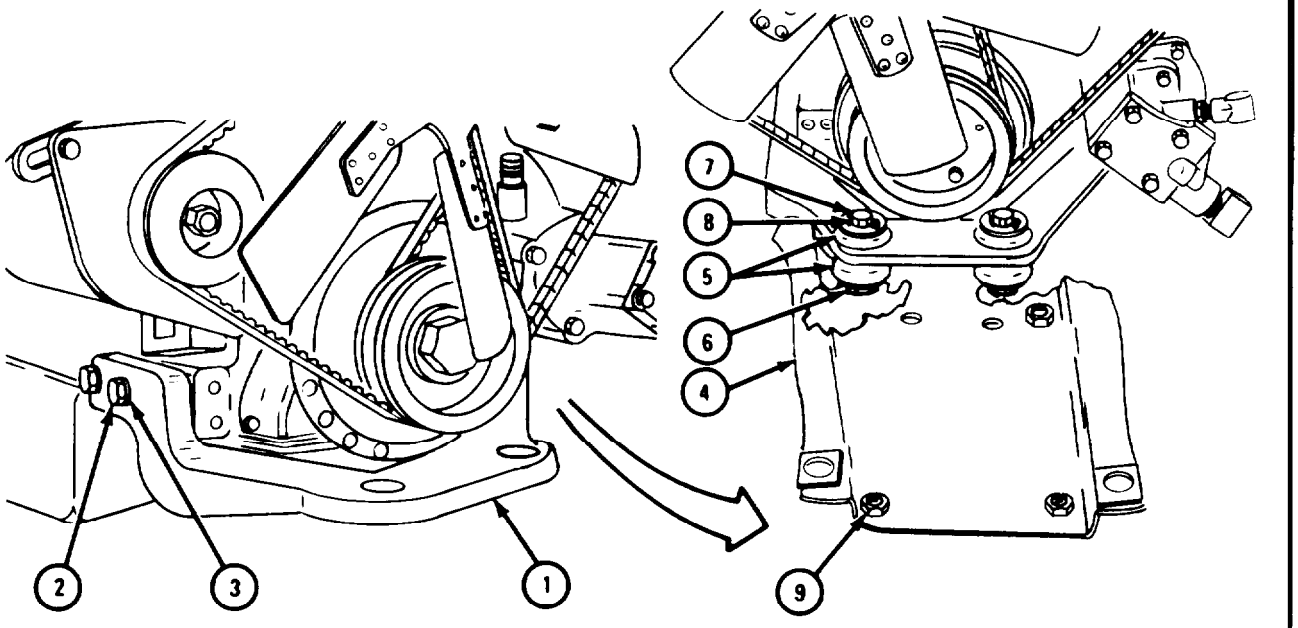
	1.	Put bracket (1) in place.
	2.	Put in two bolts (2) and washers (3).
	3.	Do step 2 again on other side of engine.
Soldier A	4.	Put mount (4) in place. Put in four insulators (5).
Soldier B	5.	Working under truck, put in and hold two bolts (6).
Soldier A	6.	Put on two nuts (7) and tighten nuts to 210 to 230 pound-feet.
	7.	Put in two cotter pins (8).
Soldier B	8.	Put in five cap screws (9). Tighten capscrews to 23 to 26 pound-feet.
	9.	Lower engine and unhook hoist from lifting eye.

NOTE

Follow-on Maintenance Action Required:

1. Replace radiator. Refer to TM 9-2320-211-20.
2. Fill cooling system. Refer to TM 9-2320-211-20.
3. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 102640

2-4. REAR ENGINE MOUNTS AND BRACKETS REMOVAL AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES: None

PERSONNEL: TWO

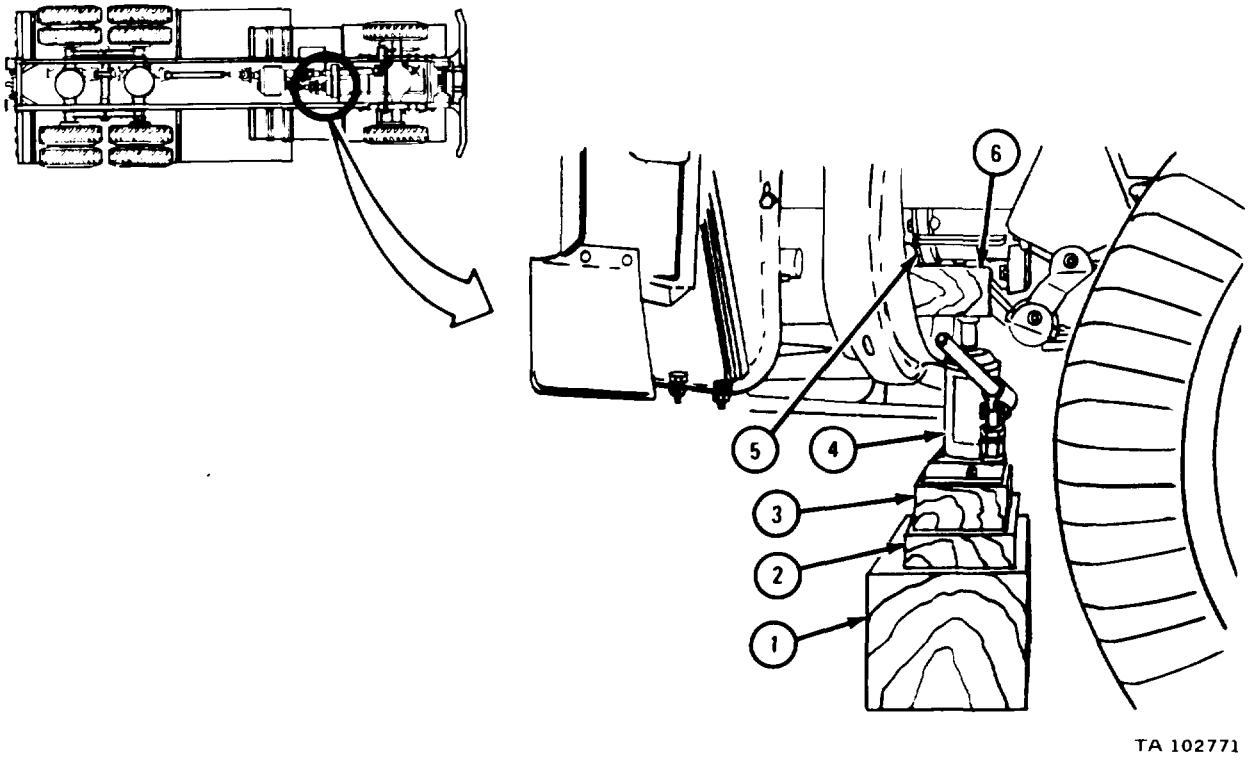
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set, wheels chocked.

a. Removal.

FRAME 1

1. Put wood blocks (1, 2, and 3) and hydraulic jack (4) under flywheel housing (5) as shown.
2. Put wood block (6) between hydraulic jack (4) and flywheel housing (5).
3. Raise jack (4) until wood block (6) is pressed firmly against flywheel housing (5) .

GO TO FRAME 2

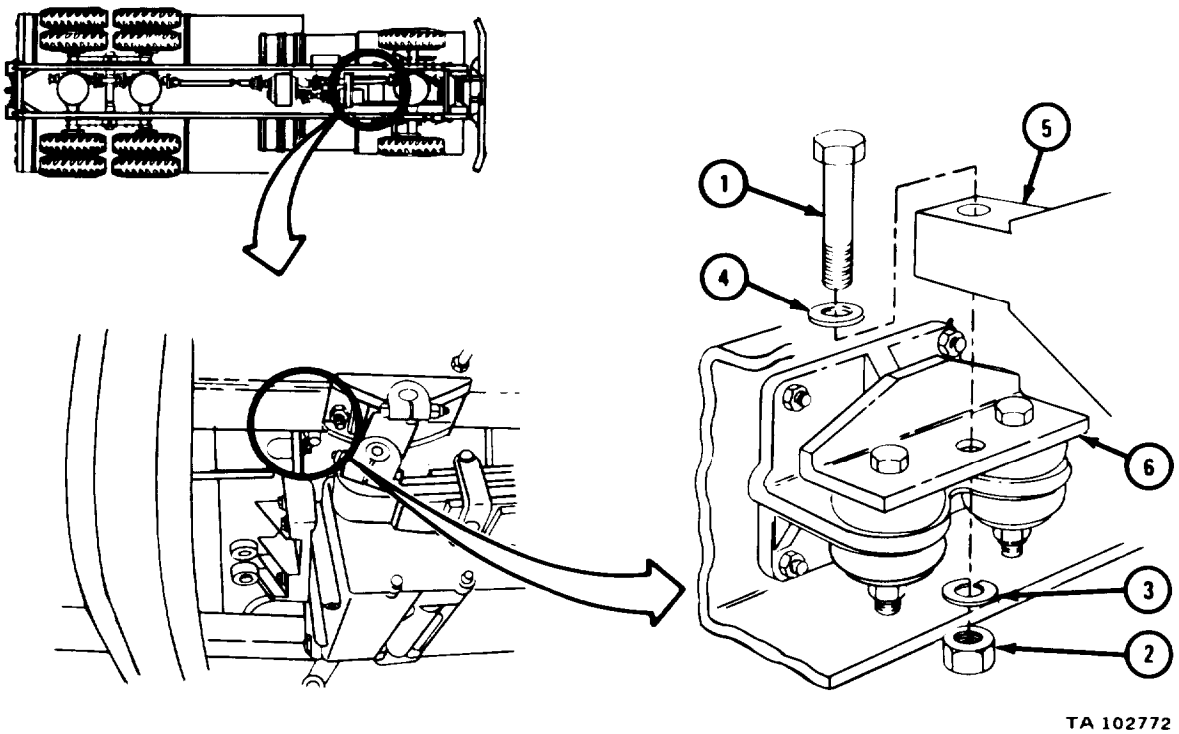


TA 102771

FRAME 2

Soldier A	1. Hold rear mounting bolt (1).
Soldier B	2. Take off nut (2) and lockwasher (3).
Soldier A	3. Take out bolt (1) and flat washer (4).
Soldiers A and B	4. Do steps 1, 2, and 3 again for other rear mount assembly.
Soldier A	5. Jack up flywheel housing (5) three to four inches off rear mount (6).

GO TO FRAME 3

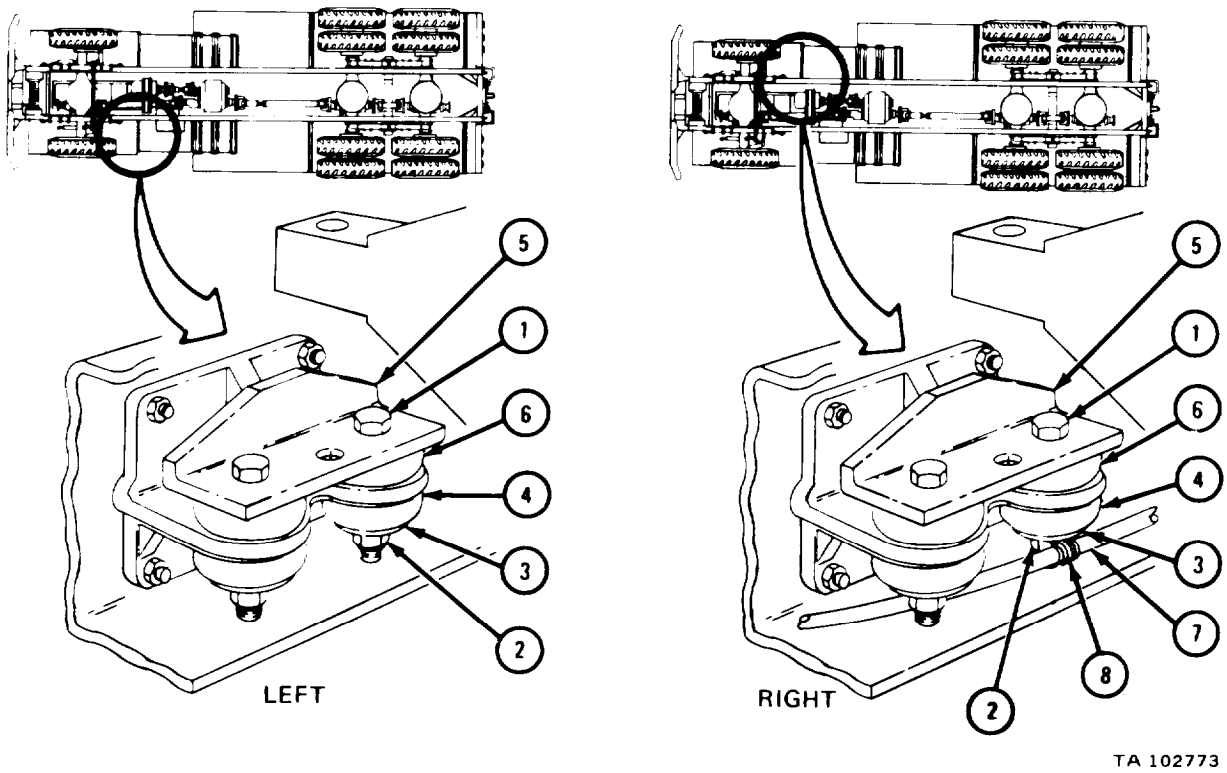


TA 102772

FRAME 3

Soldier A	1.	Hold two mounting screws (1) .
Soldier B	2.	Take off two nuts (2), washers (3), and insulators (4). Throw away insulators.
Soldier A	3.	Take out two screws (1). Take off support bracket (5) and two insulators (6). Throw away insulators.
Soldiers A and B	4.	Do steps 1, 2, and 3 on right side of truck.
	5.	Take off air line (7) and clamp (8) under nut (2) on right rear engine mount.

END OF TASK



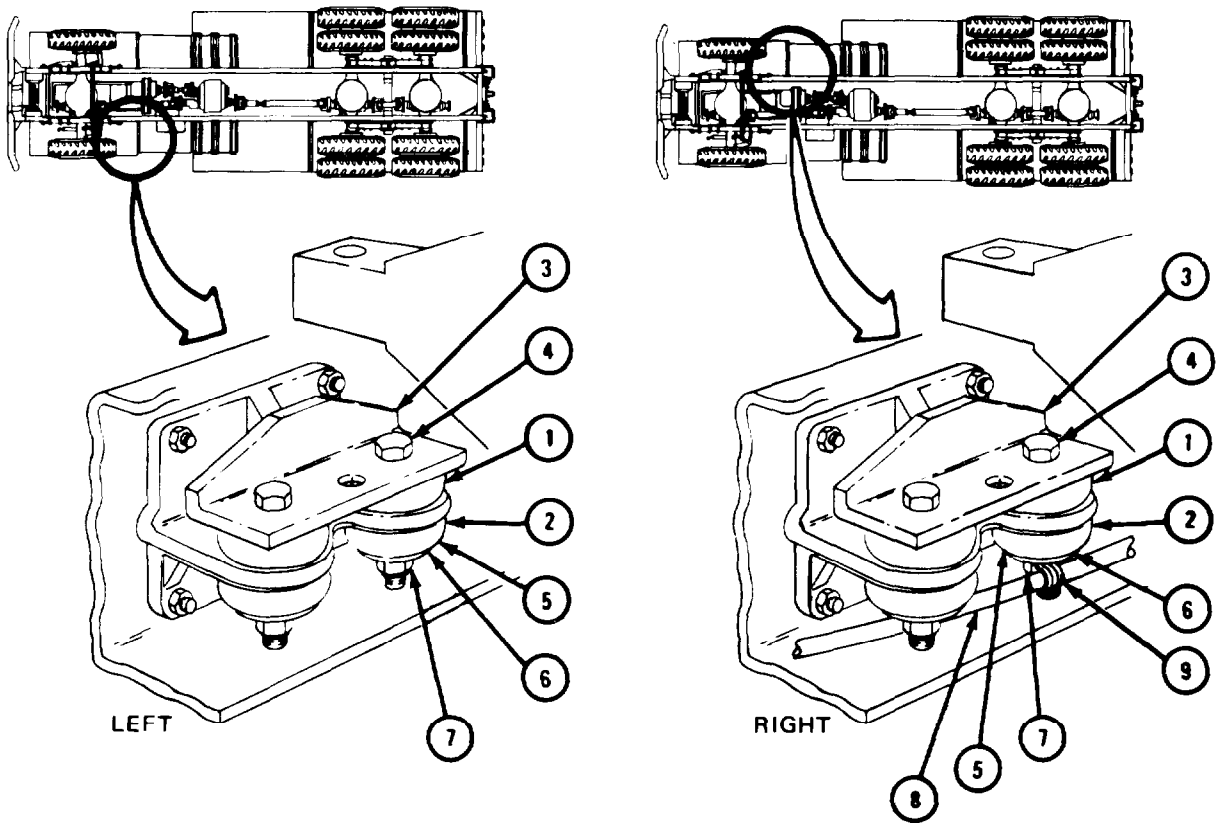
TA 102773

b. Replacement.

FRAME 1

Soldier A	1.	Hold two upper insulators (1) on frame bracket (2). Put support bracket (3) on insulators (1).
	2.	Line up holes and put in two screws (4).
	3.	Hold two screws (4).
Soldier B	4.	Put two lower insulators (5) and washers (6) on screws (4).
	5.	Put on two nuts (7) and tighten them to 75 to 85 pound-feet.
Soldiers A and B	6.	Do steps 1 through 5 again on other side of truck.
	7.	Put on air line (8) and clamp (9) under nut (7) on right rear engine mount.

GO TO FRAME 2



FRAME 2

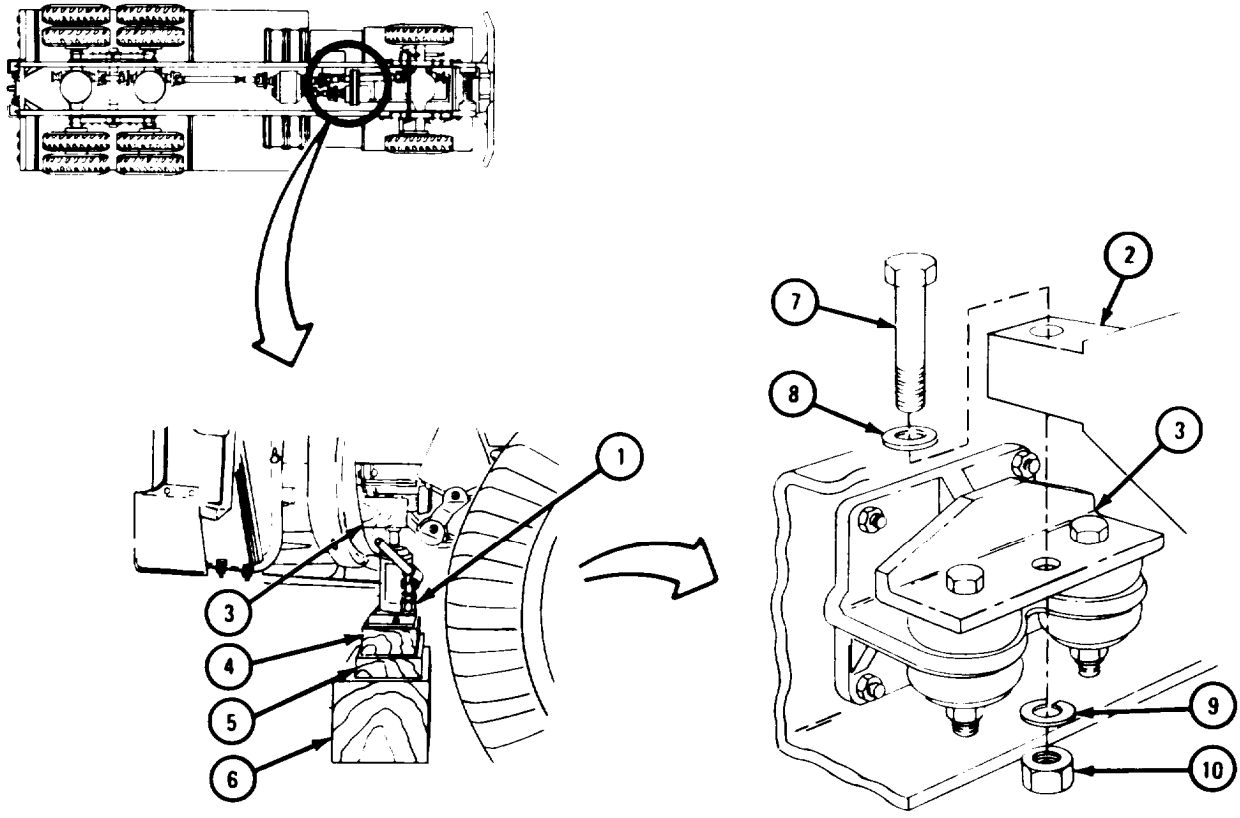
1. Let jack (1) down so that housing (2) rests on bracket (3). Take away jack (1) and wood blocks (4, 5, and 6).

Soldier A 2. Put screw (7) with washer (8) through housing (2) and bracket (3) and hold it.

Soldier B 3. Put on lockwasher (9) and nut (10). Tighten nut to 150 pound-feet.

Soldiers A and B 4. Do steps 1, 2, and 3 again on other side of truck.

END OF TASK



TA 102775

2-5. ENGINE ASSEMBLY, REMOVAL, AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES : Cotter pins
Tags

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood and hood side panels. Refer to TM 9-2320-211-10.

(2) Takeoff battery ground cable. Refer to TM 9-2320-211-20.

(3) Take apart electrical harnesses in engine compartment. Refer to para 6-16.

(4) Remove power takeoff linkage. Refer to Part 3, para 17-59.

(5) Remove air cleaner hoses. Refer to TM 9-2320-211-20.

(6) Remove engine exhaust. Refer to TM 9-2320-211-20.

(7) Remove throttle accelerator linkage. Refer to TM 9-2320-211-20.

(8) Remove clutch and brake control linkage and return springs. Refer to TM 9-2320-211-20.

(9) Remove steering pump hoses. Refer to TM 9-2320-211-20.

(10) Drain cooling system. Refer to TM 9-2320-211-20.

(11) Remove radiator brush guard. Refer to TM 9-2320-211-20.

(12) Remove radiator assembly. Refer to TM 9-2320-211-20.

(13) Remove transmission assembly. Refer to para 7-3.

(14) Remove mounting bolts and lay power steering reservoir on left fender. Refer to TM 9-2320-211-20.

(15) Remove headlight brackets from fender. Refer to TM 9-2320-211-20.

(16) Remove tachometer flexible shaft assembly. Refer to TM 9-2320-211-20.

b. Removal.

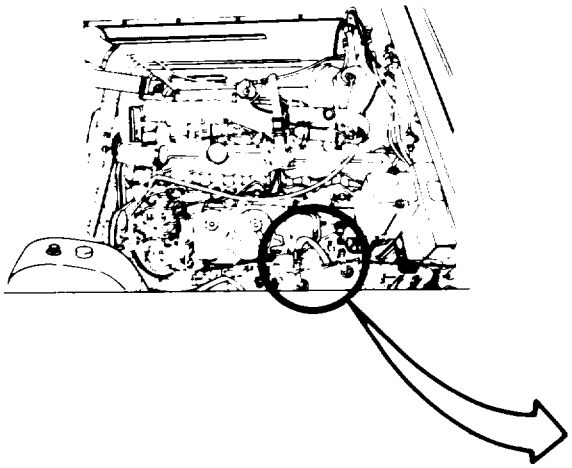
FRAME 1

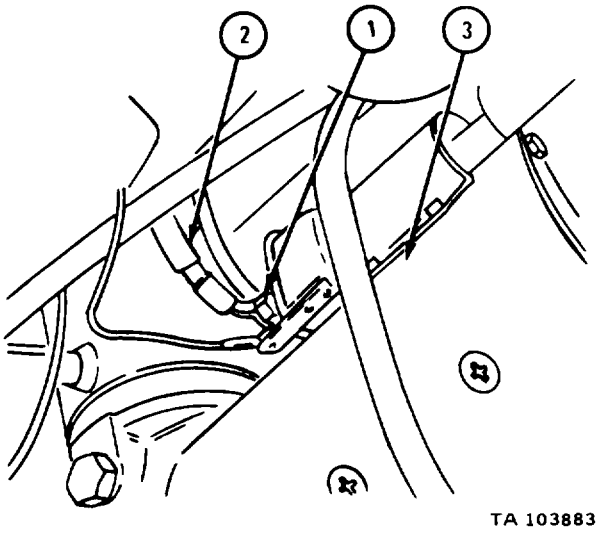
NOTE

Tag all wires so they can be put back in proper place.

1. Take off nuts (1) holding starter cables (2).
2. Take off cables (2) from starter (3).
3. Put nuts (1) back on starter (3).

GO TO FRAME 2



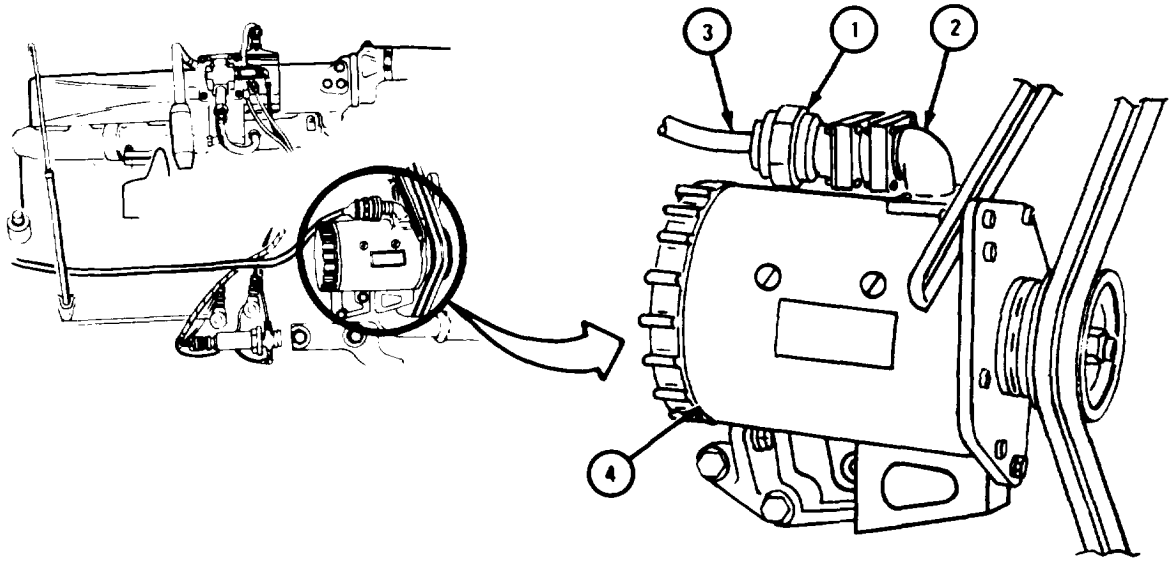


TA 103883

FRAME 2

1. Loosen nut (1) from elbow (2).
2. Slide nut (1) back on cable (3). Take off cable from generator (4).

GO TO FRAME 3



TA 103884

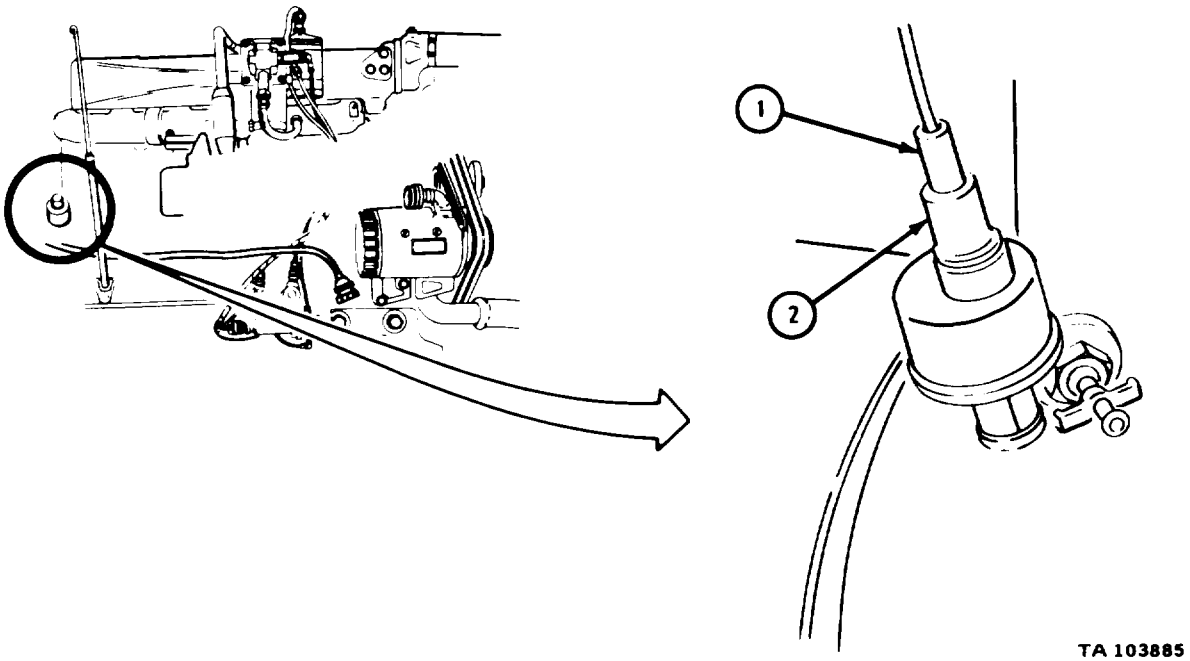
FRAME 3

NOTE

Newer vehicles have a push, pull type connector.

1. Twist connector (1) to left and pull it off.
2. Take out oil pressure gage sending unit (2).

GO TO FRAME 4



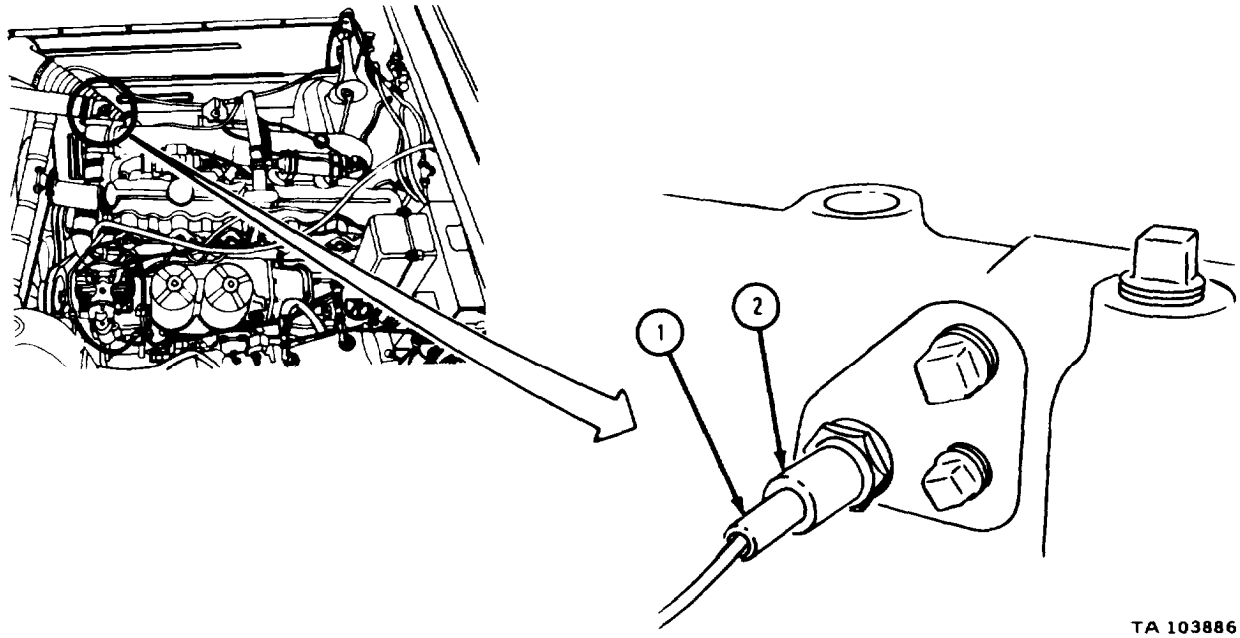
FRAME 4

NOTE

Newer vehicles have a push, pull type connector.

1. Twist connector (1) to right and pull it off.
2. Take out water temperature sending unit (2).

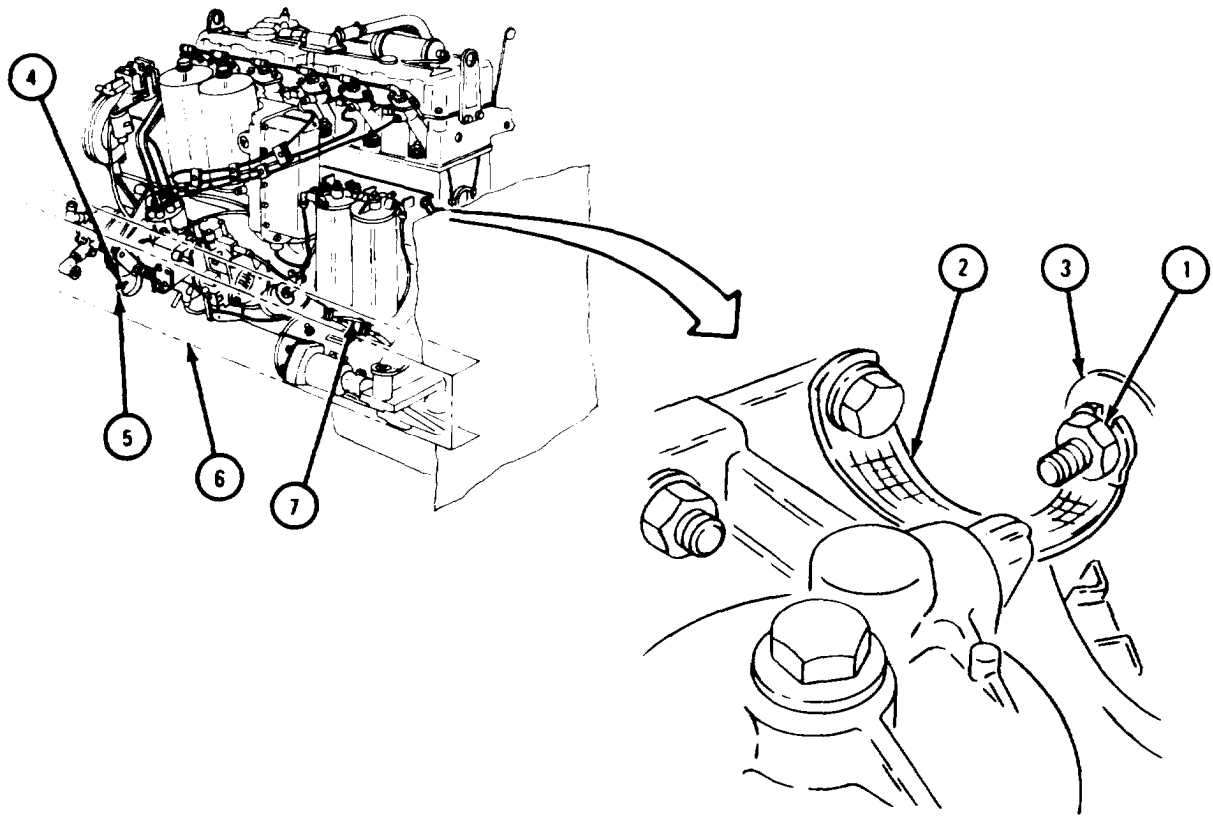
GO TO FRAME 5



FRAME 5

1. Unscrew nut (1).
2. Takeout ground strap (2) from fire wall (3).
3. Unscrew nut (4).
4. Take out ground strap (5) from frame (6).
5. Take off fuel line (7) at frame (6).

GO TO FRAME 6

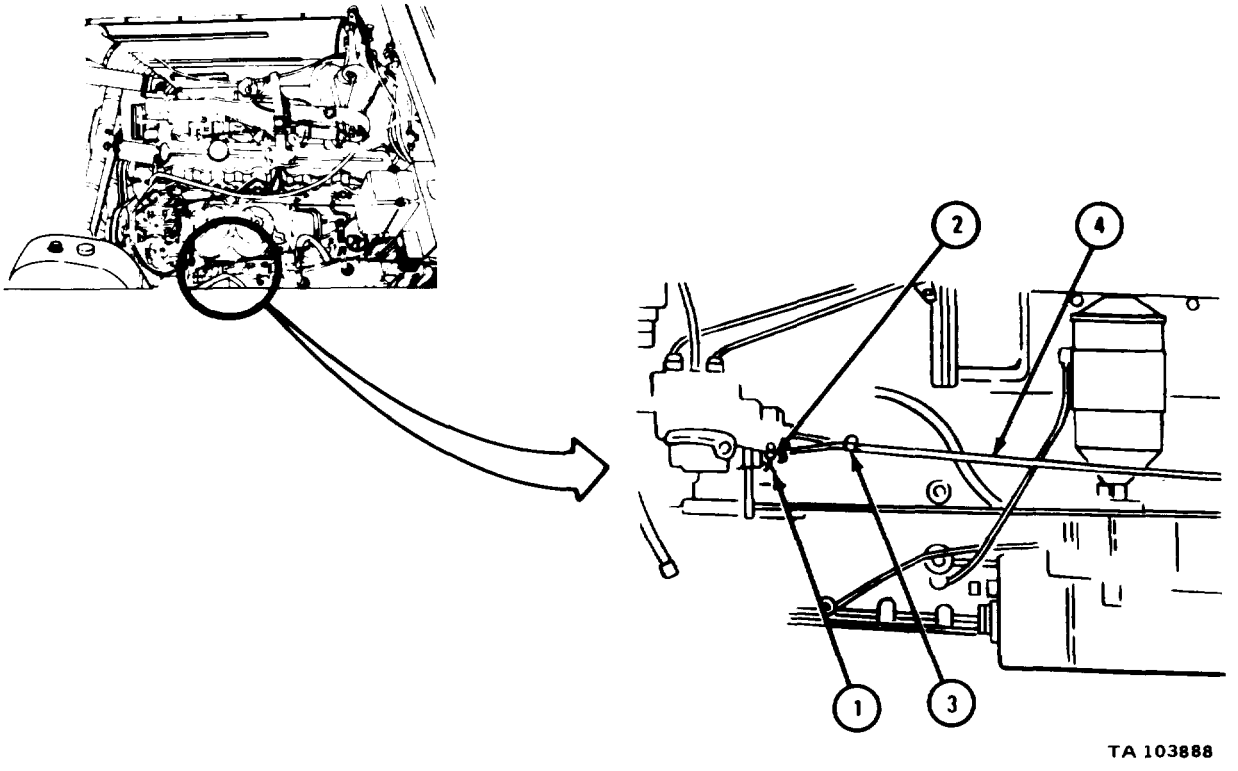


TA 103887

FRAME 6

1. Take out cotter pin (1) from pin (2). Throw away cotter pin.
2. Take off nut, washer, and screw (3).
3. Take off cable (4).

GO TO FRAME 7



FRAME 7

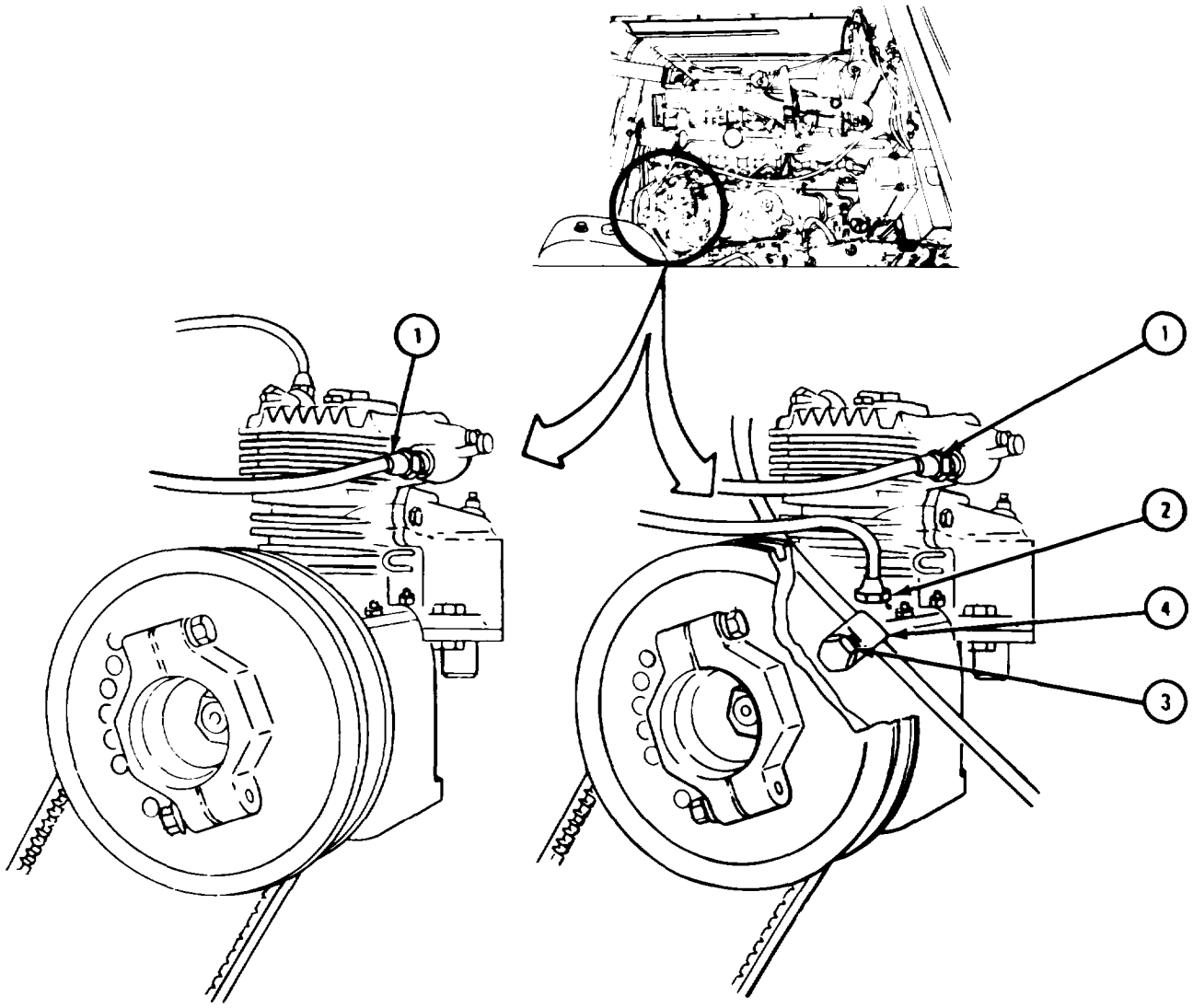
1. Take off air supply line (1).

NOTE

Truck may have governor air line (2) at top of compressor or at side of compressor.

2. Take off governor air line (2).
3. Take out bolt (3). Take off clip (4).

GO TO FRAME 8



AIR LINE AT TOP

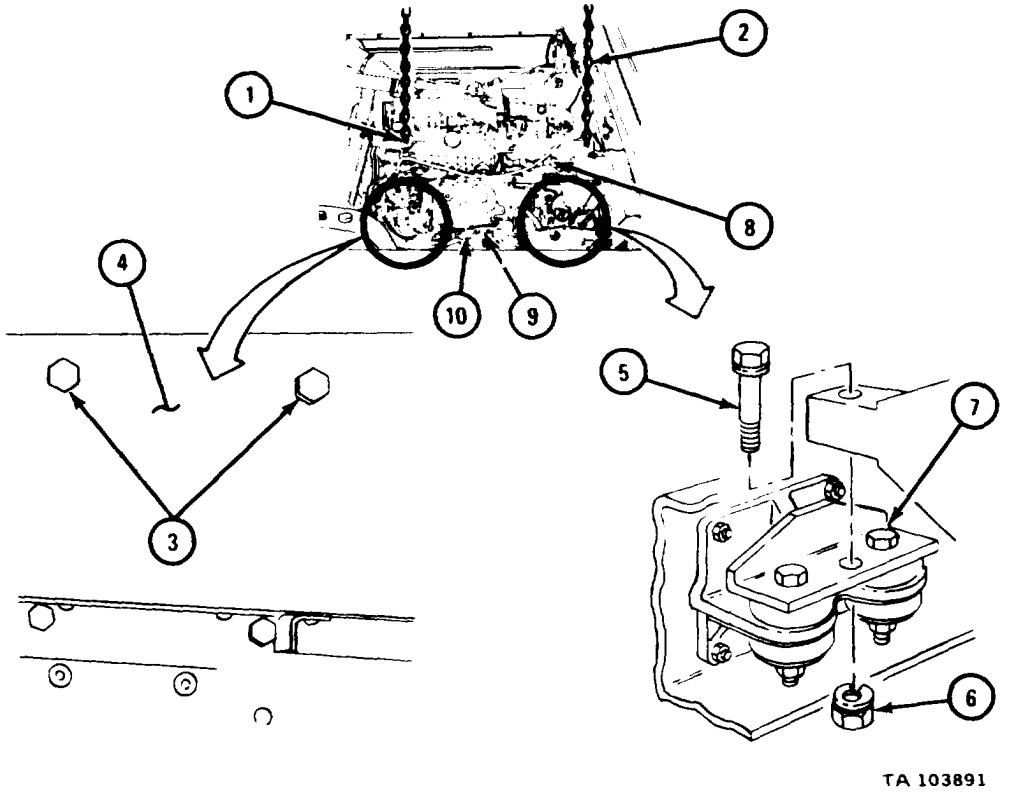
AIR LINE AT SIDE

TA 103889

FRAME 8

Soldiers A and B	1.	Put on hoist and chain sling to front and rear lifting brackets (1 and 2).
	2.	Take slack out of hoist and chain sling.
Soldier A	3.	Take off capscrews and lockwashers (3) from front mounting support (4).
	4.	Hold bolt and flat washer (5) for soldier B.
Soldier B	5.	Take off nut and lockwasher (6) from rear mounting Plate (7).
Soldier A	6.	Take out bolt and flat washer (5).
Soldiers A and B	7.	Do steps 4, 5, and 6 again on other side of engine (10).
	8.	Take off fuel line (9) at injector pump (10).
	9.	Raise engine (8) out of engine compartment with hoist and chain sling. Place engine on engine stand.
	10.	Take off hoist and chain sling.

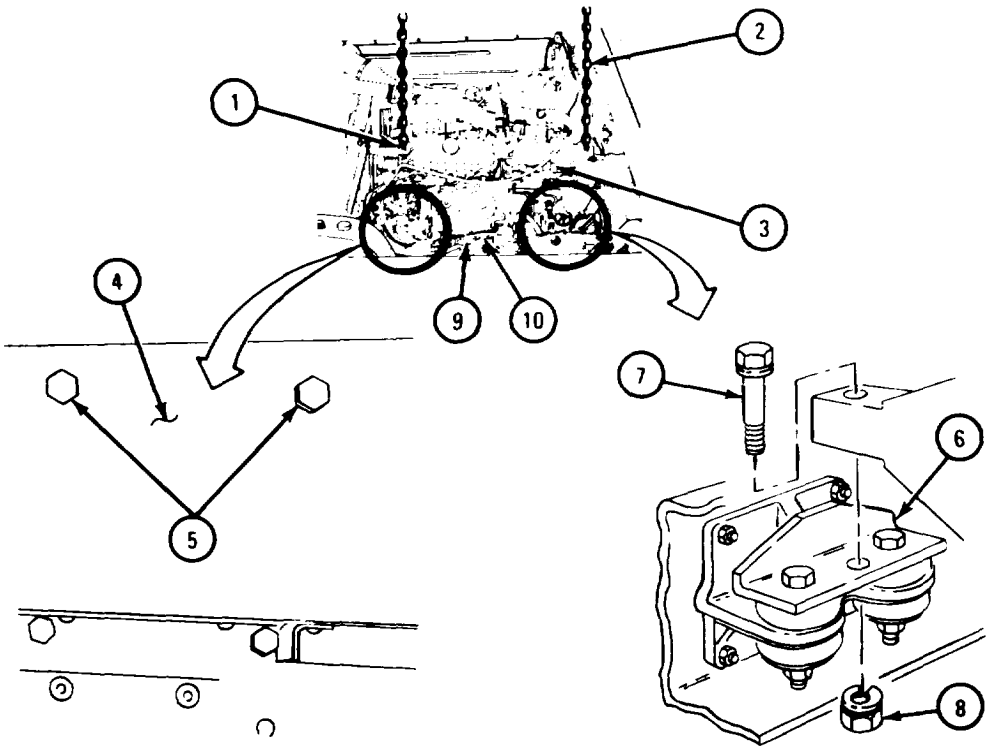
END OF TASK



TA 103891

c. Replacement.

FRAME 1		
Soldiers A and B	1.	Put on hoist and chain sling to front and rear lifting brackets (1 and 2).
	2.	Take slack out of chain sling.
	3.	Raise engine (3) with hoist and chain sling high enough to clear engine compartment.
	4.	Lower engine (3) into engine compartment.
Soldier A	5.	Line up holes in front mounting support (4) and put in capscrews and lockwashers (5).
	6.	Line up holes in rear mounting plate (6) and put in bolt and flat washer (7).
Soldier B	7.	Put on nut and lockwasher (8). Tighten nut to 150 pound-feet.
Soldiers A and B	8.	Do steps 6 and 7 again on other side of engine (3).
Soldier A	9.	Put on fuel line (9) at injector pump (10).
GO TO FRAME 2		



TA 103892

FRAME 2

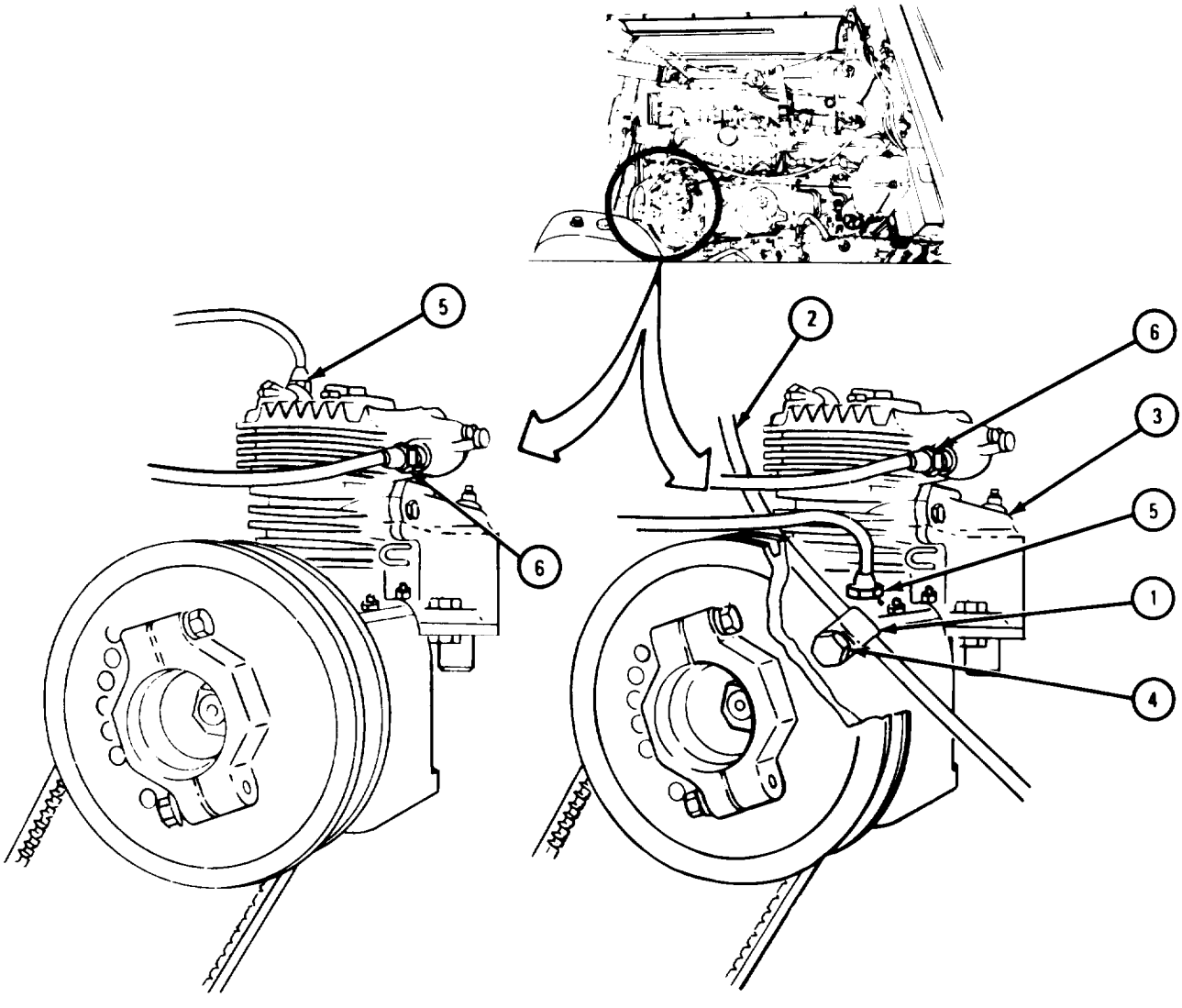
1. Put clip (1) on line (2).
2. Put clip (1) on air compressor (3) with bolt (4).

NOTE

Truck may have governor air line (5) at top of compressor or at side of compressor.

3. Put on and tighten air line (5).
4. Put on and tighten air line (6).

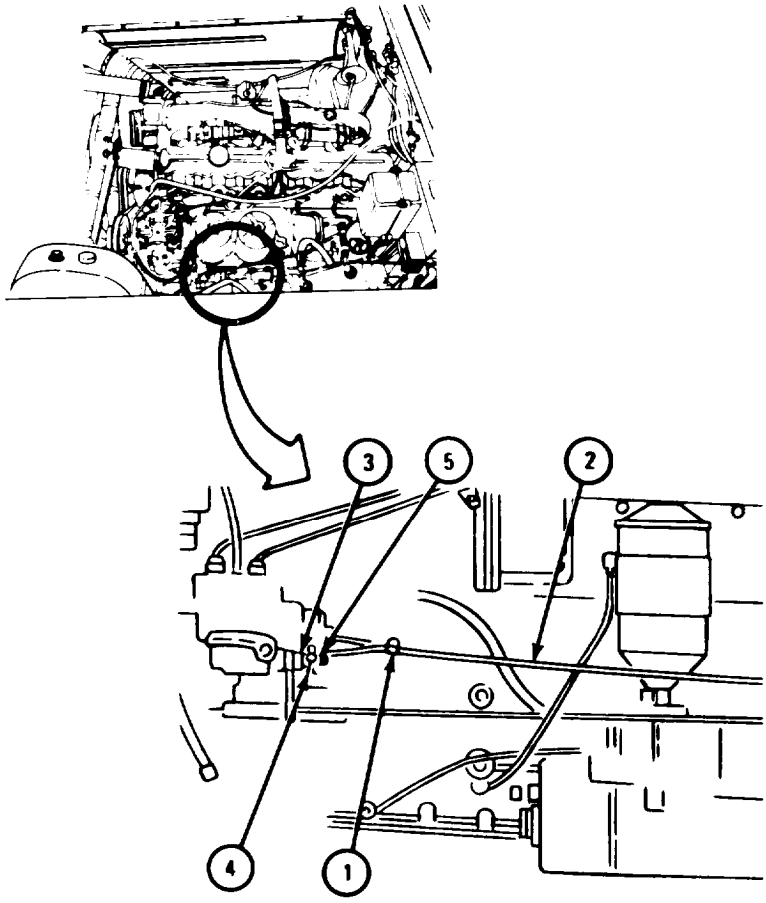
GO TO FRAME 3



FRAME 3

1. Take screw, washer, and nut (1) from fuel shutoff control wire (2). Mount wire to fuel shutoff valve (3). Put on, but not tighten screw, washer, and nut.
2. Put cotter pin (4) in pin (5) on fuel shutoff valve (3).
3. Set length of wire and tighten screw, washer, and nut (1).

GO TO FRAME 4

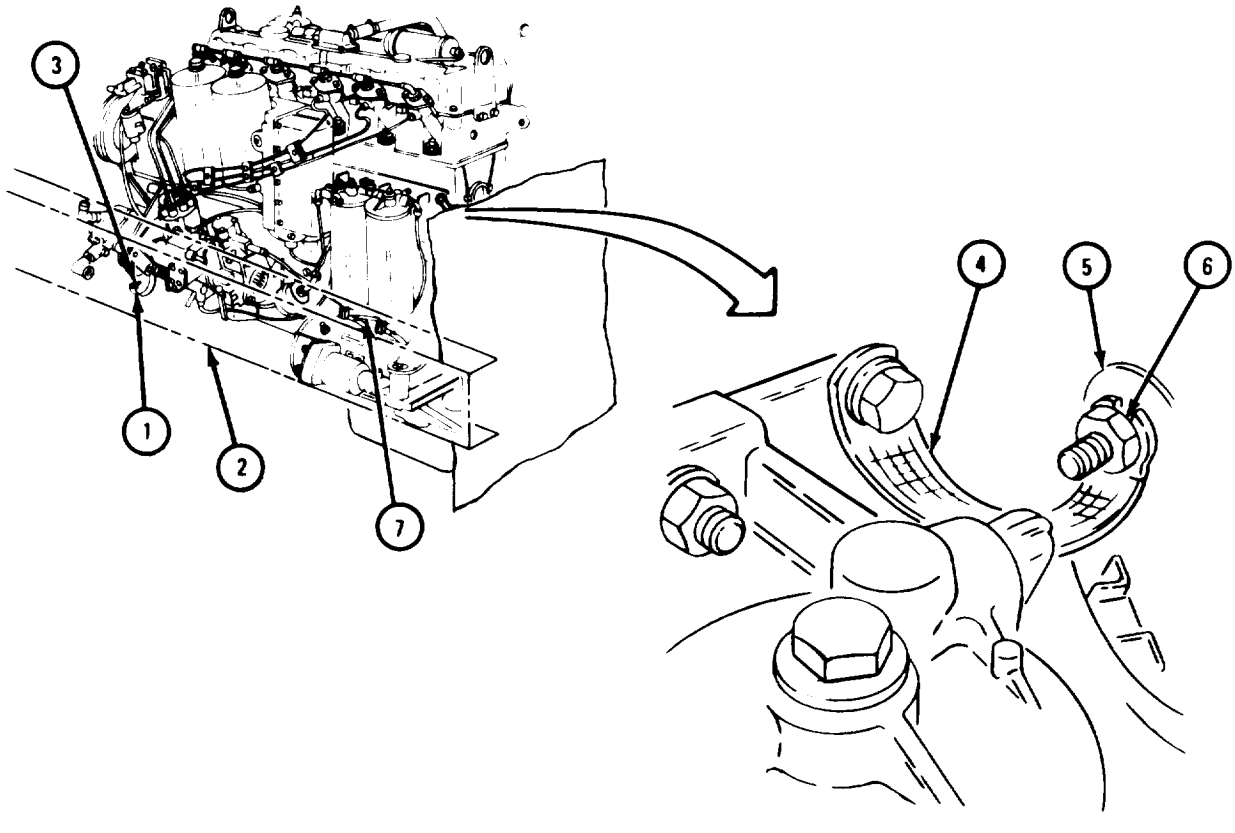


TA 103895

FRAME 4

1. Put ground strap (1) on frame (2). Put in bolt (3).
2. Put ground strap (4) on firewall (5). Put in bolt (6).
3. Put on fuel line (7) at frame (2).

GO TO FRAME 5



TA 103896

FRAME 5

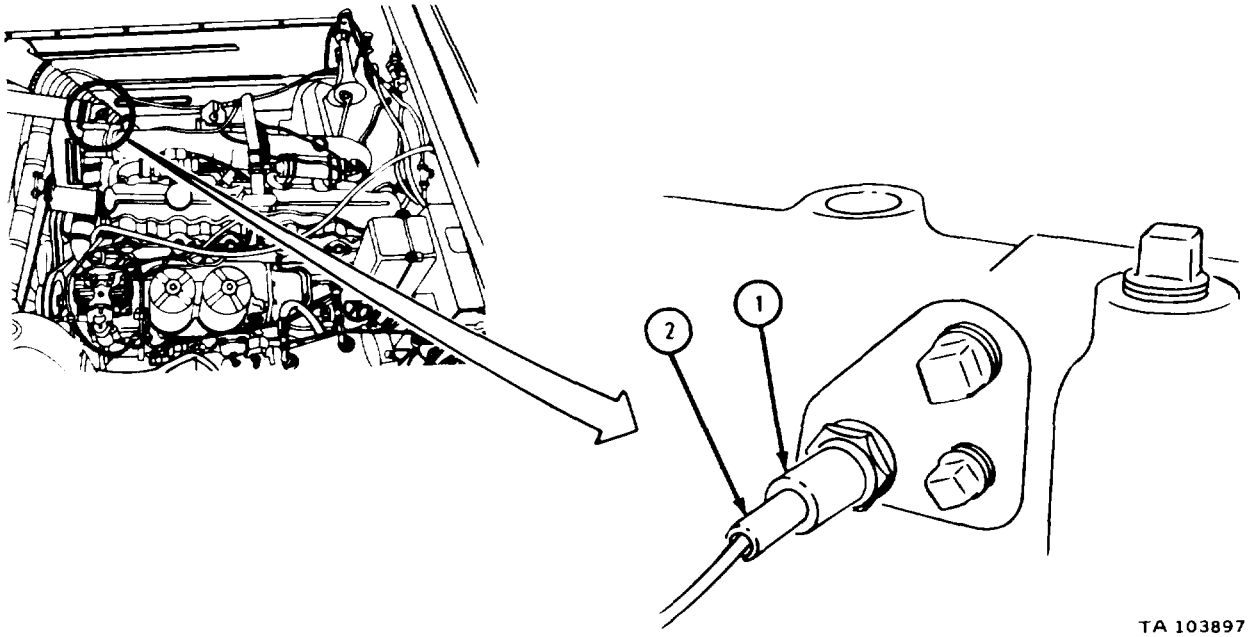
1. Screw in water temperature sending unit (1).

NOTE

Newer vehicles have a push, pull type connector.

2. Put in connector (2) and twist it to right to lock.

GO TO FRAME 6



FRAME 6

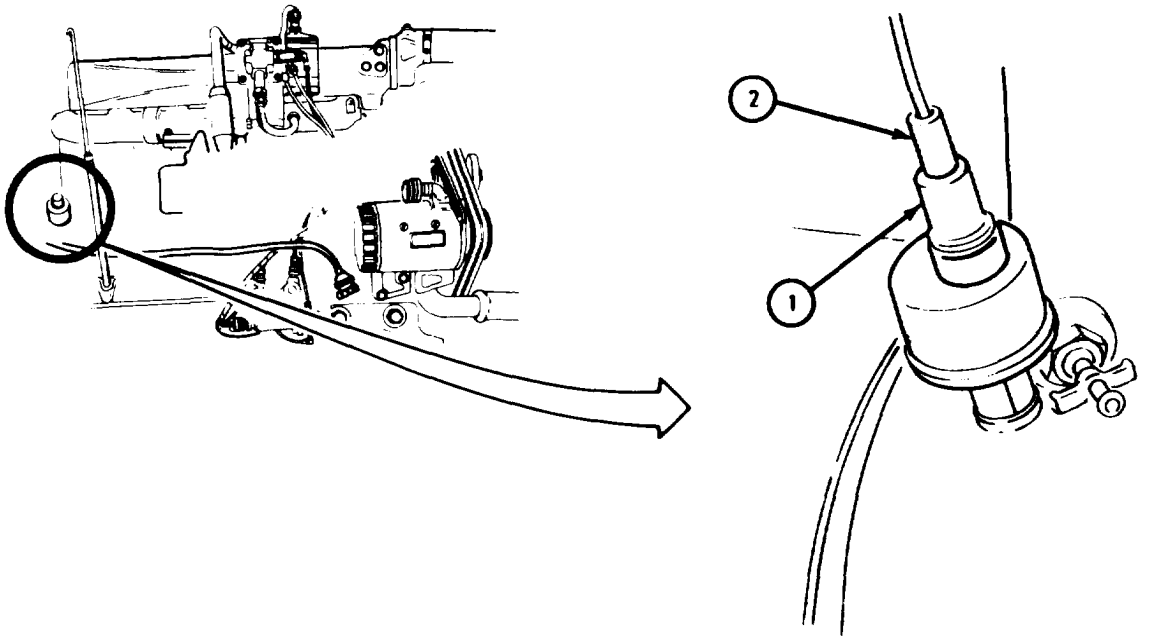
1. Screw in oil pressure gage sending unit (1).

NOTE

Newer vehicles have a push, pull type connector.

2. Put in connector (2) and twist it to right to lock.

GO TO FRAME 7

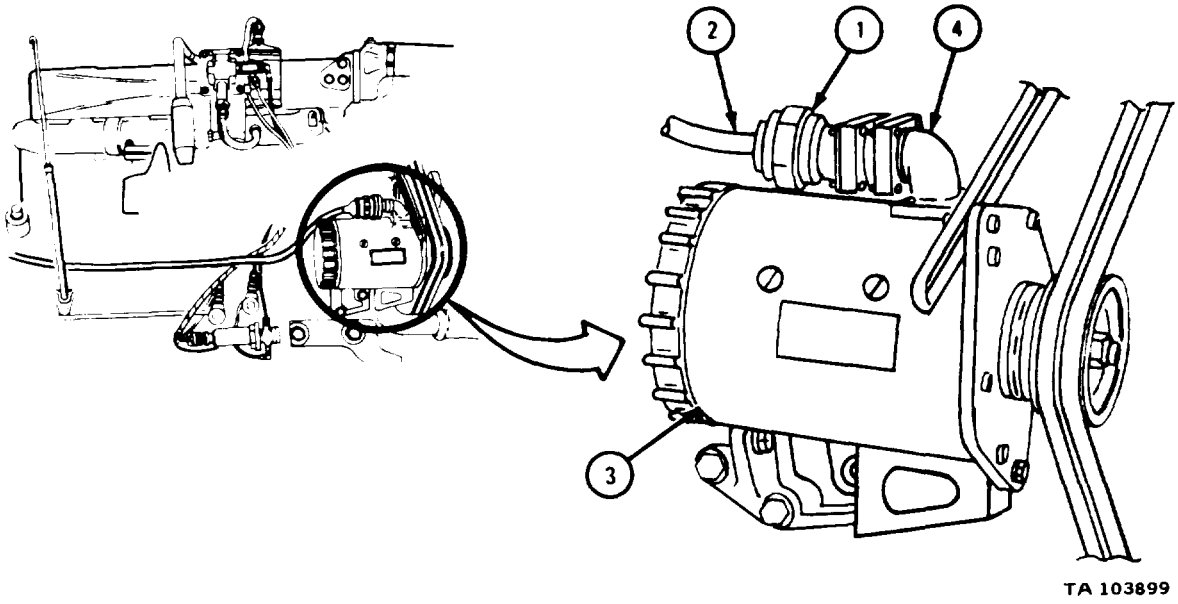


TA 103898

FRAME 7

1. Slide nut (1) forward on cable (2).
2. Join cable (2) to generator (3). Put nut (1) onto elbow (4).

GO TO FRAME 8

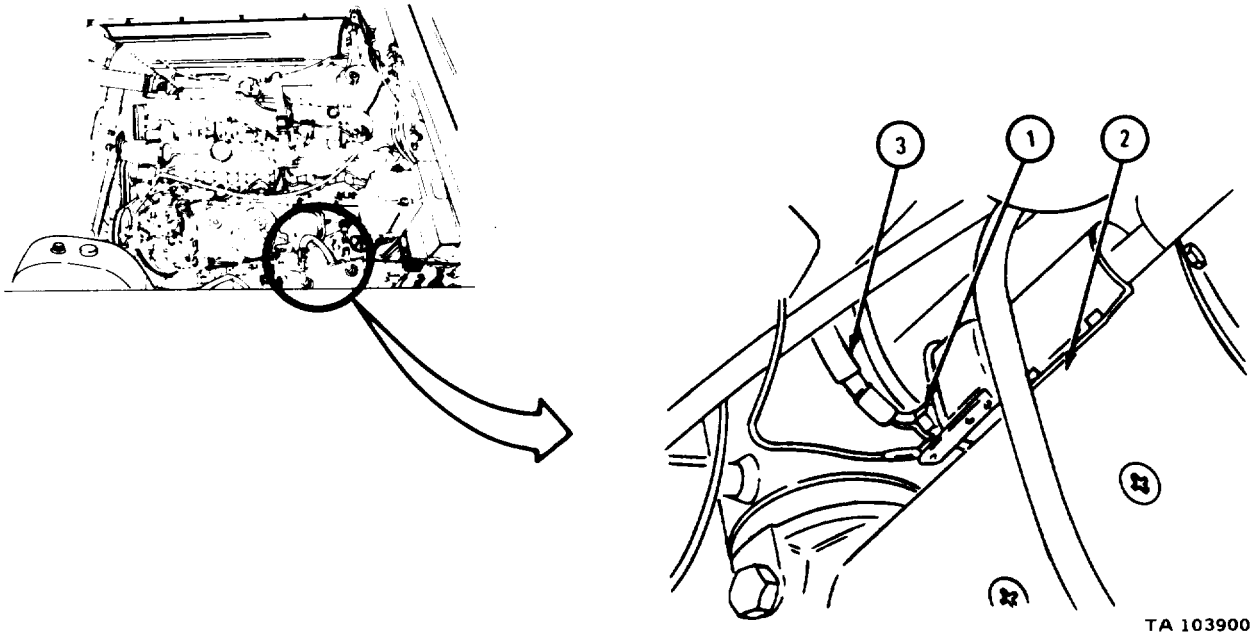


TA 103899

FRAME 8

1. Take off nuts (1) from terminal posts on starter (2).
2. Put cables (3) on starter (2). Put on nuts (1).

GO TO FRAME 9



FRAME 9

NOTE

Follow-on Maintenance Action Required:

1. Replace tachometer flexible shaft assembly. Refer to TM 9-2320-211-20.
2. Replace headlight brackets. Refer to TM 9-2320-211-20.
3. Replace power steering reservoir. Refer to TM 9-2320-211-20.
4. Replace transmission assembly. Refer to para 7-3.
5. Replace radiator assembly. Refer to TM 9-2320-211-20.
6. Replace radiator brush guard. Refer to TM 9-2320-211-20.
7. Fill cooling system. Refer to TM 9-2320-211-20.
8. Replace steering pump hoses. Refer to TM 9-2320-211-20.
9. Replace clutch and brake control linkage and return springs. Refer to TM 9-2320-211-20.
10. Replace throttle accelerator linkage. Refer to TM 9-2320-211-20.
11. Replace engine exhaust. Refer to TM 9-2320-211-20.
12. Replace air cleaner hoses. Refer to TM 9-2320-211-20.
13. Replace power takeoff linkage. Refer to part 3, para 17-59.
14. Join electrical harnesses in engine compartment. Refer to para 6-16.
15. Reconnect battery ground cable. Refer to TM 9-2320-211-20.
16. Close hood and hood side panels. Refer to TM 9-2320-211-10.

END OF TASK

Section III. CRANKCASE, BLOCK, AND CYLINDER HEAD

2-6. CYLINDER HEAD REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: No special tools needed

SUPPLIES: Sealant, MIL-S-7916B
Gasket and preformed packing set pn 5702677
Gasket set, turbocharger to exhaust

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood and engine side panels. Refer to TM 9-2320-211-10.

(2) Disconnect battery ground cable. Refer to TM 9-2320-211-20.

(3) Drain cooling system. Refer to TM 9-2320-211-20.

(4) Remove fuel injector tubes. Refer to TM 9-2815-210-34.

(5) Remove turbocharger assembly. Refer to TM 9-2815-210-34.

(6) Remove cylinder head water outlet manifold. Refer to TM 9-2815-210-34.

(7) Remove intake and exhaust manifolds. Refer to para 2-24.

(8) Remove engine breather tube. Refer to TM 9-2320-211-20.

(9) Remove manifold flame heater assembly. Refer to TM 9-2320-211-20.

(10) Remove valve covers and gaskets. Refer to TM 9-2320-211-20.

(11) Remove rocker arm assembly. Refer to para 2-15.

(12) Remove fuel injector assemblies. Refer to TM 9-2815-210-34.

(13) Remove engine lift and radiator support. Refer to TM 9-2320-211-20.

(14) Remove pushrods. Refer to para 2-14.

b. Removal.

FRAME 1

NOTE

This procedure is the same for front and rear cylinder head removal.

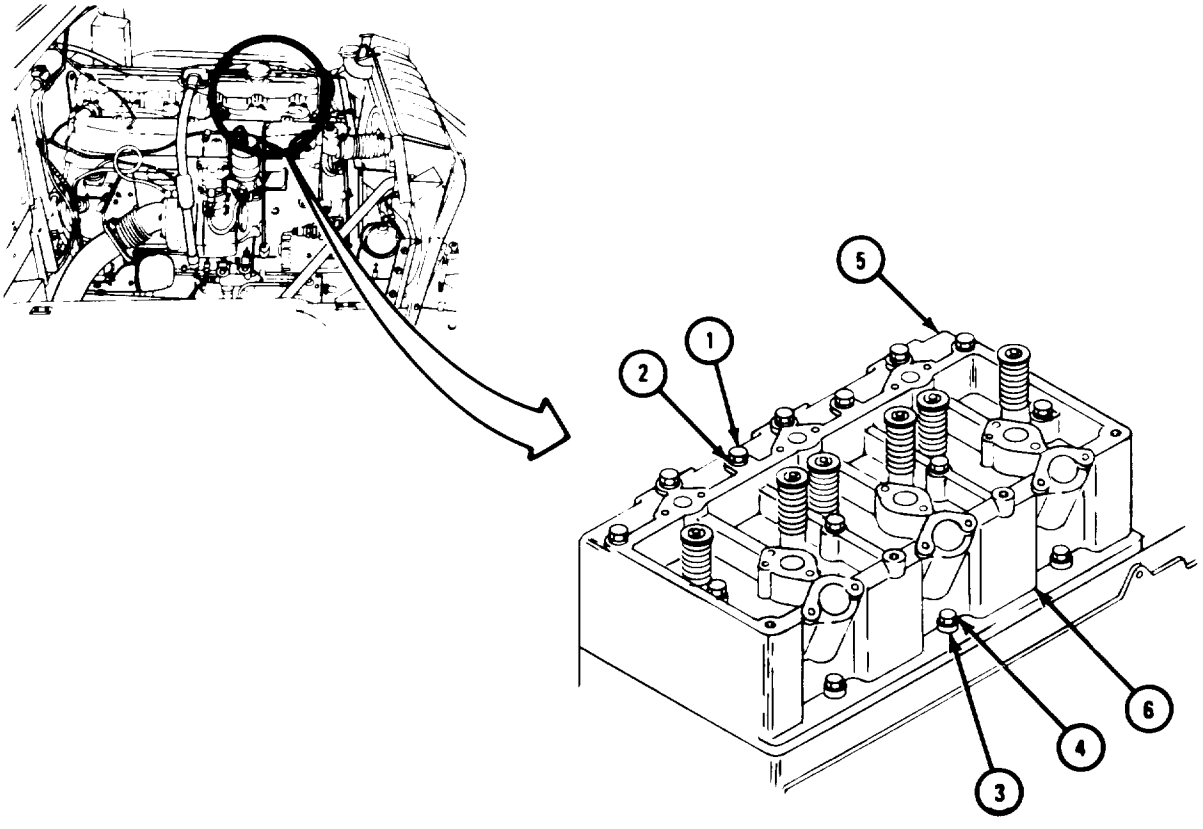
1. Take off 11 plain nuts (1) and flatwashers (2).

NOTE

Early model cylinder heads use 3/8-inch sleeve spacers under three head nuts at stud bases. Later model cylinder heads use 1/8-inch flatwashers under three head nuts at stud bases.

2. Take off three plain nuts (3) and three sleeve spacers (4) or washers.
3. Take off cylinder head assembly (5). Take off cylinder head gasket and fire rings (6). Throw away gasket and fire rings.

END OF TASK



c. Repair. Refer to TM 9-2815-210-34 for repair of the cylinder head.

d. Replacement.

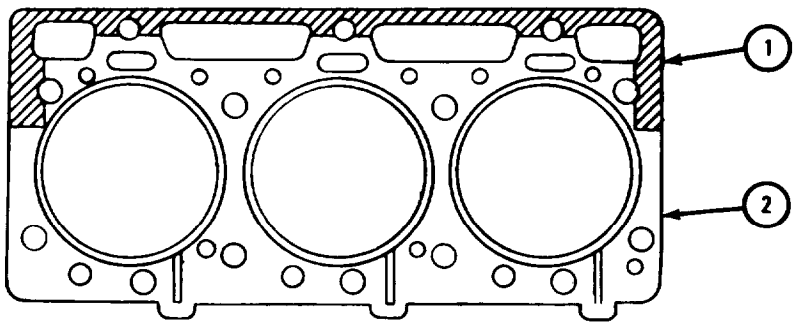
FRAME 1

NOTE

This procedure is the same for front and rear cylinder head replacement.

1. Put a thin coat of sealant, MIL-S-7916B (1) as shown to both sides of cylinder head gasket (2) before putting it on cylinder head.

GO TO FRAME 2

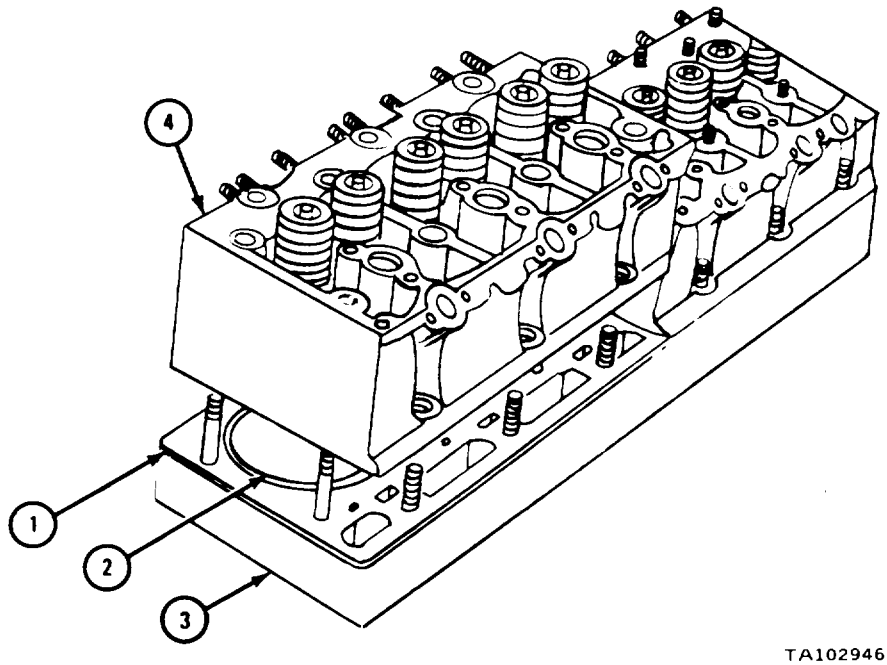


TA102945

FRAME 2

1. Put cylinder head gasket (1) and three fire rings (2) in place on engine block (3).
2. Mount cylinder head (4) onto block (3).

GO TO FRAME 3



TA102946

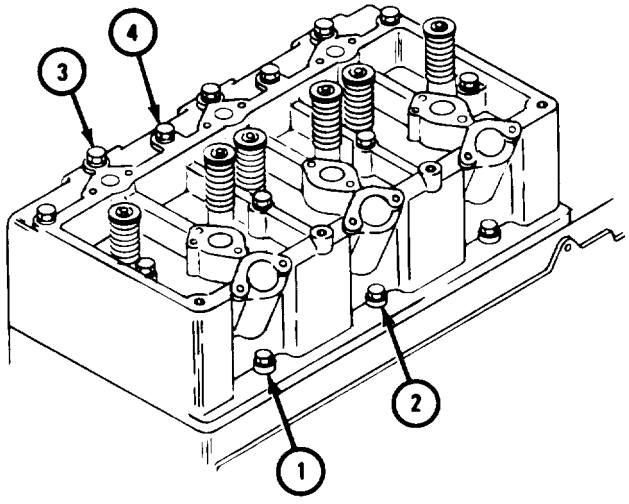
FRAME 3

NOTE

Early model cylinder heads use 3/8-inch sleeve spacers under three head nuts at stud bases. Later model cylinder heads use 1/8-inch flatwashers under three headnuts at stud bases.

1. Put on three plain nuts (1) with three sleeve spacers (2) or flatwashers. Do not tighten at this time.
2. Put on 11 plain nuts (3) with flatwashers (4). Do not tighten at this time.

GO TO FRAME 4



TA102947

FRAME 4

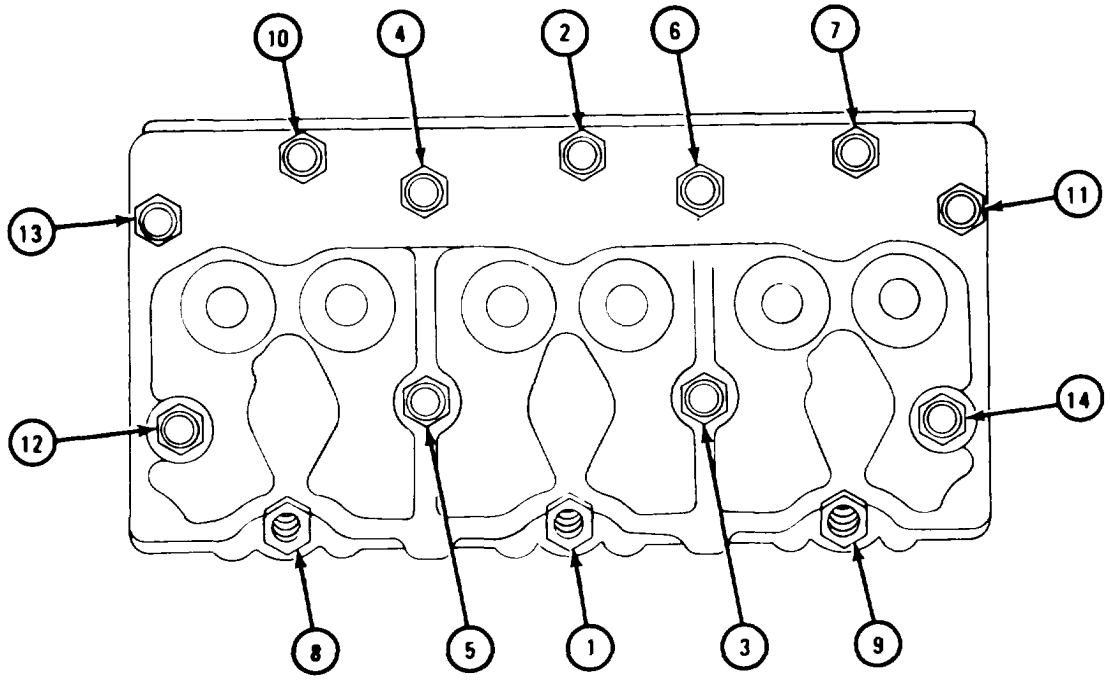
1. Tighten nuts 1 through 28 in the order shown, and as follows:
   a. Tighten nuts 1 through 14 to 40 pound-feet.
   b. Tighten nuts 1 through 14 to 80 pound-feet.
   c. Tighten nuts 1 through 14 to 110 pound-feet.
   d. Tighten nuts 1 through 14 to 130 pound-feet.

NOTE

Perform step le only when TD (thick deck) is stamped on crankcase.

   e. Tighten nuts 1 through 14 to 157 pound-feet.
2. Do steps la through ld for remaining 14 nuts.

GO TO FRAME 5



FRAME 5

NOTE

Follow-on Maintenance Action Required:

1. Replace pushrods. Refer to para 2-14.
2. Replace rocker arm assembly. Refer to para 2-15.
3. Replace valve covers and gaskets. Refer to TM 9-2320-211-20.
4. Replace cylinder head water outlet manifold. Refer to TM 9-2815-210-34.
5. Replace intake and exhaust manifolds. Refer to para 2-24.
6. Replace turbocharger assembly. Refer to TM 9-2815-210-34.
7. Replace fuel injector tubes. Refer to para 4-6.
8. Replace fuel injector assemblies. Refer to para 4-3.
9. Replace breather tube. Refer to TM 9-2320-211-20.
10. Replace manifold flame heater assembly. Refer to TM 9-2320-211-20.
11. Replace engine lift and radiator support. Refer to TM 9-2320-211-20.
12. Connect battery ground cable. Refer to TM 9-2320-211-20.
13. Fill cooling system. Refer to TM 9-2320-211-20.
14. Close hood and side panels. Refer to TM 9-2320-211-10.

END OF TASK

Section IV. CRANKSHAFT

2-7. CRANKSHAFT FRONT SEAL REMOVAL AND REPLACEMENT.

TOOLS: Oil seal replacer, pn 11642003
Oil seal installation adapter, fabricated locally
Puller, mechanical, pn 11642008

SUPPLIES: Seal, crankshaft oil front
Lubricating oil, ICE, OE/HDO 30, MIL-L-2104
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

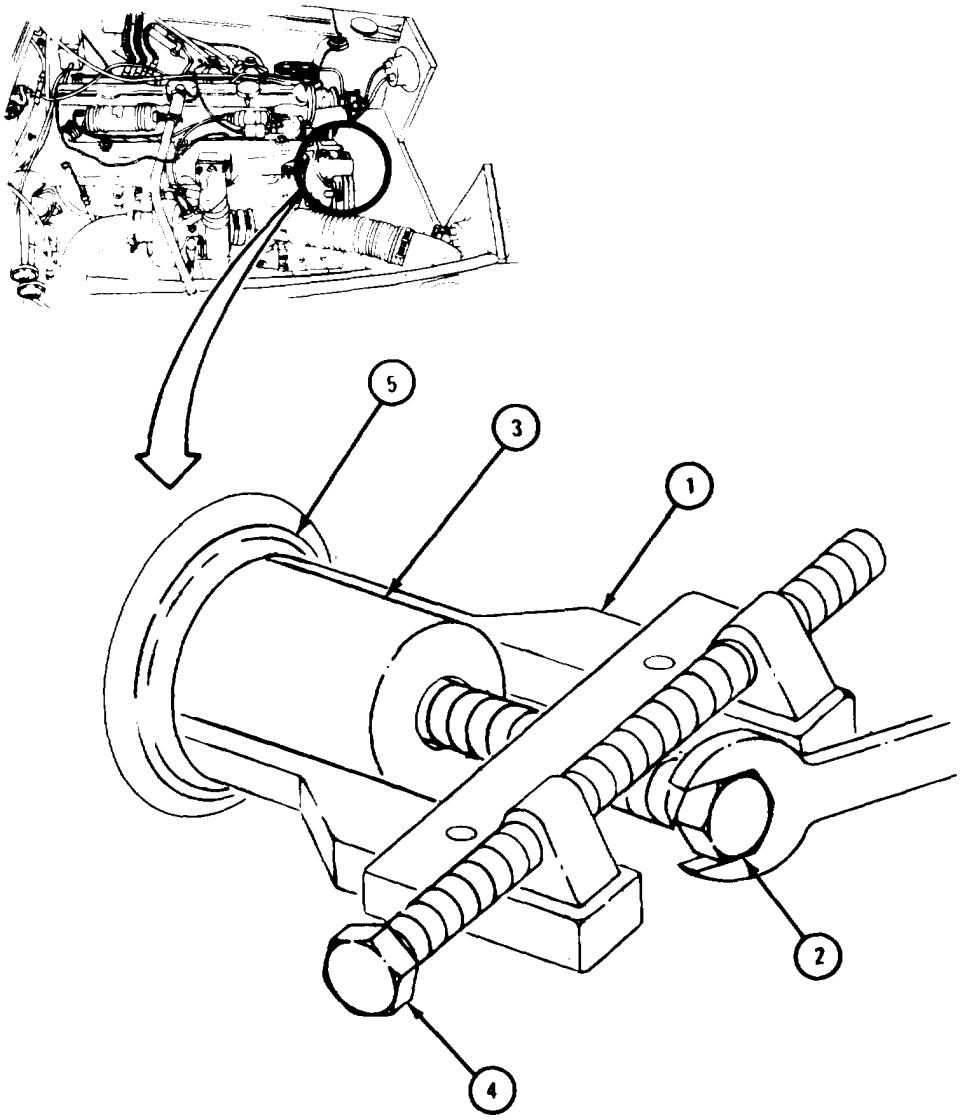
a. Preliminary Procedure. Remove damper and pulley assembly. Refer to para 2-9.

b. Removal.

FRAME 1

1. Put mechanical puller (1) with center screw (2) in end of crankshaft (3).
2. Turn screw (4) until legs of mechanical puller (1) hold oil seal (5).
3. Turn screw (2) and takeout oil seal (5).

END OF TASK



TA 102553

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep *a* fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

c. Cleaning. Clean area around oil seal bore with solvent. Do not get solvent in engine. Let area air dry.

d. Replacement.

FRAME 1

1. Make an oil seal installation adapter. See figure 2-1 for fabrication instructions
2. Put oil seal installation adapter (1) on oil seal replacer (2).

NOTE

The crankshaft front seal has a double lip which must be put in timing case cover with flanged edge away from cover mounting flange.

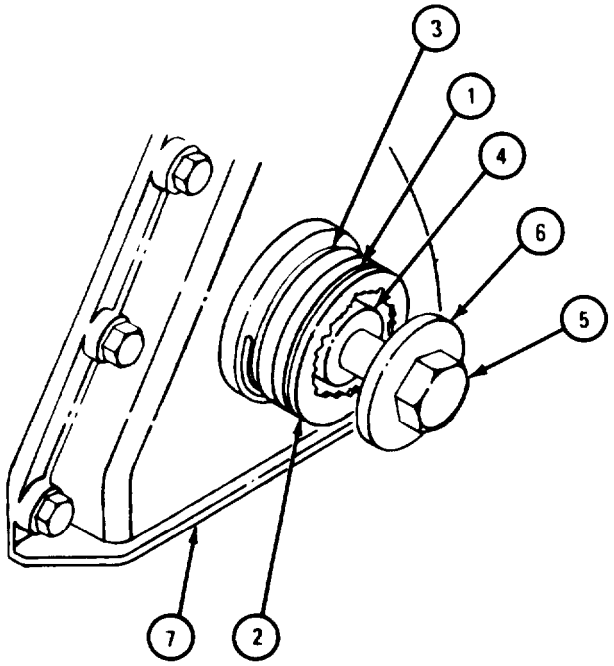
3. Spread lubricating oil on new oil seal (3).
4. Put new oil seal on oil seal replacer (2).
5. Put oil seal replacer (2), oil seal (3) and adapter (1) on crankshaft (4).
6. Put on screw (5) with washer (6). Turn screw until adapter (1) mates with timing case cover (7).
7. Tighten screw (5), until oil seal (3) is seated flush in timing case cover (7).
8. Take out screw (5) with washer (6), oil seal replacer (2) and oil seal installation adapter (1).

NOTE

Follow-on Maintenance Action Required:

Replace damper and pulley assembly. Refer to para 2-9.

END OF TASK



TA 102555

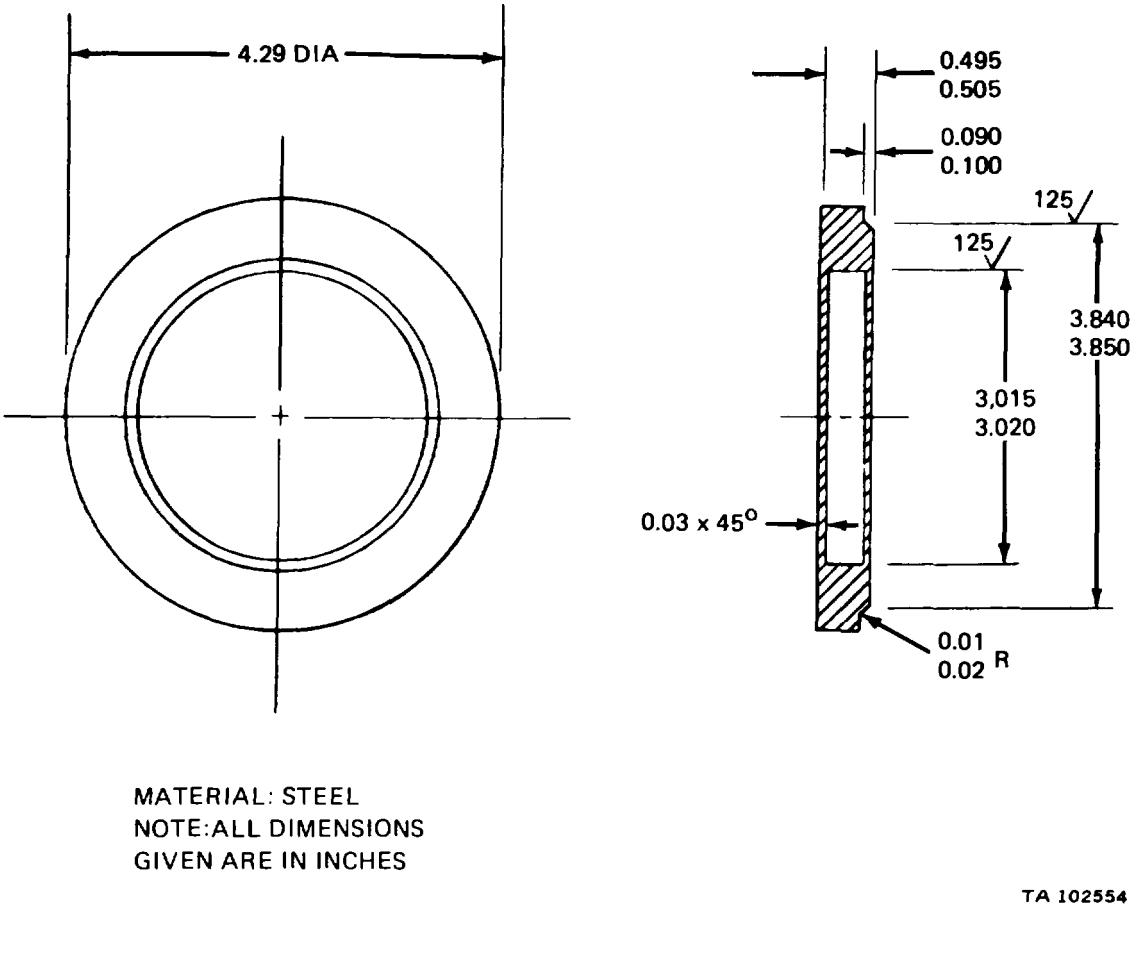


Figure 2-1. Oil Seal Installation Adapter, Fabrication Instructions

2-8. CRANKSHAFT REAR OIL SEAL REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Rear oil seal
Rear oil seal housing gasket
Crocus cloth

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove transmission. Refer to para 7-3.

(2) Remove clutch. Refer to para 3-3.

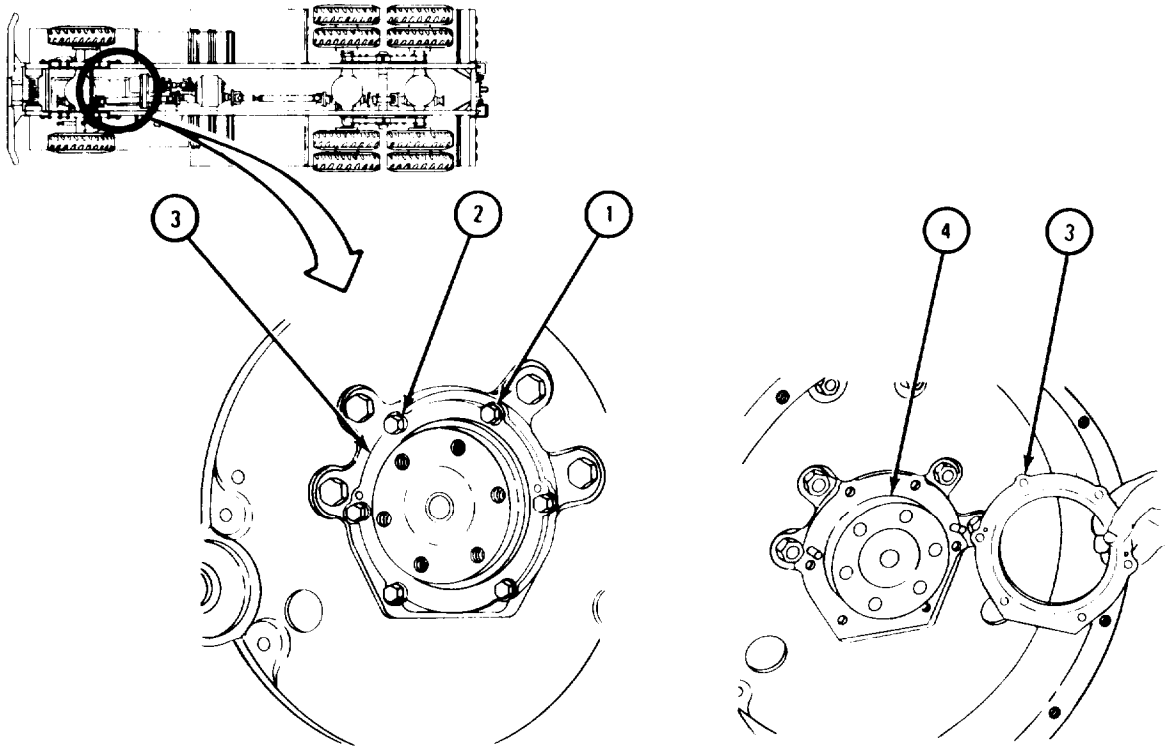
(3) Remove flywheel. Refer to para 2-10.

b. Removal.

FRAME 1

1. Take out six capscrews (1) with lockwashers (2). Take off seal housing (3).
2. Take oil seal housing gasket (4) off and throw away.

END OF TASK



c. Cleaning, Inspection, and Repair.

FRAME 1

WARNING

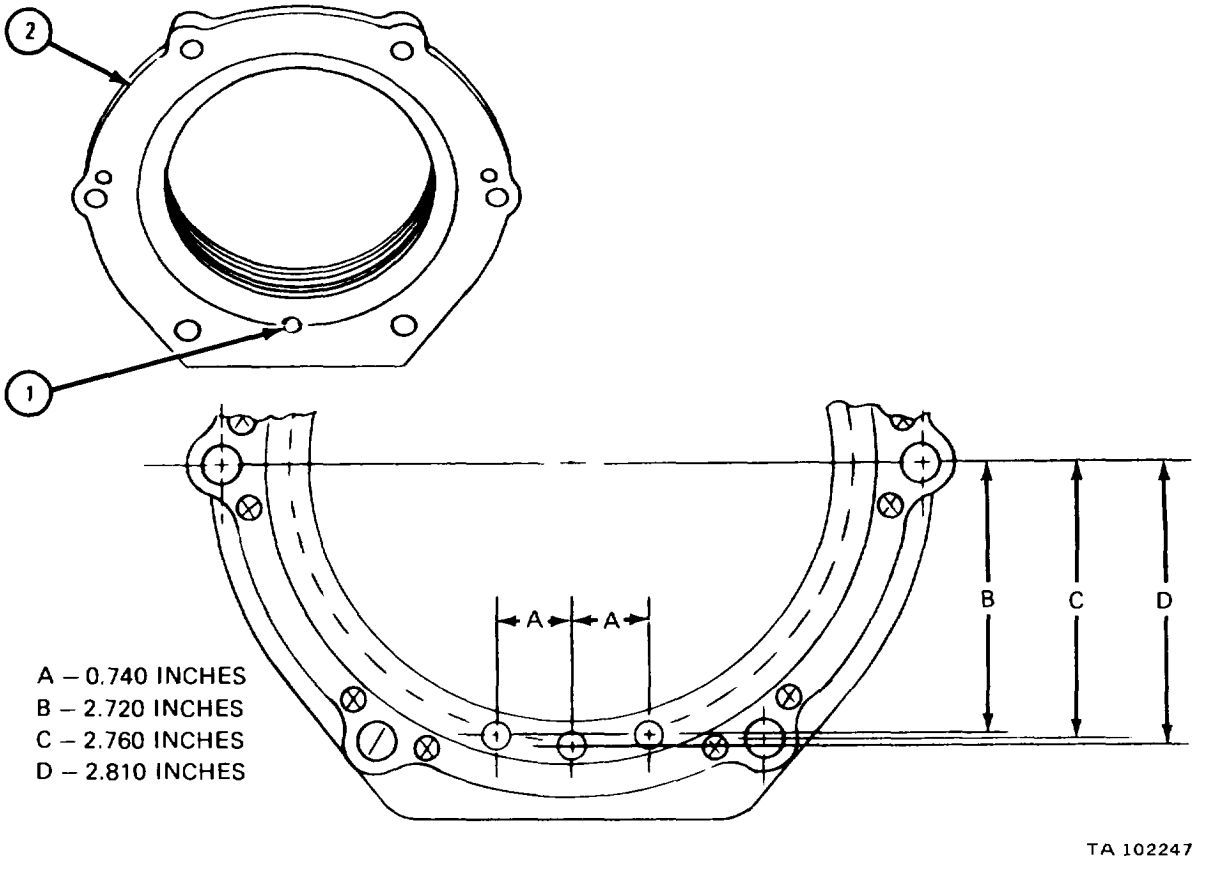
Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

1. Drive out old seal with punch through hoIe (1). Wash housing (2) in dry cleaning solvent.
2. Check housing (2) for burrs and cracks. Replace if cracked. Polish burrs with crocus cloth.

NOTE

Check that housing (2) has 3 holes. If it has only 1, drill 2 more as shown. All holes are 0.250 inches in diameter.

END OF TASK

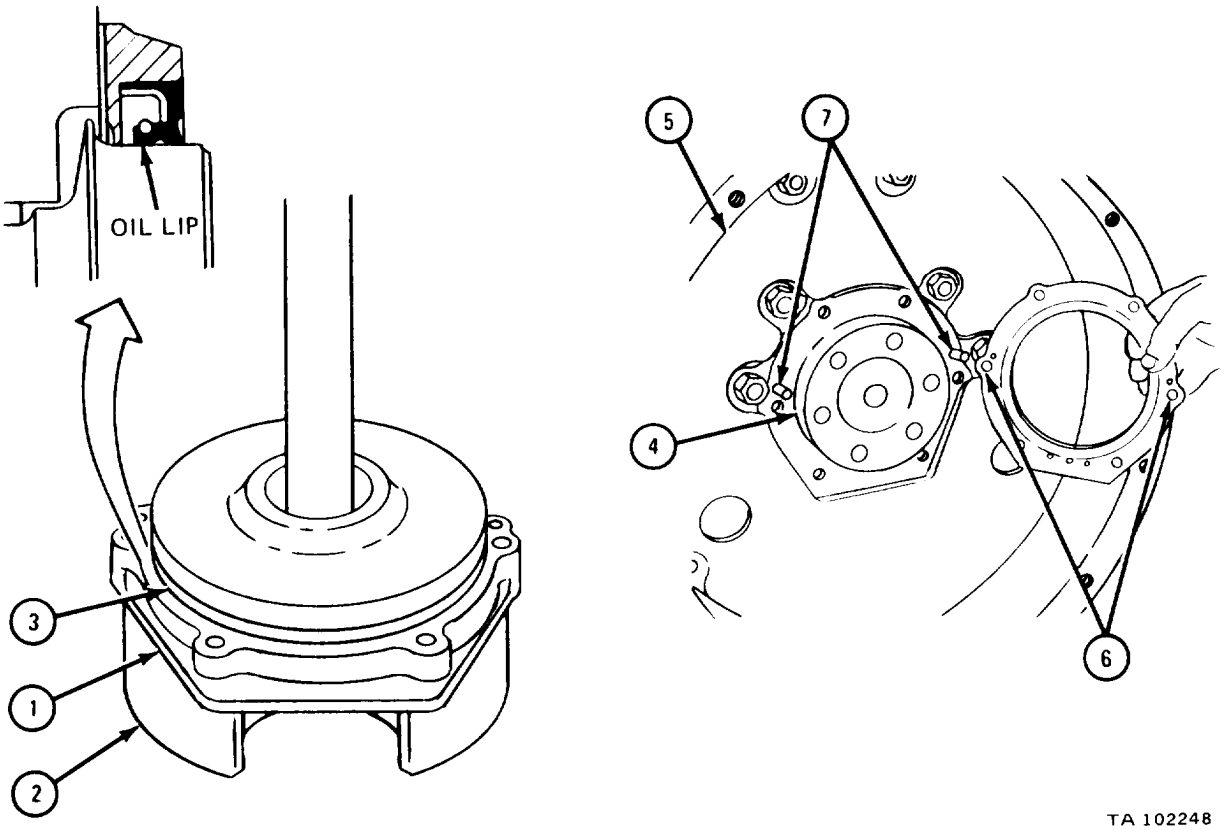


d. Replacement.

FRAME 1

1. Put seal housing (1) on arbor press (2), gasket surface down.
2. Put new seal (3) on housing (1) as shown.
3. Press seal (3) into housing (1) with arbor press.
4. Put new gasket (4) on crankcase (5).
5. Line up holes (6) with pins (7). Put seal housing assembly (1) into place.

GO TO FRAME 2



FRAME 2

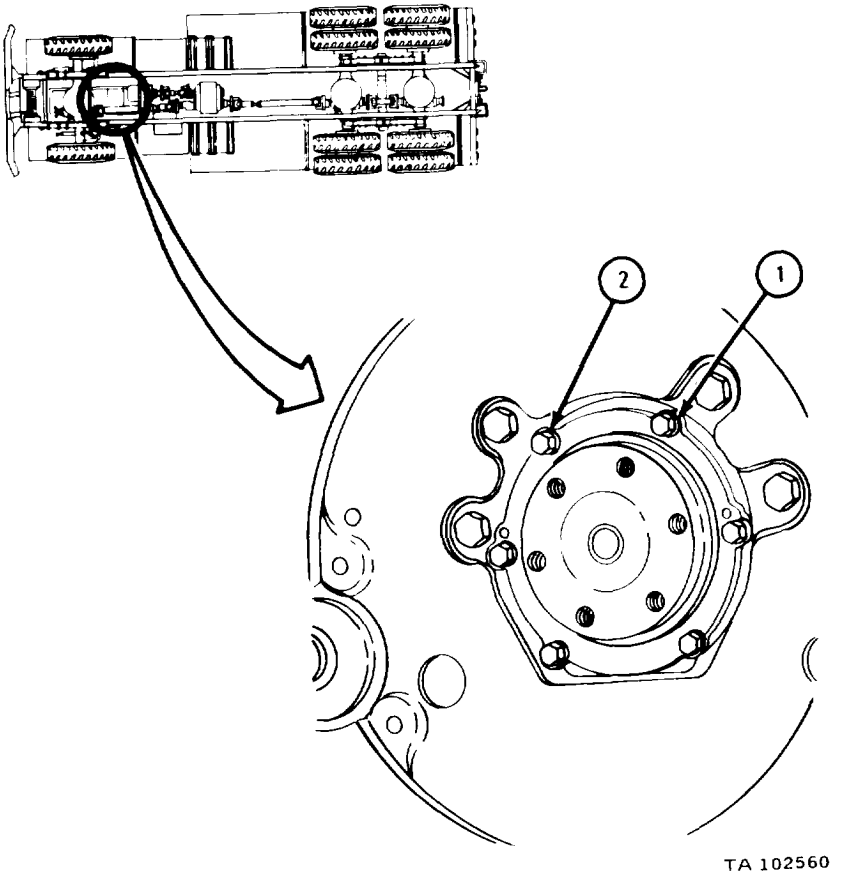
1. Put in six capscrews (1) and washers (2).

NOTE

Follow-on Maintenance Action Required:

1. Replace flywheel. Refer to para 2-10.
2. Replace clutch. Refer to para 3-3.
3. Replace transmission. Refer to para 7-3.

END OF TASK



2-9. CRANKSHAFT VIBRATION DAMPER REMOVAL AND REPLACEMENT.

TOOLS: Mechanical puller kit, pn 8708724
Plug, pn 10899178
Damper and pulley locator
Gear replacer, pn 10899179

SUPPLIES: Lubrication oil, ICE, OE/HDO 30, MIL-L-2104
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Drain coolant. Refer to TM 9-2320-211-20.

(3) Remove radiator. Refer to TM 9-2320-211-20.

(4) Remove engine drive belts. Refer to TM 9-2320-211-20.

(5) Remove fan. Refer to TM 9-2320-211-20.

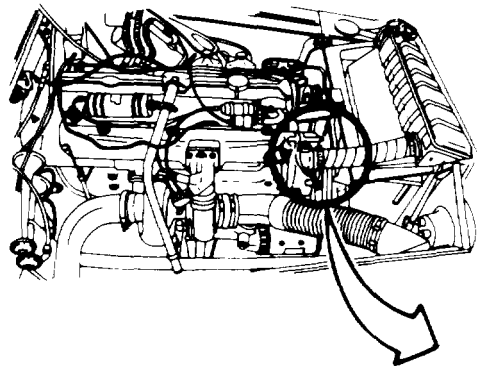
(6) Remove front engine mounts. Refer to para 2-3.

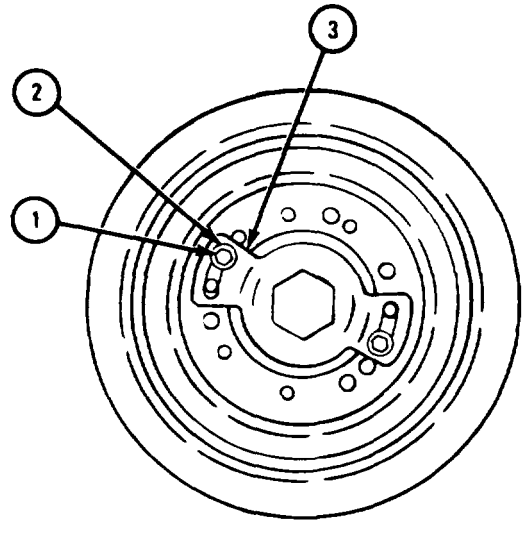
b. Removal.

FRAME 1

1. Take off two capscrews (1) and two lockwashers (2).
2. Take off lockplate (3).

GO TO FRAME 2





TA 102623

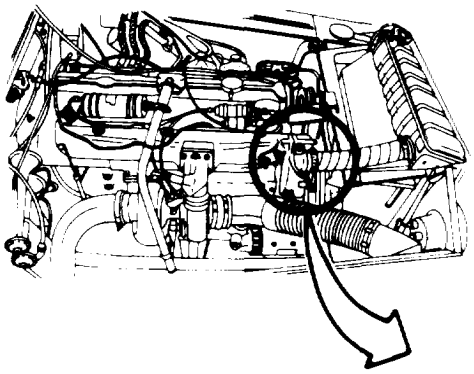
FRAME 2

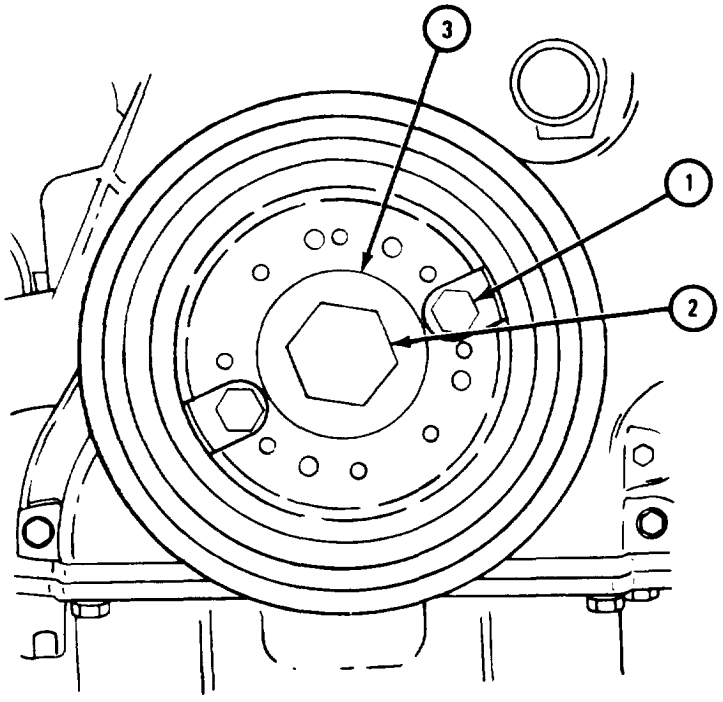
NOTE

Tighten retaining bolt (2) to 225 to 250 pound-feet. It may be required to stop the engine from turning when taking out bolt.

1. Put in two 3/8-16 bolts (1) in pulley mounting holes. Put a bar over one bolt and under the other bolt and use as a lever to stop engine from turning.
2. Take off retaining bolt (2) and retaining washer (3).
3. Take off two 3/8-16 bolts (1).

GO TO FRAME 3



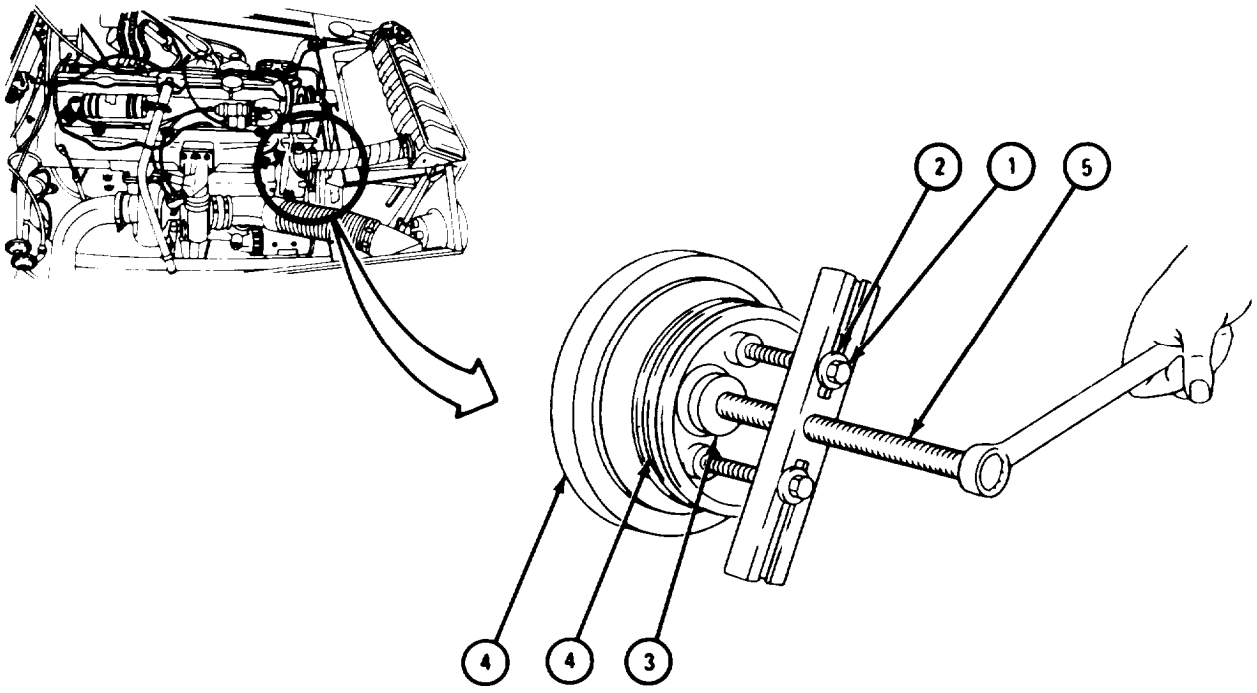


TA 102624

FRAME 3

1. Put in mechanical puller capscrews (1) in hub of pulley, as shown. Use thick washers (2) under heads of capscrews.
2. Put in small end of puller adapter (3) in end of crankshaft and turn puller screw tight against adapter (3) to hold it in place.
3. Take off crankshaft damper and pulley assembly (4) by turning mechanical puller screw (5) to the left.

END OF TASK



TA 102625

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

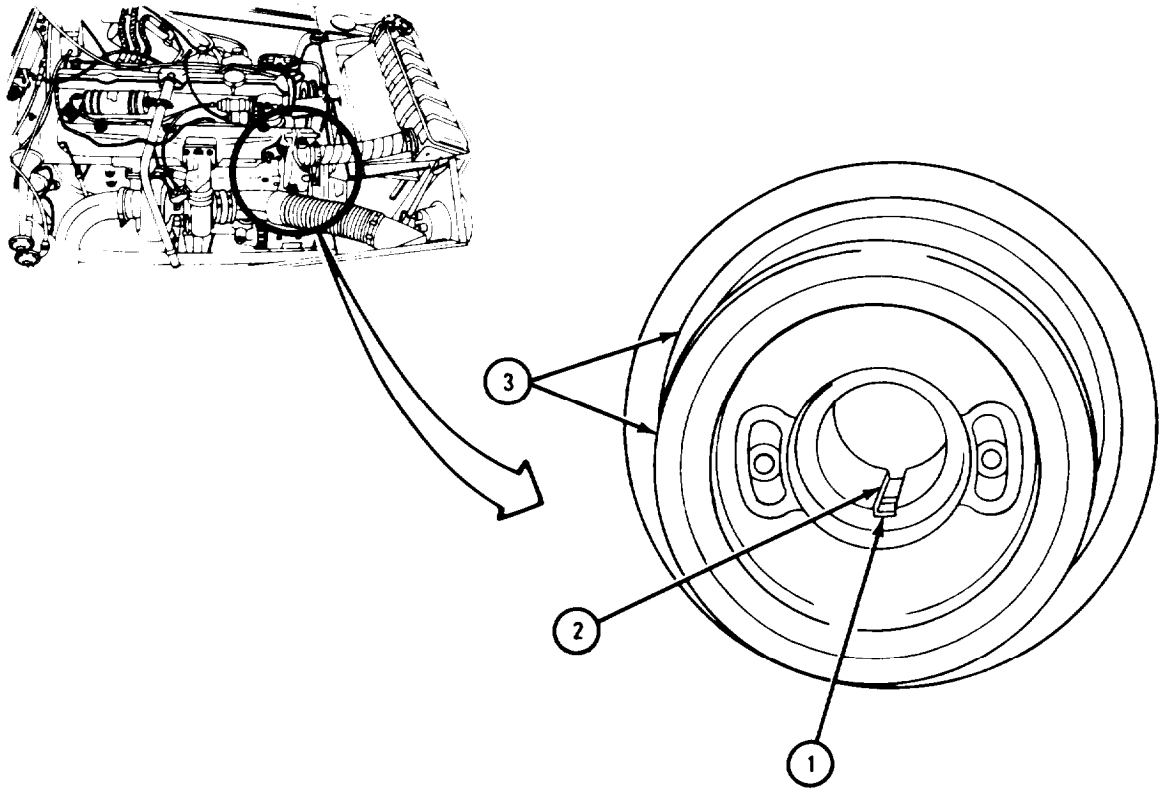
c. Cleaning. Clean inner and outer surfaces of metallic parts and all area subject to oil, or grease with dry cleaning solvent.

d. Inspection and Repair.

FRAME 1

1. Take off keyway seal (1) from keyway (2) and hold for assembly.
2. Check keyway (2) for burrs or damage.
3. Check damper and pulley assembly (3) for burrs, damage or cracks. Get a new damper and pulley assembly (3) if either is cracked or damaged.
4. Check rubber insert in damper and pulley assembly (3) for cracks, cuts or loose fit. If rubber insert has pulled apart from steel hub or rim , get a new damper and pulley assembly.
5. Check alining marks for slippage.
6. Fix minor damage.
7. Take out minor burrs or raised metal from keyway (2), and damper and pulley assembly (3) hub and grooves with a fine mill file.
8. Fix threads in damper and pulley assembly (3) screw holes with taps.

END OF TASK



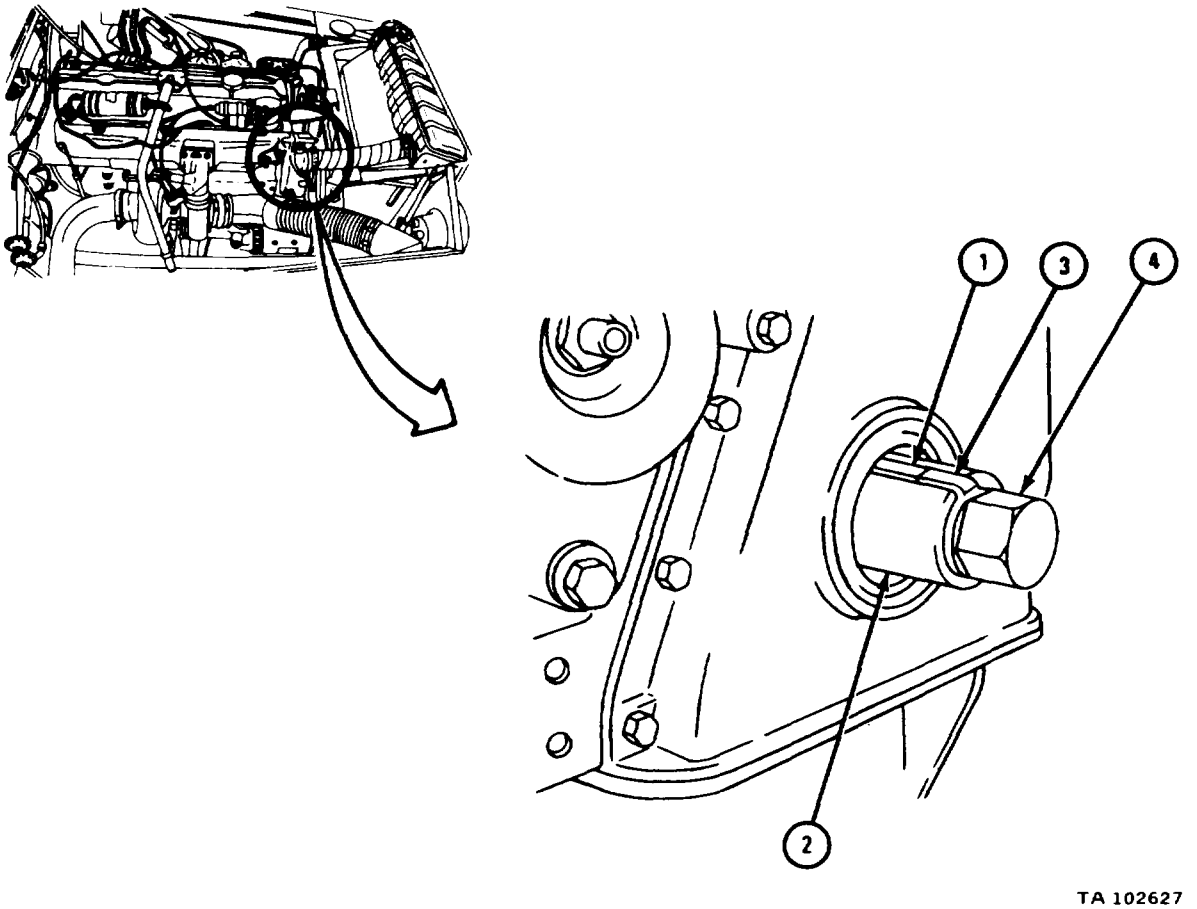
TA 102626

e. Replacement.

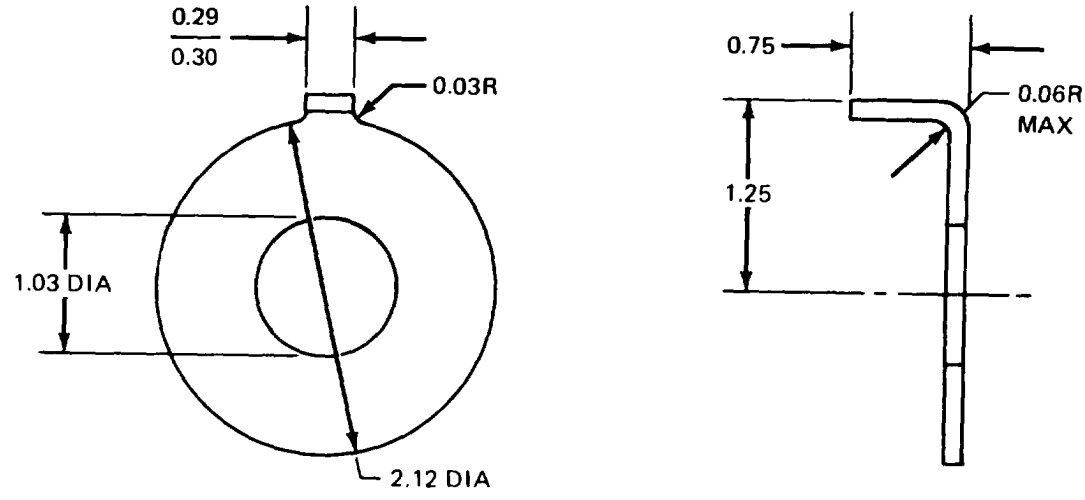
FRAME 1

1. Put keyway (1) on crankshaft (2).
2. Make a damper and pulley locator (3). See figure 2-2 for fabrication instructions.
3. Aline damper and pulley locator (3) with the key (2) in the crankshaft and hold with the pulley mounting bolt (4).

GO TO FRAME 2



TA 102627



NOTE

ALL DIMENSIONS SHOWN
ARE IN INCHES.

MATL: CARBON STEEL 0.1196 (NO. 11MS GAGE)
THICK SPEC QQ-S-698 CADMIUM PLATE

TA 102628

Figure 2-2. Crankshaft Damper and Pulley Locator, Fabrication Instructions

FRAME 2

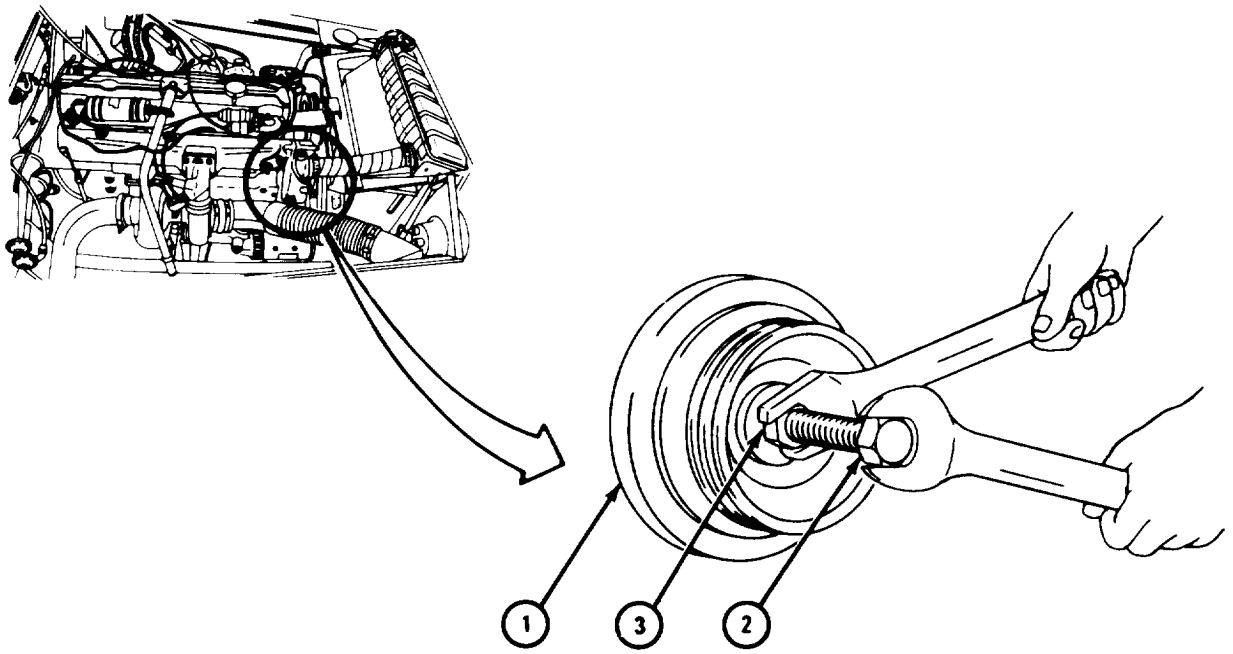
1. Spread lubricating oil around oil seal before putting damper and pulley assembly back.
2. Preheat crankshaft damper and pulley assembly (1) at 200°F for 30 minutes.

NOTE

To insure proper seating of crankshaft damper and pulley assembly, the installation of the heated damper and pulley assembly, including installation and tightening of retaining screw, should be done as rapidly as possible before temperature of the pulley and crankshaft equalize.

3. Start crankshaft damper and pulley assembly (1) on crankshaft alining pulley keyway with pulley locator. Heated pulley should slide on crankshaft and seat against deflector.
4. If pulley (1) does not seat the right way, take out pulley mounting bolt, put crankshaft damper and pulley reflector in the end of crankshaft.
5. Hold replacer bolt (2) while turning plain nut (3) to seat damper and pulley assembly (1).
6. Take out damper and pulley replacer and pulley locator.

GO TO FRAME 3



TA 102629

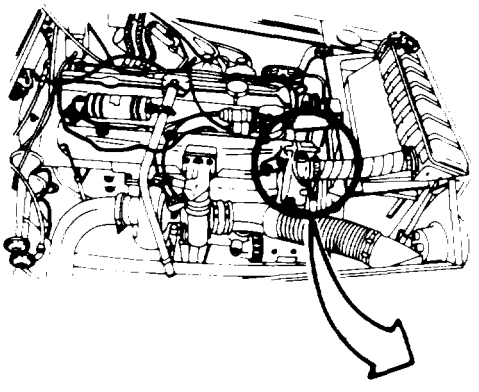
FRAME 3

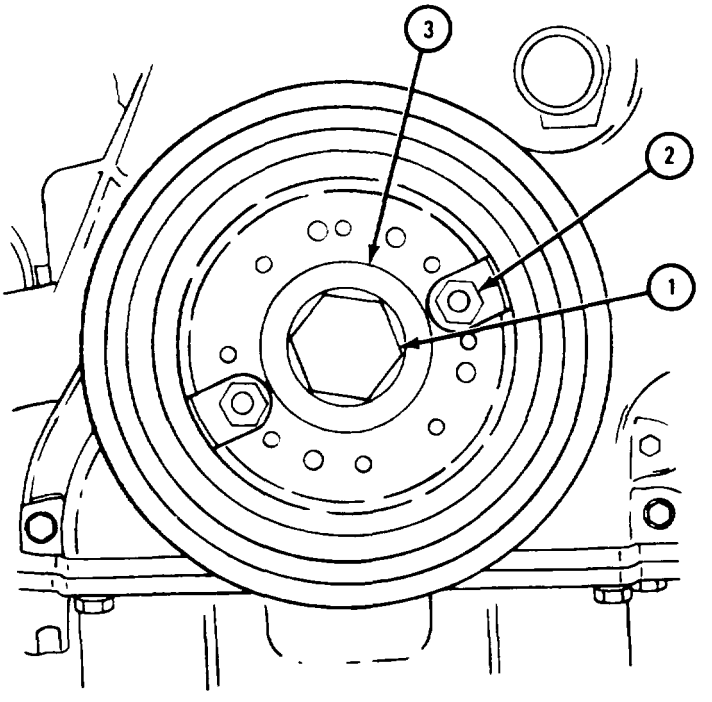
NOTE

Tighten retaining bolt (1) to 225 to 250 pound-feet. It may be required to stop the engine from turning when taking out bolt.

1. Put in two 3/8-16 bolts (2) in pulley mounting holes. Put a bar over one bolt and under the other bolt, and use as a lever to stop engine from turning.
2. Put back retaining bolt (1) and retaining washer (3).
3. Tighten bolt (1) 225 to 250 pound-feet.
4. Take off two 3/16-16 bolts (2).

GO TO FRAME 4





TA 102630

FRAME 4

NOTE

When screw holes in lockplate do not aline with threaded holes in pulley, the plate can be turned over and placed so the holes are alined.

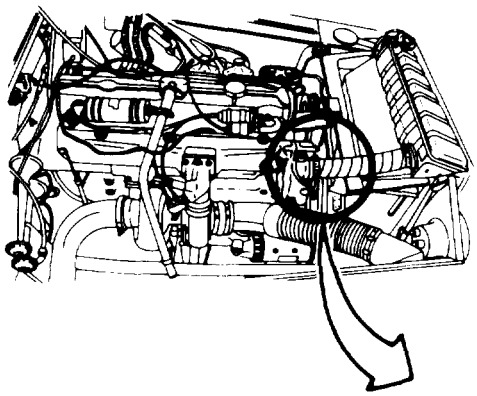
1. Put in keyway seat.
2. Put back lockplate (1).
3. Put in two capscrews (2) and two lockwashers (3).

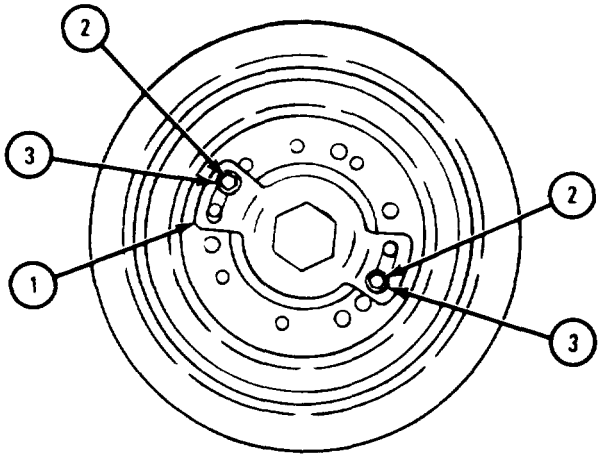
NOTE

Follow-on Maintenance Action Required:

1. Replace front engine mounts. Refer to para 2-3.
2. Replace fan. Refer to TM 9-2320-211-20.
3. Replace belts. Refer to TM 9-2320-211-20.
4. Replace radiator. Refer to TM 9-2320-211-20.
5. Replace coolant. Refer to TM 9-2320-211-20.
6. Close hood. Refer to TM 9-2320-211-10

END OF TASK





TA 102631

Section V. FLYWHEEL

2-10. FLYWHEEL REMOVAL AND REPLACEMENT.

TOOLS: Pilot bolt, fabricated locally

SUPPLIES: None

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove transmission. Refer to para 7-3.

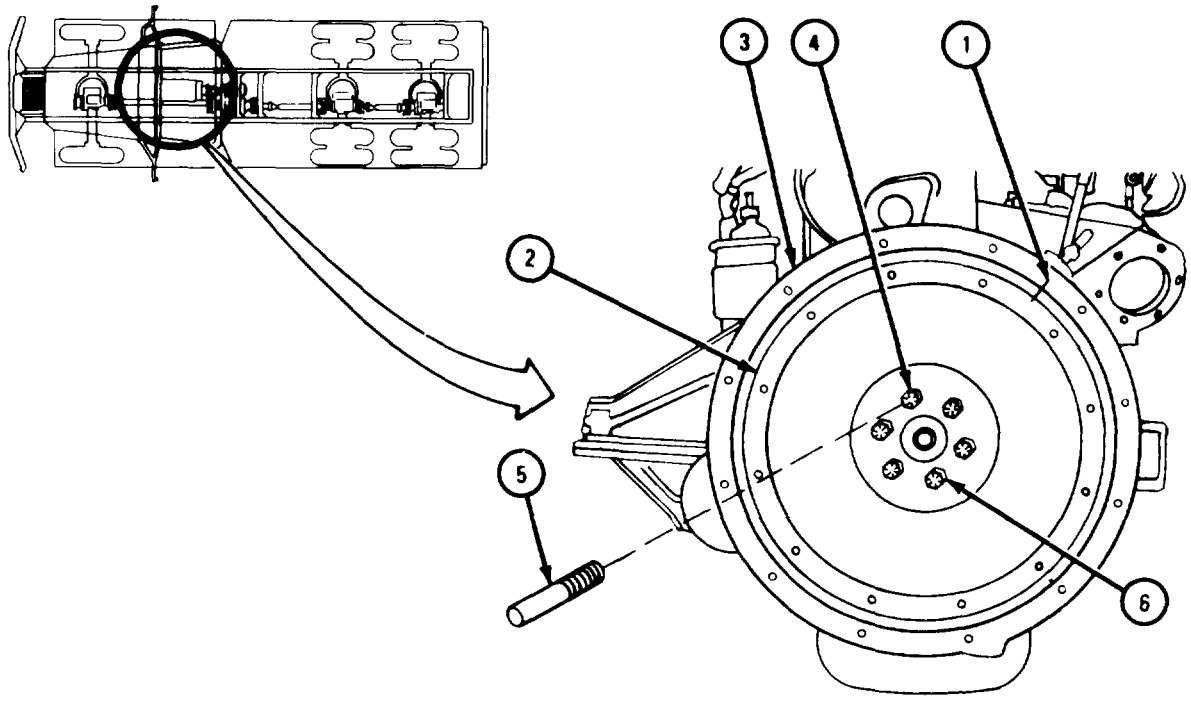
(2) Remove clutch. Refer to para 3-3.

b. Removal.

FRAME 1

1. Scribe a mark (1) across rim of flywheel (2) and housing (3).
2. Take out bolt (4). Screw in (5). See figure 2-3 for fabrication instructions.
3. Take out five bolts (6).
4. Pull flywheel (2) out of housing (3) over pilot bolt (5).
5. Take out pilot bolt (5).

END OF TASK



TA 102104

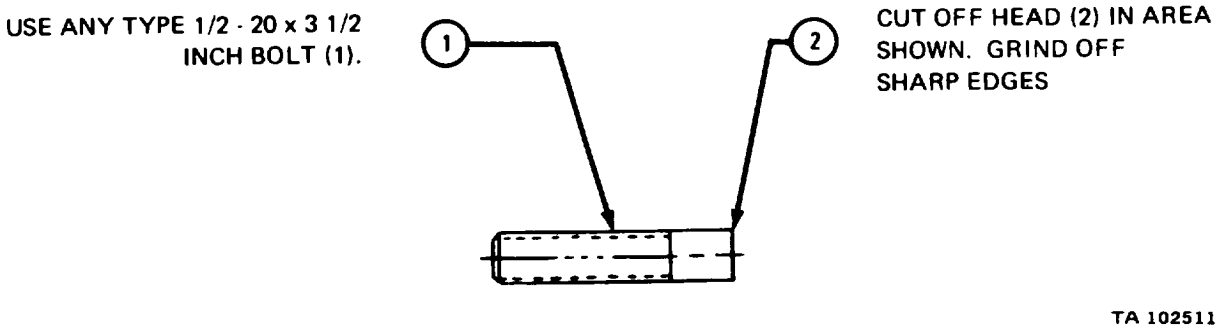


Figure 2-3. Pilot Bolt, Fabrication Instructions

c. Cleaning. There are no special cleaning procedures required. Refer to cleaning procedures given in para 1-3.

d. Inspection and Repair.

(1) Check that flywheel face is not grooved, scuffed, heat marked or warped. If flywheel face is damaged, get a new flywheel.

(2) Check that ring gear is not worn, cracked, and that teeth are not broken. If gear is damaged, put on a new one. Refer to para 2-11.

(3) Check that pilot bearing turns freely without binding. If pilot bearing is damaged, put in a new one. Refer to para 2-13.

(4) Check that clutch mounting holes have no damaged threads. Retap damaged threads.

e. Replacement.

FRAME 1

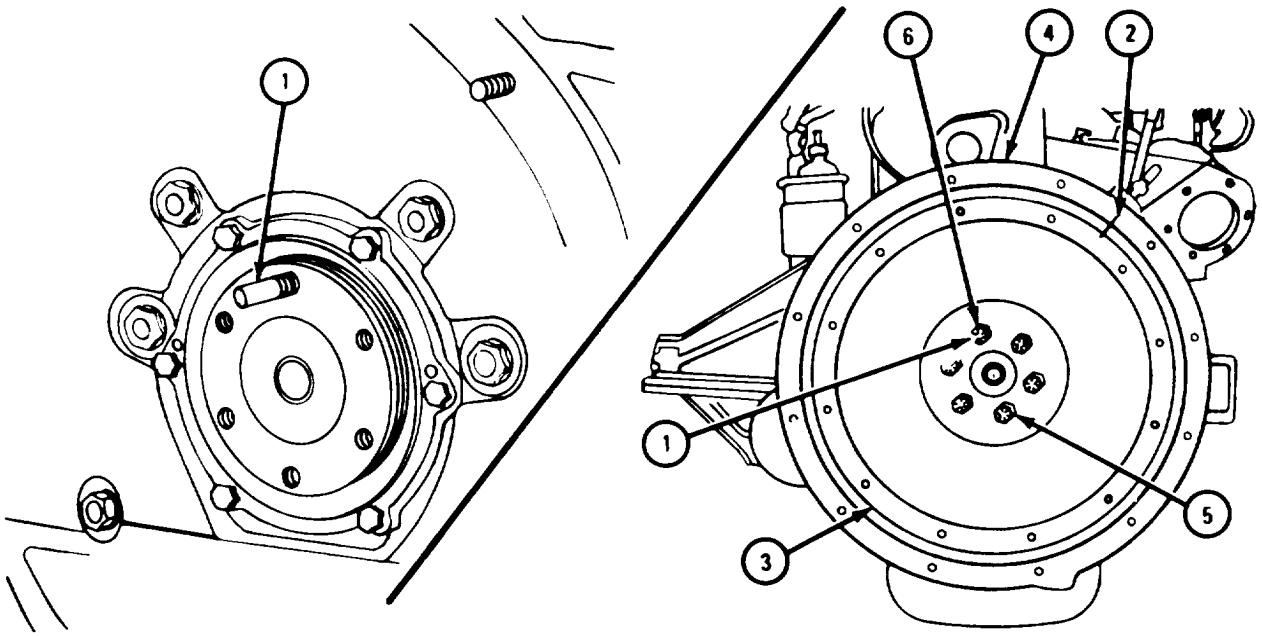
1. Put in pilot bolt (1). Line up scribe mark (2) on flywheel (3) housing (4). Slide flywheel over pilot bolt.
2. Put in and hand tighten five bolts (5). Take out pilot bolt (1). Put in and hand tighten bolt (6).
3. Tighten bolts (5 and 6) to 80 to 90 pound-feet. Retighten bolts to 115 to 120 pound-feet.

NOTE

Follow-on Maintenance Action Required:

1. Replace clutch. Refer to para 3-3.
2. Replace transmission. Refer to para 7-3.

END OF TASK



TA 102279

2-11. FLYWHEEL RING GEAR REMOVAL AND REPLACEMENT.

TOOLS: No special tools required.

SUPPLIES: Crayons, heat indicating, 400°
Gear, spur, flywheel, FSN 3020-264-5559
Gloves

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove transmission. Refer to para 7-3.

(2) Remove clutch. Refer to para 3-3.

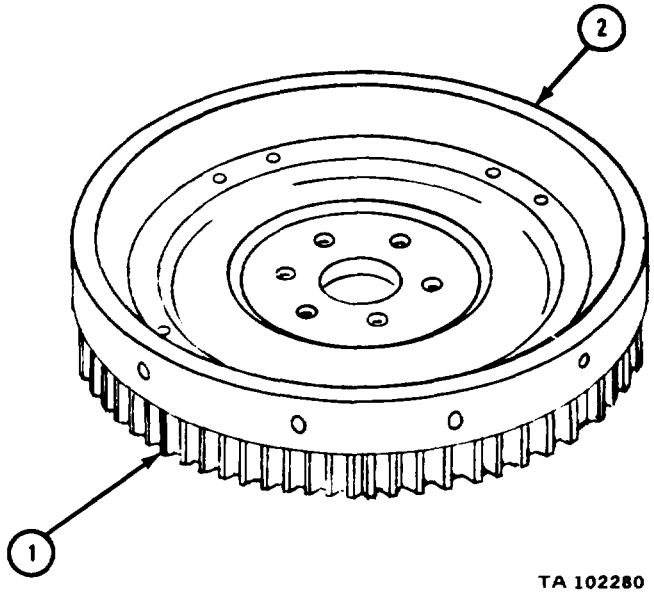
(3) Remove flywheel. Refer to para 2-10.

b. Removal.

FRAME 1

1. Using a hacksaw, cut through ring gear (1) until hacksaw blade comes in contact with flywheel (2) surface.
2. Put blade of chisel in hacksaw cut in ring gear (1).
3. Using hammer on chisel, complete cutting of ring gear (1).

GO TO FRAME 2

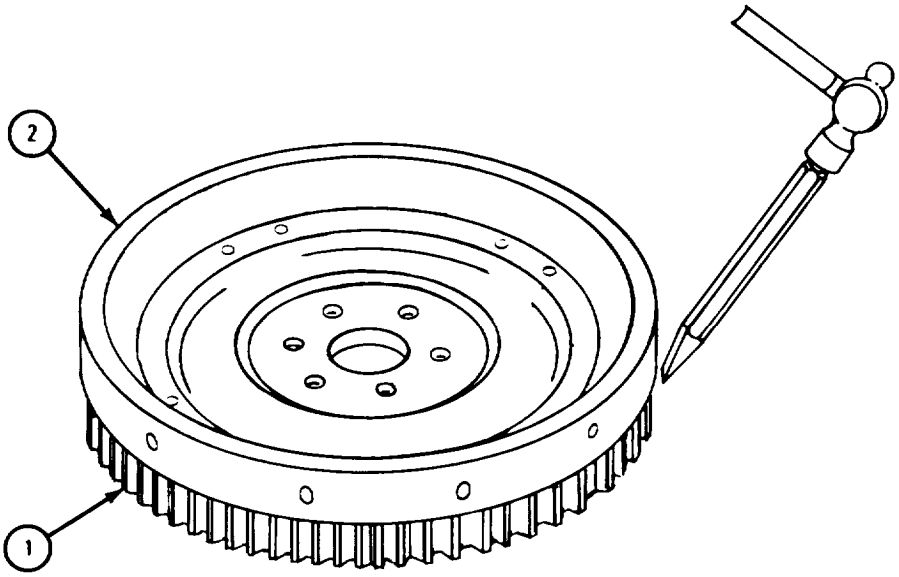


TA 102280

FRAME 2

1. Using hammer and chisel, drive ring gear (1) off flywheel (2). Throw away ring gear.

END OF TASK



TA 116704

c. Replacement.

FRAME 1

WARNING

Use extreme care when handling heated ring gear to prevent being injured.

CAUTION

Do not heat ring gear over 400°F; too much heat may destroy the original heat treatment.

NOTE

Heat indicating "crayons, " which are placed on the ring gear, will melt when the right temperature is reached are available. Use of one of these "crayons" will insure against overheating the ring gear.

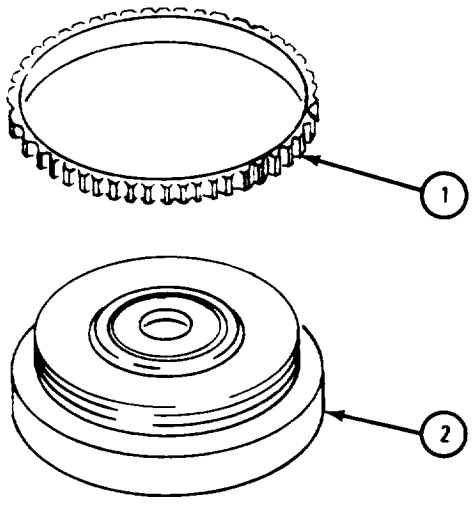
1. Put two "crayons" on ring gear (1). Heat gear evenly to 400°F.
2. Wearing protective gloves, place ring gear (1) on flywheel (2) with bevel on teeth nearest flywheel (2).

NOTE

Follow-on Maintenance Actions Required:

1. Replace flywheel. Refer to para 2-10.
2. Replace clutch. Refer to para 3-3.
3. Replace transmission. Refer to para 7-3.

END OF TASK



TA 102281

2-12. FLYWHEEL HOUSING REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Lint-free rags

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, handbrake set, engine off.

a. Preliminary Procedures.

(1) Remove transmission. Refer to para 7-3.

(2) Remove clutch. Refer to para 3-3.

(3) Remove flywheel. Refer to para 2-10.

(4) Disconnect batteries. Refer to TM 9-2320-211-20.

(5) Remove starter. Refer to TM 9-2320-211-20.

(6) Remove front axle propeller shaft. Refer to para 9-5.

(7) Trucks with power takeoff, remove all propeller shafts. Refer to TM 9-2320-211-20.

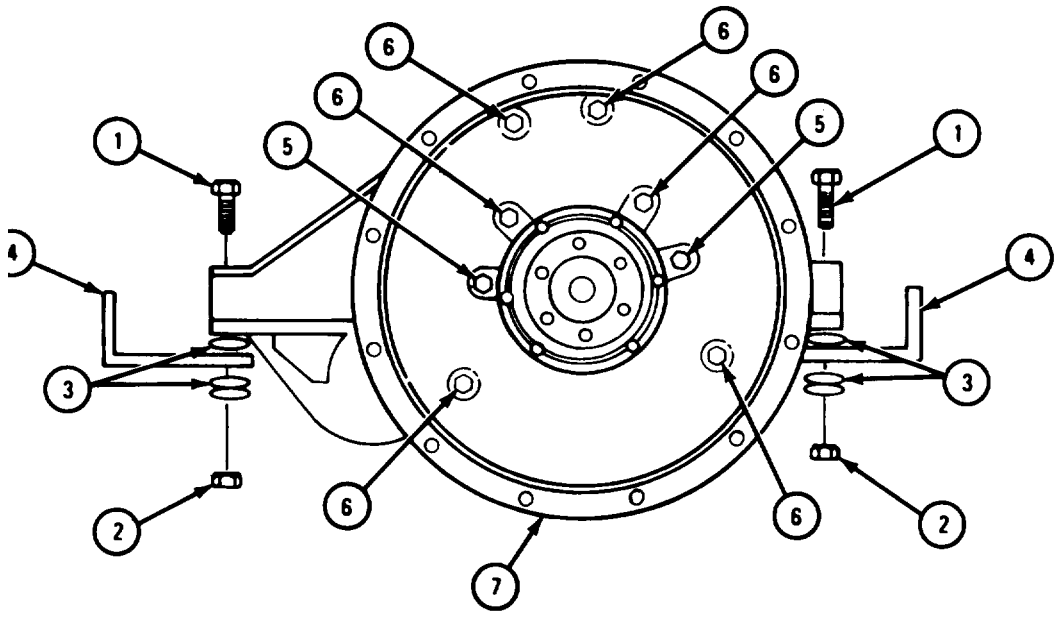
(8) Trucks with power takeoff, remove linkages. Refer to Part 3, para 17-59.

b. Removal.

FRAME 1

1. Using suitable jack, support rear of engine.
2. Take out two rear engine mounting bolts (1) and nuts (2), and four resilient mounts (3) from rear mounting brackets (4).
3. Take out two nuts with washers (5).
4. Take out six nuts with washers (6).
5. Pull off flywheel housing (7).

END OF TASK



TA 102295

c. Cleaning, Inspection, and Repair.

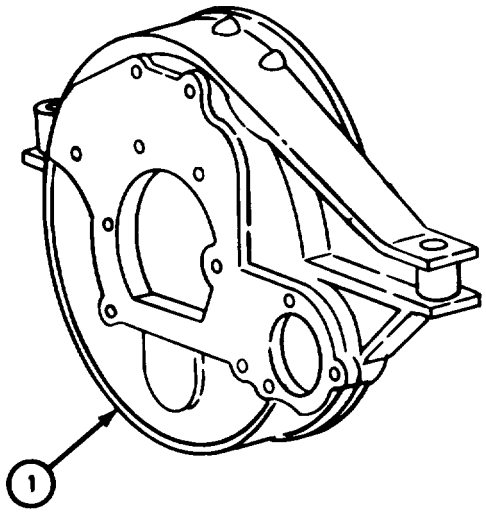
FRAME 1

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

1. Clean flywheel housing (1) with dry cleaning solvent. Dry with clean dry rags.
2. Check that flywheel housing (1) has no cracks.
3. Fix cracks by welding. Refer to TM 9-237. Get new housing if used one cannot be fixed.

END OF TASK



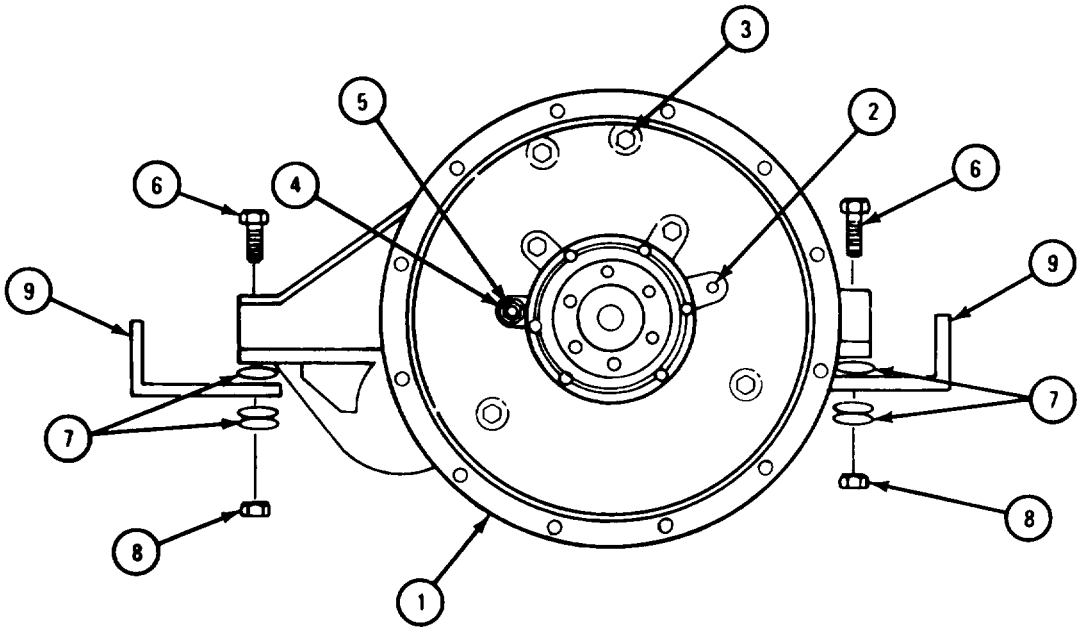
TA 102297

d. Replacement.

FRAME 1

1. Put housing with new gasket (1) over studs (2).
2. Put on six nuts with 1/16-inch thick washers (3).
3. Put on two nuts (4) and 1/8-inch thick washers (5).
4. Put in two rear engine mounting bolts (6), four resilient mounts (7), and two nuts (8).
5. Take jack support from rear of engine and lower engine onto rear mounting brackets (9).
6. Tighten rear mounting bolts (6) and nuts (8).

GO TO FRAME 2

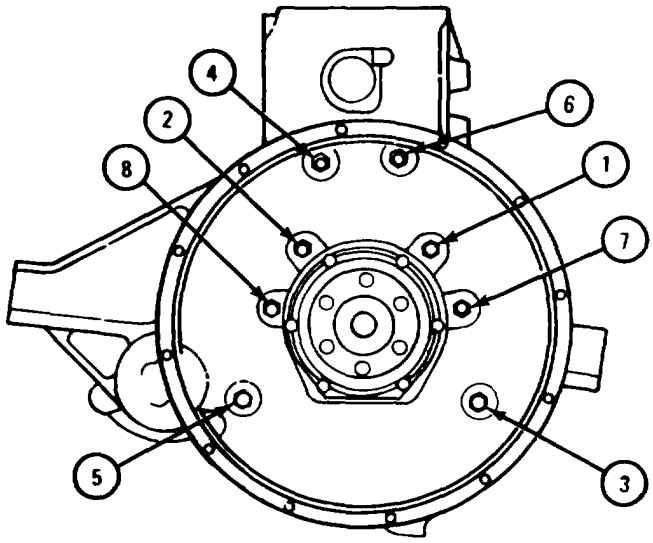


TA 102296

FRAME 2

1. Tighten nuts in the sequence shown below.

GO TO FRAME 3



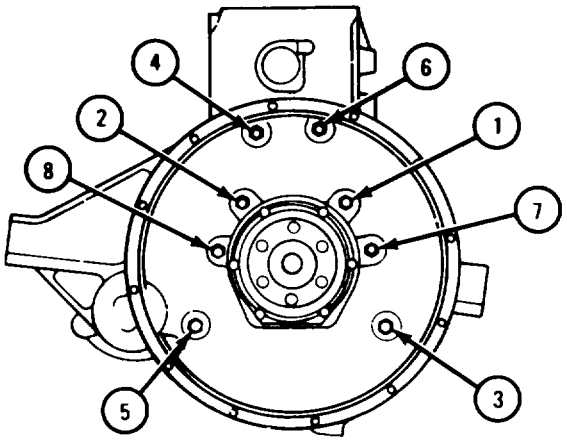
TA 118916

FRAME 3

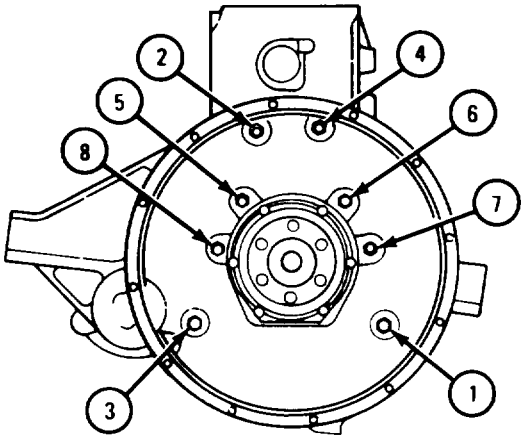
1. Tighten nuts (1 through 6) again using torque wrench in the sequence and steps shown.
2. Tighten nuts (7 and 8) to 45 pound-feet.

END OF TASK

STEP 1



STEP 2 AND STEP 3



STEP 1. TIGHTEN NUTS (1 THRU 6) TO 20 POUND-FEET IN SEQUENCE SHOWN

STEP 2. TIGHTEN NUTS (1 THRU 6) TO 45 POUND-FEET IN SEQUENCE SHOWN

STEP 3. TIGHTEN NUTS (7 AND 8) TO 45 POUND-FEET

TA 118917

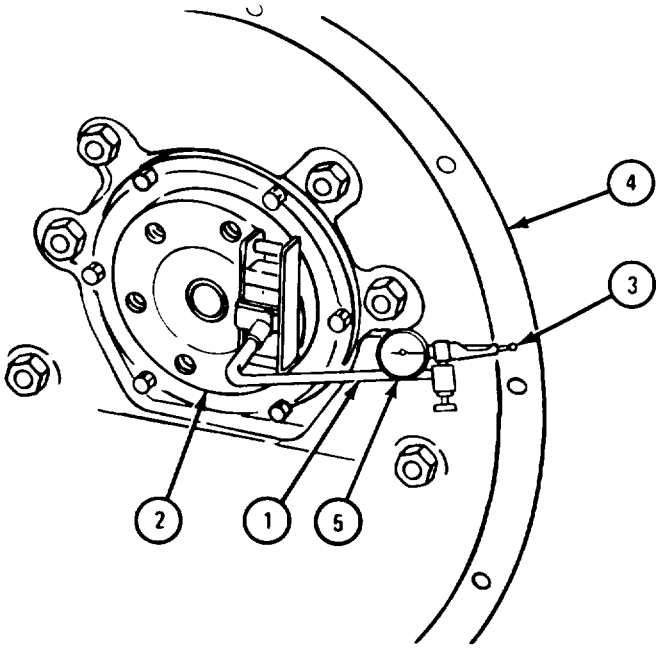
e. Final Inspection.

(1) Flywheel housing face runout.

FRAME 1

1. Check flywheel housing face runout as follows:
   a. Mount dial indicator (1) on crankshaft flywheel flange (2).
   b. Indicator point (3) must rest on flywheel housing mounting face (4).
   c. Set indicator dial (5) on zero reading.
   d. Turn crankshaft 360° pushing toward front of engine.
   e. Check runout. Reading must not exceed 0.0008 inch total indicator reading (TIR).
   f. If reading is more than given limits, get new flywheel housing.

END OF TASK



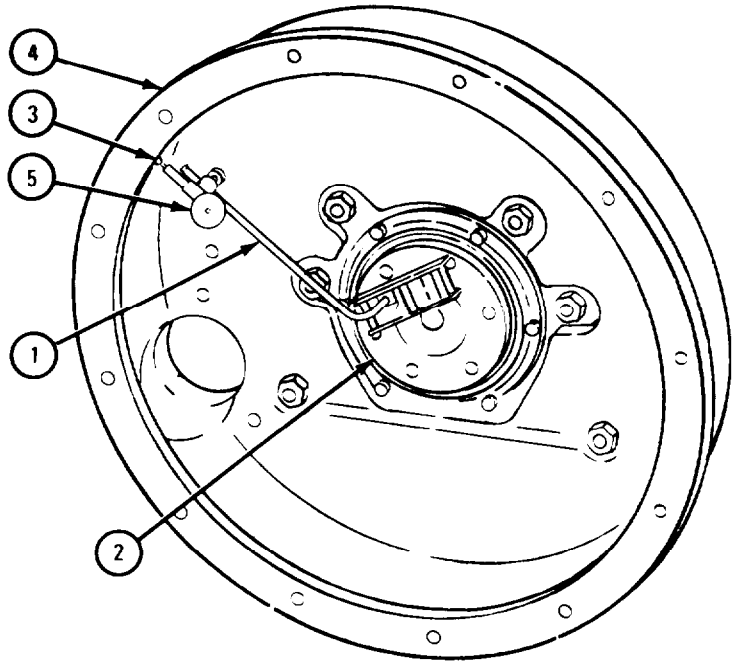
TA 118918

(2) Flywheel housing inside rim.

FRAME 1

1. Check flywheel housing inside rim for out-of-round condition as follows:
   a. Mount dial indicator (1) on crankshaft flywheel flange (2).
   b. Rest indicator point (3) on inside rim of flywheel housing (4).
   c. Set indicator dial (5) to zero reading.
   d. Turn crankshaft 360° and check out-of-round.
   e. Reading must not exceed 0.008 inch.
   f. If reading is more than given limits, get new flywheel housing.

GO TO FRAME 2



TA 118919

FRAME 2

NOTE

Follow-on Maintenance Action Required:

1. Replace flywheel. Refer to para 2-10.
2. Replace clutch. Refer to para 3-3.
3. Replace transmission. Refer to para 7-3.
4. Replace front axle propeller shaft. Refer to para 9-5.
5. Replace starter. Refer to TM 9-2320-211-20.
6. Replace all propeller shafts on trucks with power take-off. Refer to TM 9-2320-211-20.
7. Replace all linkages on trucks with power takeoff. Refer to Part 3, para 17-59.
8. Connect batteries. Refer to TM 9-2320-211-20.

END OF TASK

2-13. PILOT BEARING REMOVAL AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES : Pilot bearing

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove transmission. Refer to para 7-3.

(2) Remove clutch. Refer to para 3-3.

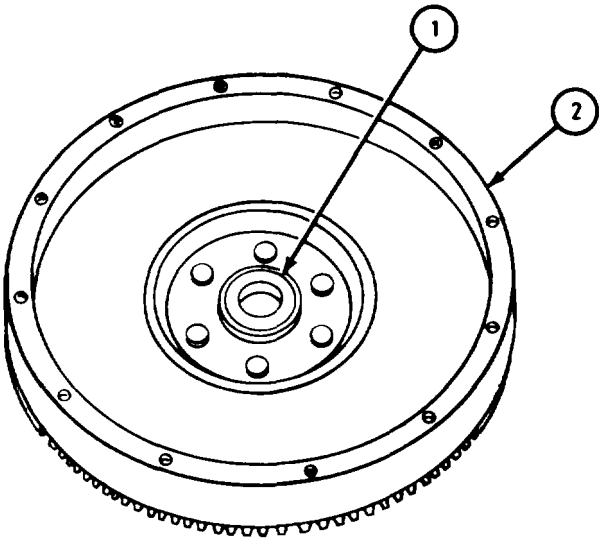
(3) Remove flywheel. Refer to para 2-10.

b. Removal.

FRAME 1

1. Pull bearing (1) off flywheel (2). Throw bearing away.

END OF TASK



TA 102298

c. Replacement.

FRAME 1

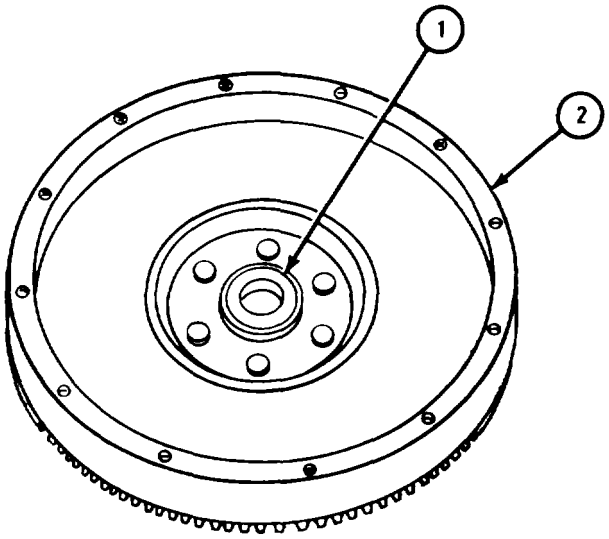
1. Press new bearing (1) in flywheel (2).
2. Check that bearing (1) turns with no binding.

NOTE

Follow-on Maintenance Action Required:

1. Replace flywheel. Refer to para 2-10.
2. Replace clutch. Refer to para 3-3.
3. Replace transmission. Refer to para 7-3.

END OF TASK



TA 102298

Section VI. VALVES, CAMSHAFT, AND TIMING SYSTEM

2-14. VALVE ROCKER ARM PUSHRODS, REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES: Tags

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open engine cover. Refer to TM 9-2320-211-10.

(2) Disconnect battery ground. Refer to TM 9-2320-211-20.

(3) Remove cylinder head covers and gaskets. Refer to TM 9-2515-210-3.

(4) Remove rocker arm assembly. Refer to para 2-15.

b. Removal.

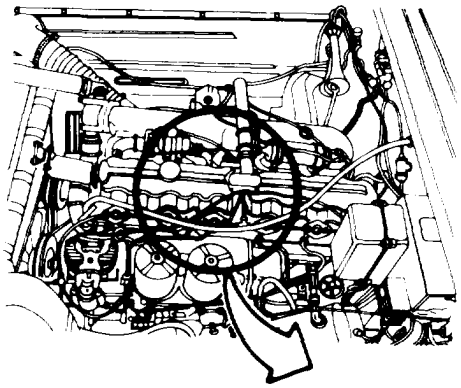
FRAME 1

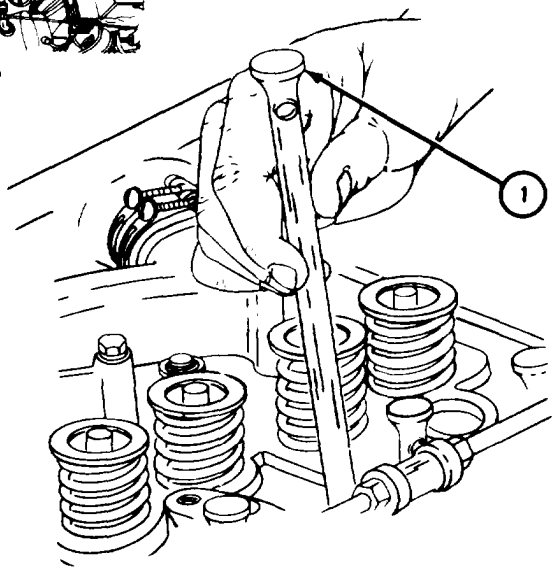
CAUTION

When taking out the valve rocker arm pushrods, the tappet may be lifted from bore in engine block. The tappet covers must be removed to put in a new tappet.

1. Take out valve rocker arm pushrod (1) using a fast snapping pull.
2. Make sure each valve rocker arm pushrod (1) is tagged to show which valve tappet it was taken from.

END OF TASK





TA 102963

c. Inspection.

NOTE

This procedure is the same for all 12 pushrods.

(1) Check pushrods for scratches and grooves. Check that socket ends are not loose.

(2) Check that pushrods are straight, within limits given in TM 9-2815-210-34.

(3) If pushrods do not pass inspection, get new ones.

d. Replacement.

FRAME 1

NOTE

This procedure is the same for all 12 pushrods. Take off tag from each pushrod before putting it in its proper hole.

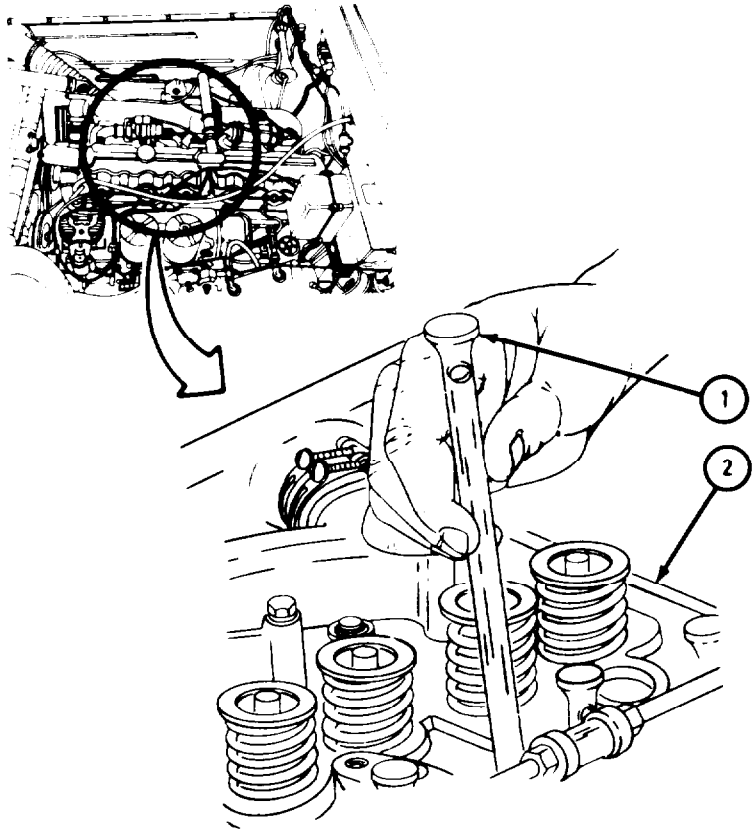
1. Put pushrod (1) back into hole in cylinder head (2).
2. Make sure pushrod (1) is seated properly.

NOTE

Follow-on Maintenance Action Required:

1. Replace rocker arm assembly. Refer to para 2-15.
2. Replace cylinder head covers and gaskets. Refer to TM 9-2815-210-34.
3. Connect battery ground. Refer to TM 9-2320-211-20.
4. Close engine cover. Refer to TM 9-2320-211-10.

END OF TASK



TA 102964

2-15. ROCKER ARM ASSEMBLY, REMOVAL, REPAIR, REPLACEMENT, AND ADJUSTMENT.

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2) Fed. Spec P-D-680
Dry rags
Container.

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood and side panels. Refer to TM 9-2320-211-10.

(2) Drain engine oil. Refer to LO 9-2320-211-12.

(3) Disconnect battery ground. Refer to TM 9-2320-211-20.

(4) Remove cylinder head covers. Refer to TM 9-2815-210-34.

b. Removal.

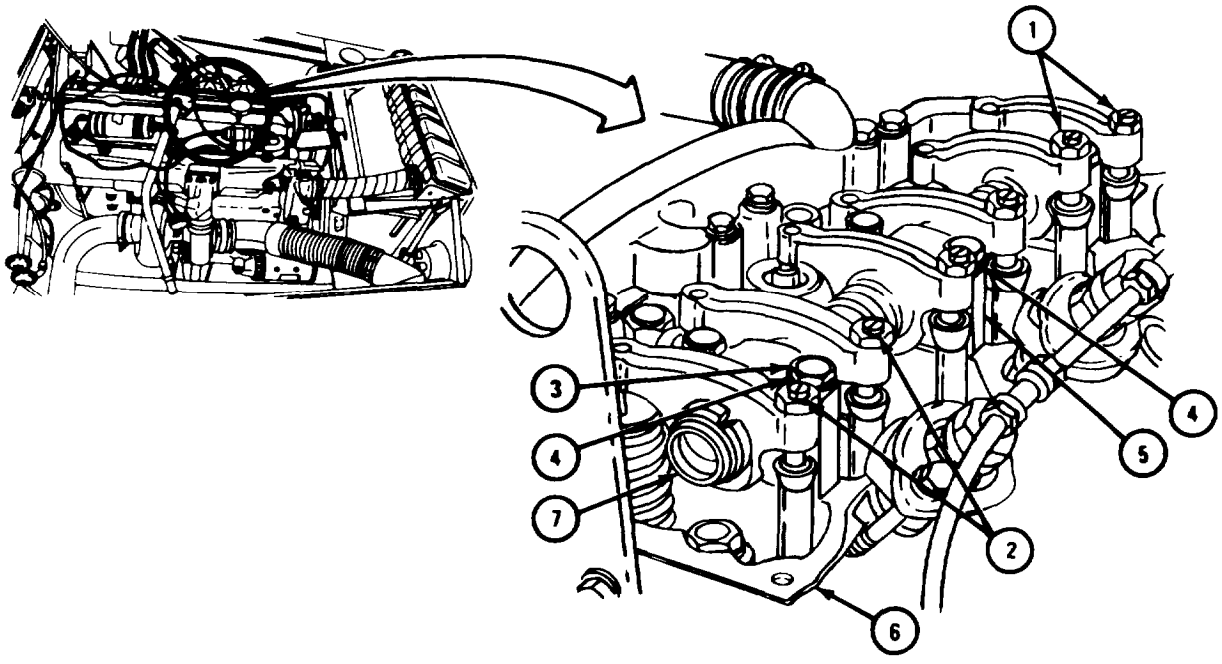
FRAME 1

NOTE

This procedure is the same for the front and rear valve rocker arm assemblies.

1. Loosen six locknuts (1) and six adjusting screws (2). Do not take off locknuts at this time.
2. Take out six screws (3) and lockwashers (4) holding three rocker arm shaft supports (5) to cylinder head (6).
3. Take off rocker arm assembly (7).
4. Take off six locknuts (1) and take out six screws (2).

END OF TASK



TA 102965

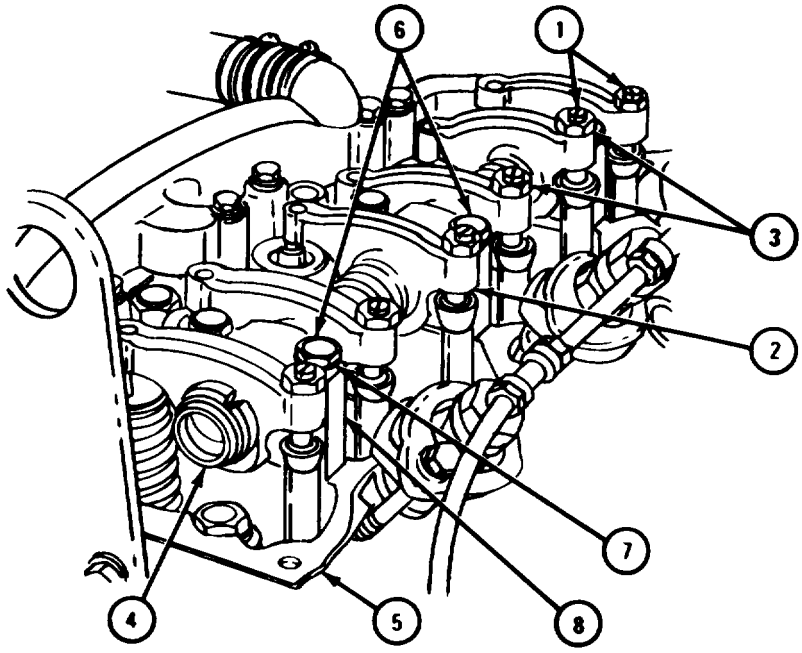
c. Cleaning, Inspection, and Repair. Refer to TM 9-2815-210-34 for procedures to clean, inspect, and repair rocker arm assembly.

d. Replacement.

FRAME 1

1. Put in six rocker arm adjusting screws (1) from bottom of rocker arm (2).
2. Put locknuts (3) on screws (1) and hand tighten.
3. Put rocker arm assembly (4) on cylinder head (5).
4. Put on six screws (6) and lockwashers (7) holding three rocker arm shaft supports (8) to cylinder head (5) .
5. Tighten screws (6) to 28 pound-feet.

END OF TASK



TA 102971

e. Adjustment.

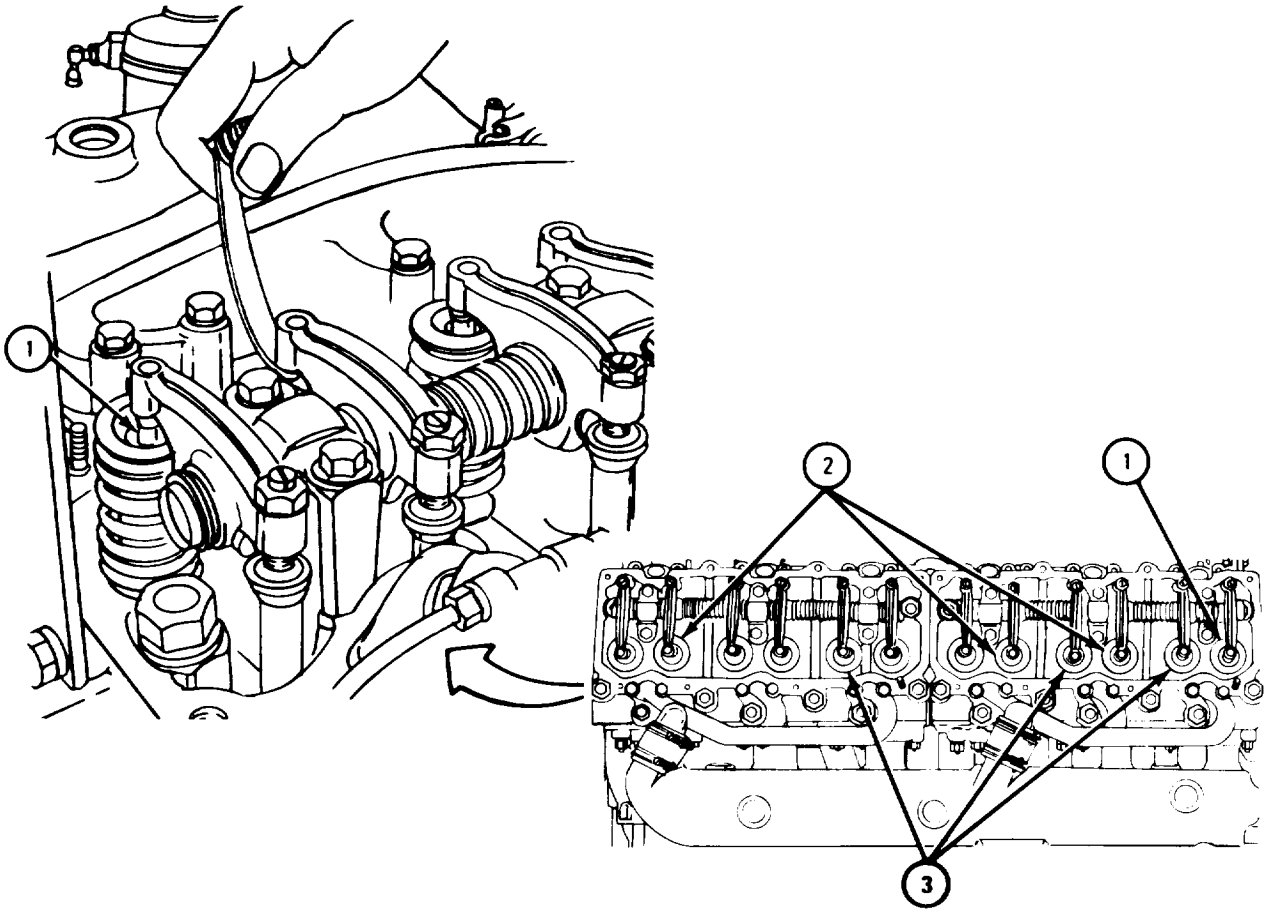
NOTE

Intake valves are the front valves in each cylinder and exhaust valves are the rear ones.

FRAME 1

1. Looking at engine from fan end, turn crankshaft to right until cylinder number 1 intake valve (1) is fully open.
2. Set clearance on cylinder number 2, 3, and 6 intake valves (2) to 0.010 inch.
3. Set clearance on cylinder number 1, 2, and 4 exhaust valves (3) to 0.025 inch.

GO TO FRAME 2



FRAME 2

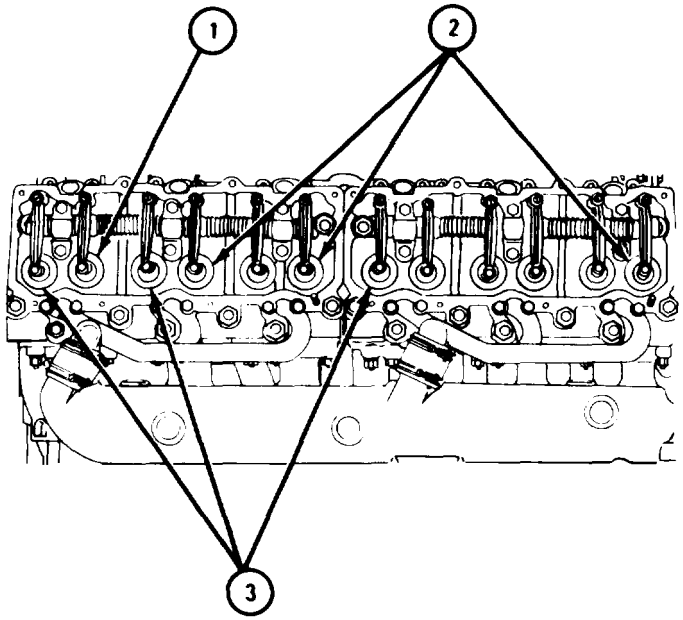
1. Turn crankshaft 1 full turn to right until cylinder number 6 intake valve (1) is fully open.
2. Set clearance on cylinder number 1, 4, and 5 intake valves (2) to 0.010 inch.
3. Set clearance on cylinder number 3, 5, and 6 exhaust valves (3) to 0.025 inch.

NOTE

Follow-on Maintenance Action Required:

1. Replace cylinder head covers. Refer to TM 9-2815-210-34.
2. Reconnect battery ground. Refer to TM 9-2320-211-20.
3. Fill engine with oil. Refer to LO 9-2320-211-12.
4. Close hood and side panels. Refer to TM 9-2320-211-10.

END OF TASK



TA 102973

2-16. CRANKSHAFT GEAR AND CAMSHAFT GEAR REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2) Fed. Spec P-D-680
Tempilstick mfr no. 14503D

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Remove radiator. Refer to TM 9-2320-211-20.

(3) Remove front engine mount. Refer to TM 9-2320-211-20.

(4) Remove crankshaft damper and pulley assembly. Refer to para 2-9.

(5) Remove oil pan assembly. Refer to para 2-21.

(6) Remove water pump assembly. Refer to TM 9-2320-211-20.

(7) Remove timing gear cover assembly. Refer to TM 9-2815-210-34.

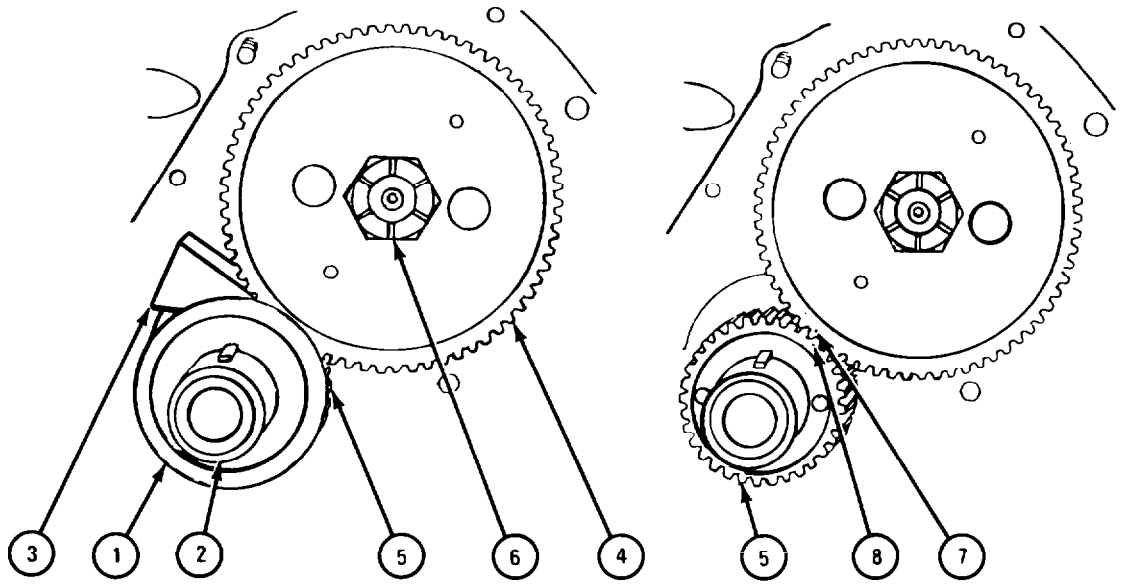
(8) Remove fuel pump drive gear. Refer to TM 9-2815-210-34.

b. Removal.

FRAME 1

1. Slide oil deflector (1) off crankshaft (2).
2. Put wood wedge (3) between camshaft gear (4) and crankshaft gear (5).
3. Unscrew nut (6). Do not take off yet. Take out wood block (3).
4. Turn crankshaft to line up punch marks (7 and 8).
5. Pull off crankshaft gear (5).

GO TO FRAME 2

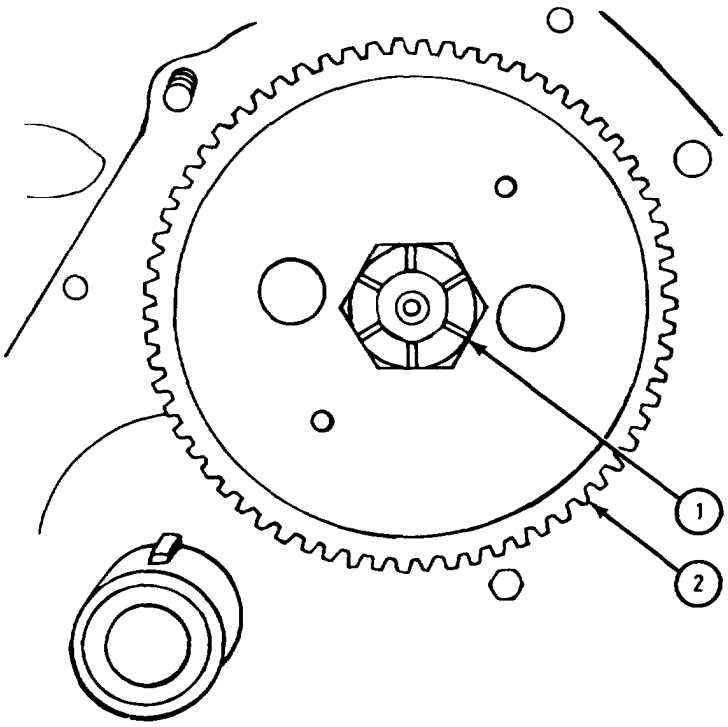


TA 103002

FRAME 2

1. Take off camshaft gear retaining nut (1). Pull off camshaft gear (2).

END OF TASK



TA 103003

c. Cleaning, Inspection, and Repair.

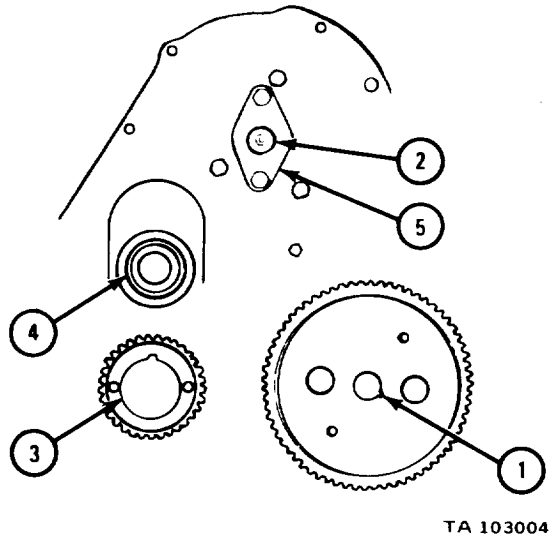
WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby at all times when using solvent. Use only in well–ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

FRAME 1

1. Clean both gears in dry cleaning solvent.
2. Check gear teeth for burrs and pits. Polish small burrs and pits with crocus cloth. Get new gear, if damage will not rub out.
3. Check keyways in gears for raised metal or burrs. Polish off with a fine mill file.
4. Measure inside diameter of gear (1) and outside diameter of camshaft (2). Check with table 2-1.
5. Measure inside diameter of gear (3) and outside diameter of crankshaft (4). Check with table 2-1.
6. Check that plate (5) is not loose, cracked, or scored. Tighten if loose. Get new plate, if scored or cracked.

END OF TASK



TA 103004

Table 2-1. Camshaft Gear and Crankshaft Gear Tolerances

Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Camshaft gear inside diameter	1.3744 to 1.3749	None
2	Camshaft out side diameter	1.3752 to 1.3758	None
3	Crankshaft gear inside diameter	2.2495 to 2.2500	None
4	Crankshaft out side diameter	2.2492 to 2.2498	None
5	Camshaft end play	0.002 to 0.015	0.015
6	Gear backlash	0.003 to 0.009	None

d. Replacement.

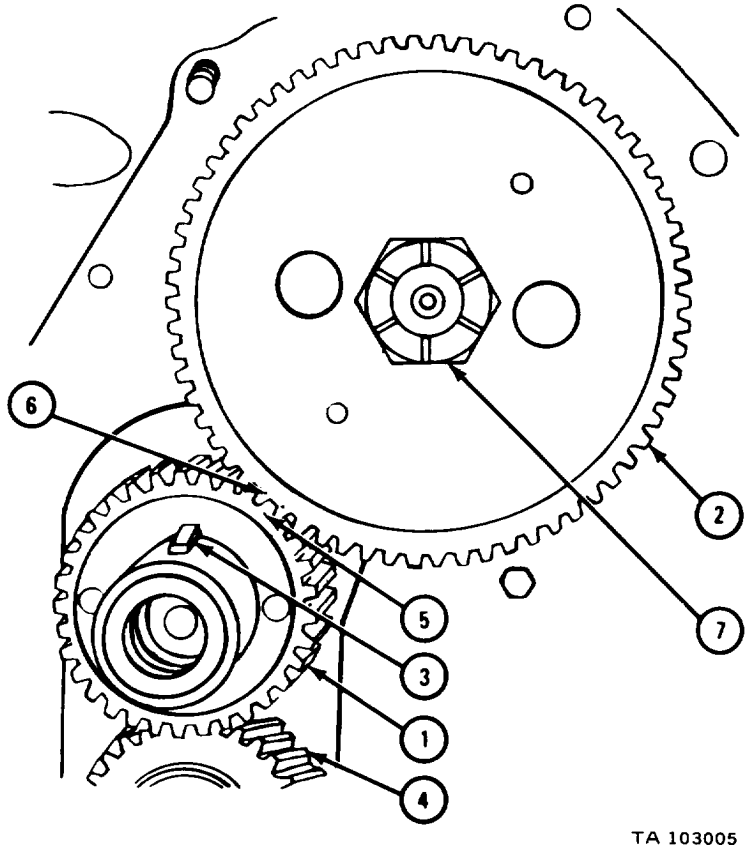
FRAME 1

WARNING

Wear heavy gloves when handling heated gears. Failure to do this may cause injury to personnel.

1. Using templistick, heat crankshaft gear (1) and camshaft gear (2) to 250°F.
2. Line up gear (1) with key (3) and push gear on. Oil pump gear teeth (4) must mesh. Timing mark (5) must face away from block.
3. Line up camshaft gear (2) and camshaft key. Push gear (2) on. Match punchmarks (5 and 6).
4. Put on nut (7).

GO TO FRAME 2



TA 103005

FRAME 2

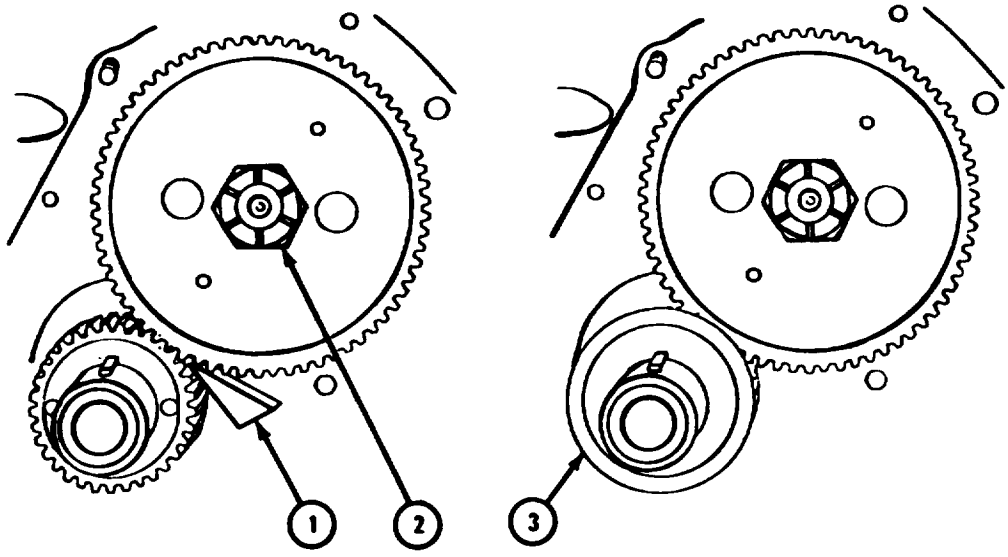
1. Put in wood block (1). Tighten nut (2) to 325 to 350 pound-feet. Takeout wood block (1).
2. Measure camshaft end play. If within limits in table 2-1, go to step 4. If not in limits, go to step 3.
3. If end play is over limits, put in new thrust plate. If below limits, lap thrust plate until minimum is reached.
4. Check gear backlash with table 2-1. Replace gears if backlash is over limits.
5. Put on oil deflector plate (3).

NOTE

Follow-on Maintenance Action Required:

1. Retime fuel injector pump. Refer to para 4-5.
2. Install fuel pump drive gear. Refer to TM 9-2815-210-34.
3. Replace timing gear cover assembly. Refer to TM 9-2815-210-34.
4. Replace water pump assembly. Refer to TM 9-2320-211-20.
5. Replace oil pan assembly. Refer to para 2-21.
6. Replace crankshaft damper and pulley assembly. Refer to para 2-9.
7. Replace front engine mount. Refer to TM 9-2320-211-20.
8. Replace radiator. Refer to TM 9-2320-211-20.
9. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 103006

2-17. CAMSHAFT AND BUSHING TYPE BEARINGS REMOVAL AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES : Anti-scuff lubricant, Lubrizol / 1060 or Texaco TLA111
Rear bearing plug
Sealer compound, type II, MIL-S-45180
Thrust plate
Solvent, dry cleaning, type II (SD-2), Fed. Spec. P-D-680

PERSONNEL : Two

EQUIPMENT CONDITION : Truck parked, engine off and cool, handbrake set.

a. Preliminary Procedures.

(1) Open engine and side panels. Refer to TM 9-2320-211-10.

(2) Disconnect battery. Refer to TM 9-2320-211-20.

(3) Drain cooling system. Refer to TM 9-2320-211-20.

(4) Take off brushguard assembly. Refer to TM 9-2320-211-20.

(5) Take off radiator and radiator hoses. Refer to TM 9-2320-211-20.

(6) Take off oil filter cap. Refer to TM 9-2320-211-20.

(7) Take off fan, power steering, water pump and alternator drive belts. Refer to TM 9-2320-211-20.

(8) Take off water pump and hoses. Refer to TM 9-2320-211-20.

(9) Take off air compressor pulley and adjusting flange. Refer to TM 9-2815-210-34.

(10) Take off tachometer drive sleeve. Refer to TM 9-2815-210-34.

(11) Take off tachometer drive adapter. Refer to TM 9-2815-210-34.

(12) Take off crankshaft vibration damper and pulley assembly. Refer to para 2-9.

(13) Take off tachometer drive adapter cable. Refer to TM 9-2815-210-34.

(14) Take off hydraulic pump. Refer to TM 9-2815-210-34.

(15) Take off timing gear, cover assembly and gasket. Refer to TM 9-2815-210-34.

(16) Take off flame heater ignition unit. Refer to TM 9-2815-210-34.

(17) Take off crankcase breather adapter tube. Refer to TM 9-2320-211-20.

(18) Take off intake manifold and gaskets. Refer to para 2-24.

(19) Take off exhaust manifold and gaskets. Refer to para 2-24.

(20) Take off fuel return-to-fuel injector pump overflow valve tube. Refer to TM 9-2815-210-34.

(21) Take off turbocharger assembly. Refer to TM 9-2815-210-34.

(22) Take off thermostat housing and gasket. Refer to TM 9-2320-211-20.

(23) Take off crankcase breather adapter. Refer to TM 9-2815-210-34.

(24) Take off cylinder head covers and gaskets. Refer to TM 9-2815–210–34.

(25) Take off cylinder head assemblies and gaskets. Refer to para 2-6.

(26) Take out valve tappets. Refer to para 2-19.

b . Removal.

FRAME 1

CAUTION

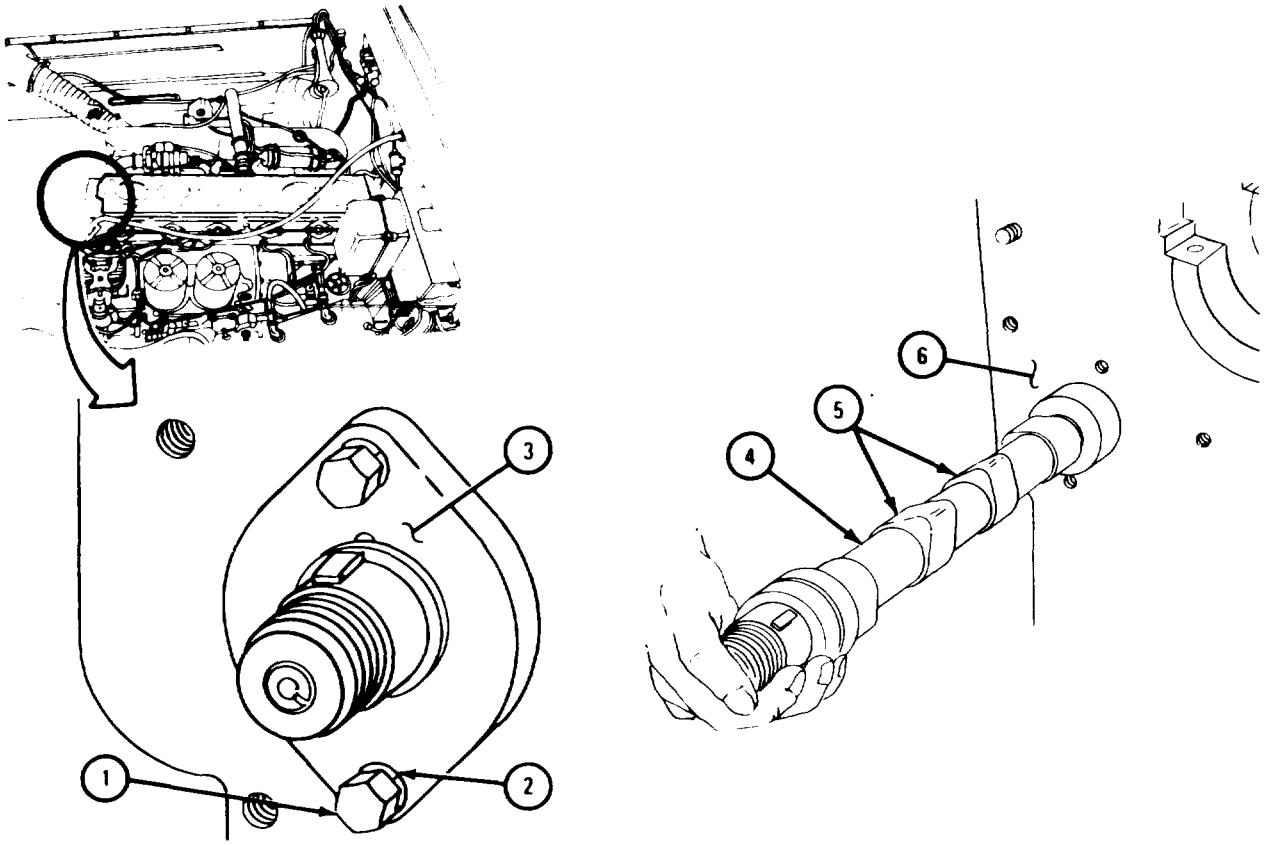
To stop damage to bushing type bearings, be very careful when pulling out camshaft assembly from engine block .

Soldier A 1. Take out two screws (1) and lockwashers (2) from camshaft thrust plates (3).

Soldier B 2. As soldier A pulls out camshaft (4), guide it carefully so that camshaft lobes (5) are not damaged.

Soldier A 3. While soldier B turns camshaft assembly (4), pull straight out of engine block (6).

GO TO FRAME 2

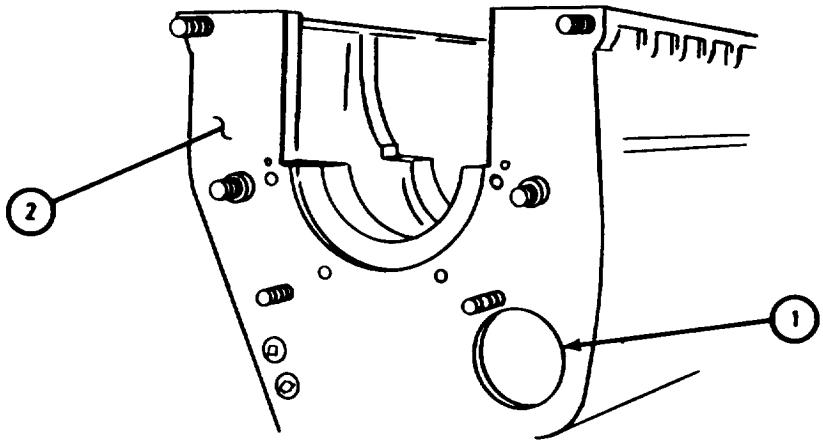


TA 114062

FRAME 2

1. Take out camshaft rear bearing plug (1) from engine block (2) and throw away.

END OF TASK



TA 114063

c. Cleaning.

NOTE

Open up oil passages with a wire probe to break up sludge and gum deposits. There are no special cleaning procedures required. Refer to cleaning procedures given in para 1-3.

d. Inspection.

(1) Use magnaflux equipment, if available, or a magnifying glass and a strong light to check camshaft assembly for wear to cam lobes and bearing surfaces.

(2) Check for scuffing, scoring or scratches.

(3) Check for stripped or damaged threads. Refer to TM 9-2815-210-34.

(4) Check keyway for damage or oversize.

(5) Measure diameter of camshaft journals.

(6) Check that measurements are within wear limits. If not, replace with a new camshaft assembly. Refer to TM 9-2815-210-34.

e. Repair.

(1) Repairs to the camshaft assembly are limited to taking out minor scratches, burrs and nicks from camshaft lobes and bearing contact surfaces.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(2) Use crocus cloth soaked in dry cleaning solvent and a fine mill file to take out nicks, scratches or burrs from camshaft assembly.

f. Replacement.

FRAME 1

Soldier A 1. Coat camshaft lobes (1) with anti-scuff lubricant.

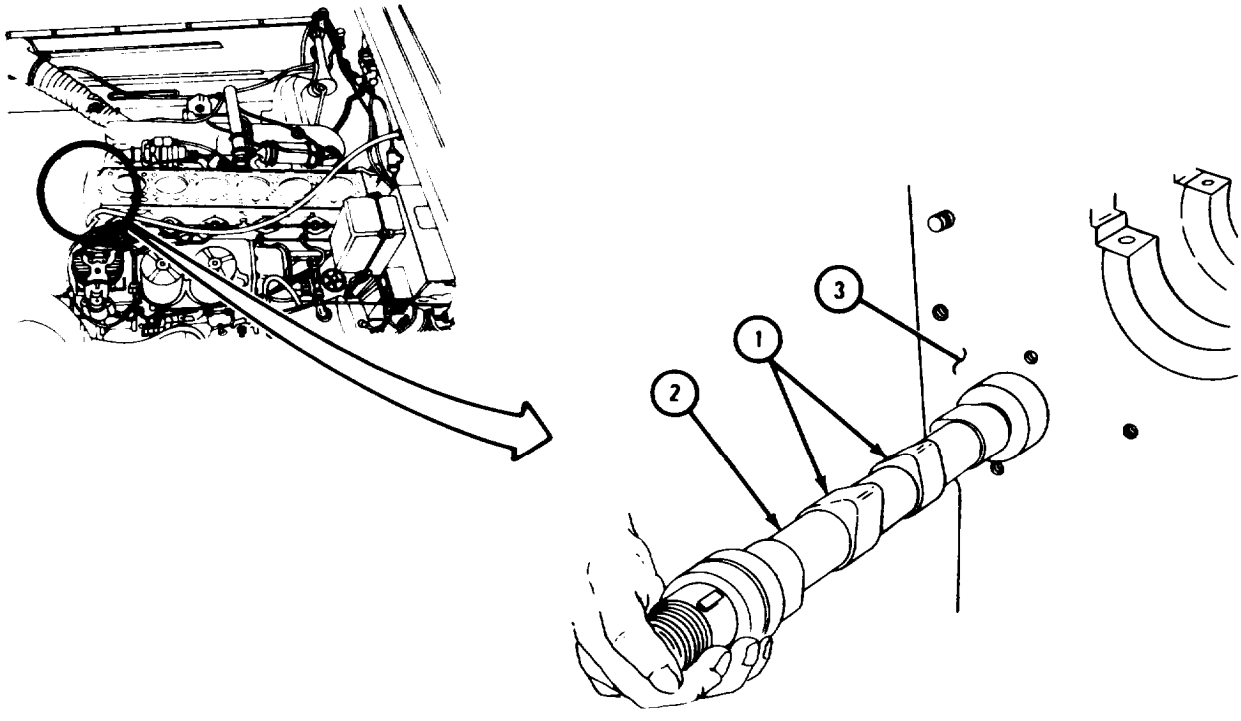
CAUTION

To stop damage to bushing type bearings, be very careful when putting cam shaft assembly into engine block .

Soldier B 2. Guide camshaft assembly (2) carefully into engine block (3).

Soldier A 3. Push and turn cam shaft assembly into engine block until it reaches rear bearing plug cutout.

GO TO FRAME 2



TA 114064

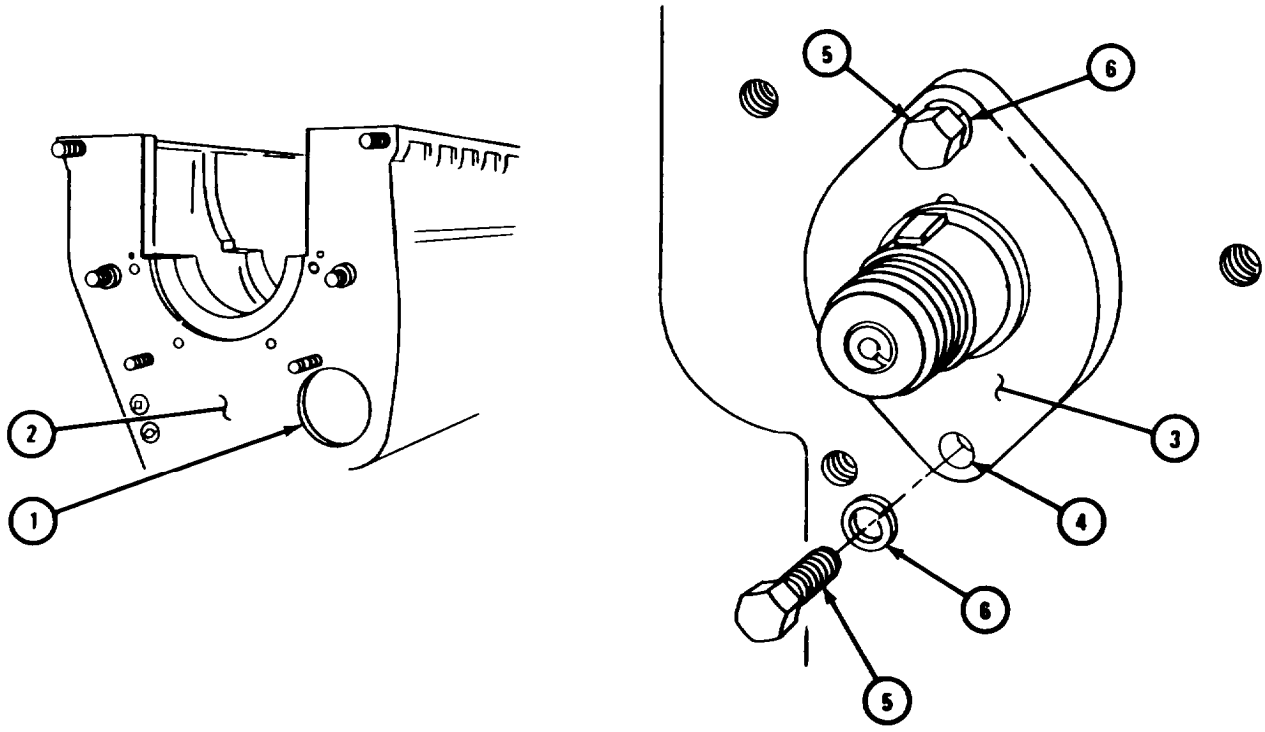
CAUTION

Be careful not to bump camshaft as it could unseat rear bearing plug (1) and cause an oil leak.

FRAME 2

1. Coat edge of rear bearing plug with sealant.
2. Put new camshaft rear bearing plug (1) into engine block (2) and tap center of plug to expand it.
3. Aline new camshaft thrust plate (3) with engine block holes (4).
4. Put in two screws (5) and two lockwashers (6).

GO TO FRAME 3



FRAME 3

NOTE

Follow-on Maintenance Action Required:

1. Put in valve tappets. Refer to para 2-19.
2. Put on cylinder head assemblies and gaskets. Refer to para 2-6.
3. Put on cylinder head covers and gaskets. Refer to TM 9-2815-210-34.
4. Put on crankcase breather adapter. Refer to TM 9-2815-210-34.
5. Put on thermostat housing and gasket. Refer to TM 9-2320-211-20.
6. Put on turbocharger assembly. Refer to TM 9-2815-210-34.
7. Put on fuel return-to-fuel injector pump overflow valve tube. Refer to TM 9-2815-210-34.
8. Put on exhaust manifold and gaskets. Refer to para 2-24.
9. Put on intake manifold and gaskets. Refer to para 2-24.
10. Put on crankcase breather adapter tube. Refer to TM 9-2320-211-20.
11. Put on flame heater ignition unit. Refer to TM 9-2815-210-34.
12. Put on timing gear, cover assembly and gasket. Refer to TM 9-2815-210-34.
13. Put on hydraulic pump. Refer to TM 9-2815-210-34.
14. Put on tachometer drive adapter cable. Refer to TM 9-2815-210-34.
15. Put on crankshaft vibration damper and pulley assembly. Refer to para 2-9.
16. Put on tachometer drive adapter. Refer to TM 9-2815-210-34.
17. Put on tachometer drive sleeve. Refer to TM 9-2815-210-34.
18. Put on air compressor pulley and adjusting flange. Refer to TM 9-2815-210-34.
19. Put on water pump and hoses. Refer to TM 9-2320-211-20.
20. Put on fan, power steering, water pump and alternator drive belts. Refer to TM 9-2320-211-20.
21. Put on oil filter cap. Refer to TM 9-2320-211-20.
22. Put on radiator and radiator hoses. Refer to TM 9-2320-211-20.
23. Put on brushguard assembly. Refer to TM 9-2320-211-20.
24. Fill up cooling system with coolant. Refer to TM 9-2320-211-20.
25. Connect battery. Refer to TM 9-2320-211-20.
26. Close hood and side panels. Refer to TM 9-2320-211-10.

END OF TASK

2-18. TAPPET CHAMBER COVER REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Tappet cover gasket

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Open left side panel. Refer to TM 9-2320-211-10.

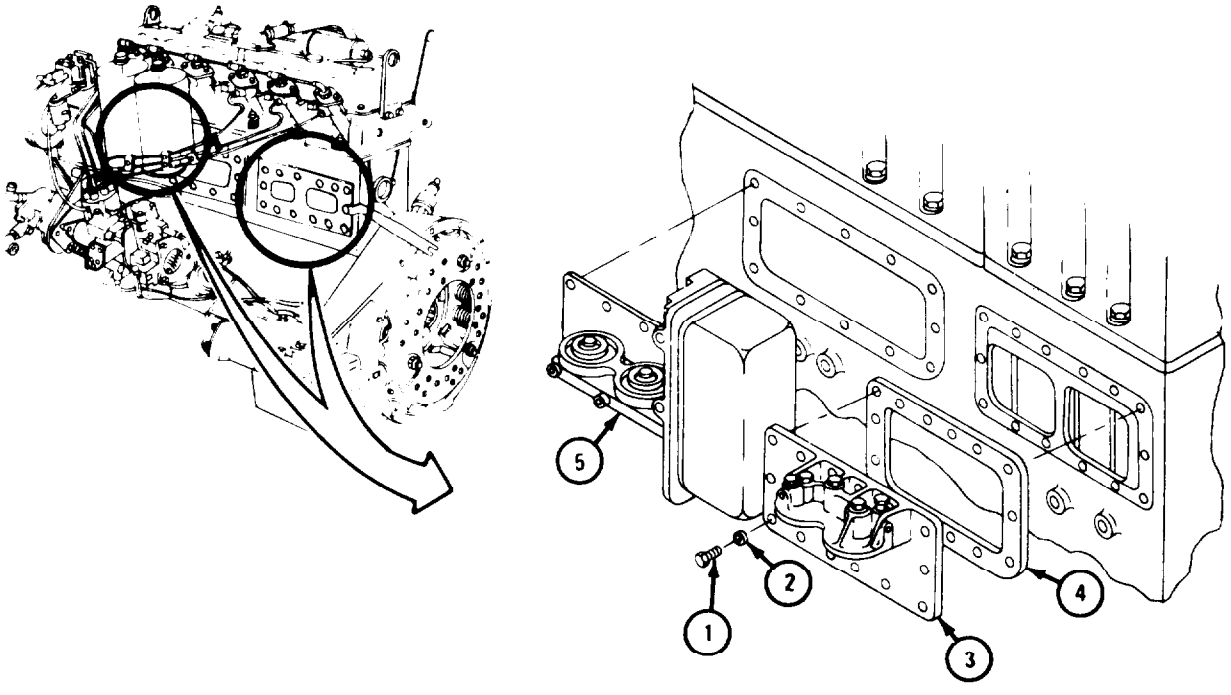
(3) Remove fuel filters and bracket. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Take out 11 capscrews (1) with washers (2).
2. Pull off rear cover (3). Take off gasket (4) and throw away.
3. The front cover (5) is part of the oil cooler and filter housing assembly. Refer to para 2-22 for oil cooler and filter housing assembly removal.

END OF TASK



c. Cleaning, Inspection, and Repair.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean rear tappet cover with solvent. Dry using lint free cloth.

(2) Check that gasket mating surface on cover is free of nicks, burrs, or scratches.

(3) Repair gasket mating surface on cover using crocus cloth.

(4) If cover is cracked or badly bent, get new cover.

d. Replacement.

FRAME 1

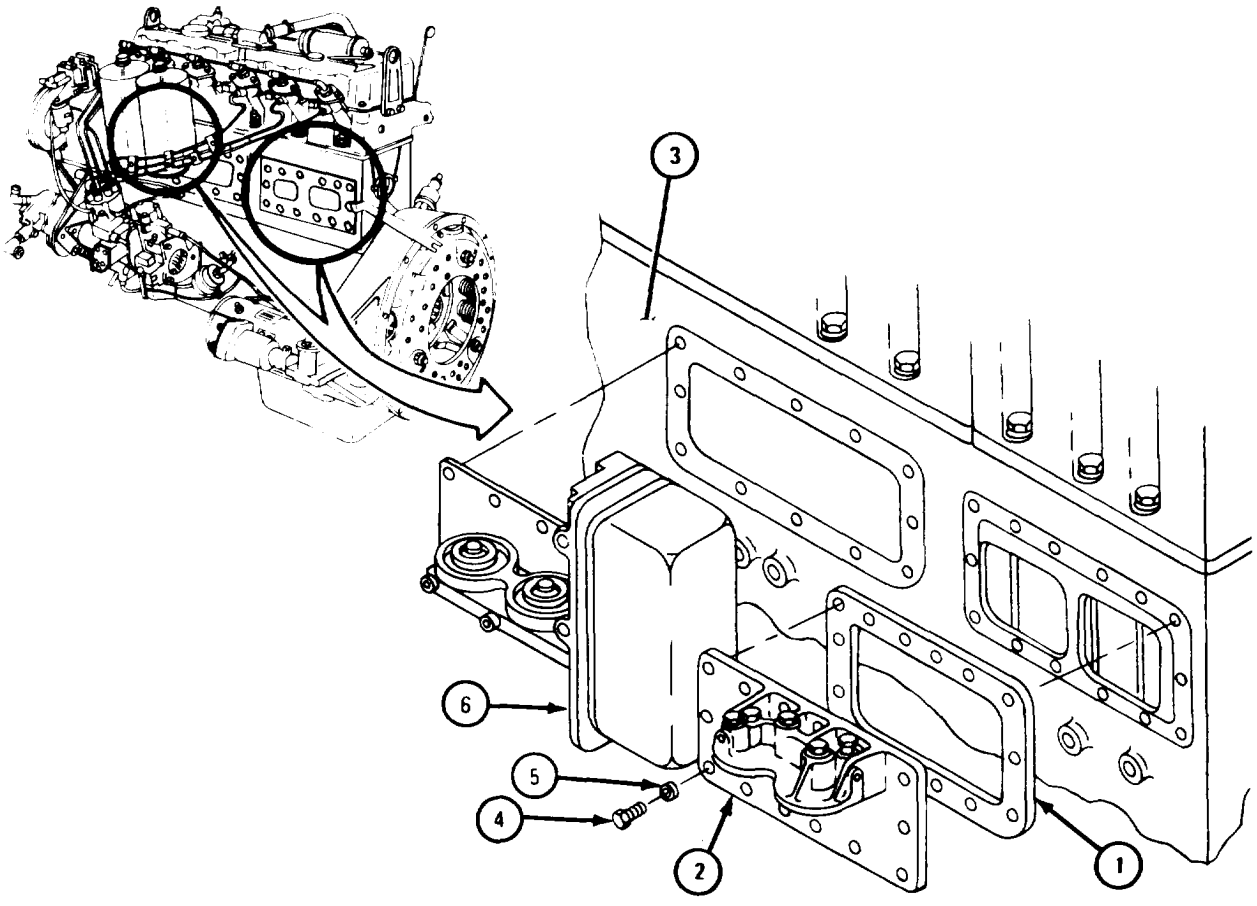
1. Put new cover gasket (1) and cover (2) on engine (3).
2. Put in 11 capscrews (4) with washers (5).
3. The front cover (6) is part of the oil cooler and filter housing assembly. Refer to para 2-22 for oil cooler and filter housing assembly replacement.

NOTE

Follow-on Maintenance Action Required:

1 Replace fuel filters and bracket. Refer to TM 9-2320-211-20.
2 Close left side panel. Refer to TM 9-2320-211-10.
3 Close hood. Refer to TM 9-2320-211-10.

END OF TASK



2-19. VALVE TAPPETS REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Anti-scuff lubricant
Crocus cloth

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Disconnect battery ground. Refer to TM 9-2320-211-20.

(3) Remove fuel injector tubes. Refer to TM 9-2815-210-34.

(4) Remove cylinder head covers and gaskets. Refer to TM 9-2815-210-34.

(5) Remove rocker arm assembly. Refer to para 2-15.

(6) Remove pushrods. Refer to para 2-14.

(7) Remove fuel filter. Refer to TM 9-2320-211-20.

(8) Remove oil filter. Refer to TM 9-2320-211-20.

(9) Remove oil cooler. Refer to para 2-22.

(10) Remove valve tappet chamber cover. Refer to para 2-18.

(11) Remove air compressor and mounting bracket. Refer to TM 9-2320-211-20.

b. Removal.

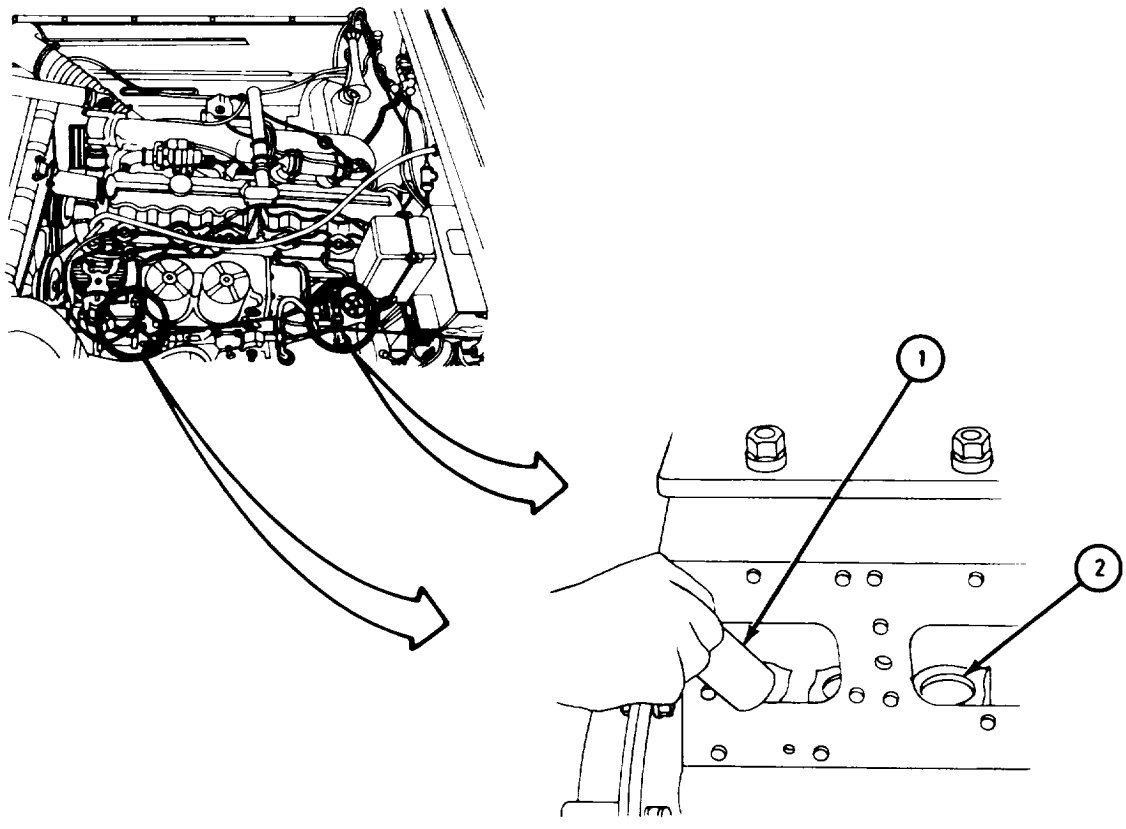
FRAME 1

CAUTION

Crankcase, camshaft, and tappets must stay as a matched set.

1. Take out 12 valve tappets (1) from crankcase (2).
2. Make sure each valve tappet (1) is tagged as to the camshaft lobe it was taken from.

END OF TASK



TA 102764

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

Eye shields must be worn when using compressed air. Eye injury can occur if eye shields are not used.

c. Cleaning. Clean valve tappets with dry cleaning solvent and blow dry.

d. Inspection and Repair. For procedures to inspect and repair valve tappets, refer to TM 9-2815-210-34.

e. Replacement.

FRAME 1

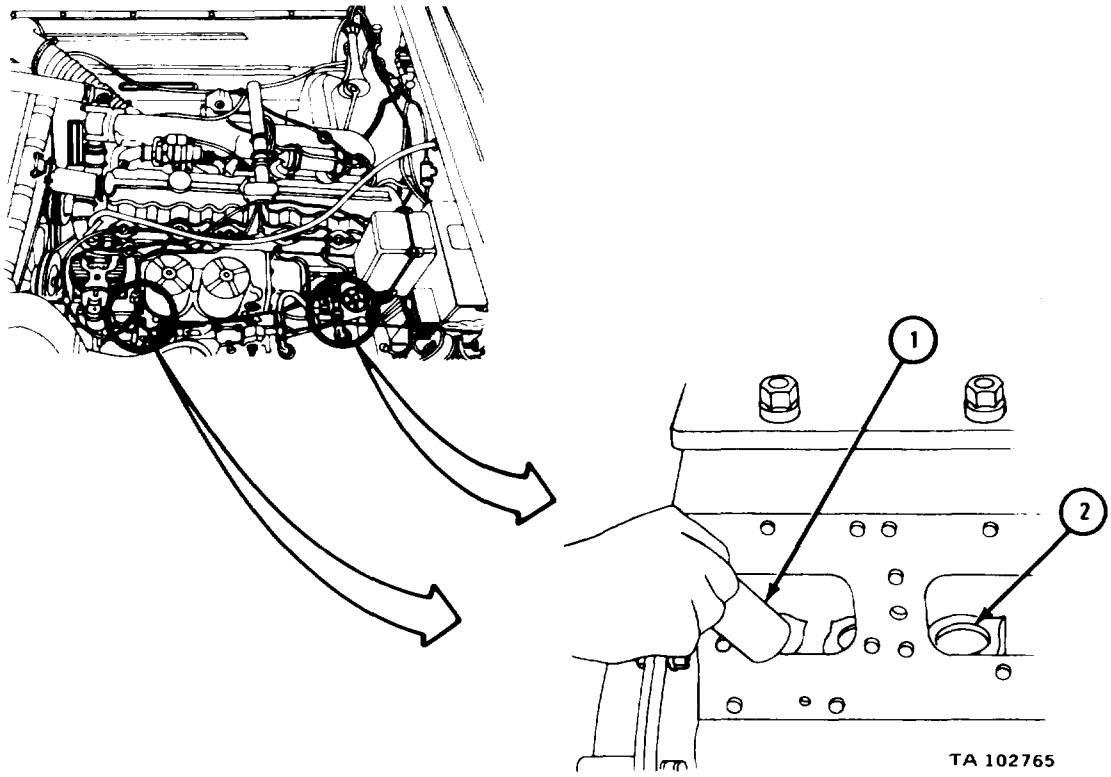
1. Put anti-scuff lubricant on all valve tappets.
2. Put valve tappet (1) in crankcase (2), making that was taken out.

NOTE

Follow-on Maintenance Action Required:

1. Replace air compressor and mounting bracket. Refer to TM 9-2320-211-20.
2. Replace valve tappet chamber cover. Refer to para 2-18.
3. Replace oil cooler. Refer to para 2-22.
4. Replace oil filter. Refer to TM 9-2320-211-20.
5. Replace fuel filter. Refer to TM 9-2320-211-20.
6. Replace pushrods. Refer to paragraph 2-14.
7. Replace rocker arm housings. Refer to para 2–15.
8. Replace cylinder head covers and gaskets. Refer to TM 9-2815-210-34.
9. Replace fuel injector tubes. Refer to TM 9-2815-210-34.
10. Connect battery ground. Refer to TM 9-2320-211-20.
11. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



Section VII. ENGINE LUBRICATING SYSTEM

2-20. ENGINE OIL PUMP ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCKS WITH ENGINES LDS 465-1 AND LDS 465-1A).

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean, dry rags
Oil pump outlet tube preformed packing
Nickel copper wire
Oil pump pickup tube gasket
Pressure oil pump outlet tube gasket
Scavenger pump inlet tube gasket
Scavenger pump outlet tube gasket

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain engine oil. Refer to LO 9-2320-211-12.

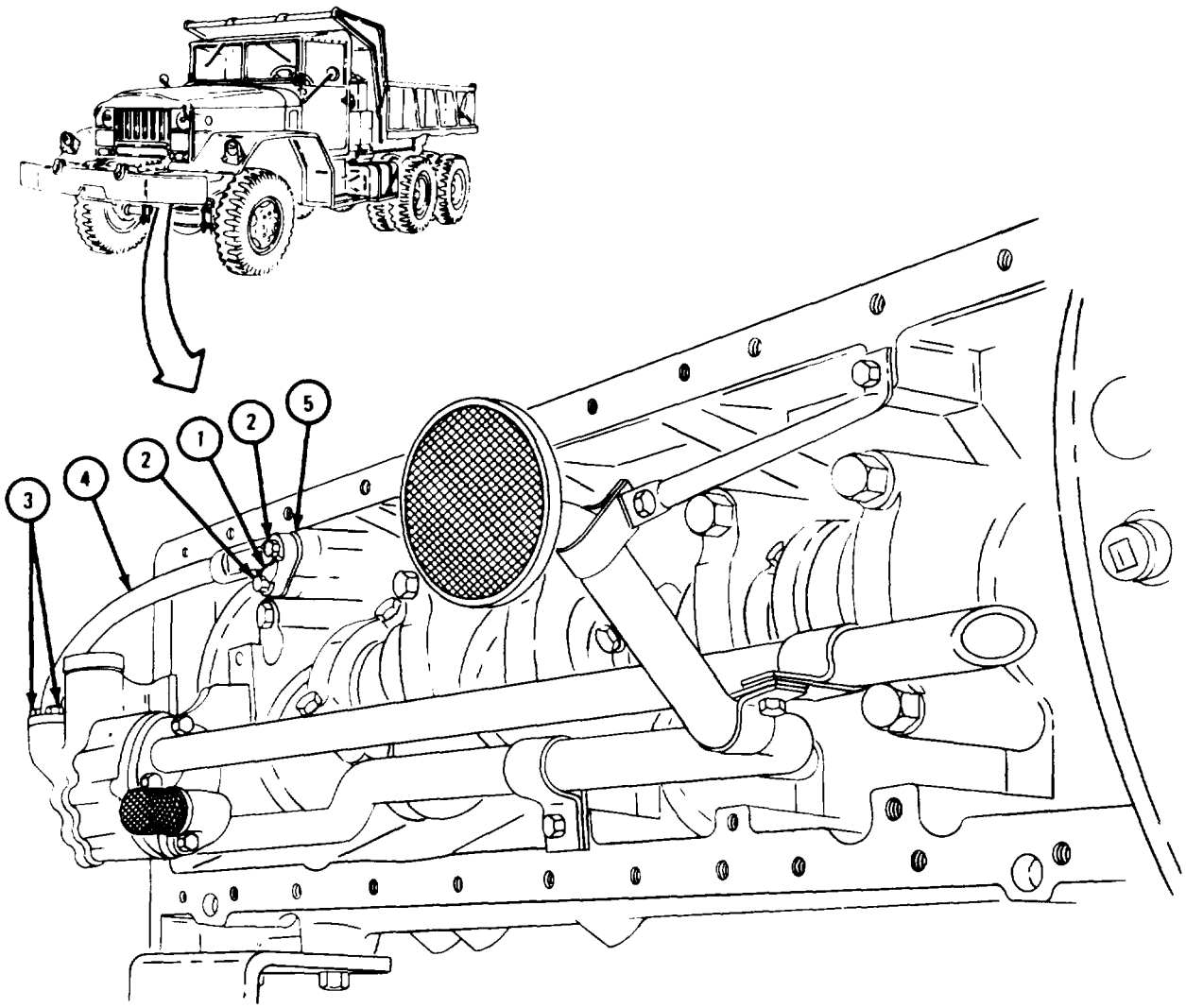
(2) Remove oil pan. Refer to para 2-21.

b. Removal.

FRAME 1

1. Cut and take out safety wire (1).
2. Take out two bolts (2).
3. Take out two capscrews with washers (3).
4. Take out oil pump outlet tube assembly (4).
5. Take out and throw away gasket (5).

GO TO FRAME 2

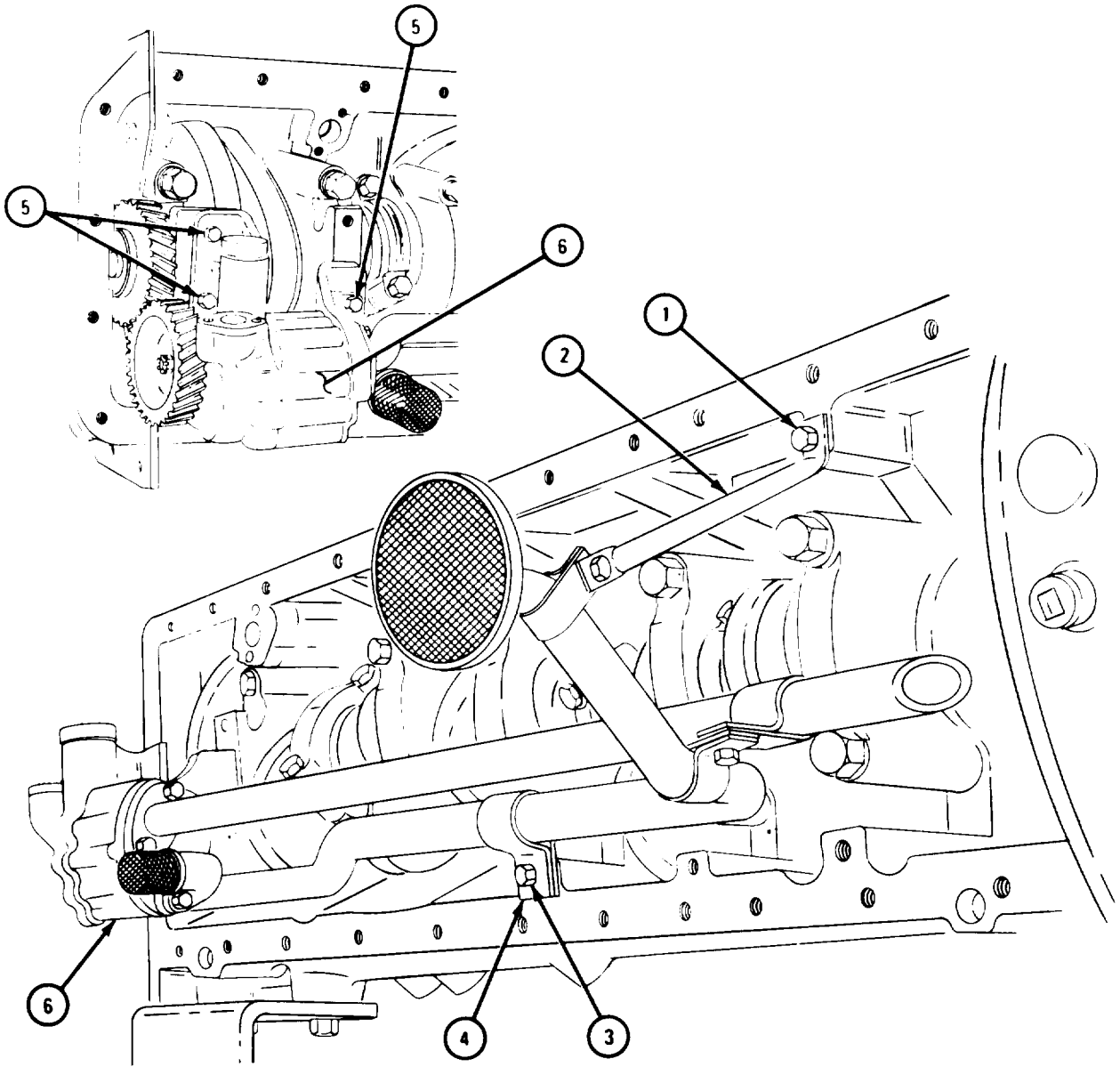


TA 102646

FRAME 2

1. Take out bolt with washer (1) from tube brace (2).
2. Take out bolt with washer (3) from tube clamp (4).
3. Take out three bolts (5) from oil pump assembly (6).
4. Take out oil pump assembly (6).

END OF TASK

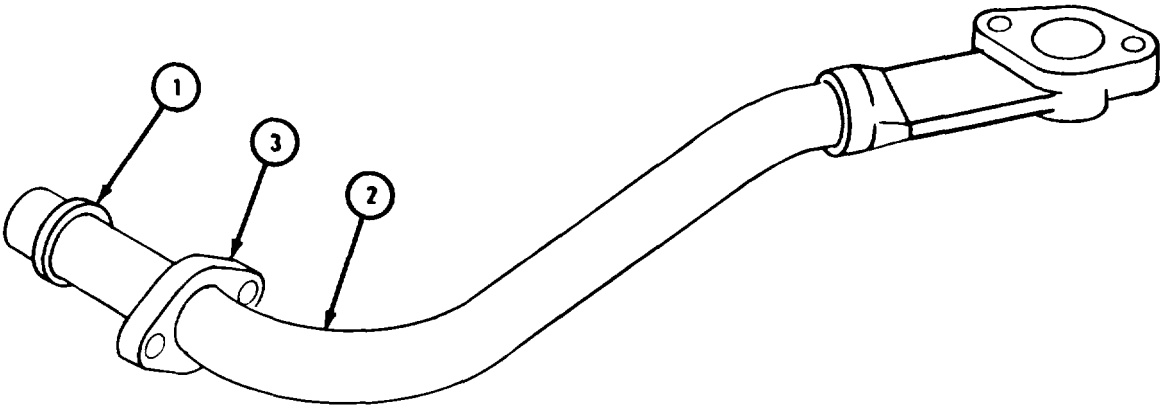


TA 102694

c. Disassembly.

1. Take preformed packing (1) off oil pump outlet tube assembly (2). Throw away preformed packing (1).
2. Takeoff flange (3).

GO TO FRAME 2

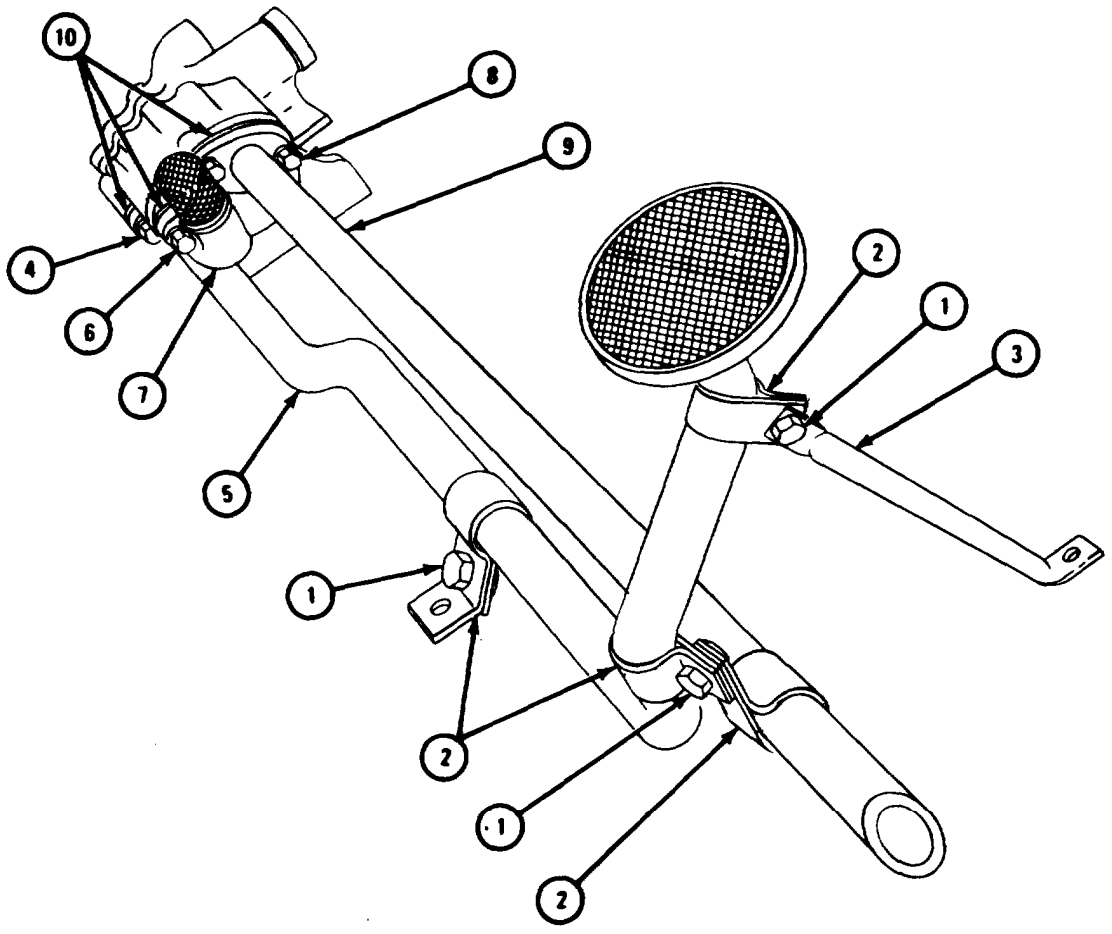


TA 113488

FRAME 2

1. Take out three capscrews with washers (1) from four tube clamps (2). Take out tube brace (3).
2. Take out two capscrews with washers (4) from pressure oil pump pickup tube assembly (5). Take out tube assembly.
3. Take out two capscrews with washers (6) from oil pump inlet screen assembly (7). Take out screen assembly.
4. Take out two capscrews with washers (8) from scavenger oil pump outlet tube assembly (9). Take out tube assembly.
5. Take off and throw away three gaskets (10).

END OF TASK



TA 113489

d. Cleaning. There are no special cleaning procedures required. Refer to cleaning procedures given in para 1-3.

e. Inspection and Repair. Refer to TM 9-2815-210-34 for inspection of the oil pump tube assemblies and the oil pump assembly.

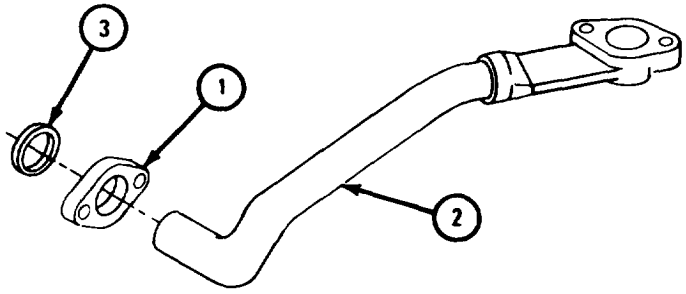
f. Adjustment and Testing. Refer to TM 9-2815-210-34 for test and adjustment of the oil pump assembly.

g. Assembly.

FRAME 1

1. Put flange (1) on oil pump outlet tube assembly (2).
2. Put preformed packing (3) on tube assembly (2).

GO TO FRAME 2

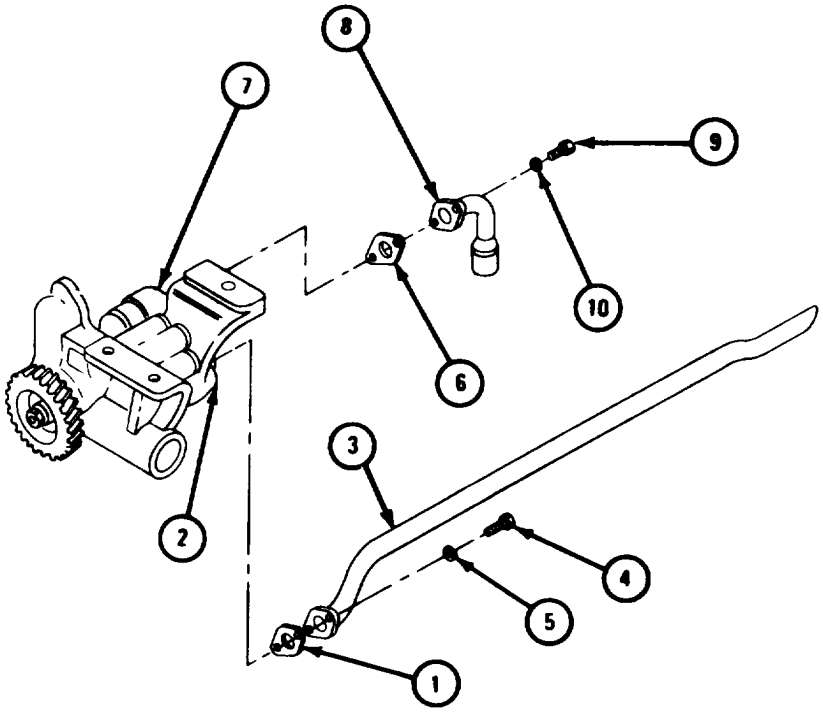


TA 113490

FRAME 2

1. Put gasket (1) on oil pump inlet (2).
2. Put scavenger oil pump inlet tube assembly (3) on gasket (1).
3. Put in two 3 1 /2-inch long capscrews (4) with lockwashers (5).
4. Put gasket (6) on oil pump outlet (7).
5. Put scavenger oil pump outlet tube assembly (8) on gasket (6).
6. Put in two 3 1/2-inch long cap screws (9) with lockwashers (10).

GO TO FRAME 3

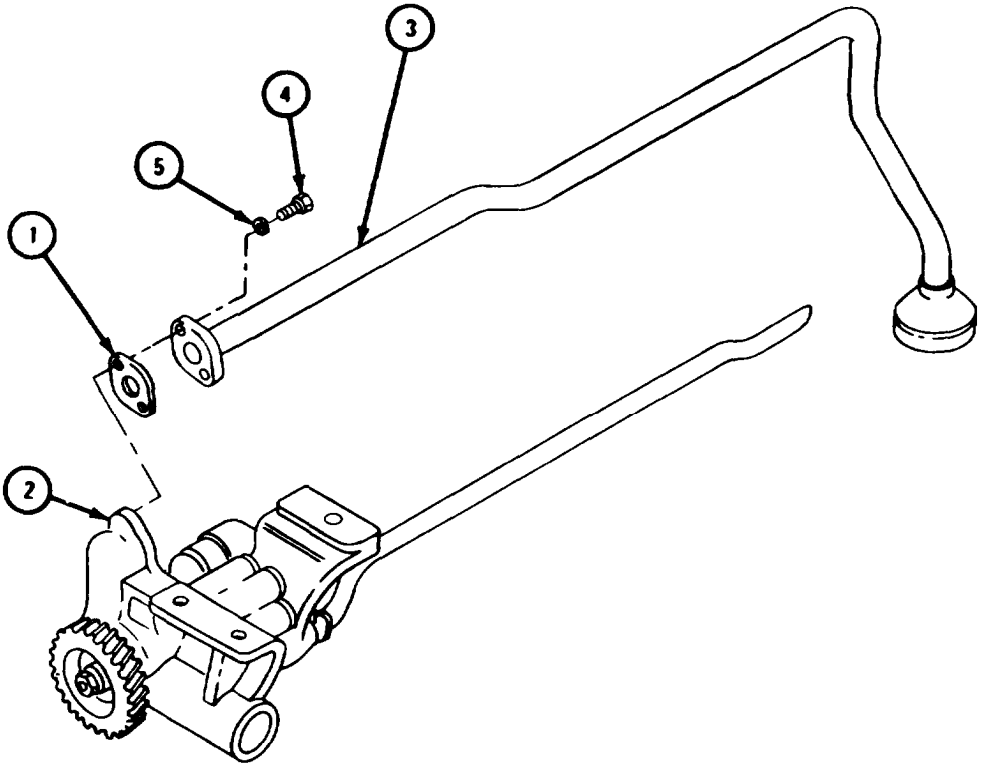


TA 113492

FRAME 3

1. Put gasket (1) on oil pump inlet (2).
2. Put pressure oil pump pickup tube assembly (3) on gasket (1). Put in two 3/4-inch long capscrews (4) with lockwashers (5).

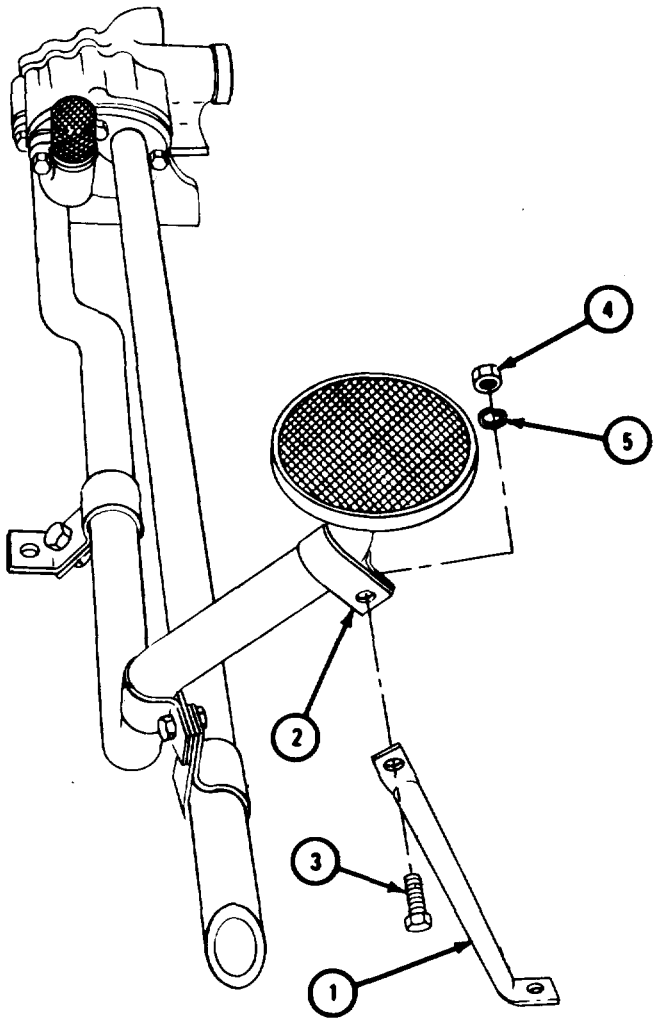
GO TO FRAME 4



FRAME 4

1. Put tube brace (1) on tube clamp (2).
2. Put in 3/4-inch long cap screw (3). Put on nut (4S) with lockwasher (5).

GO TO FRAME 5

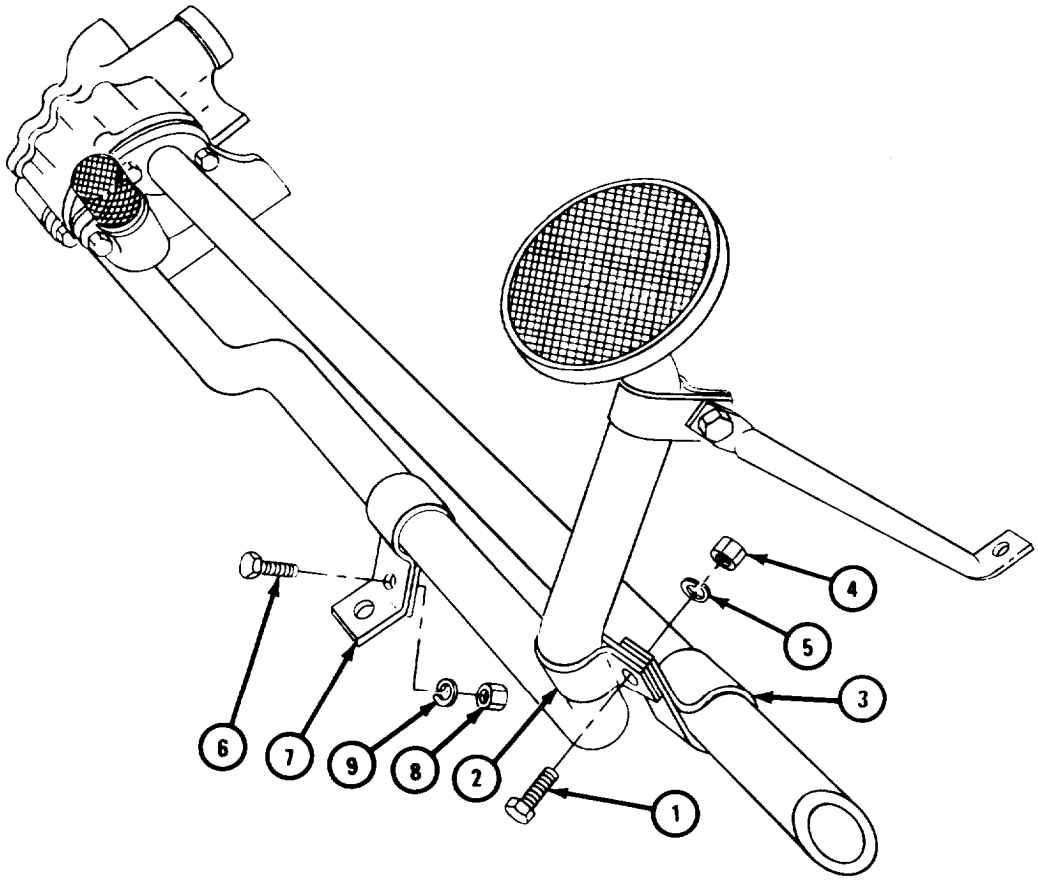


TA 113493

FRAME 5

1. Put 3/4-inch long capscrew (1) in tube clamp (2) and tube clamp (3). Put on nut (4) with lockwasher (5).
2. Put 5/8-inch long capscrew (6) in tube clamp (7). Put on nut (8) with lockwasher (9).

END OF TASK



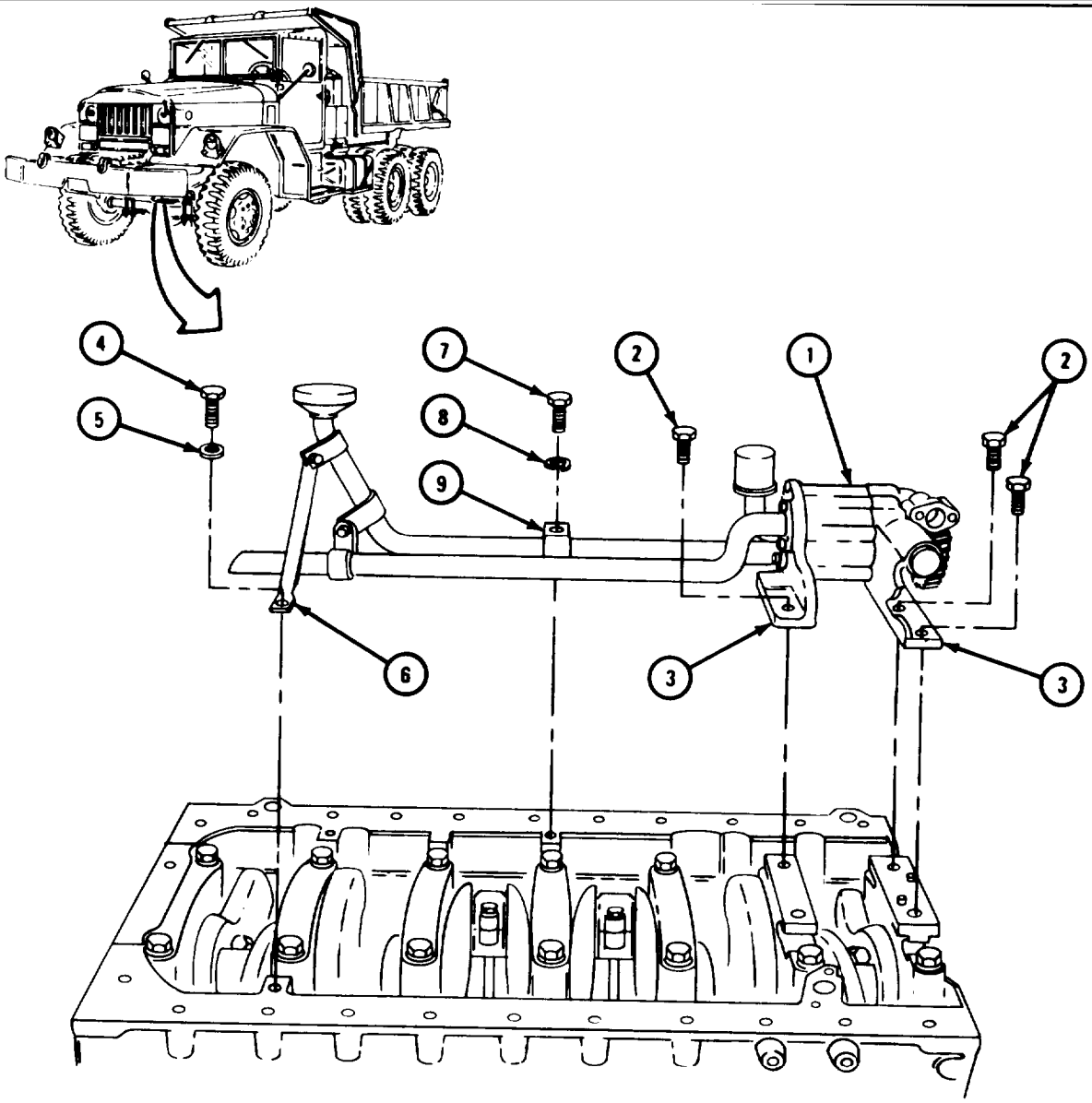
TA 113494

h. Replacement.

FRAME 1

1. Put in oil pump assembly (1).
2. Put three self-locking bolts (2) in oil pump housing (3). Tighten bolts to 48 to 58 pound-feet.
3. Put machine bolt (4) with lockwasher (5) in tube clamp (6).
4. Put machine bolt (7) with lockwasher (8) in tube clamp (9).

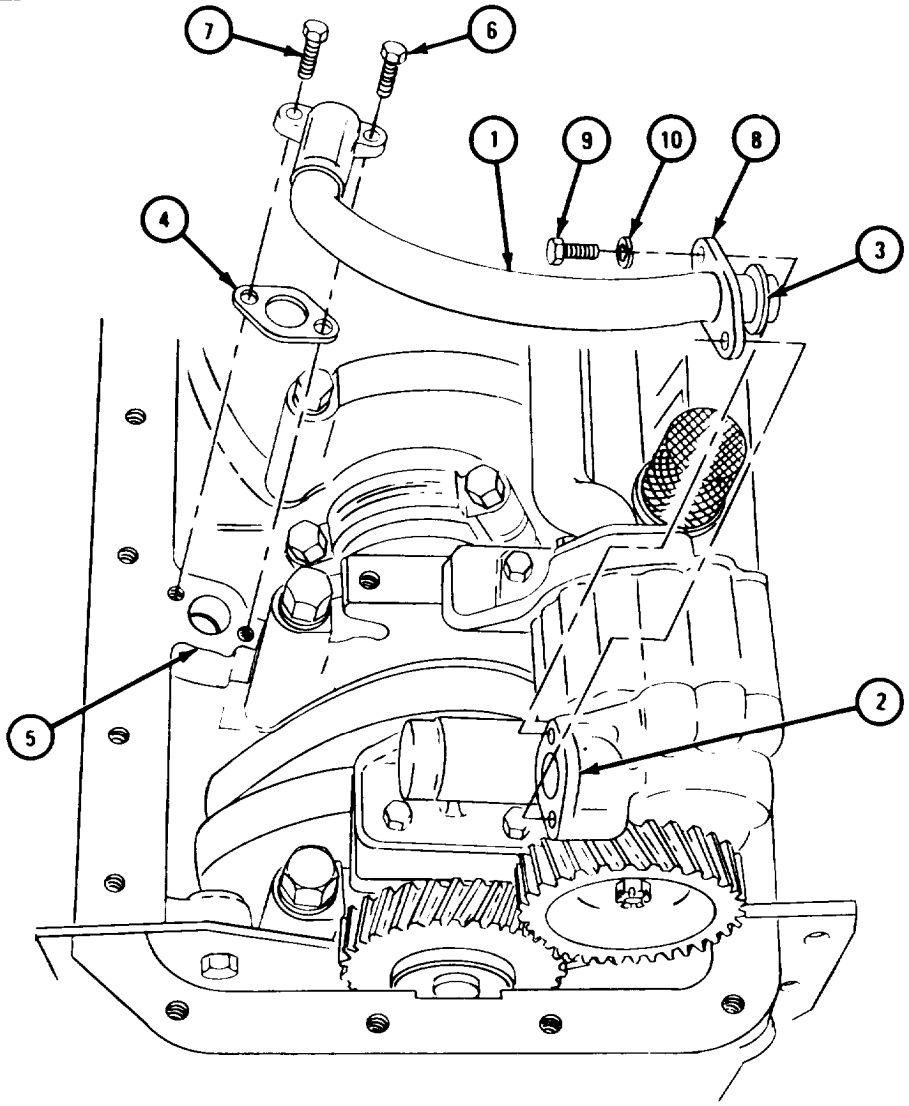
GO TO FRAME 2



FRAME 2

1. Put end of oil pump outlet tube assembly (1) in oil pump outlet (2), seating preformed packing (3) on top of oil pump outlet (2).
2. Put gasket (4) on crankcase oil inlet (5). Put oil pump outlet tube assembly (1) over gasket (4).
3. Put 1-1/4-inch long machine bolt (6) in oil pump side of crankcase inlet end of tube assembly (1).
4. Put 1-inch long machine bolt (7) in other side of crankcase end of tube assembly (1).
5. Seat flange (8) on oil pump outlet (2). Put in two capscrews (9) with lockwashers (10).

GO TO FRAME 3



TA 114071

FRAME 3

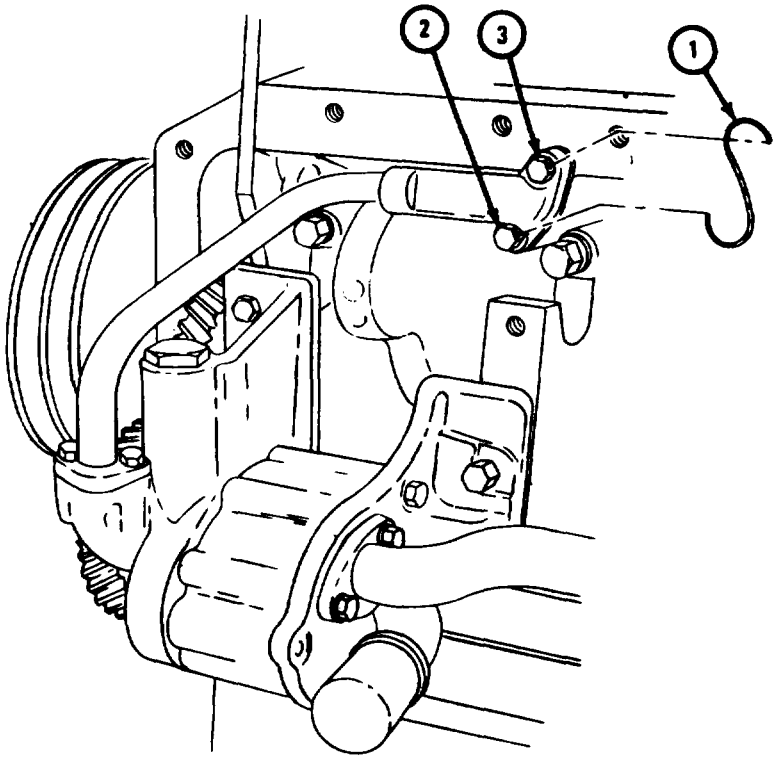
1. Put one end of nickel copper wire (1) through hole in bolt (2).
2. Put other end of nickel copper wire (1) through hole in bolt (3).
3. Bend end of wire (1) back over head of bolt (2) and over head of bolt (3).

NOTE

Follow-on Maintenance Action Required:

1. Replace oil pan. Refer to para 2-21.
2. Refill crankcase with engine oil. Refer to LO 9-2320-211-12.

END OF TASK



TA 114072

2-21. OIL PAN REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Gasket, oil pan 10889730
Sealant, MIL-S-45180 or MIL-S-7916B

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Drain oil. Refer to LO 9-2320-211-12.

(3) Remove dipstick. Refer to TM 9-2320-211-10.

(4) Disconnect battery gtound cable. Refer to TM 9-2320-211-20.

(5) If vehicle has a front winch, remove front winch propeller shaft. Refer to TM 9-2320-211-20.

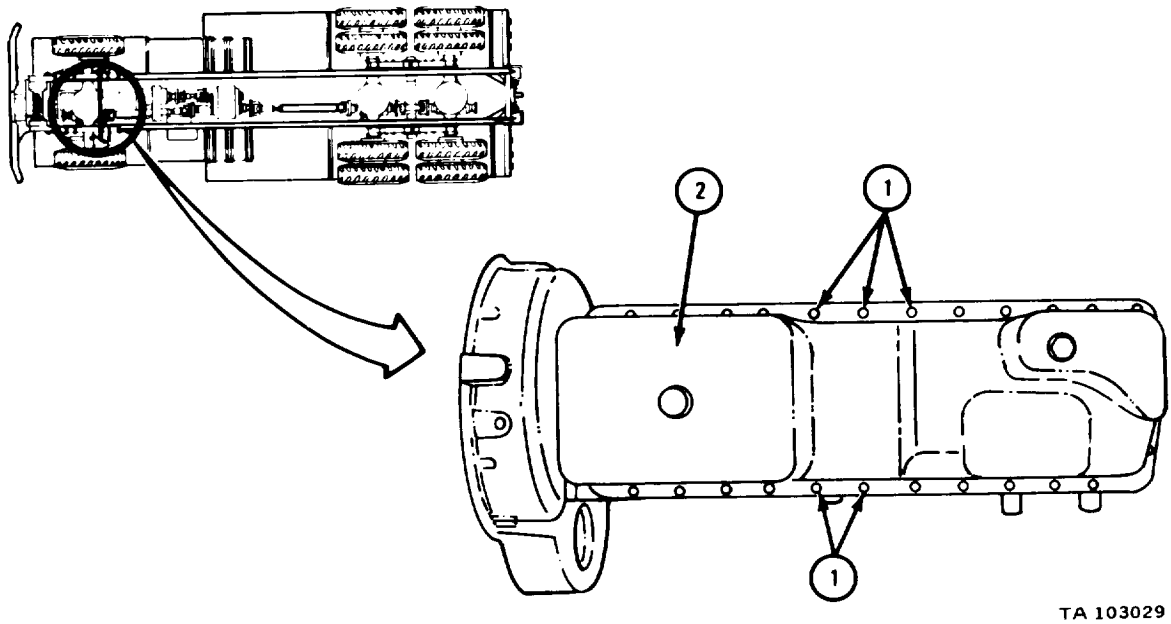
b. Removal.

(1) Models LD465-1, LD465-1C and LDT465-1C.

FRAME 1

1. Take out 30 capscrews with lockwashers (1).
2. Take off oil pan with gasket (2). Throw gasket away.

END OF TASK

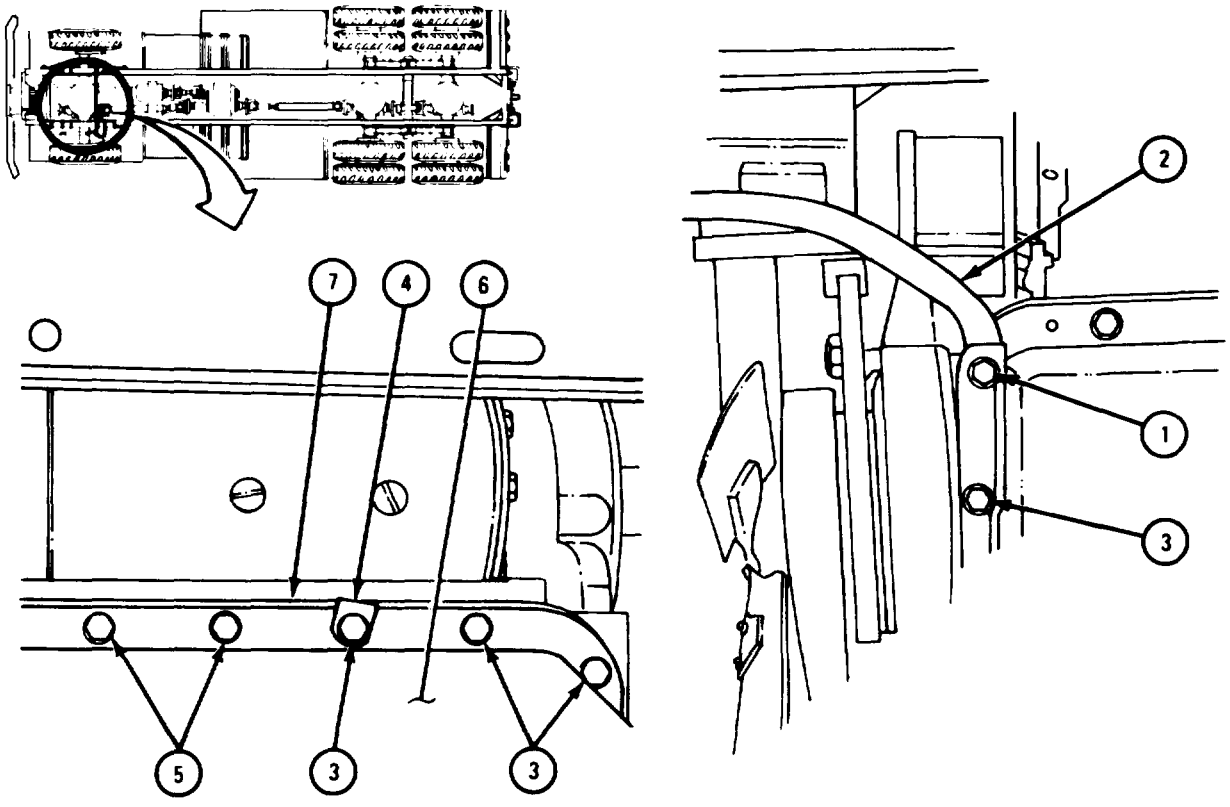


(2) Model LDS465-1A.

FRAME 1

1. Take out cap screw with lockwasher (1) and move ground strap (2) out of way.
2. Take out screw with lockwasher (3) and take off drain tube bracket (4).
3. Take out 28 screws with lockwashers (5) and take off oil pan (6) with gasket (7). Throw gasket away.

END OF TASK



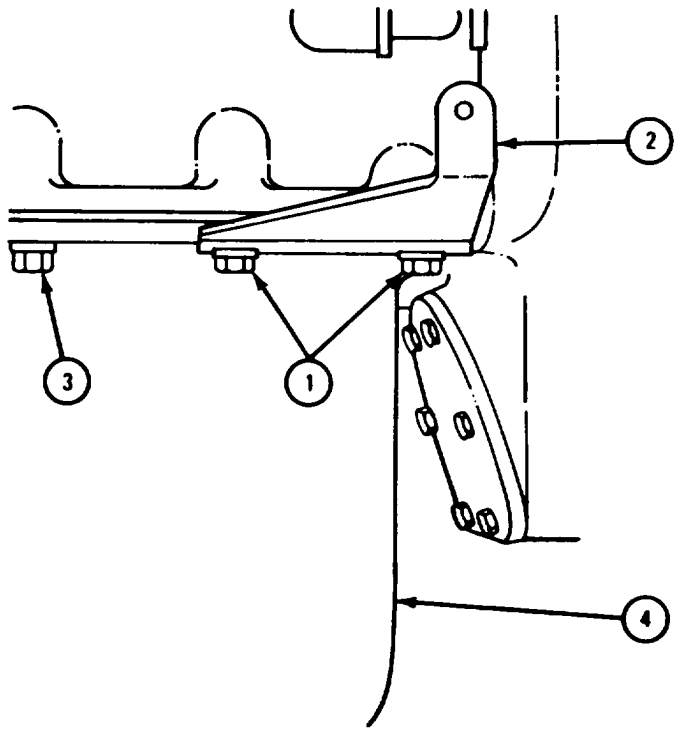
TA 103030

(3) Model LDS465-2.

FRAME 1

1. Take out two capscrews with lockwashers (1) and take off throttle return spring bracket (2).
2. Take out 28 capscrews with lockwashers (3) and take off oil pan with gasket (4). Throw gasket away.

END OF TASK



TA 105742

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

Eye shields must be worn when using compressed air. Eye injury can occur if eye shields are not used.

NOTE

Clean parts before inspection and after repairs.

c. Cleaning. Clean oil pan inside and out with dry cleaning solvent, and clean oil pan gasket surface on engine bleak. Refer to TM 9-247

d. Inspection and Repair.

(1) Check for cracks. Repair cracks by welding. Refer to TM 9-237.

(2) Check for dents. Knock out dents with a soft-face hammer. Refer to FM 43-2.

(3) Check gasket surface for nicks or burrs. Fix any nicks or burrs with a fine mill file.

e. Replacement.

(1) Models LD465-1, LD465-1C and LDT465-1C.

FRAME 1

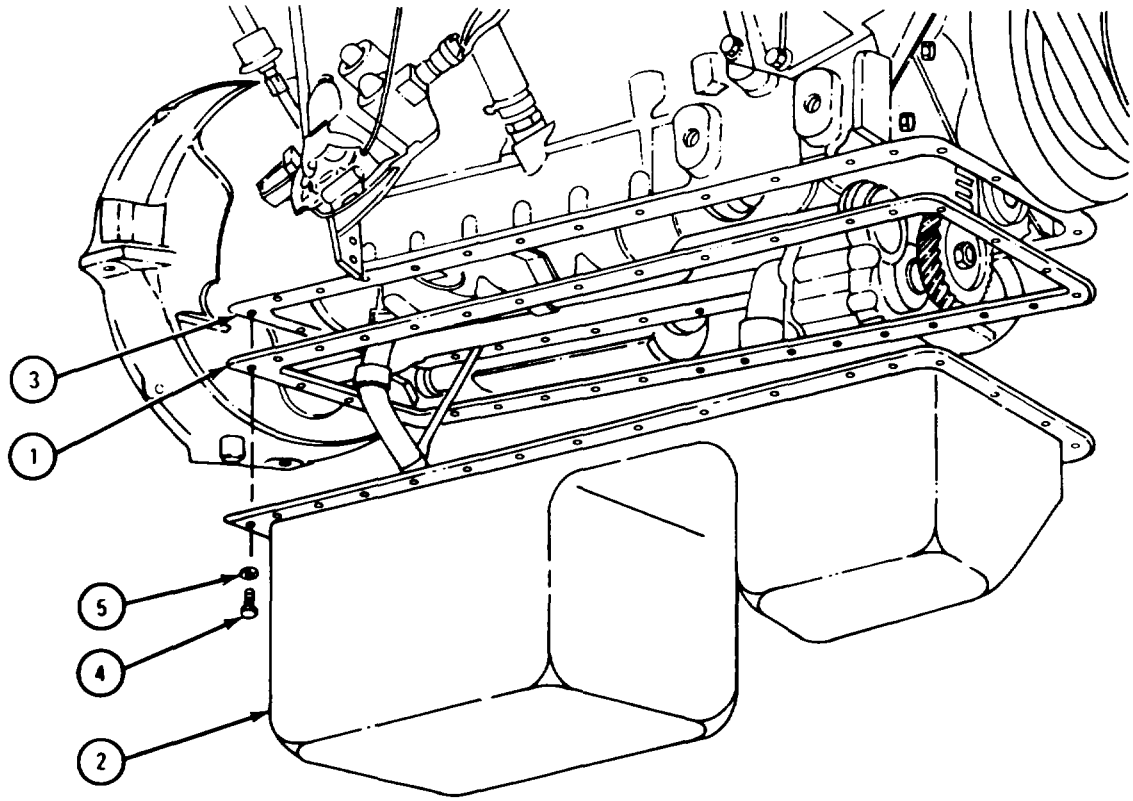
1. Coat oil pan gasket (1) on both sides with sealant. Put oil pan gasket (1) on oil pan (2).
2. Put oil pan (2) with gasket (1) in place on engine block (3) and put in 30 capscrews (4) with 30 lockwashers (5).

NOTE

Follow-on Maintenance Action Required:

1. If vehicle has a front winch, replace front winch propeller shaft. Refer to TM 9-2320-211-20.
2. Connect battery ground cable. Refer to TM 9-2320-211-20.
3. Replace dipstick. Refer to TM 9-2320-211-10.
4. Fill crankcase with oil. Refer to LO 9-2320-211-12.
5. Check for oil leaks. Refer to TM 9-2320-211-10.
6. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 105743

(2) Model LDS-465-1A.

FRAME 1

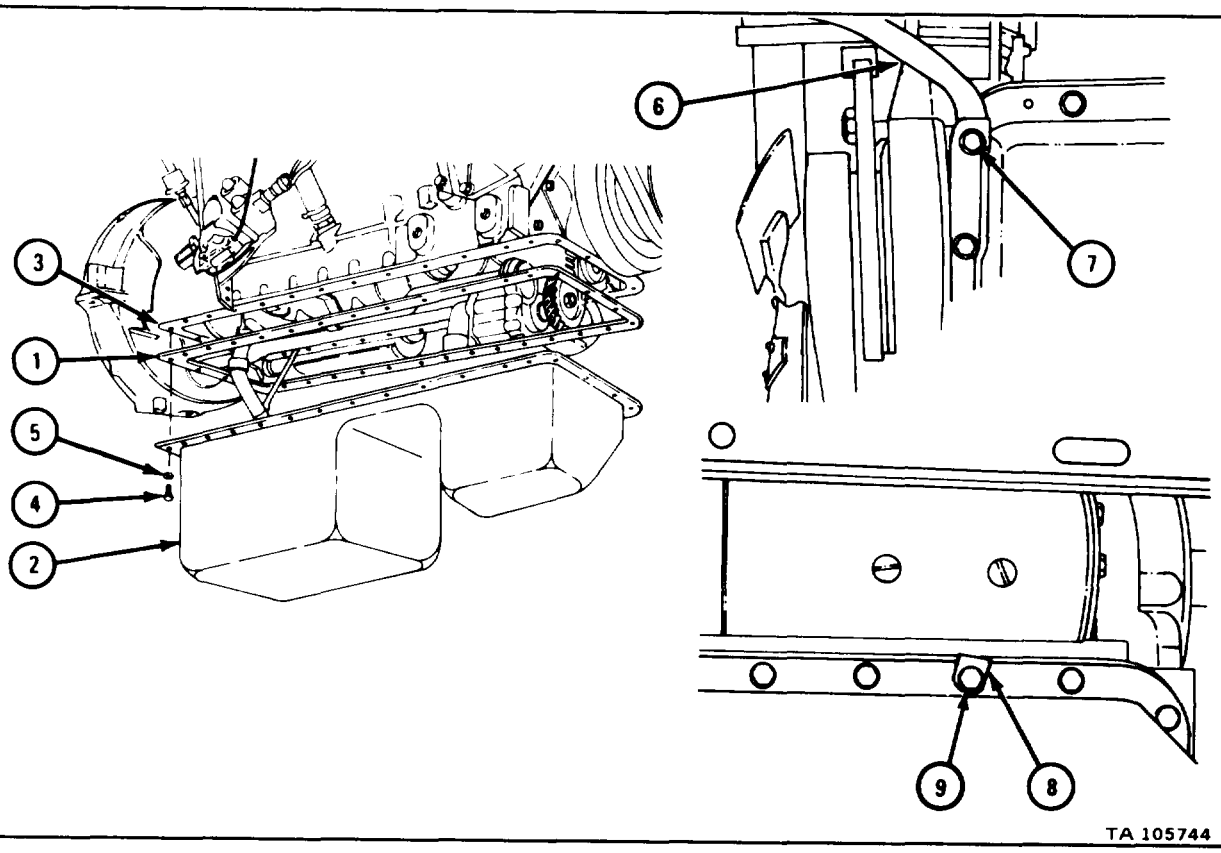
1. Coat oil pan gasket (1) on both sides with sealant. Put oil pan gasket (1) on oil pan (2).
2. Put oil pan (2) with gasket (1) in place on engine block (3) and put in 28 capscrews (4) with 28 lockwashers (5).
3. Put ground strap (6) in place and put in cap screw and lockwasher (7).
4. Aline drain tube bracket (8). Put in one screw and washer (9).

NOTE

Follow-on Maintenance Action Required:

1. If vehicle has a front winch, replace front winch propeller shaft. Refer to TM 9-2320-211-20.
2. Connect battery ground cable. Refer to TM 9-2320-211-20.
3. Replace dipstick. Refer to TM 9-2320- 211-10.,
4. Fill crankcase with oil. Refer to LO 9-2320-211-12.
5. Check for oil leaks. Refer to TM 9-2320-211-10.
6. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



(3) Model LDS465-2.

FRAME 1

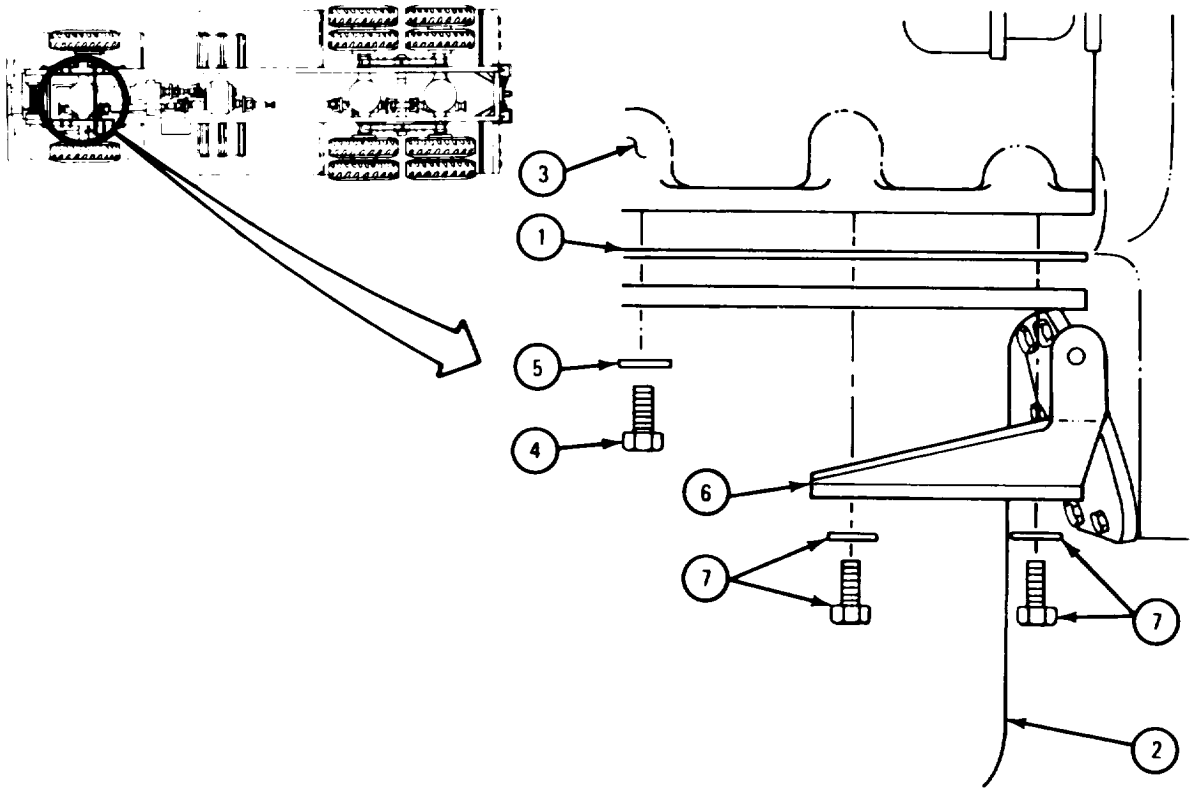
1. Coat oil pan gasket (1) on both sides with sealant. Put oil pan gasket (1) on oil pan (2).
2. Put oil pan (2) with gasket (1) in place on engine block (3) and put in 28 capscrews (4) with 28 lockwashers (5).
3. Put throttle return spring bracket (6) in place and put in two capscrews with lockwashers (7).

NOTE

Follow-on Maintenance Action Required:

1. If vehicle has a front winch, replace front winch propeller shaft. Refer to TM 9-2320-211-20.
2. Connect battery ground cable. Refer to TM 9-2320-211-20.
3. Replace dipstick. Refer to TM 9-2320-211-10.
4. Fill crankcase with oil. Refer to LO 9-2320-211-12.
5. Check for oil leaks. Refer to TM 9-2320-211-10.
6. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 105745

2-22. OIL COOLER ELEMENT AND HOUSING REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: No special tools required.

SUPPLIES: Solvent, dry cleaning, type II (SD-2) Fed. Spec P-D-680
Oil cooler cover gasket
Oil cooler preformed packings
Crocus cloth
Plunger plug gaskets

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Remove rear three fuel injector tubes. Refer to TM 9-2815-210-34.

(3) Remove oil filters. Refer to TM 9-2320-211-20.

(4) Drain engine cooling system. Refer to TM 9-2320-211-20.

(5) Remove fuel filter housing. Refer to TM 9-2320-211-20.

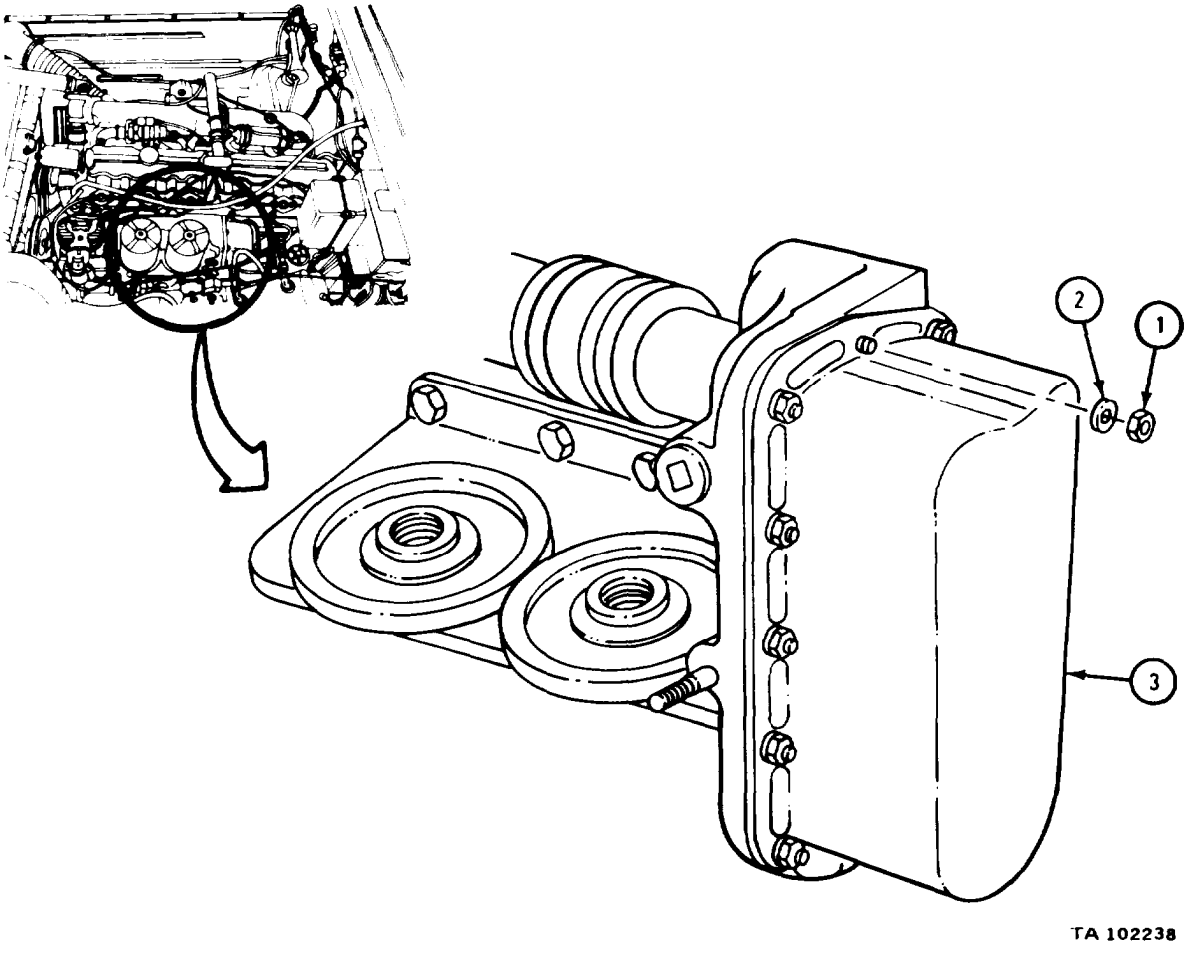
b. Removal.

(1) Oil cooler radiator and cover.

FRAME 1

1. Take off 12 nuts (1) and washers (2). Take off *cover* (3).

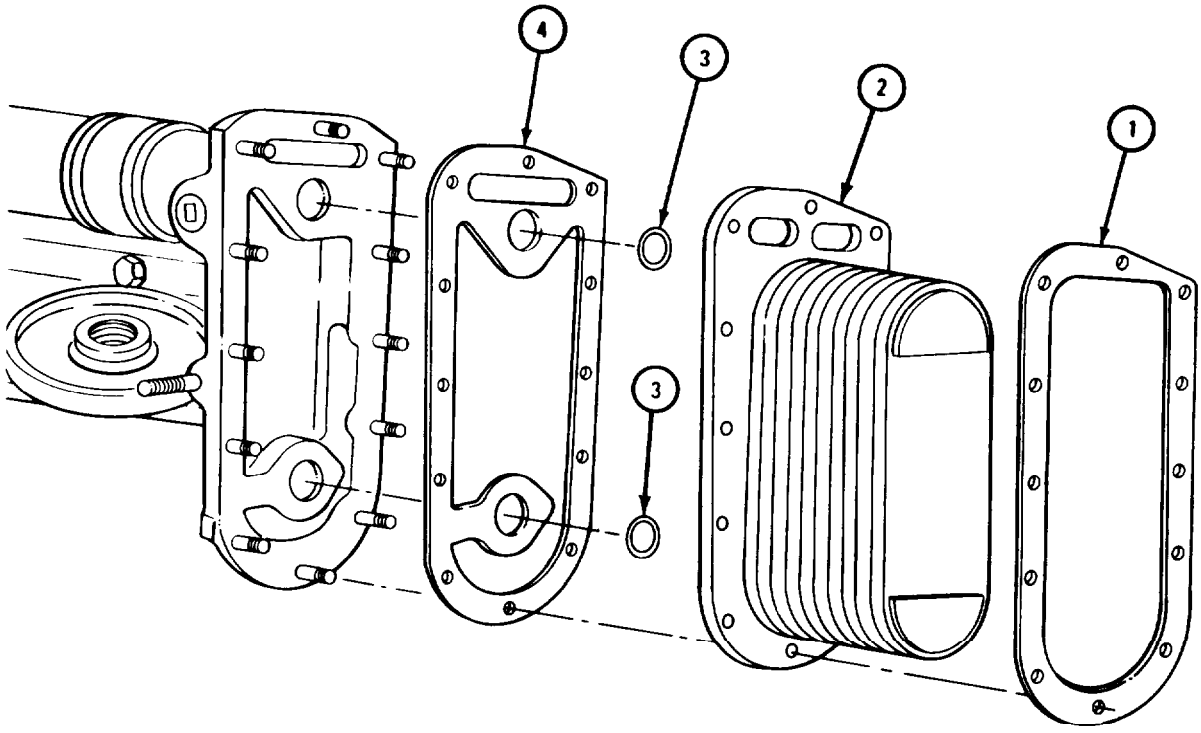
GO TO FRAME 2



FRAME 2

1. Take out and throw away cover gasket (1).
2. Take off oil cooler core (2).
3. Take out and throw away two preformed packings (3).
4. Take out and throw away gasket (4).

END OF TASK



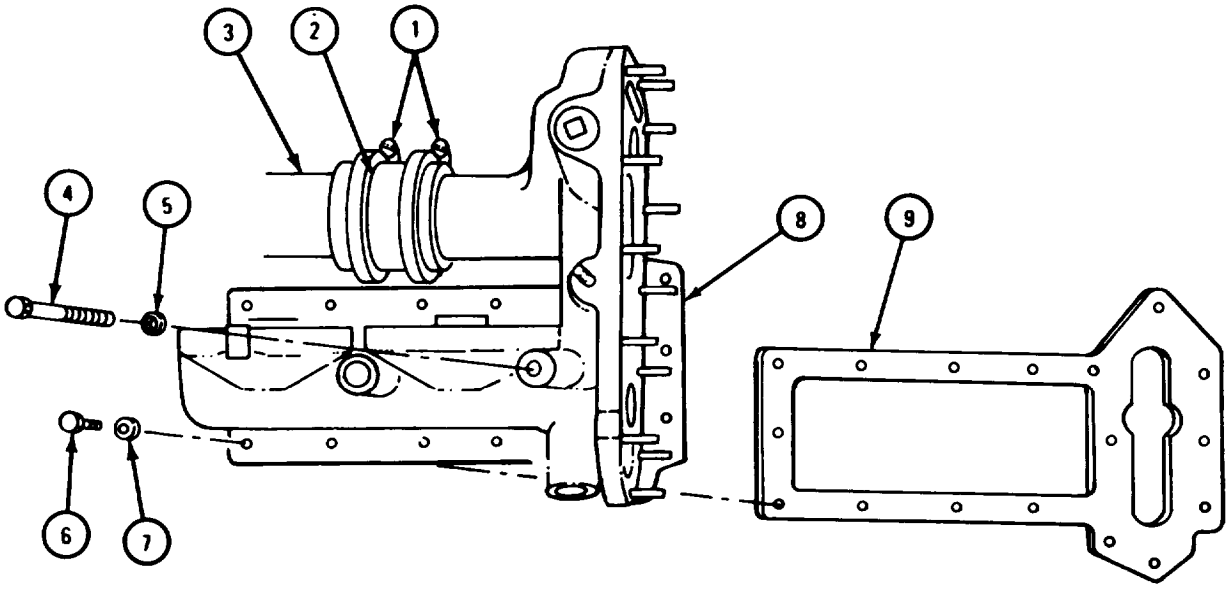
TA 102239

(2) Oil cooler housing.

FRAME 1

1. Loosen two hose clamps (1). Slide hose (2) back on oil cooler water inlet tube (3).
2. Take out machine bolt (4) and washer (5).
3. Take out 16 machine bolts (6) and washers (7). Take off housing (8).
4. Take off and throw away gasket (9).

END OF TASK



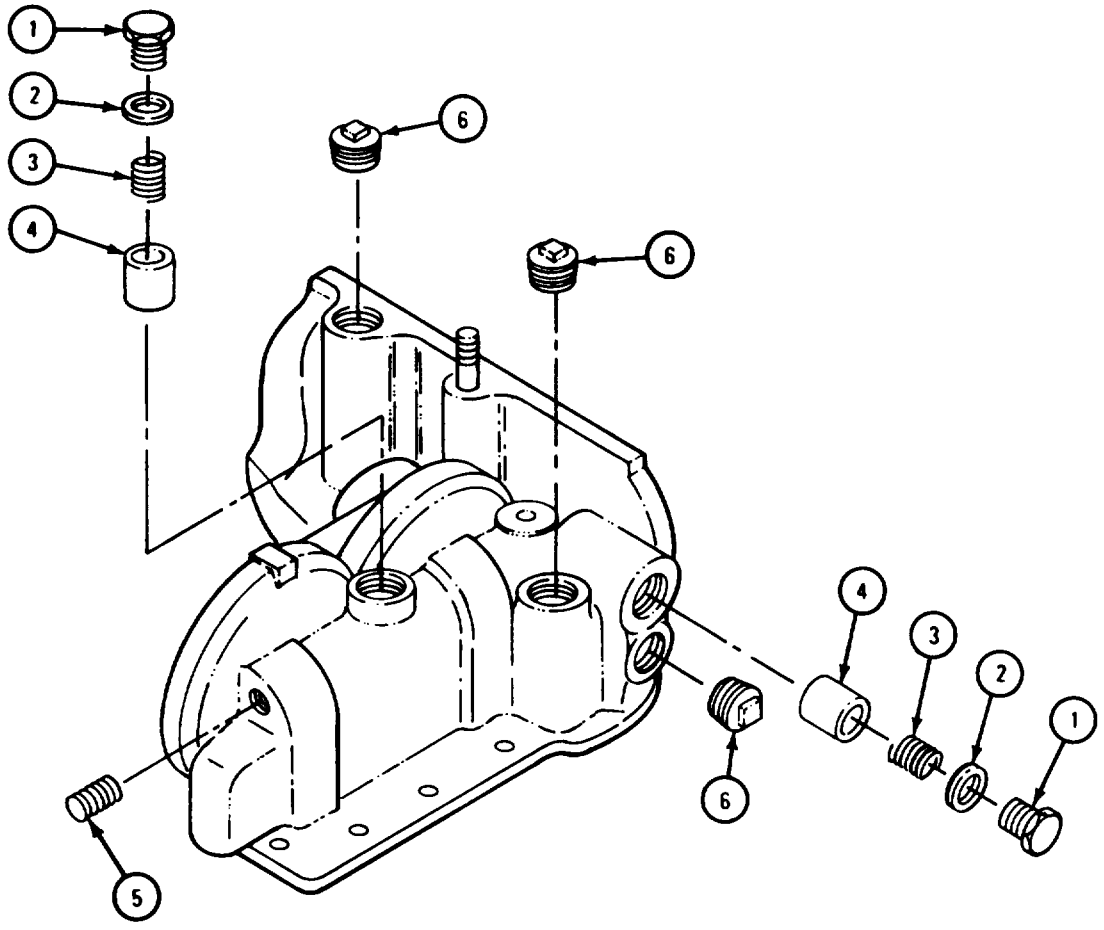
TA 102240

c. Disassembly.

FRAME 1

1. Take out two plugs (1), two gaskets (2), two springs (3), and two plungers (4). Throw away gaskets (2).
2. Take out plug (5).
3. Take out three plugs (6).

END OF TASK



TA 102241

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

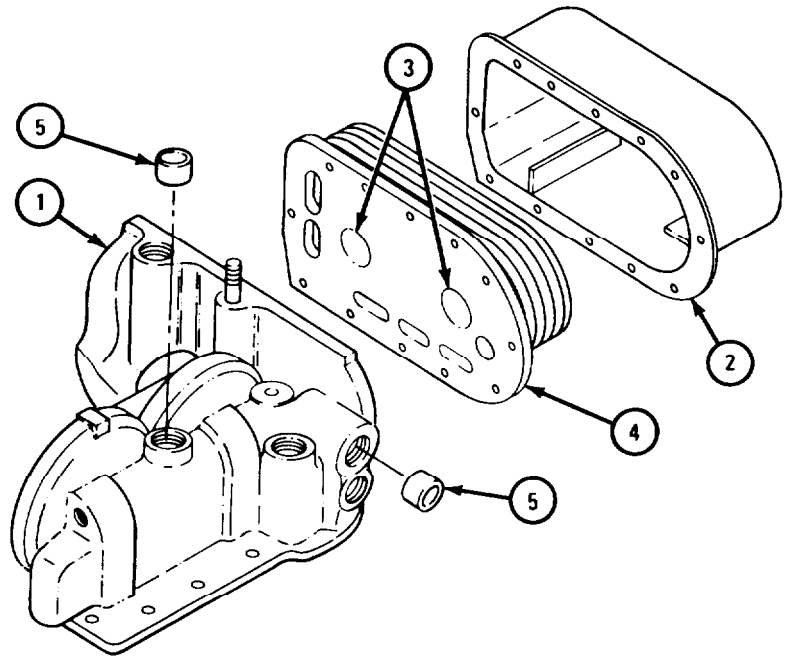
d. Cleaning. Clean all parts with solvent. Dry using lint-free cloth.

e. Inspection and Repair.

FRAME 1

1. Check that housing (1) and cover (2) have no cracks. If cracks are found, get a new part.
2. Plug one opening (3) in cooler core (4). Put a 150 psi air source into the other opening.
3. Put cooler core (4) under water. Check that cooler does not leak. If cooler leaks, get a new one.
4. Check that gasket surface on cooler core (4) is smooth. Take off rough spots using crocus cloth.
5. Check that plungers (5) have no scratches or burrs. Polish plungers with crocus cloth.

GO TO FRAME 2



TA 102242

FRAME 2

NOTE

Readings must be within limits given in table 2-2. If readings are not within given limits, throw away part and get a new one.

1. Measure two plunger bores (1).
2. Measure outside diameters of two plungers (2).
3. Measure fit between two plunger bores (1) and two plungers (2).
4. Measure free length of two springs (3).
5. Measure squeezed length of two springs (3), using 7. 65-pound load.
6. Measure solid length of two springs (3).

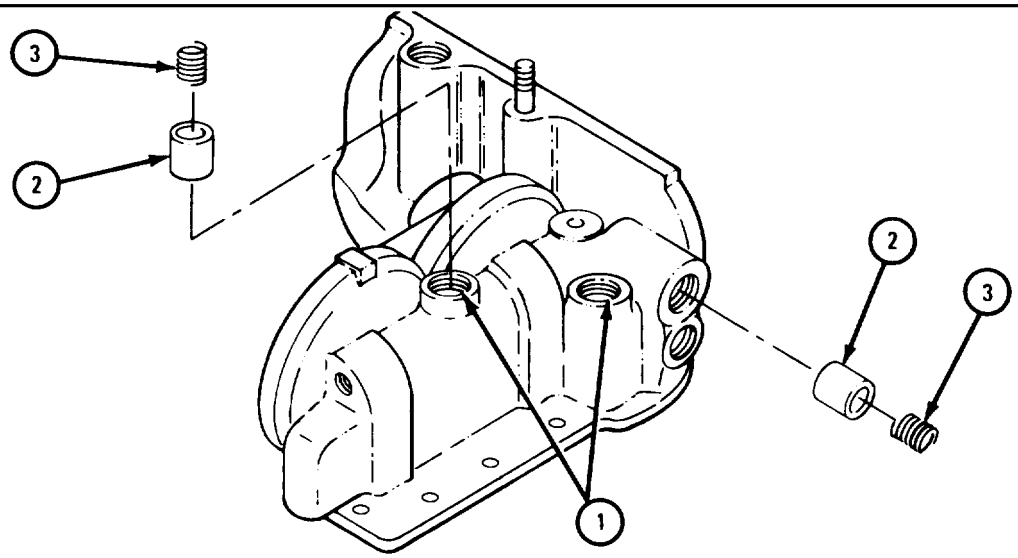


Table 2-2. Oil Cooler Housing Wear Limits

Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Plunger bore inner diameter	0.8030 to 0.8040	0.8050
2	Valve plunger outer diameter	0.8000 to 0.8010	0.7990
1 and 2	Fit of plunger in bore	0.0020 to 0.0040	0.0060
3	Spring (free length)	1.6200	None
3	Spring width (7.65-pound load)	1.3800	None
3	Spring solid height	0.9520 maximum	None

f. Assembly.

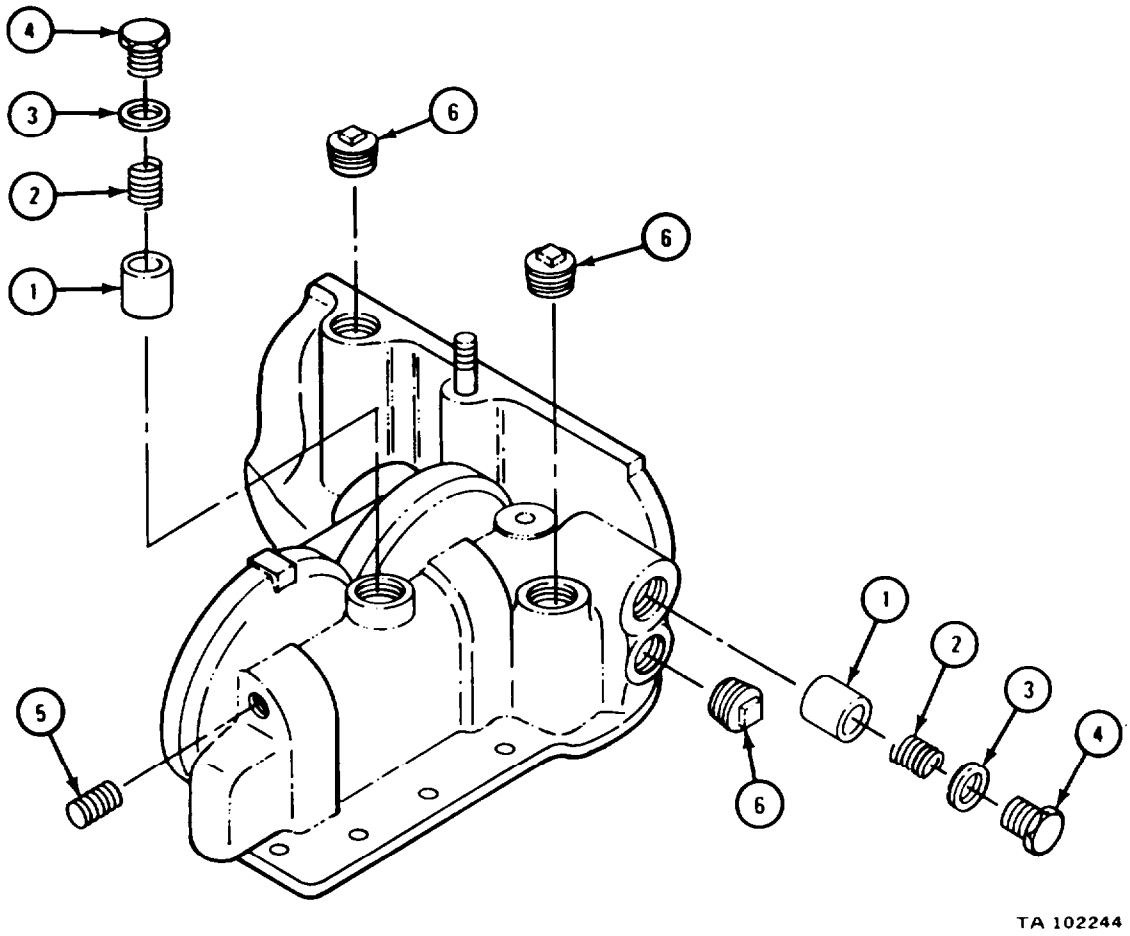
FRAME 1

CAUTION

Do not overtighten plugs when putting in housing. Damage to threads of cast iron housing will result.

1. Put in two plugs (1) and two springs (2). Place two new gaskets (3) on two plugs (4). Put in two plugs (4) with gaskets (3).
2. Put in plug (5).
3. Put in three plugs (6).

END OF TASK



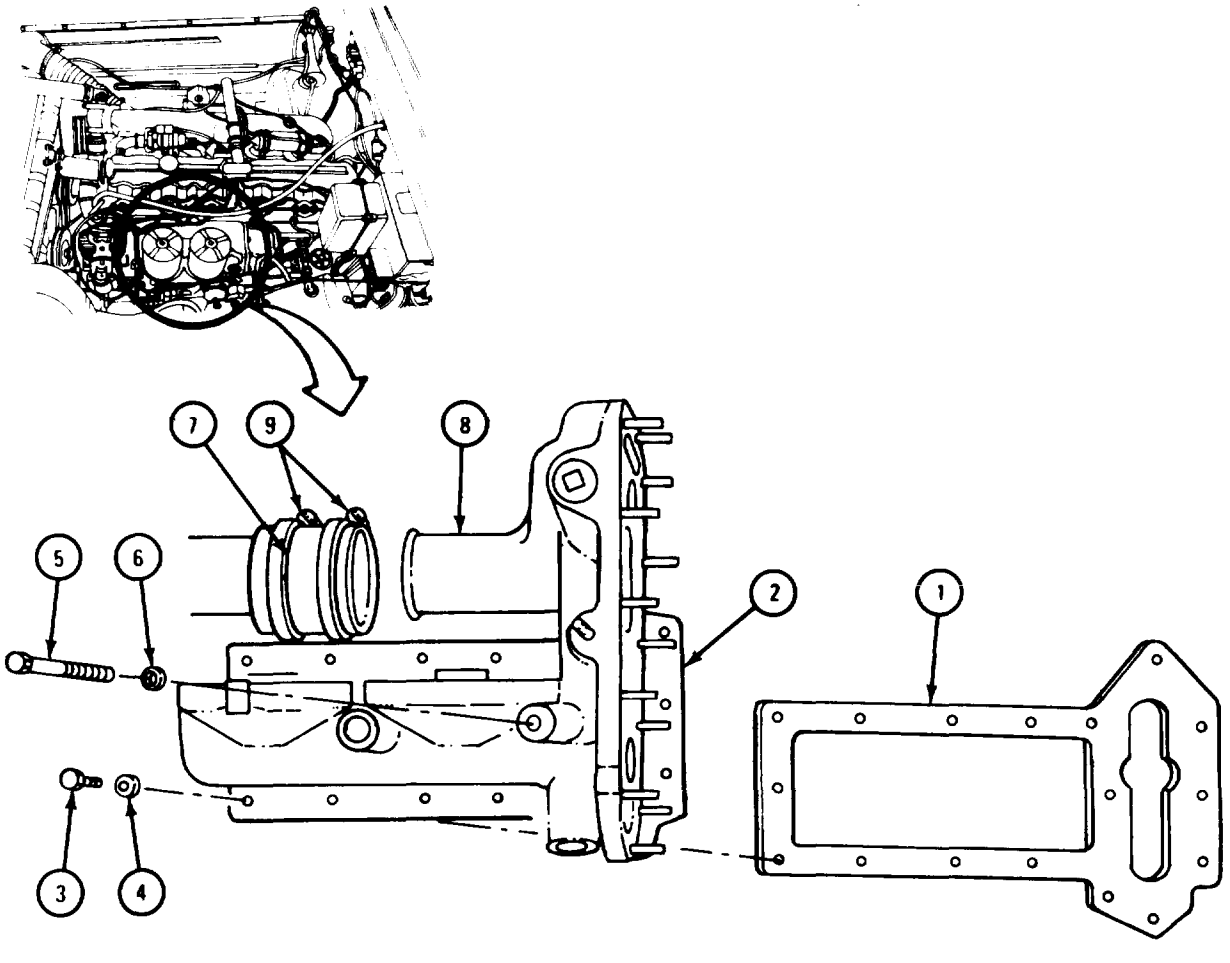
g. Replacement.

(1) Oil cooler housing

FRAME 1

1. Place new gasket (1) on engine, lining up all bolt holes in the gasket with the threaded bolt holes in the engine.
2. Place housing (2) over gasket (1), lining up holes for 16 bolts (3) with bolt holes in gasket (1) and bolt holes in engine.
3. Put in 16 machine bolts (3) with washers (4). Put in one machine bolt (5) with washer (6).
4. Slide water inlet hose (7) forward over flange (8). Tighten hose clamps (9).

END OF TASK



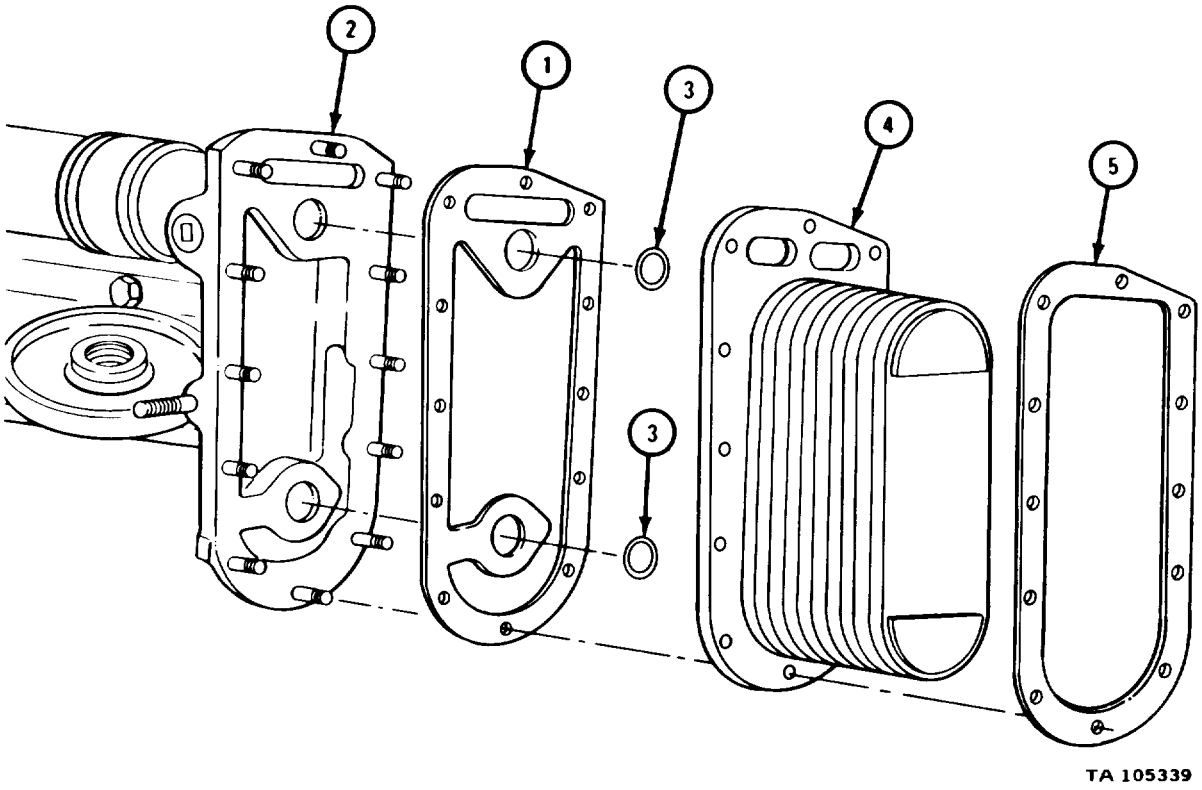
TA 102245

(2) Oil cooler radiator and cover.

FRAME 1

1. Put new gasket (1) on housing (2).
2. Put two new preformed packings (3) in gasket (1).
3. Put on oil cooler core (4).
4. Put on new cover gasket (5).

GO TO FRAME 2



TA 105339

FRAME 2

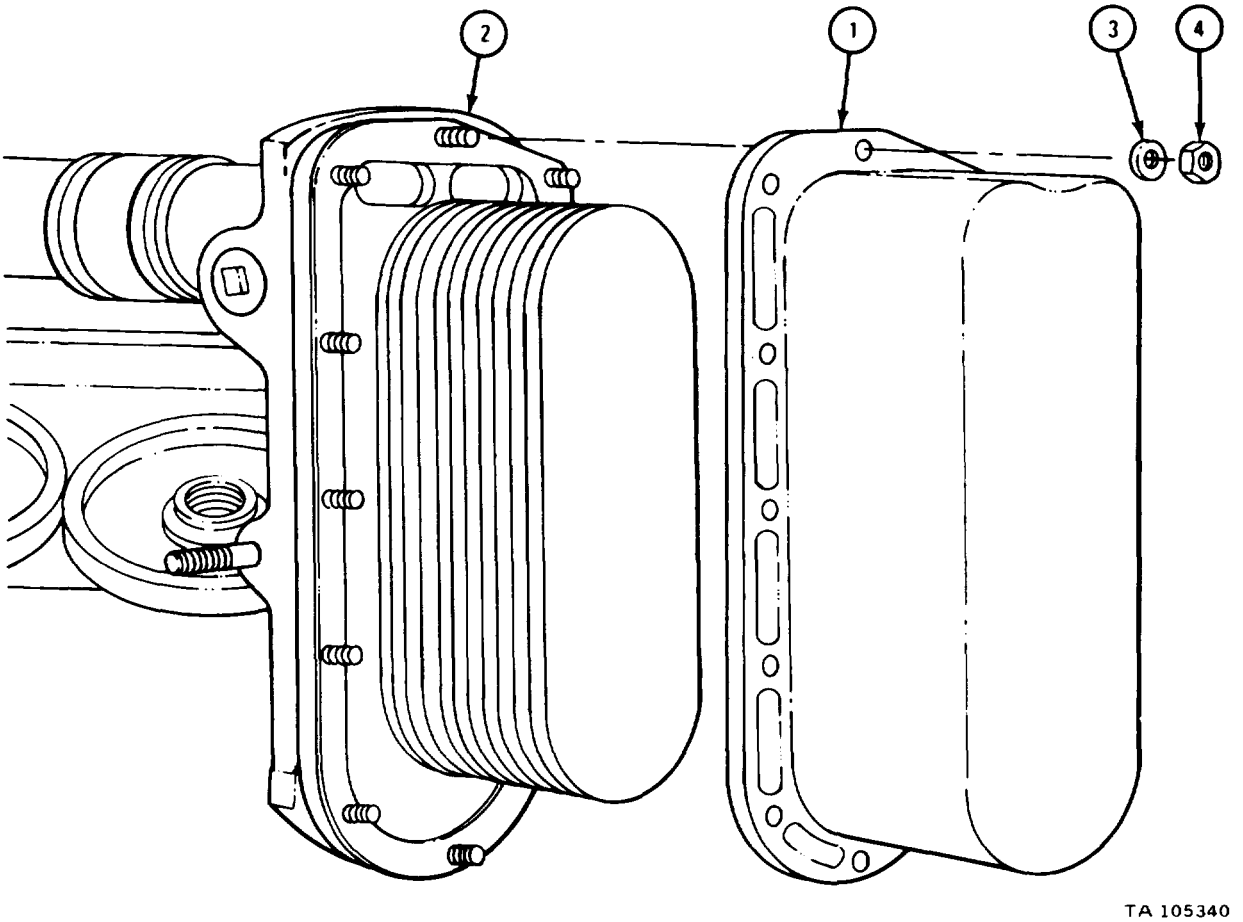
1. Put cover (1) on housing (2). Put on 12 washers (3) and nuts (4).

NOTE

Follow-on Maintenance Action Required:

1. Replace oil filters. Refer to TM 9-2320-211-20.
2. Replace fuel injection tubes. Refer to TM 9-2815-210-34.
3. Replace fuel filter housing. Refer to TM 9-2320-211-20.
4. Refill engine cooling system. Refer to TM 9-2320-211-20.
5. Start engine and check for leaks. Refer to TM 9-2320-211-10.
6. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



2-23. OIL PRESSURE REGULATOR, REMOVAL, AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean, lint-free rags
Gasket, oil pressure regulator housing to crankcase, NSN 2815-00-930-9229
Oil pressure regulator housing assembly, NSN 2815-00-194-2454

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off and cool, handbrake set.

a. Preliminary Procedures.

(1) Open hood and right side panel. Refer to TM 9-2320-211-10.

(2) If working on engine LDS465-1A or LDT465-1C (with turbocharger), remove turbocharger air intake hose. Refer to TM 9–2815-210-34.

b. Removal.

FRAME 1

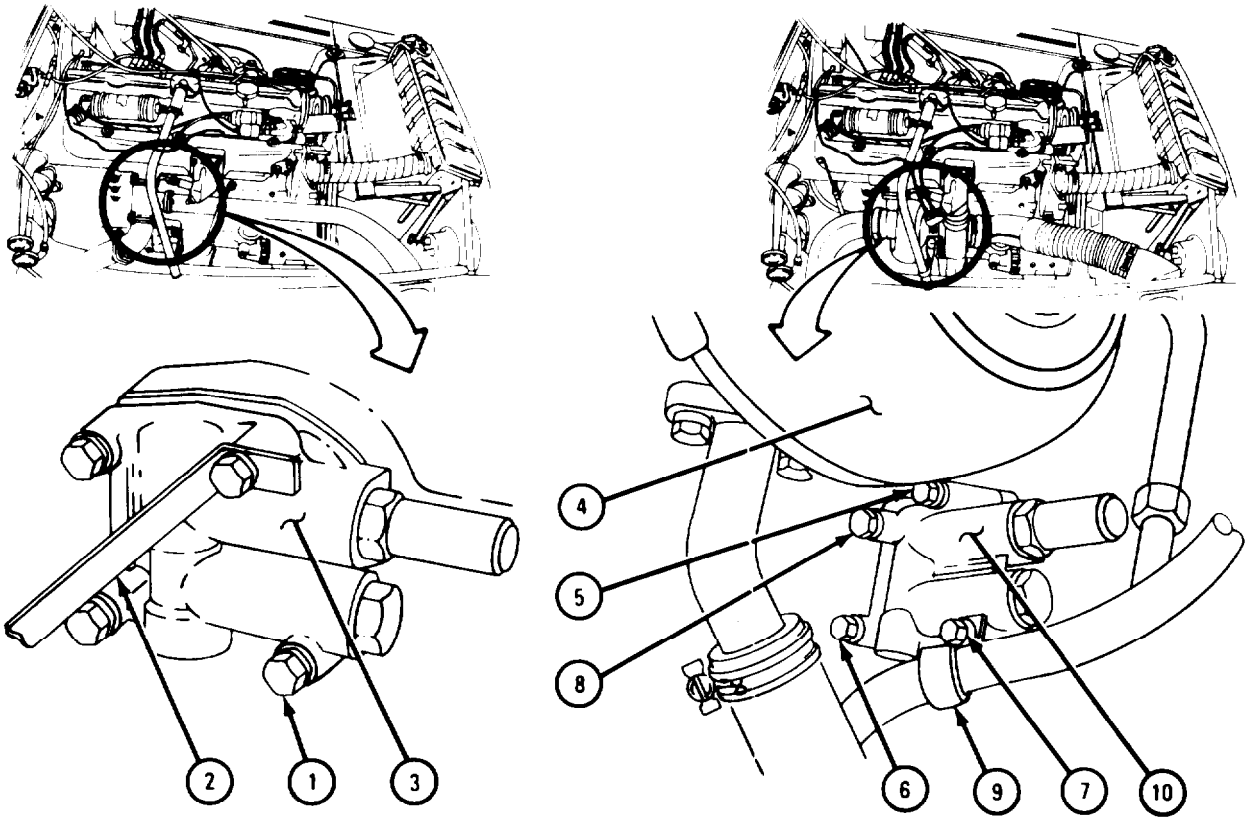
NOTE

If working on engine LD465-1 or LD465-1C (without turbocharger), refer to view A and do step 1.

If working on engine LDS465-1A or LDT465-1C (with turbocharger), refer to view B and do steps 2 and 3.

1. Take out four capscrews with lockwashers (1). Move breather tube support bracket (2) off oil pressure regulator (3). Take off oil pressure regulator (3) from engine crankcase.
2. Working under turbocharger (4), take out three capscrews with lockwashers (5, 6, and 7). Unscrew capscrew with lockwasher (8) from engine crankcase. Move cable clip (9) off oil pressure regulator (10).
3. Take off oil pressure regulator (10) with capscrew and lockwasher (8). Take out capscrew with lockwasher (8) from oil pressure regulator (10).

GO TO FRAME 2



FRAME 2

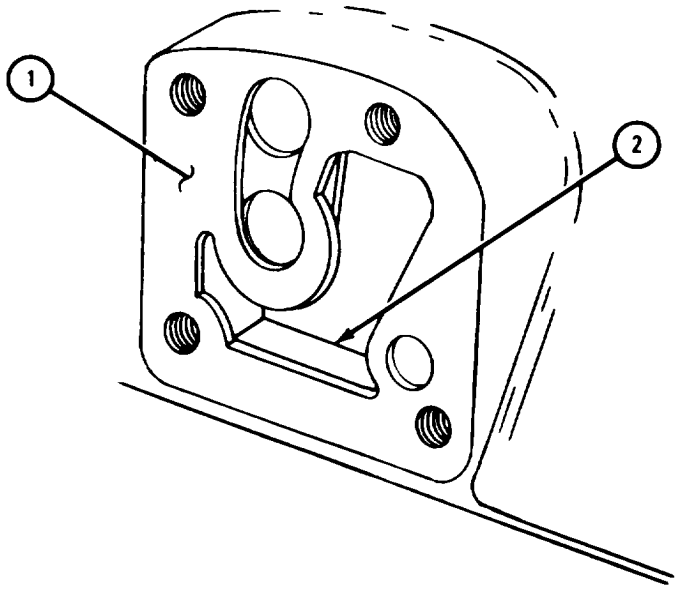
1. Take off gasket (1) from engine crankcase (2). Throw away gasket.

CAUTION

To prevent clogging of oil system and damage to engine, dust and other matter must not get into oil system openings.

2. Cover oil pressure regulator gasket areas of engine crankcase.

END OF TASK



TA 105309

c. Cleaning and Inspection.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Using dry cleaning solvent, clean oil pressure regulator and oil pressure regulator gasket area of engine crankcase. Wipe dry with clean, lint-free rags.

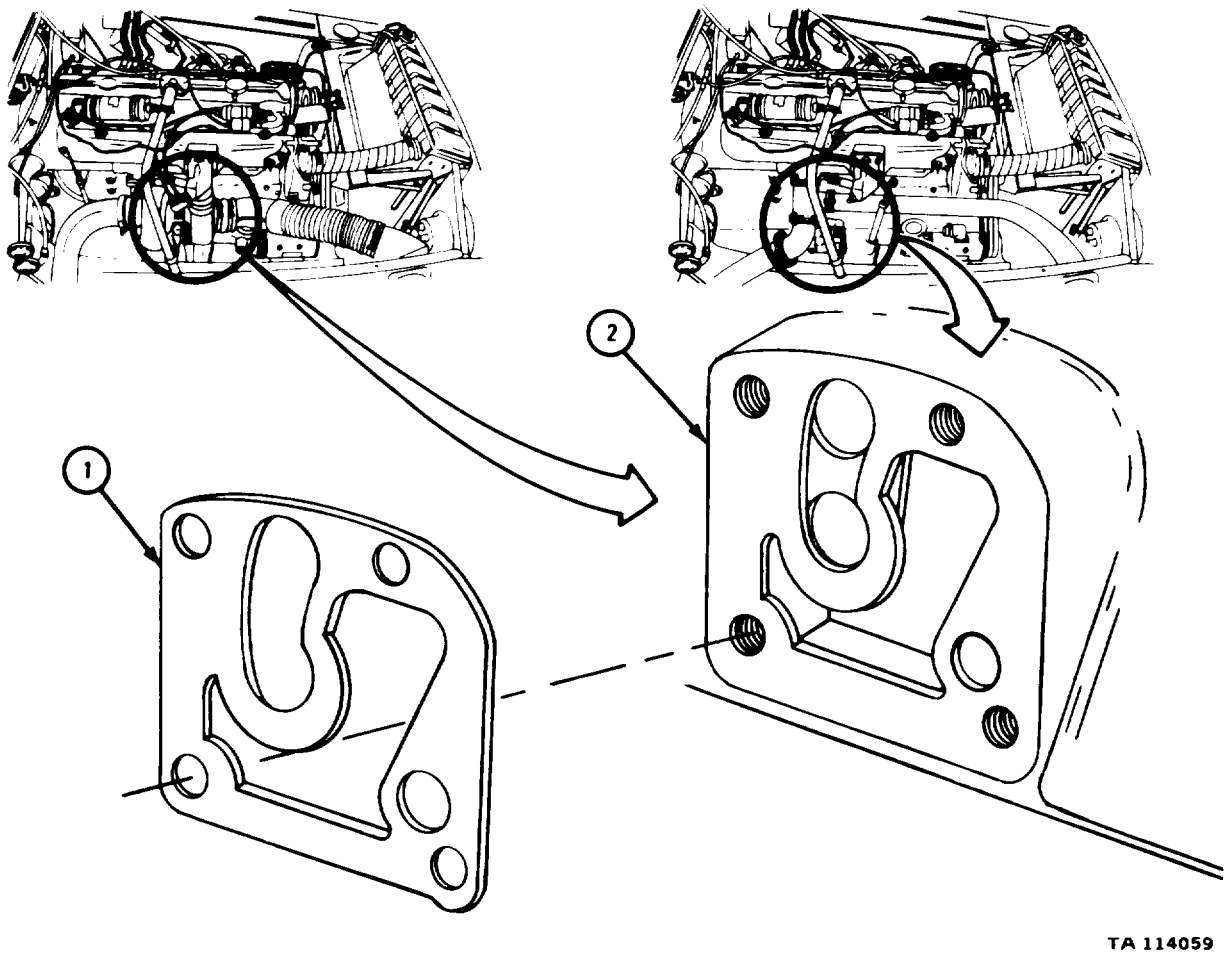
(2) Check oil pressure regulator gasket area of engine crankcase for damage. Refer to TM 9-2815-210-34.

d. Replacement.

FRAME 1

1. Put new gasket (1) on engine crankcase (2).

IF WORKING ON ENGINE LD465-1 OR LD465-1C (WITHOUT TURBOCHARGER), GO TO FRAME 2.
IF WORKING ON ENGINE LDS465-1A OR LDT465-1C (WITH TURBOCHARGER), GO TO FRAME 3



FRAME 2

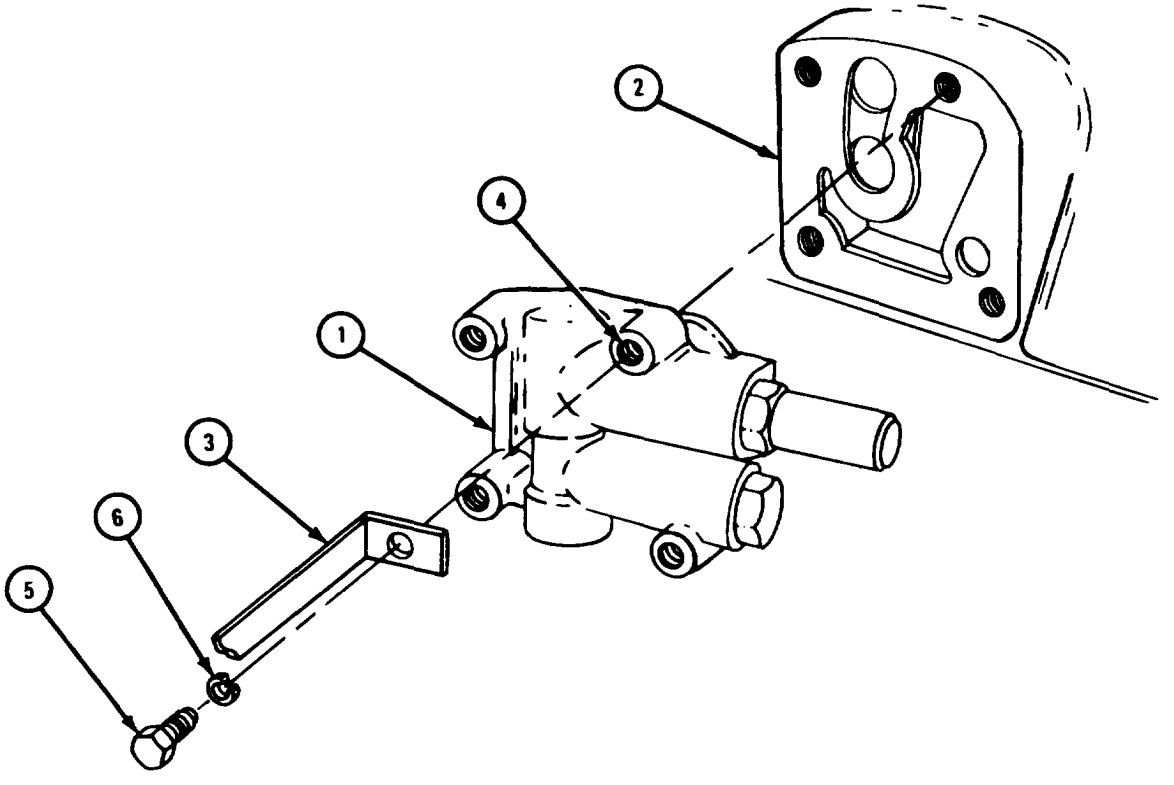
1. put new oil pressure regulator (1) on gasket (2). Move breather tube support bracket (3) over screwhole (4).
2. Put in and tighten four capscrews (5) with lockwashers (6).

NOTE

Follow-on Maintenance Action Required:

Close right side panel and hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 114060

FRAME 3

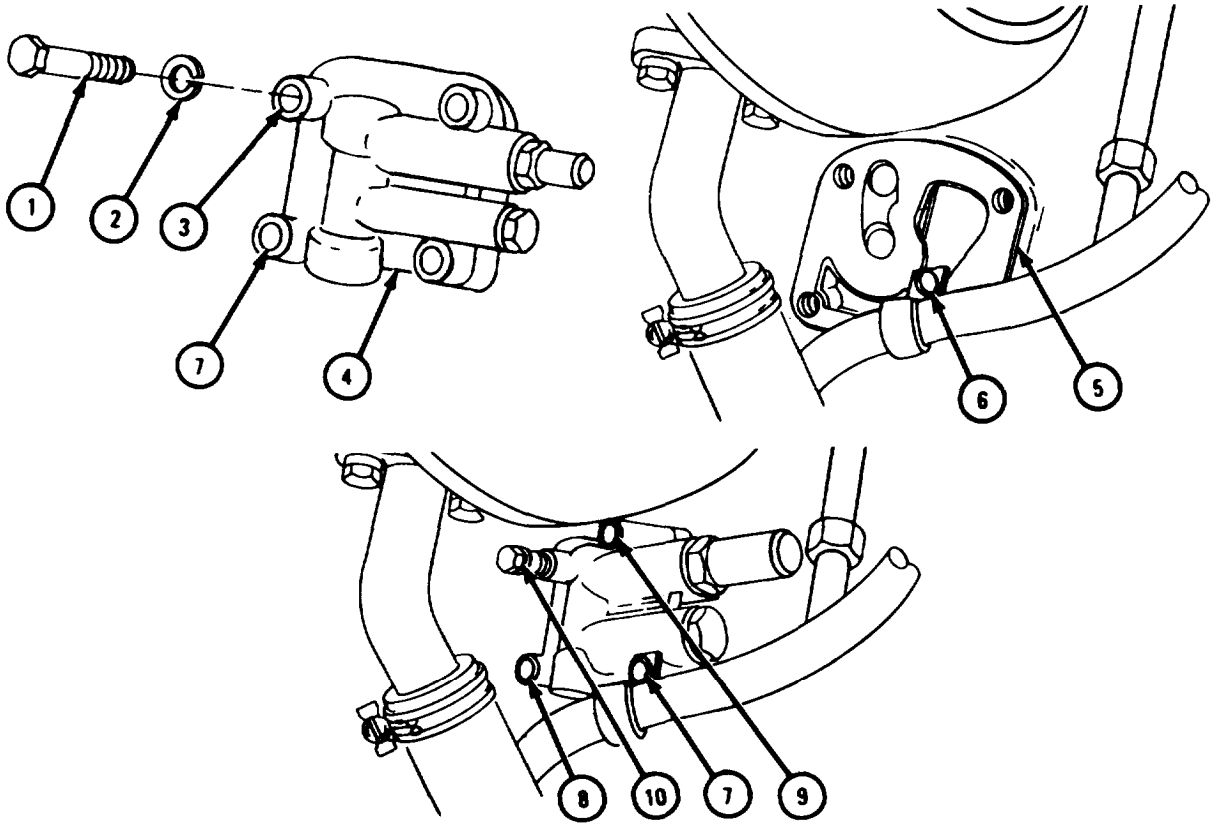
1. Put capscrew (1) with lockwasher (2) in screwhole (3) of oil pressure regulator (4).
2. Put new oil pressure regulator (4) on gasket (5).
3. Put hole in cable clamp (6) over screwhole (7) of oil pressure regulator (4).
4. Put capscrews (1) with lockwashers (2) in three screwholes (7, 8, and 9) of oil pressure regulator (4).
5. Tighten capscrew (10) and three capscrews in screwholes (7, 8, and 9).

NOTE

Follow-on Maintenance Action Required:

1. Put on turbocharger air intake hose. Refer to TM 9-2815-210-34.
2. Check for oil leak. Refer to TM 9-2320-211-10.
3. Close right side panel and hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 114061

Section VIII. MANIFOLDS

2-24. INTAKE AND EXHAUST MANIFOLDS REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Crocus cloth
Manifold gasket (2)
Water manifold gasket (6)
Intake manifold elbow gasket

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Disconnect battery ground cable. Refer to TM 9-2320-211-20.

(2) Drain coolant system. Refer to TM 9-2320-211-20.

(3) Remove thermostat housing. Refer to TM 9-2320-211-20.

(4) Remove crankcase breather tube. Refer to TM 9-2320-211-20.

(5) If engine has side mounted (solenoid controlled) flame heater system, do the following:

(a) Remove flame heater ignition unit. Refer to TM 9-2320-211-20.

(b) Remove intake manifold flame heater assembly. Refer to TM 9-2320-211-20.

(c) Remove flame heater wiring harness. Refer to TM 9-2320-211-20.

(6) If engine has top mounted-covered flame heater system, do the following:

(a) Remove flame heater nozzle and check valve assembly. Refer to TM 9-2320-211-20.

(b) Remove flame heater wiring harness. Refer to TM 9-2320-211-20.

(c) Remove flame heater ignition unit and fuel pump. Refer to TM 9-2320-211-20.

(d) Remove flame heater spark plug. Refer to TM 9-2320-211-20.

(7) If engine has top mounted-uncovered flame heater system, do the following:

(a) Remove flame heater nozzle and check valve assembly. Refer to TM 9-2320-211-20.

(b) Remove flame heater fuel pump. Refer to TM 9-2320-211-20.

(c) Remove flame heater fuel filter. Refer to TM 9-2320-211-20.

(d) Remove flame heater wiring harness. Refer to TM 9-2320-211-20.

(e) Remove flame heater ignition unit. Refer to TM 9-2320-211-20.

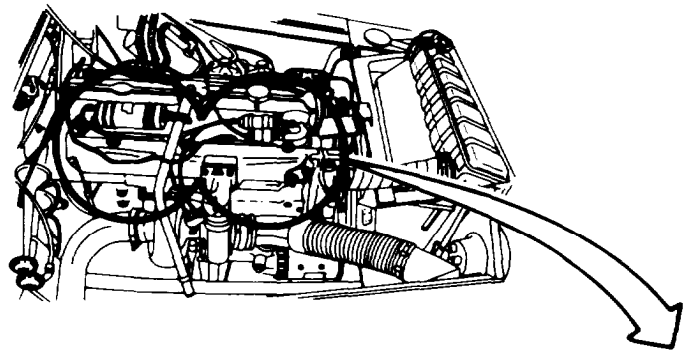
(8) Remove turbocharger. Refer to TM 9-2815-210-34.

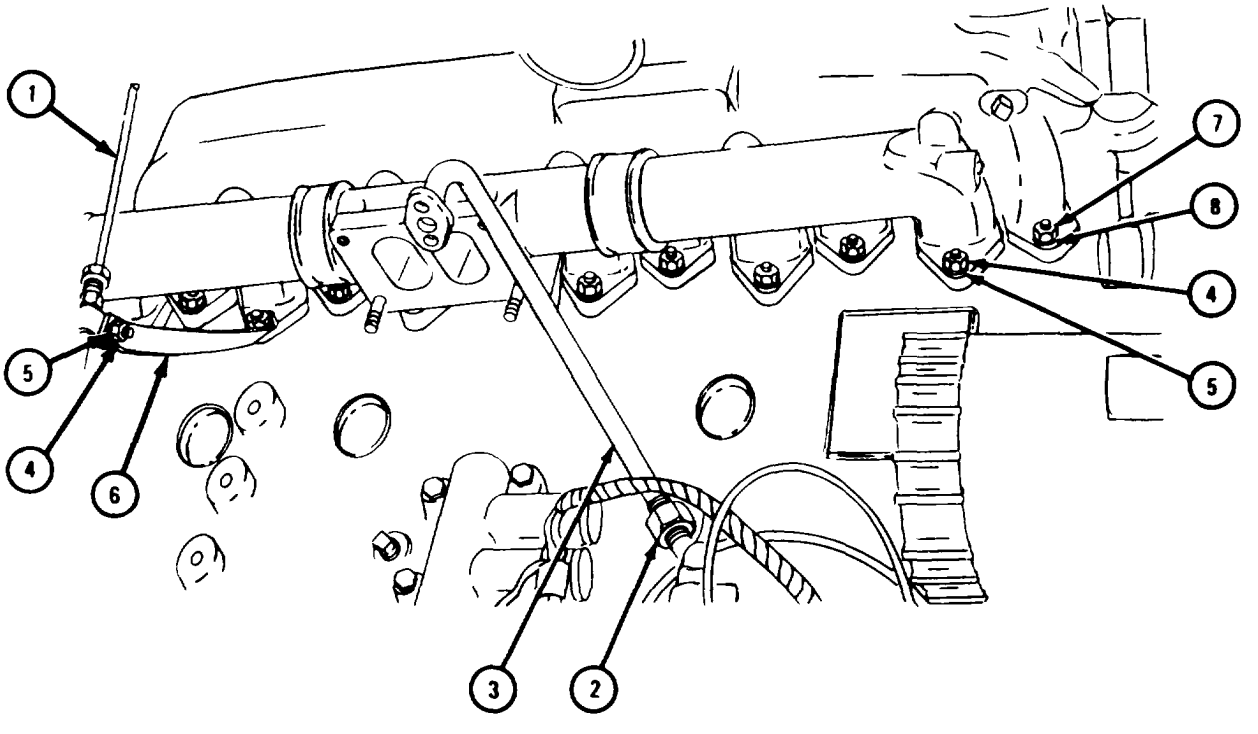
b. Removal.

FRAME 1

1. Take out oil gage rod (1).
2. Loosen fitting (2) and take off turbocharger oil inlet tube (3).
3. Take off six nuts (4) with washers (5).
4. Take off oil level gage support bracket (6).
5. Take off six nuts (7) with washers (8),

GO TO FRAME 2



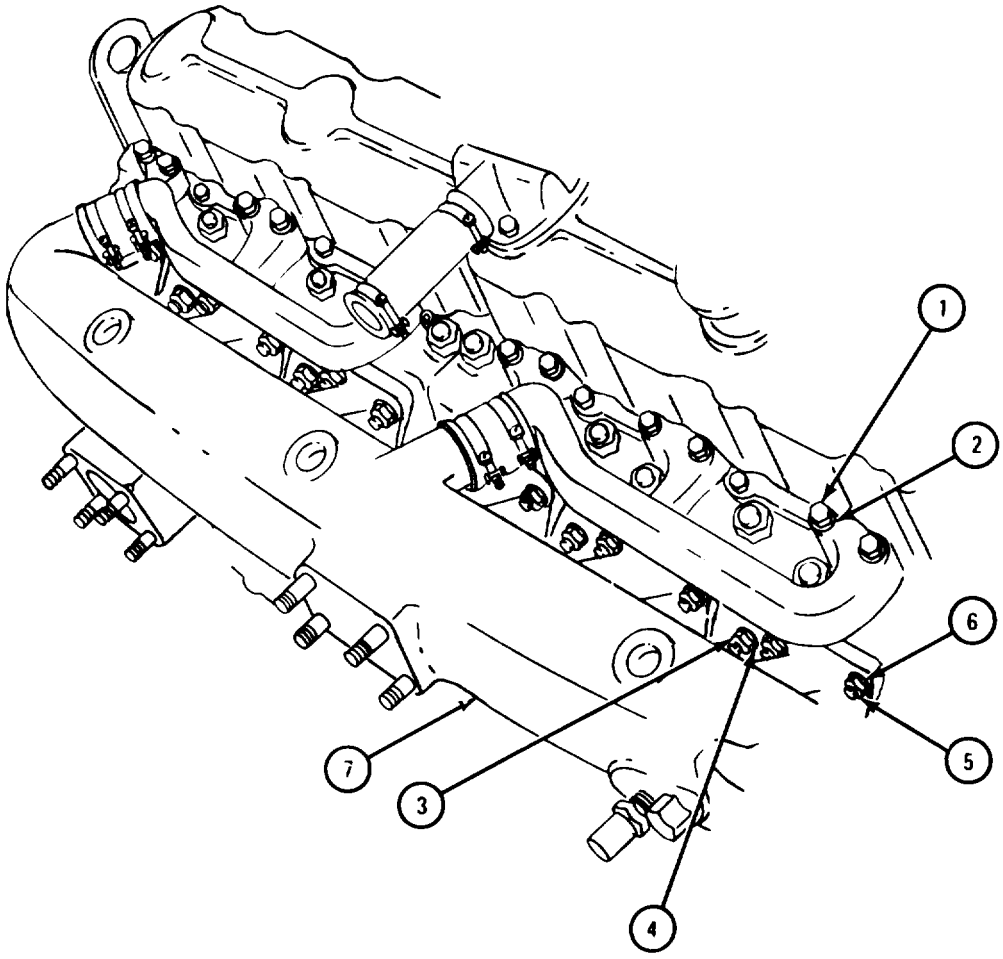


TA 102268

FRAME 2

1. Take off 12 bolts (1) with washers (2).
2. Take off six self-locking nuts (3) with washers (4).
3. Take off 12 plain nuts (5) with washers (6).
4. Pull intake and exhaust manifold (7) off engine as an assembly.

GO TO FRAME 3

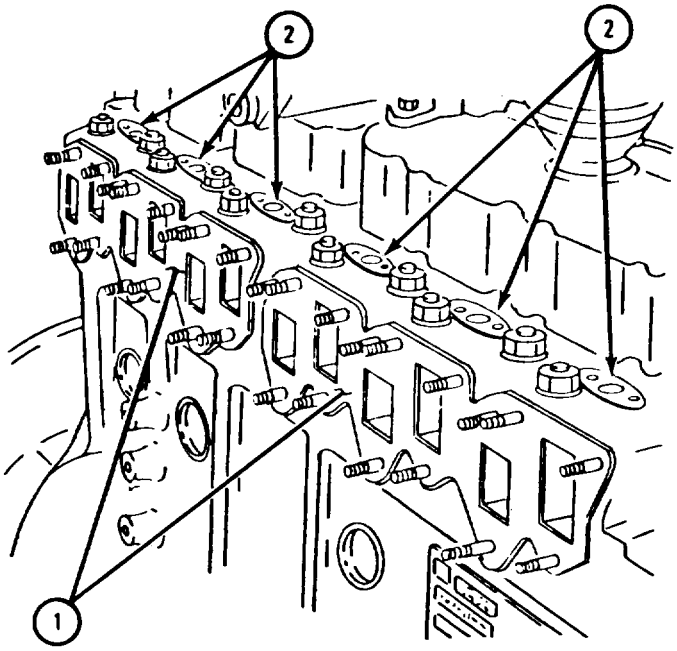


TA 102269

FRAME 3

1. Take off and throw away two gaskets (1).
2. Takeoff and throw away six gaskets (2).

END OF TASK



TA 102270

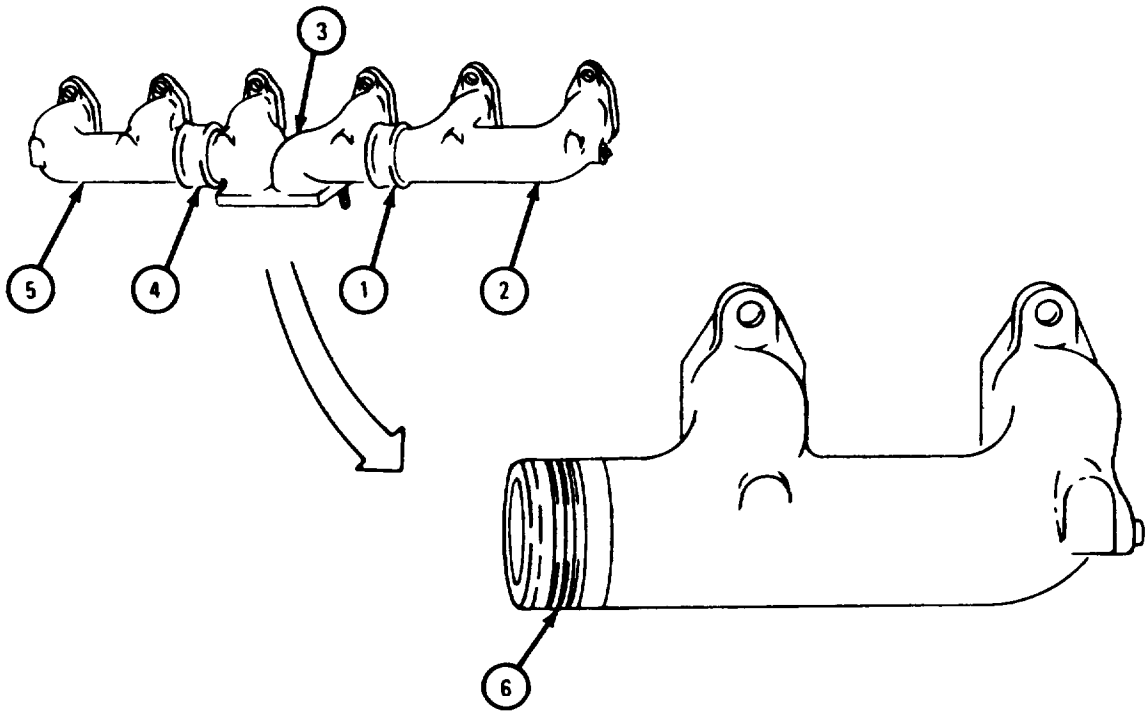
c. Disassembly.

(1) Exhaust manifold.

FRAME 1

1. Heat joint (1). Pull apart manifold sections (2 and 3).
2. Heat joint (4). Pull apart manifold sections (3 and 5).
3. Take out two seal rings (6) from manifold sections (2 and 5).

END OF TASK



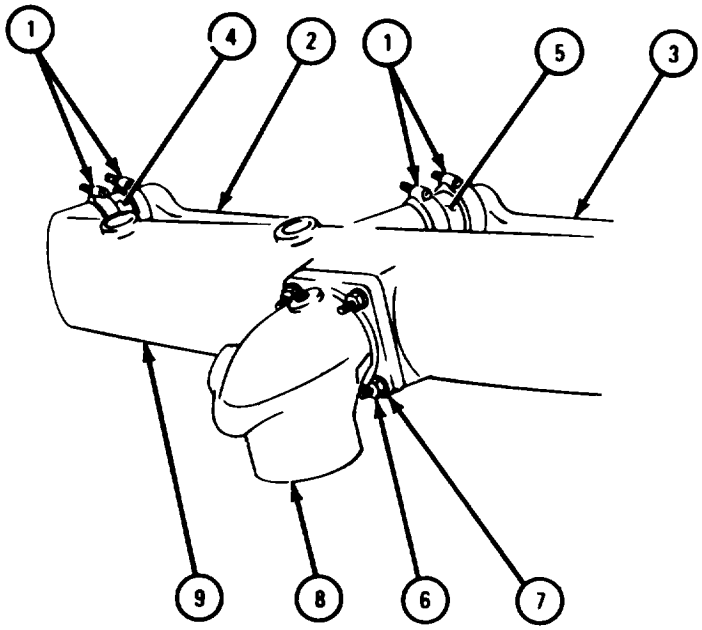
TA 102271

(2) Intake manifold.

FRAME 1

1. Loosen four clamp screws (1).
2. Takeout rear water manifold (2).
3. Take out front water manifold (3).
4. Take off hoses (4 and 5).
5. Take off four nuts (6) and washers (7).
6. Pull intake manifold elbow (8) off intake manifold (9).

GO TO FRAME 2

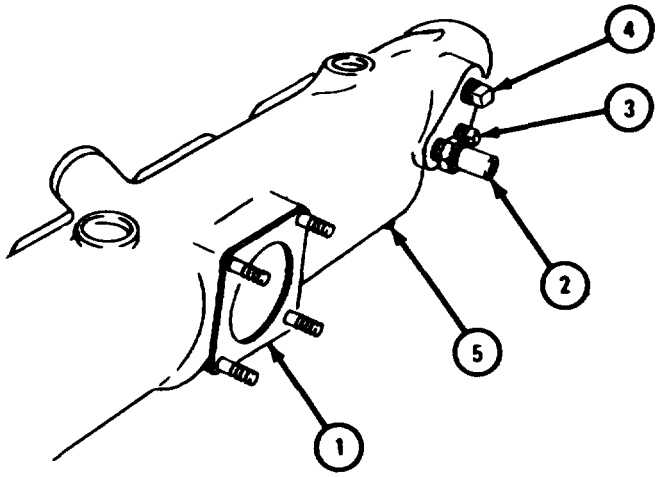


TA 102272

FRAME 2

1. Take out and throw away gasket (1).
2. Take out transmitter (2).
3. Take out plugs (3, 4, and 5).

END OF TASK



TA 102273

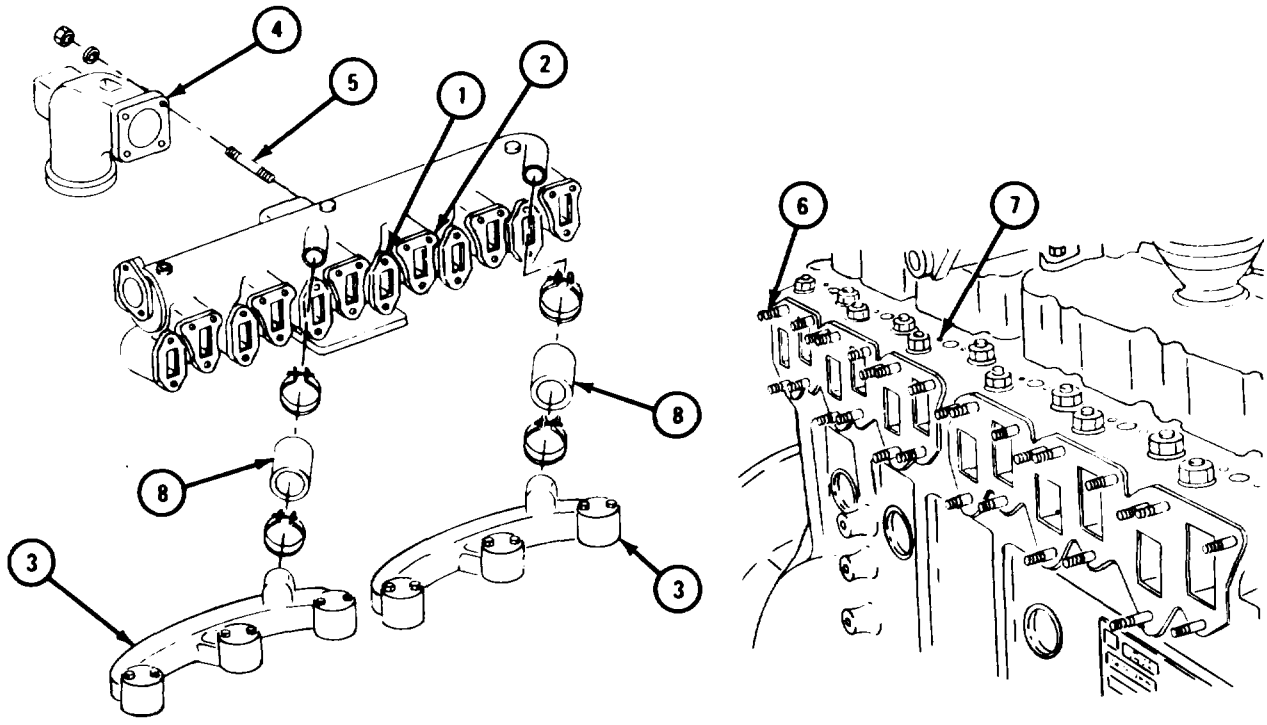
d. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures in para 1-3.

e. Inspection and Repair.

FRAME 1

1. Check that mounting flanges on manifolds (1, 2, and 3) and manifold elbow (4) are not scratched. Take off scratches with file or crocus cloth.
2. Check that four elbow studs (5) and 30 manifold studs (6) are not bent or broken and that threads are not damaged. If studs are broken, drill them out and retap holes. Get new studs in place of damaged ones.
3. Check that manifolds (1, 2, and 3) and manifold elbow (4) are not cracked. Weld cracks. Refer to TM 9-237. If more repair is needed, get a new part.
4. Check that 12 threaded holes (7) are not damaged. Retap damaged holes.
5. Check that two hoses (8) have no cracks, tears or dry rot. If hoses are damaged, get new ones.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102302

f. Assembly.

(1) Intake manifold.

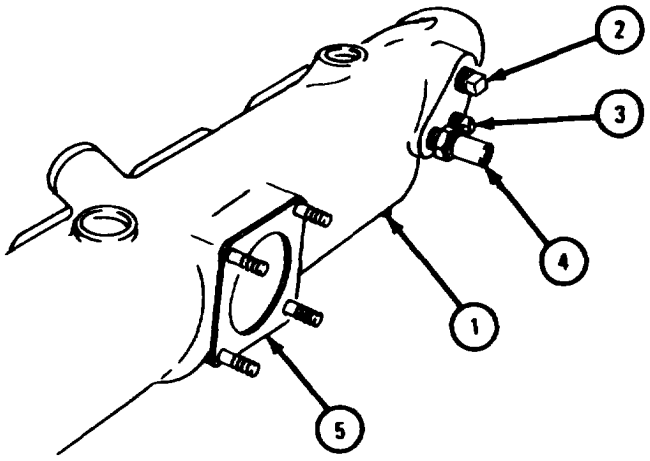
FRAME 1

CAUTION

Do not overtighten plugs (1, 2, and 3) and transmitter (4). Manifold casting can be damaged and will leak.

1. Put in plugs (1, 2, and 3).
2. Put in transmitter (4).
3. Put on gasket (5).

GO TO FRAME 2

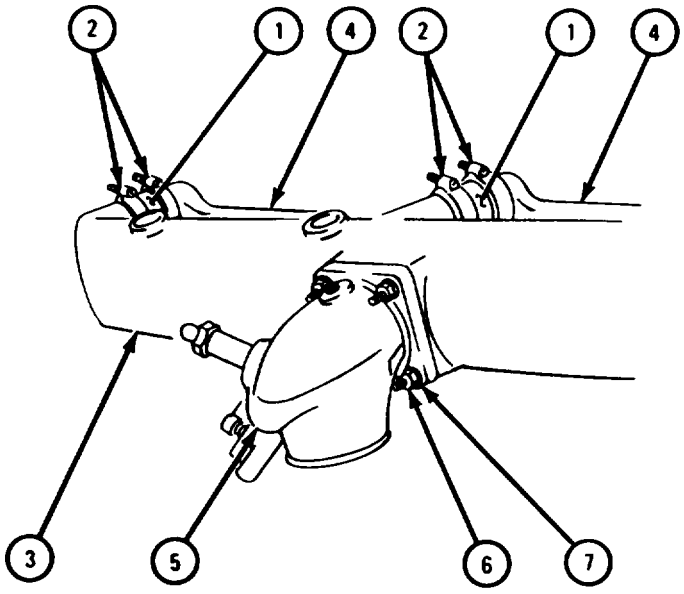


TA 102274

FRAME 2

1. Put two hoses (1) and four clamps (2) on manifold (3). Put two water manifolds (4) in hoses.
2. Tighten four clamps (2).
3. Put elbow (5) on manifold (3).
4. Hand tighten four nuts (6) and washers (7). Tighten nuts to 10 to 13 pound-feet.

END OF TASK



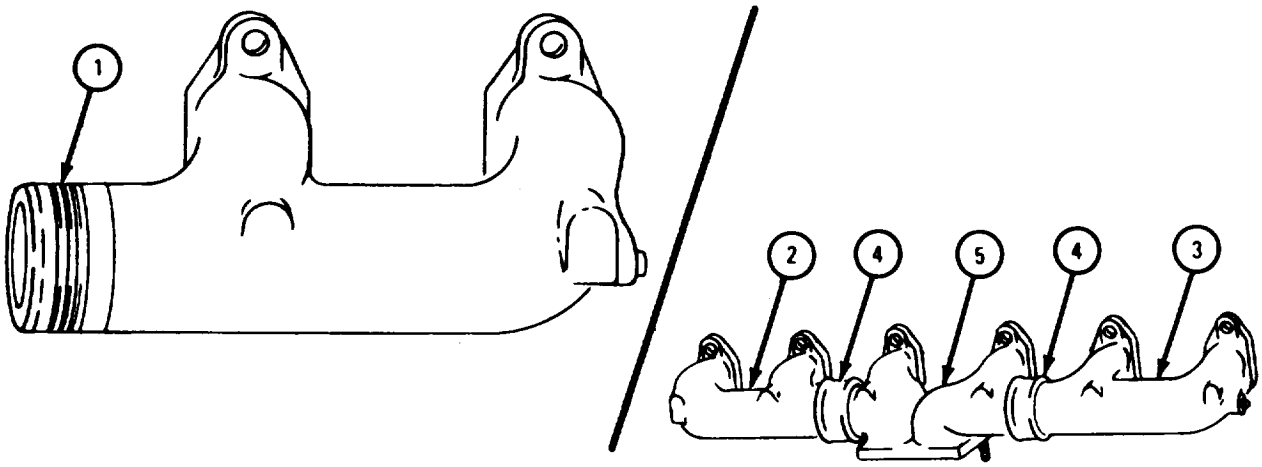
TA 102275

(2) Exhaust manifold.

FRAME 1

1. Put two seal rings (1) on rear and front manifold sections (2 and 3).
2. Heat left joint (4).
3. Squeeze seal ring (1) and push rear manifold section (2) into center manifold section (5).
4. Heat right joint (4).
5. Squeeze seal ring (1) and push front manifold section (3) into center manifold section (5).
6. Check that manifold sections (2, 3, and 5) are alined and that joints (4) are tight.

END OF TASK



TA 102276

g. Replacement.

FRAME 1

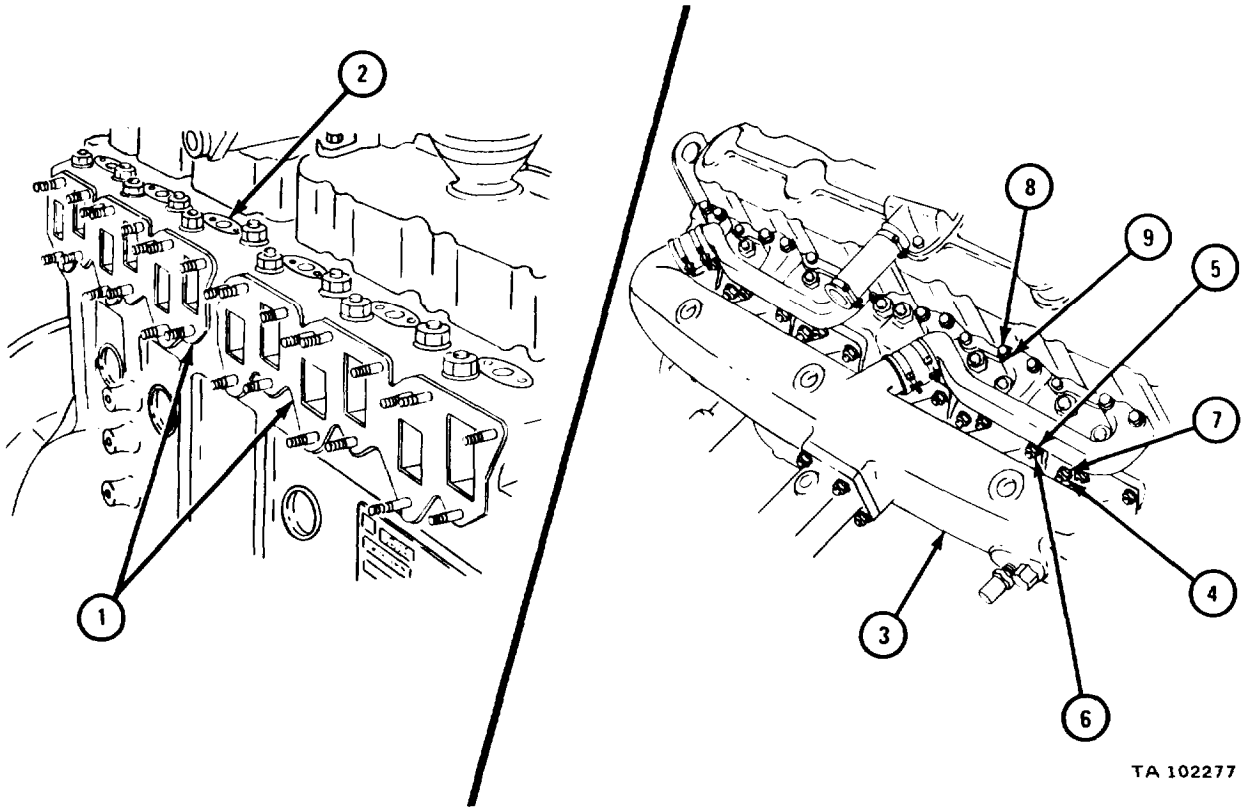
1. Put on two gaskets (1). Put on six gaskets (2).

NOTE

Intake and exhaust manifolds (3) cannot be put back separately. They must be put on at the same time.

2. Put intake, exhaust, and water manifolds (3) over studs in block. Hand tighten 12 plain nuts (4) with washers (5).
3. Hand tighten six locknuts (6) with washers (7).
4. Hand tighten 12 bolts (8) with washers (9). Tighten bolts to 15 to 20 pound-feet.

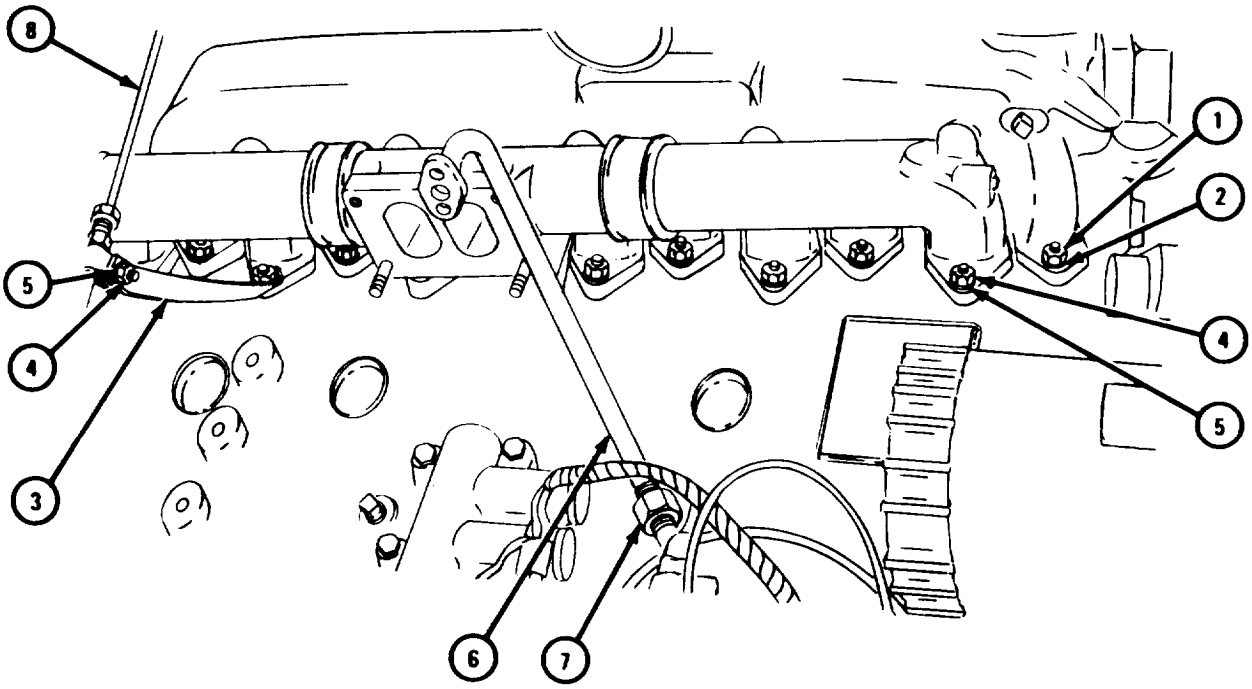
GO TO FRAME 2



FRAME 2

1. Hand tighten six nuts (1) with washers (2).
2. Put on oil level gage support bracket (3).
3. Hand tighten six nuts (4) with washers (5).
4. Tighten upper and lower nuts (1) to 12 to 15 pound-feet.
5. Tighten upper and lower nuts (4) to 34 to 39 pound-feet.
6. Put on tube (6) and screw on fitting (7). Put in oil gage rod (8).

GO TO FRAME 3



TA 102278

FRAME 3

NOTE

Follow-on Maintenance Action Required:

1. Replace turbocharger. Refer to TM 9-2815-210-34.
2. If engine has top mounted-uncovered flame heater system, do the following:
   a. Replace heater nozzle and check valve assembly. Refer to TM 9-2320-211-20.
   b. Replace flame heater pump. Refer to TM 9-2320-211-20.
   c. Replace flame heater fuel filter. Refer to TM 9-2320-211-20.
   d. Replace flame heater wiring harness. Refer to TM 9-2320-211-20.
   e. Replace flame heater ignition unit. Refer to TM 9-2320-211-20.
3. If engine has top mounted-covered flame heater system, do the following:
   a. Replace flame heater spark plug. Refer to TM 9-2320-211-20.
   b. Replace flame heater ignition unit and fuel pump. Refer to TM 9-2320-211-20.
   c. Replace flame heater wiring harness. Refer to TM 9-2320-211-20.
   d. Replace flame heater nozzle and check valve assembly. Refer to TM 9-2320-211-20.
4. If engine has side mounted (solenoid controlled) flame heater system, do the following:
   a. Replace flame heater wiring harness, Refer to TM 9-2320-211-20.
   b. Replace intake manifold flame heater assembly. Refer to TM 9-2320-211-20.
   c. Replace flame heater ignition unit. Refer to TM 9-2320-211-20.
5. Replace crankcase breather tube. Refer to TM 9-2320-211-20.
6. Replace thermostat housing. Refer to TM 9-2320-211-20.
7. Fill coolant system. Refer to TM 9-2320-211-20.
8. Reconnect battery ground cable. Refer to TM 9-2320-211-20.

END OF TASK

CHAPTER 3

CLUTCH SYSTEM GROUP MAINTENANCE

Section I. SCOPE

3-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for the clutch assembly for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels.

3-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. CLUTCH ASSEMBLY

3-3. CLUTCH ASSEMBLY REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: 3/8-16 UNC x 2 1/4-inch capscrew (3)
3/8 x l/4-inch flat washer (3)
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean soft lint-free cloth
Penetrant kit
Water

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove transmission-to-transfer case propeller shaft. Refer to TM 9-2320-211-20.

(2) Remove front winch propeller shaft (all trucks with front winch) . Refer to TM 9-2320-211-20.

(3) On truck M51A2, remove hoist pump propeller shaft. Refer to TM 9-2320-211-20.

(4) Remove power takeoff linkage on all trucks with front winch. Refer to Part 3, para 17-59.

(5) Remove cab floor tunnel and bell housing toeboard. Refer to TM 9-2320-211-20.

(6) Remove shift lever. Refer to TM 9-2320-211-20.

(7) Remove transmission declutch shift air lines, main air supply and vent lines. Refer to Hydraulic Lines and Fittings Removal and Replacement, TM 9-2320-211-20.

(8) Remove clutch actuating link rod assembly. Refer to TM 9-2320-211-20.

(9) On truck M543A2, remove outer auxiliary release clutch lever. Refer to TM 9-2320-211-20.

(10) Remove front axle propeller shaft. Refer to para 9-5.

(11) Remove transmission. Refer to para 7-3.

b. Removal.

FRAME 1

1. Mark position of clutch (1) to flywheel (2).
2. Put in three capscrews (3) and flat washers (4).

Soldier A 3 Hold clutch cover (1) in place.

CAUTION

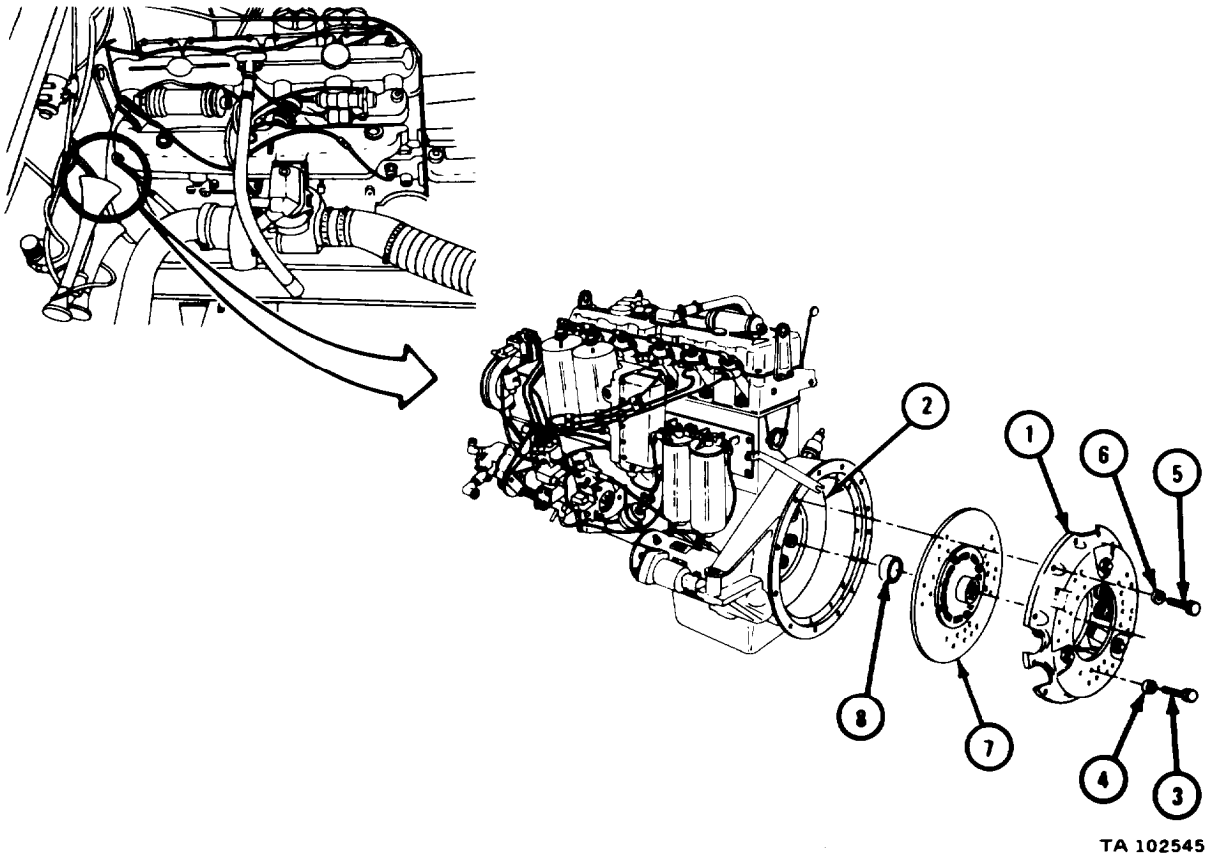
Take out 12 capscrews (5) by turning each screw one or two turns at a time to stop damage to clutch cover (1).

Soldier B 4. Take out 12 capscrews (5) and lockwashers (6).

Soldiers A and B 5. Take out clutch cover (1) and clutch disk (7).

6. If bearing (8) is damaged or worn, pull out bearing.

END OF TASK



c. Cleaning.

WARNING

Dry cleaning solvent is flammable and will not be used near an open flame. A fire extinguisher will be kept nearby when the solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean clutch cover and flywheel with solvent. Make sure that capscrew holes are clean. Let parts dry and wipe parts with clean cloth.

WARNING

Do not use a wire brush or compressed air to clean clutch disk facings. There may be asbestos dust on the disk facings which can be dangerous to your health if you breathe it in.

CAUTION

Never let dry cleaning solvent, grease or oil of of any kind touch facing of clutch disk.

(2) Clean clutch disk facings using a brush and water.

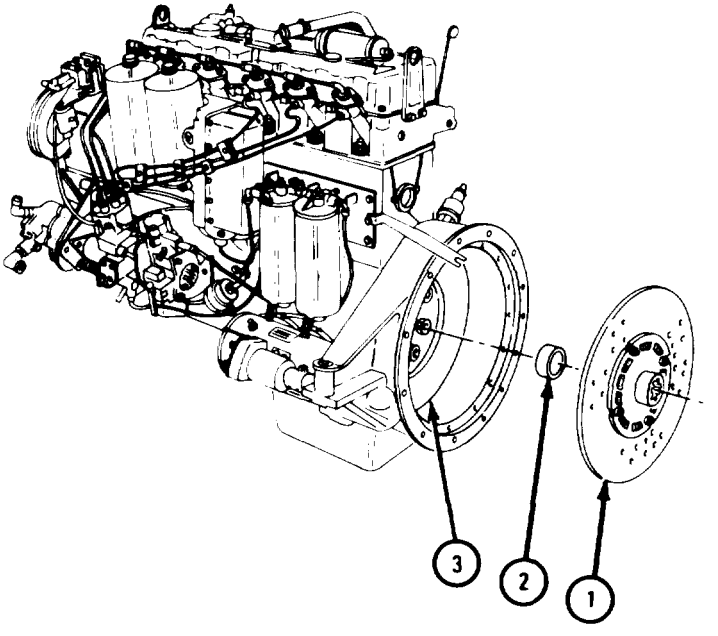
(3) Clean drive hub on clutch disk with a cloth soaked in solvent.

d. Inspection.

FRAME 1

1. Check that clutch disk (1) has no loose rivets, hub or lining distortion or damaged splines. If clutch disk is damaged, get a new one.
2. Check that thickness of clutch disk (1) is at least 0.390 inch. Take measurement at several points. If clutch disk is worn more than given limit, get a new one.
3. Check that bearing (2) is not damaged. Refer to para 7-7. If bearing is damaged, get a new one.
4. Check that flywheel (3) is not damaged.

GO TO FRAME 2

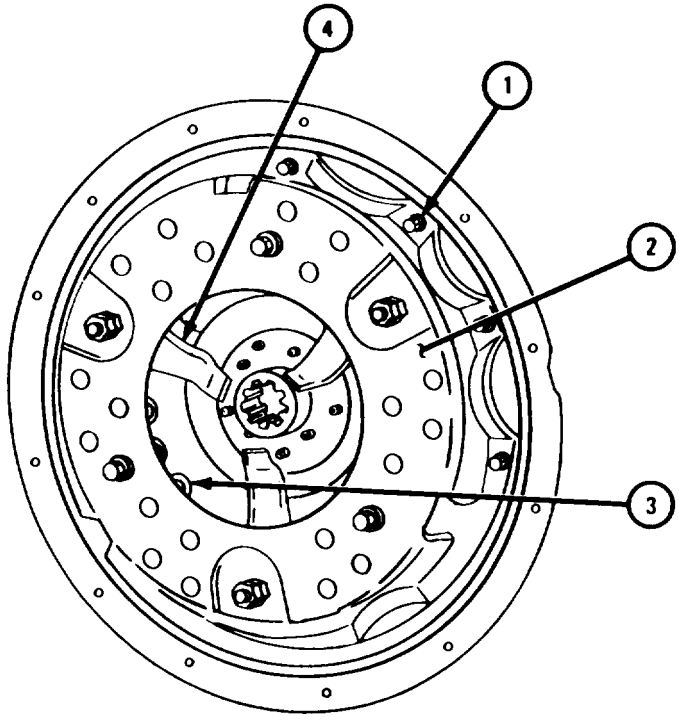


TA 102546

FRAME 2

1. Check that 12 capscrews (1) have no stripped threads. If capscrews are damaged, get new ones.
2. Check that clutch cover (2) is not broken, uneven, or damaged in any other way. If clutch is damaged, get a new one.
3. Using penetrant kit, check that clutch cover (2) is not cracked. If clutch cover is cracked, get a new one.
4. Check that springs (3) are not collapsed or broken. Get a new clutch cover (2) if springs are damaged.
5. Check that three release levers (4) are not broken. Get a new clutch cover (2) if release levers are damaged.

GO TO FRAME 3

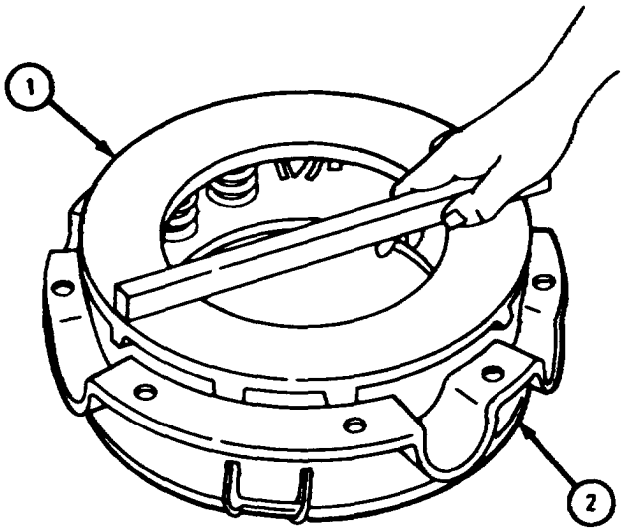


TA 102547

FRAME 3

1. Using straight bar and feeler gages, check that pressure plate (1) is not warped more than 0.010 inch. Get a new clutch cover (2) if pressure plate is warped.

END OF TASK



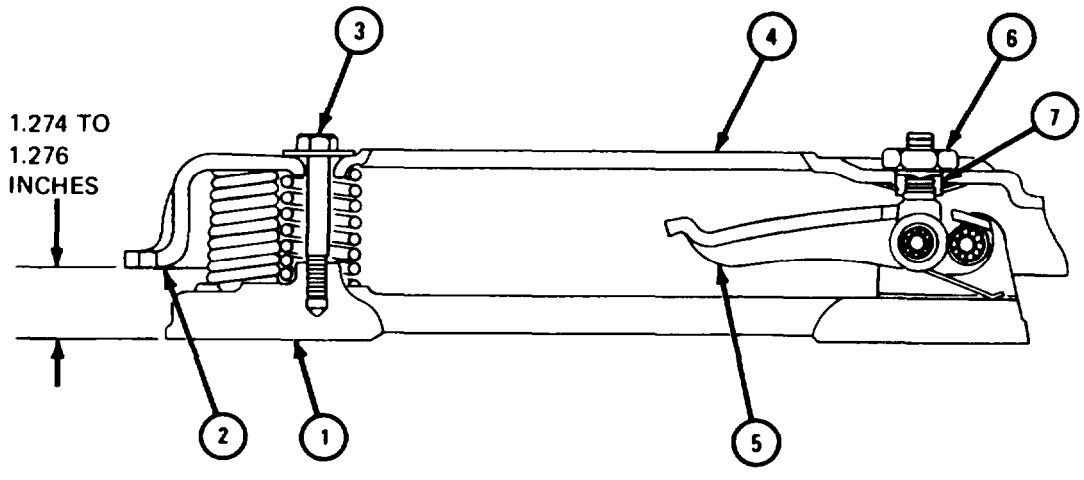
TA 102548

e. Adjustment of Clutch.

FRAME 7

1. Measure distance from outer surface of pressure plate (1) to inner surface of cover plate (2). Unscrew three capscrews (3) until distance is 1.274 to 1.276 inches.
2. Lay clutch cover (4) face down on a flat surface.
3. Measure distance from top of three release levers (5) to flat surface. If distance is not 2.163 to 2.193 inches, do steps 4 through 7.
4. Loosen three jamnuts (6).
5. If distance in step 3 was less than 2.163 inches, turn three adjusting screws (7) to the right. If distance was more than 2.193 inches, turn three adjusting screws to the left.
6. When distance in step 3 is correct, hold adjusting screws (7) and tighten jamnuts (6).
7. Turn each of three capscrews (3) one turn to the right.

END OF TASK



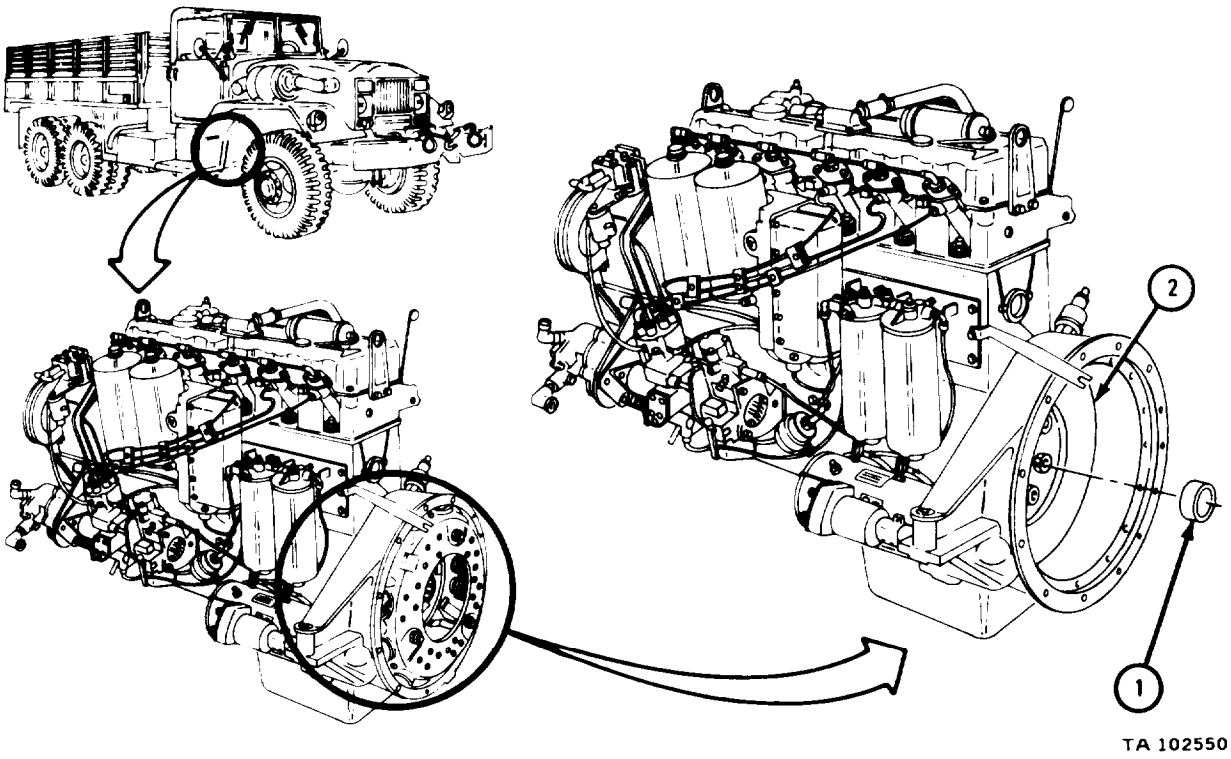
TA 102549

f. Replacement.

FRAME 1

1. Put bearing (1) into bore of flywheel (2). Refer to para 7-7.

GO TO FRAME 2

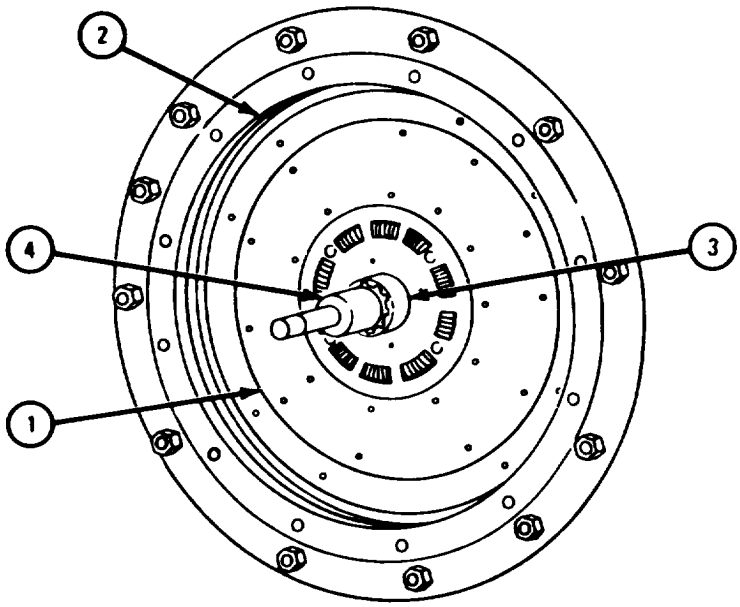


TA 102550

FRAME 2

1. Put clutch disk (1) against flywheel (2) with long end of drive hub (3) away from flywheel.
2. Using clutch alinement tool (4), aline splines of disk drive hub (3) with bearing in flywheel (2). Do not take off clutch alinement tool.

GO TO FRAME 3

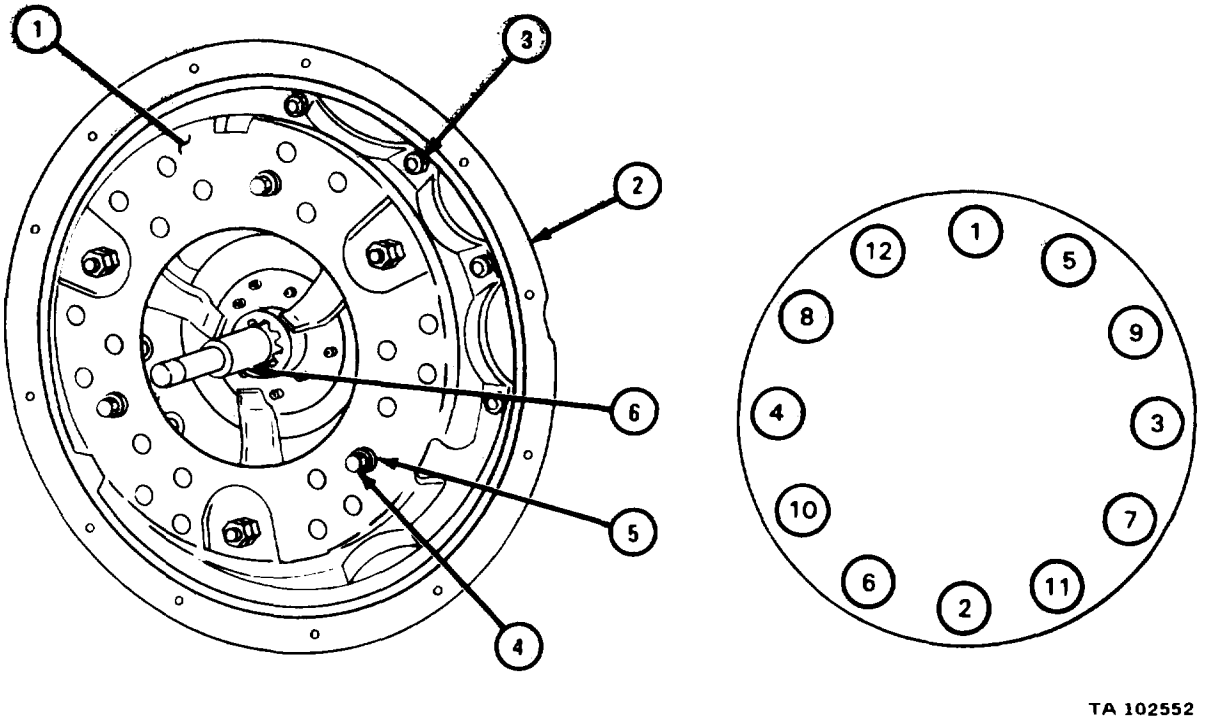


TA 102551

FRAME 3

1. Put clutch cover (1) against flywheel (2) and aline marks.
2. Put in and hand tighten 12 capscrews (3).
3. Tighten 12 capscrews (3) to 23 to 27 pound-feet in tightening order shown.
4. Take out three capscrews (4) and flat washers (5).
5. Take out clutch alinement tool (6).

GO TO FRAME 4



TA 102552

FRAME 4

NOTE

Follow-on Maintenance Action Required:

1. Replace transmission. Refer to para 7-3.
2. Replace and adjust clutch actuating link rod assembly. Refer to TM 9-2320-211-20.
3. On truck M543A2, replace outer auxiliary release clutch lever. Refer to TM 9-2320-211-10.
4. Replace transmission declutch lines and main air supply line and vent line. Refer to Hydraulic Lines and Fittings Removal and Replacement, TM 9-2320-211-20.
5. Replace cab floor tunnel and bell housing toeboard. Refer to TM 9-2320-211-20.
6. Replace shift lever. Refer to TM 9-2320-211-20.
7. Replace power takeoff linkage on all trucks with front winch. Refer to Part 3, para 17-59.
8. Replace hoist pump propeller shaft (M51A2 truck). Refer to TM 9-2320-211-20.
9. Replace front winch propeller shaft (all trucks with front winch). Refer to TM 9-2320-211-20.
10. Replace transmission-to-transfer case propeller shaft. Refer to TM 9-2320-211-20.
11. Replace front axle propeller shaft. Refer to para 9-5.
12. Check clutch assembly for proper operation. Refer to TM 9-2320-211-10.

END OF TASK

CHAPTER 4

FUEL SYSTEM GROUP MAINTENANCE

Section I. SCOPE

4-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for the fuel injector, turbocharger, fuel tanks, and cold start system for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels.

4-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. FUEL INJECTOR

4-3. FUEL INJECTOR NOZZLE AND HOLDER REPAIR.

a. Removal. Refer to TM 9-2815-210-34 to remove the fuel injector nozzle and holder.

b. Cleaning, Inspection, and Repair. Refer to TM 9-2815-210-34 for procedures to clean, inspect and repair the fuel injector nozzle and holder.

c. Replacement. Refer to TM 9-2815-210-34 to replace the fuel injector nozzle and holder.

4-4. FUEL INJECTOR PUMP REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: Gear hub holding wrench

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
3/8 x 1 1/4 capscrews (2)

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood and left side panel. Refer to TM 9-2320-211-10.

(2) Remove radiator. Refer to TM 9-2320-211-20.

(3) Remove power steering reservoir. Refer to TM 9-2320-211-20.

(4) Remove left front fender. Refer to TM 9-2320-211-20.

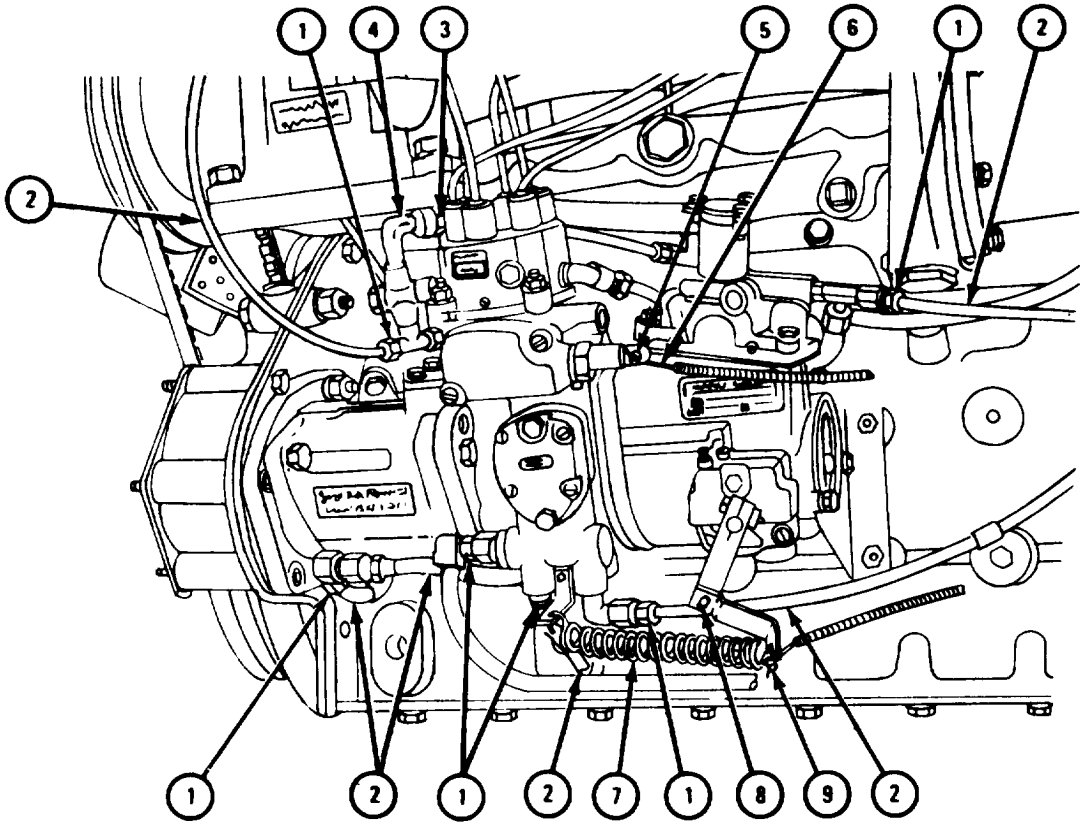
(5) Remove steering hydraulic pump. Refer to Part 2, para 13-7.

b. Removal.

FRAME 1

1. Unscrew six hose fittings (1). Takeoff lines (2).
2. Unscrew line (3) from elbow (4). Take off line.
3. Unscrew screw (5). Take out cable (6).
4. Take out spring (7). Take out pin (8). Take off linkage (9).

GO TO FRAME 2

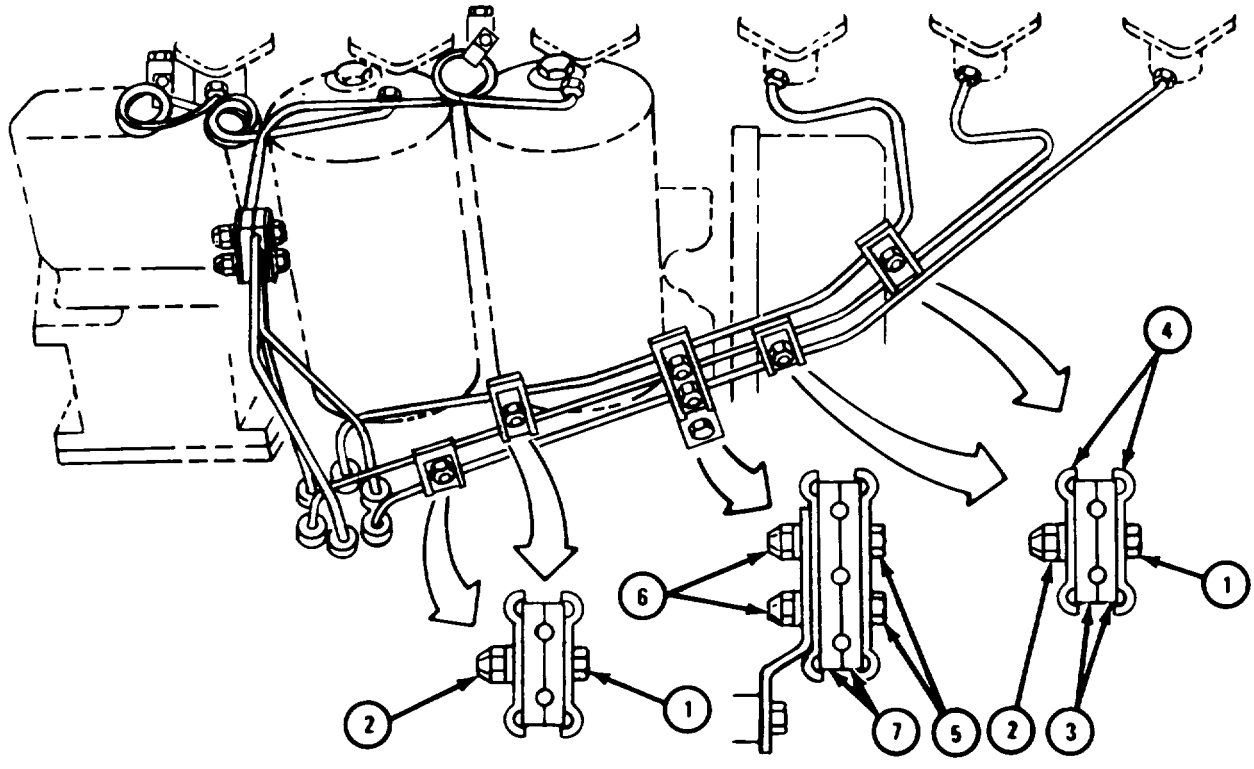


TA 102133

FRAME 2

1. Take out four capscrews (1) with washers and self-locking nuts (2).
2. Take off eight clamp pads (3) and retainers (4).
3. Take out two cap screws (5) with washers and self-locking nuts (6).
4. Take off clamp (7).

GO TO FRAME 3

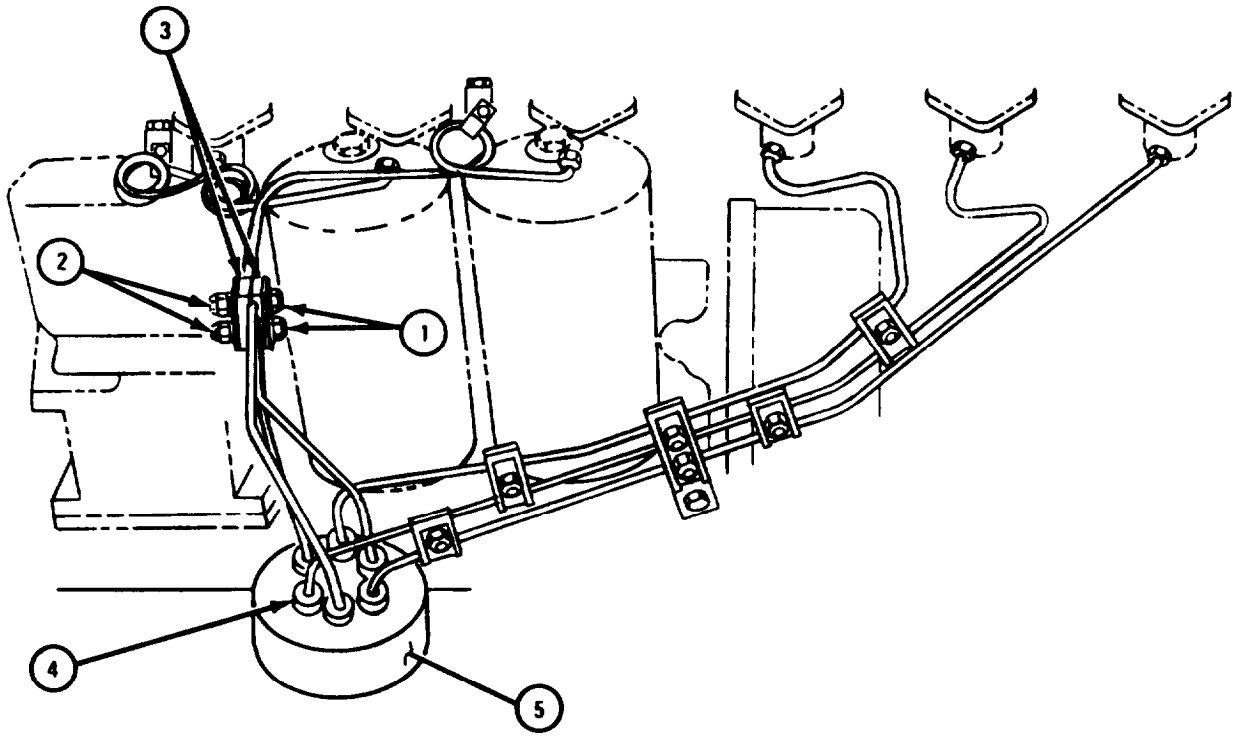


TA 102107

FRAME 3

1. Takeout two capscrews (1) with washers and self-locking nuts (2).
2. Take off two clamps (3).
3. Lift six dust caps (4) off injection pump (5).

GO TO FRAME 4

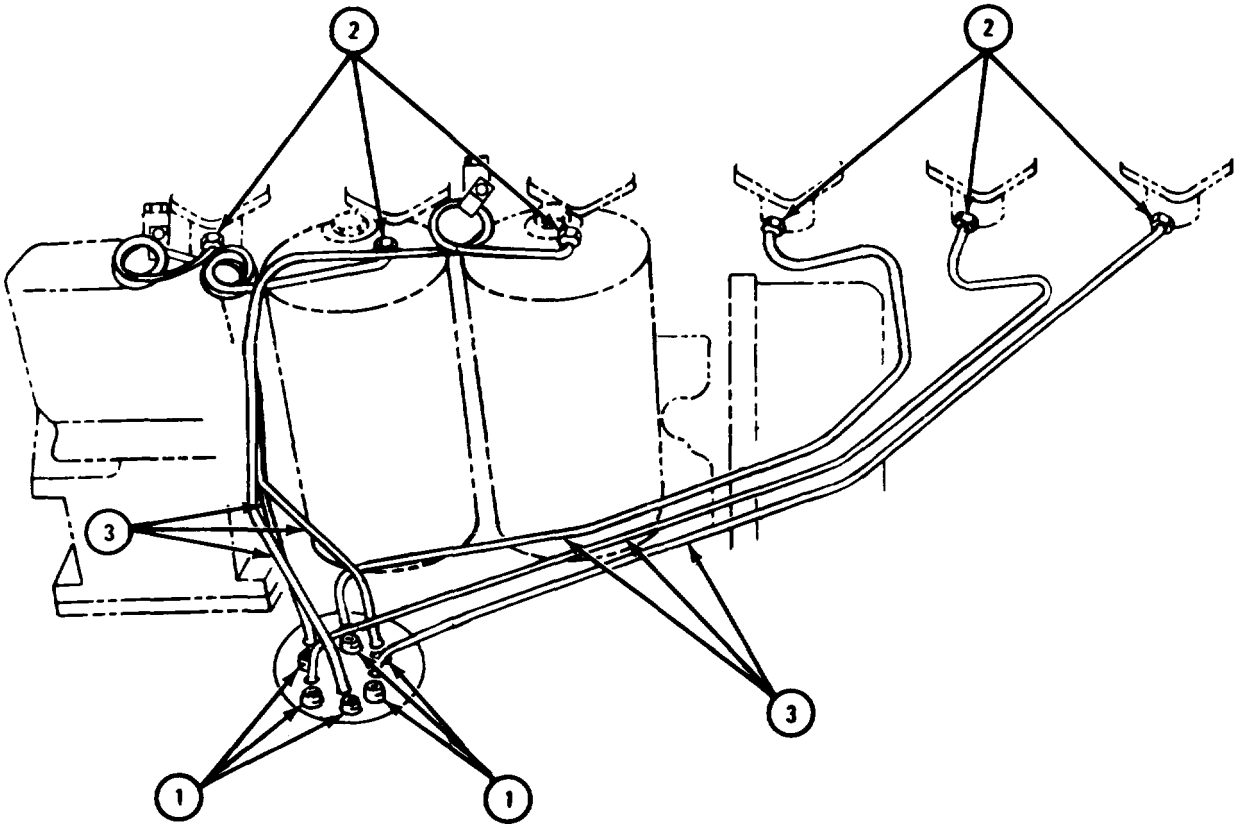


TA 102108

FRAME 4

1. Unscrew six tube fittings (1).
2. Unscrew six tube fittings (2).
3. Take off six tubes (3). Put caps on ends of tubes and in injection port holes.

GO TO FRAME 5

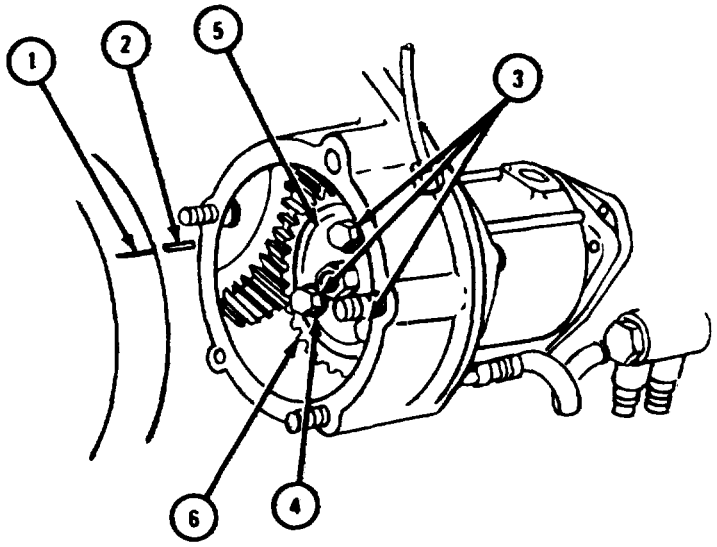


TA 102109

FRAME 5

1. Line up mark (1) with pointer (2).
2. Take out three capscrews (3) with lockwashers (4). Take out retaining plate (5).
3. Take out drive gear (6).

GO TO FRAME 6

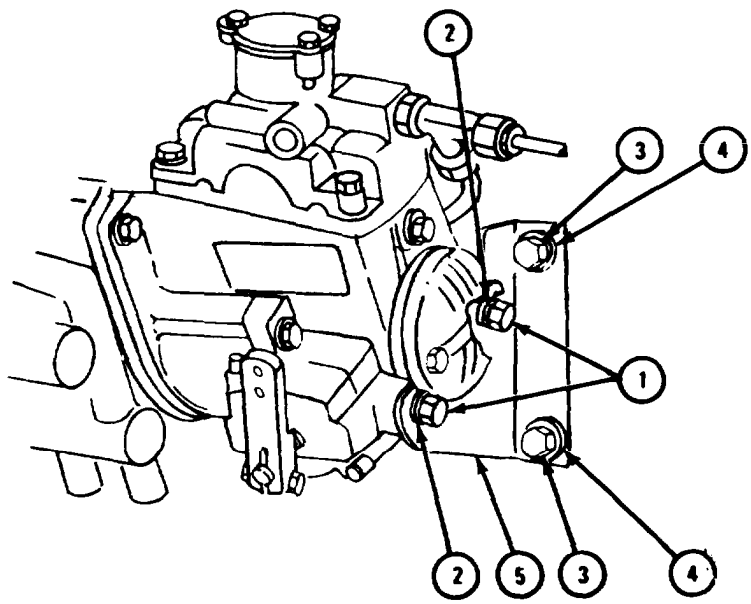


TA 102110

FRAME 6

1. Take out two capscrews (1) and washers (2).
2. Take out two capscrews (3) and washers (4). Take out bracket (5).

GO TO FRAME 7

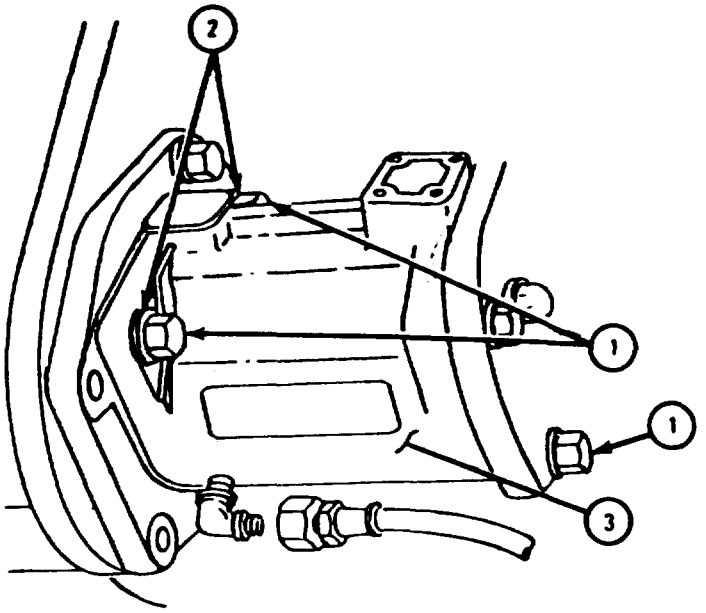


TA 102111

FRAME 7

1. Take out three capscrews (1) and washers (2).
2. Take out injection pump (3).

GO TO FRAME 8

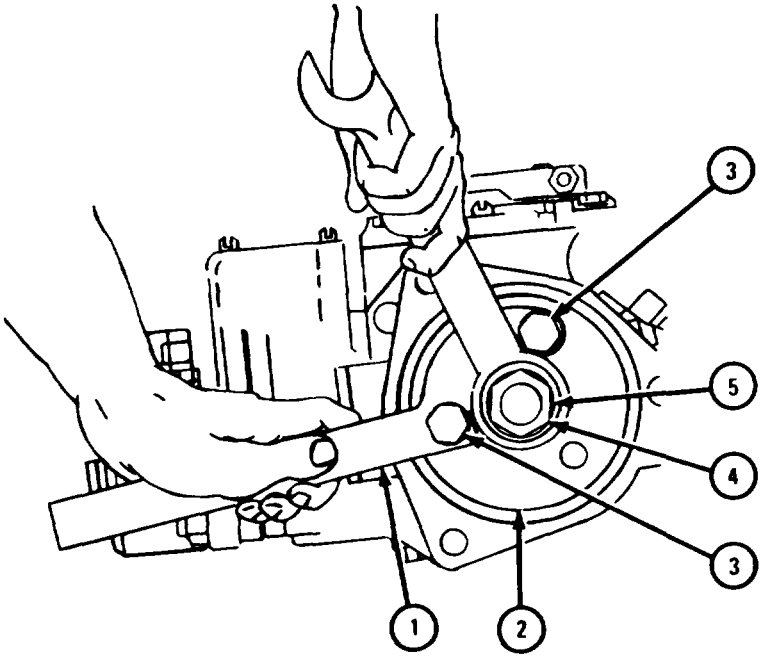


TA 102112

FRAME 8

1. Put gear hub holding wrench (1) on hub (2). See figure 4-1 for fabrication data. Put in two capscrews (3).
2. Take out nut (4) and lockwasher (5).
3. Take off hub (2).
4. Take out two capscrews (3). Take off gear hub holding wrench (1).

END OF TASK



TA 102113

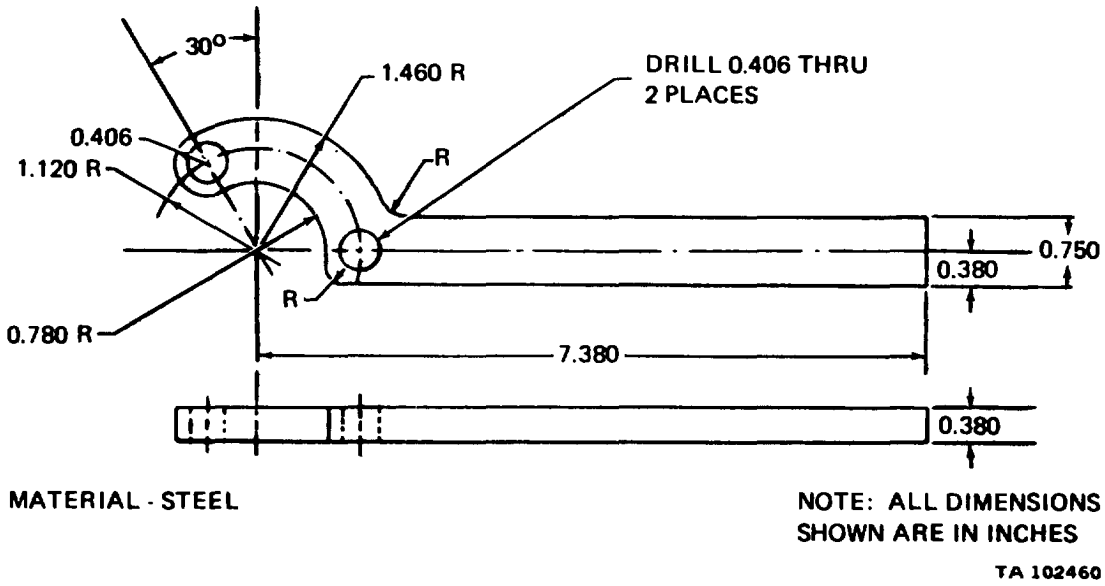


Figure 4-1. Gear Hub Holding Wrench, Fabrication Data

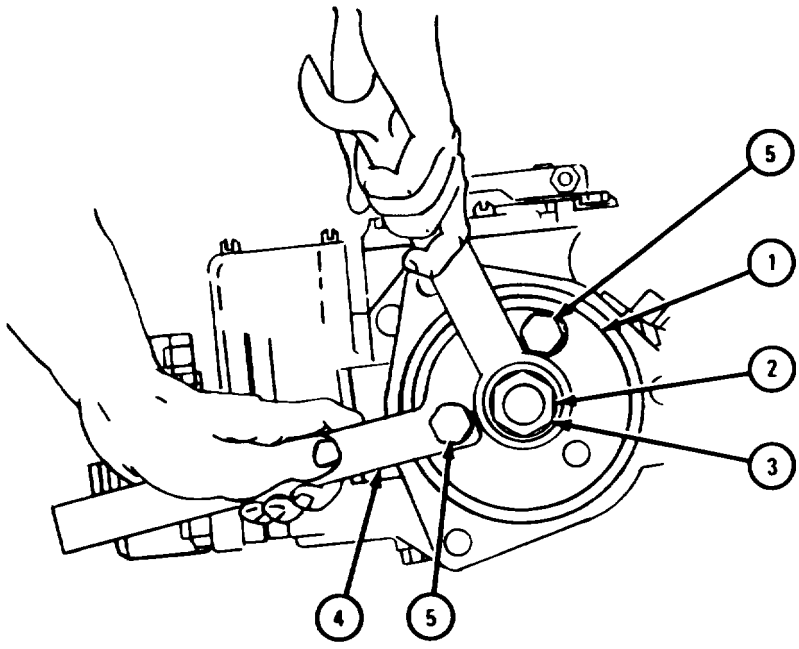
c. Repair. Refer to TM 9-2815-210-34.

d. Replacement.

FRAME 1

1. Put hub (1) on shaft. Put on lockwasher (2) and nut (3).
2. Put gear hub holding wrench (4) on hub (1). See figure 4-1 for fabrication data. Put in two capscrews (5).
3. Tighten nut (3) to 66 to 71 pound-feet.
4. Take out two capscrews (5) and holding wrench (4).

GO TO FRAME 2



TA 102114

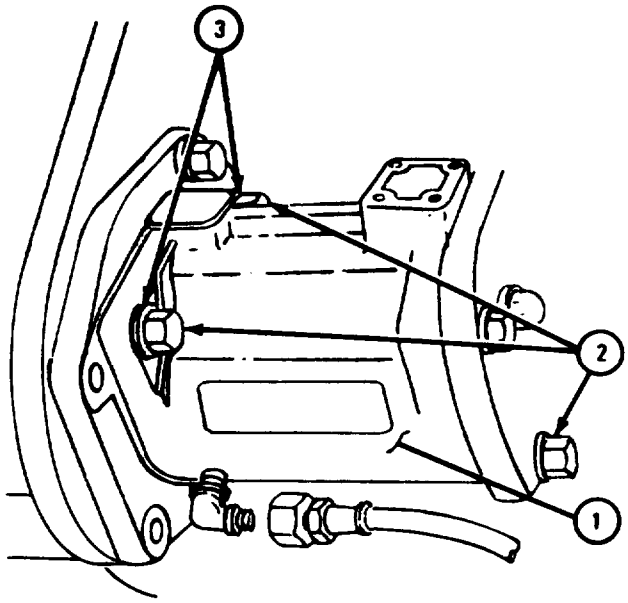
FRAME 2

1. Set injector pump (1) in place. Put in three capscrews (2) with washers (3).

NOTE

Make sure hub and pointer stay alined.

GO TO FRAME 3

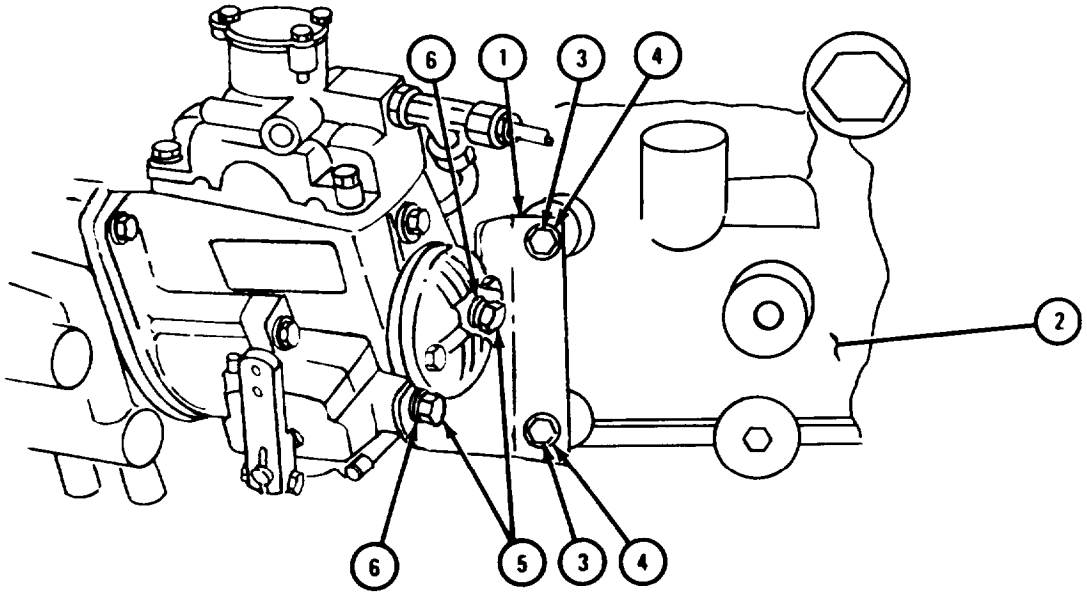


TA 116705

FRAME 3

1. Put bracket (1) on engine block (2) as shown. Put in two capscrews (3) and washers (4).
2. Put in two capscrews (5) and washers (6).

GO TO FRAME 4



TA 102118

FRAME 4

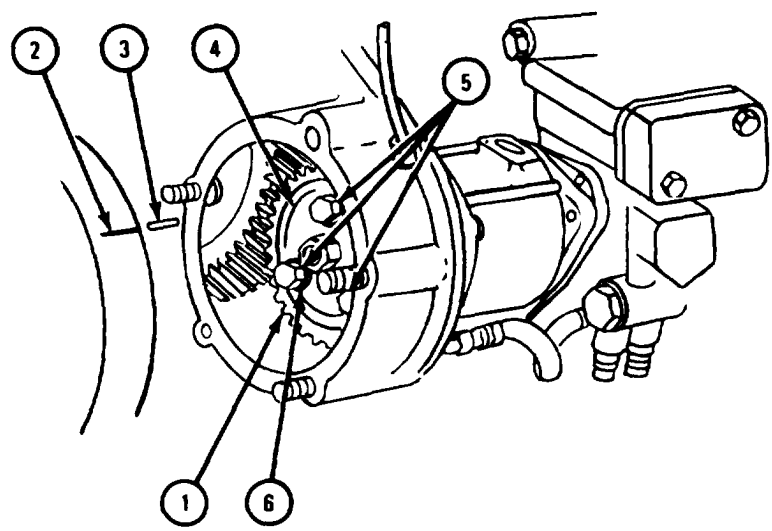
1. Put gear (1) in place.

NOTE

Holes in gear are long enough to allow alinement.

2. Make sure mark (2) and pointer (3) stay as shown.
3. Put on plate (4). Put in capscrews (5) with washers (6).

GO TO FRAME 5

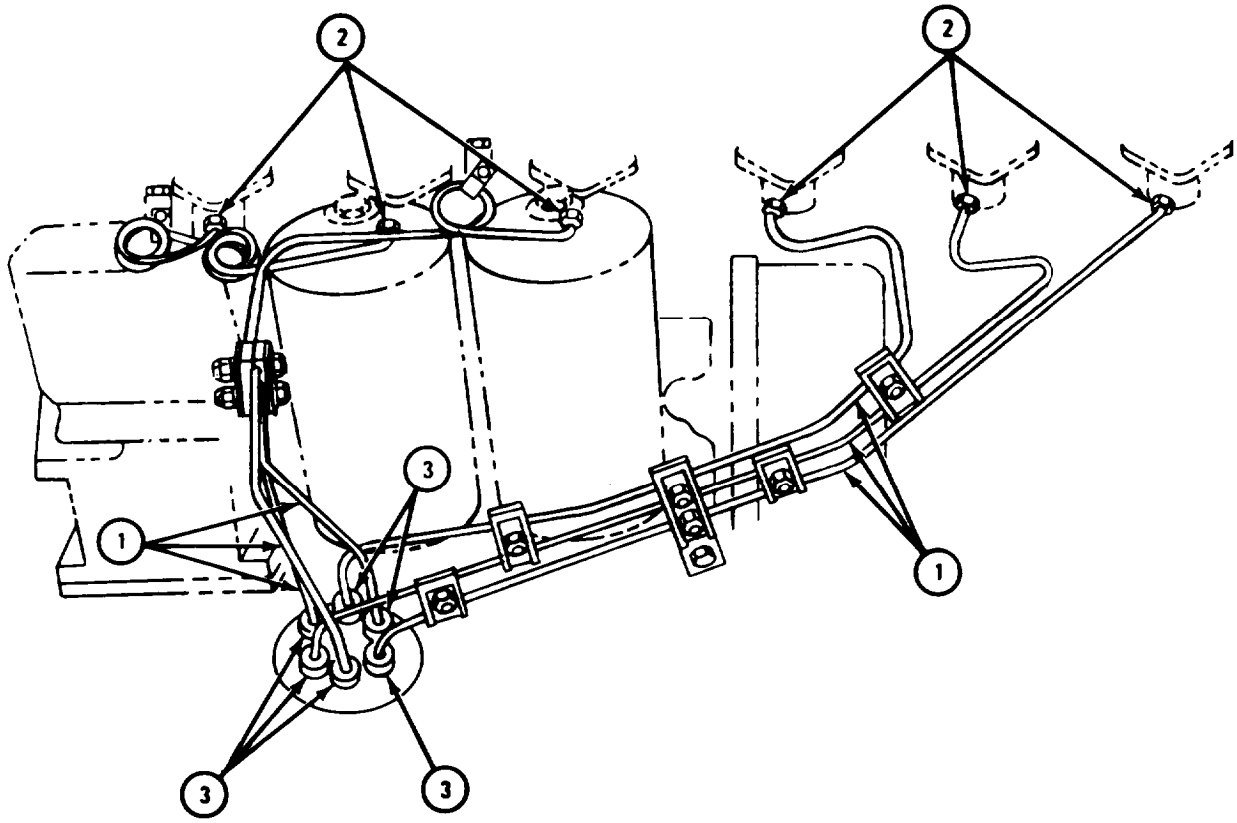


TA 102119

FRAME 5

1. Take off caps on tubes and injection pump port holes.
2. Set six tubes (1) in place.
3. Screw in fittings (2).
4. Screw six fittings (3) into pump.

GO TO FRAME 6

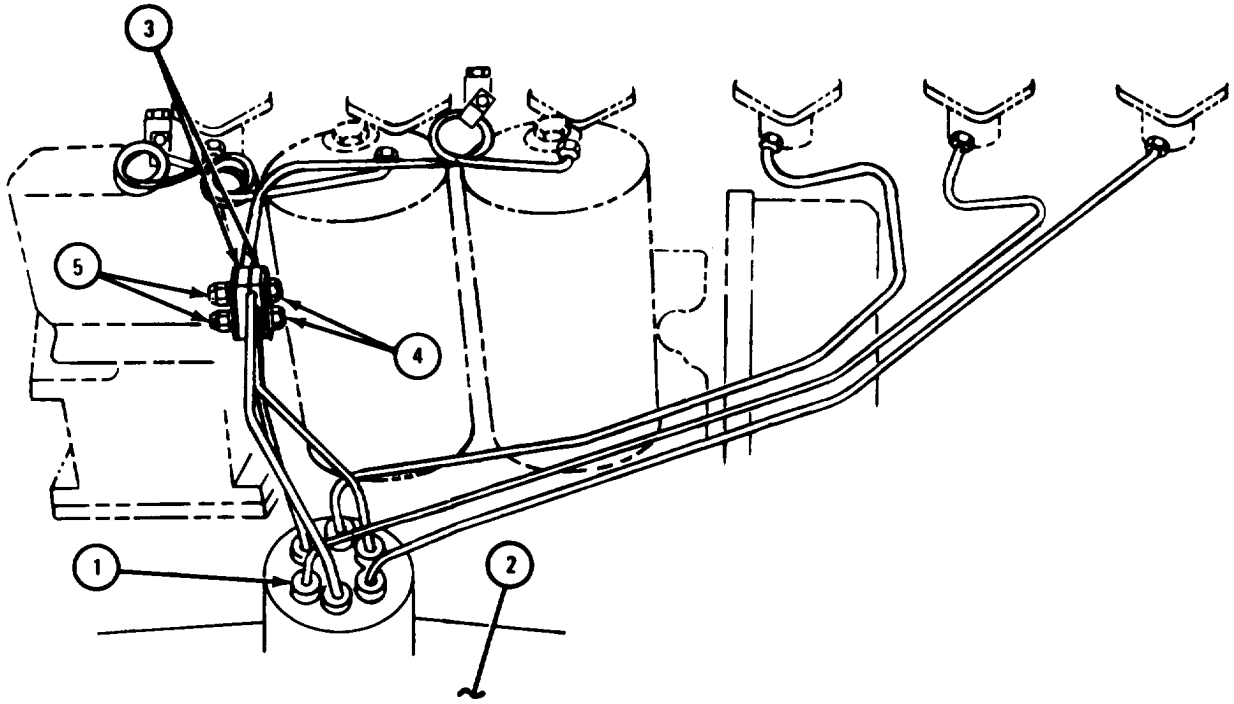


TA 102120

FRAME 6

1. Put six dustcaps (1) on injection pump (2).
2. Put on two clamps (3).
3. Put in capscrews (4) with washers. Put on self-locking nuts (5).

GO TO FRAME 7

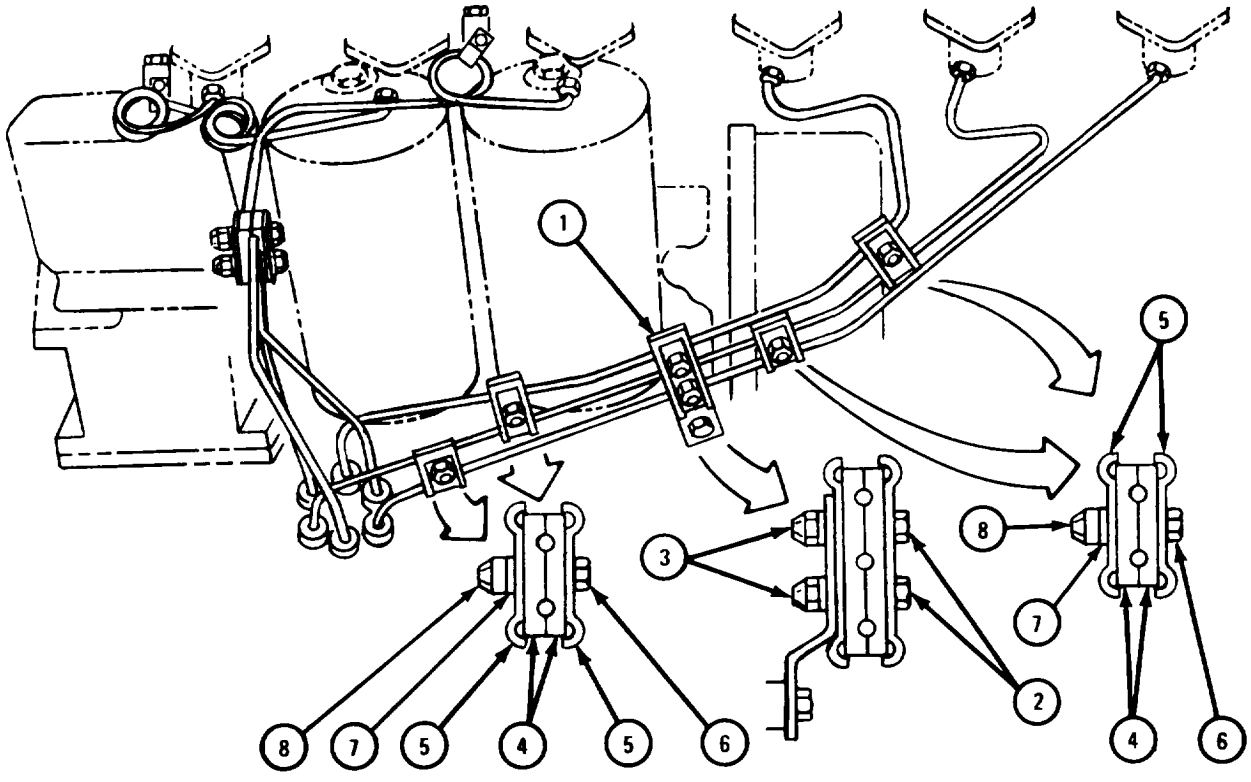


TA 102121

FRAME 7

1. Put on clamp (1). Put in capscrews (2) with washers and self-locking nuts (3).
2. Put on eight clamp pads (4) and eight retainers (5).
3. Put in four capscrews (6) with washers (7).
4. Put on four locknuts (8).

GO TO FRAME 8



FRAME 8

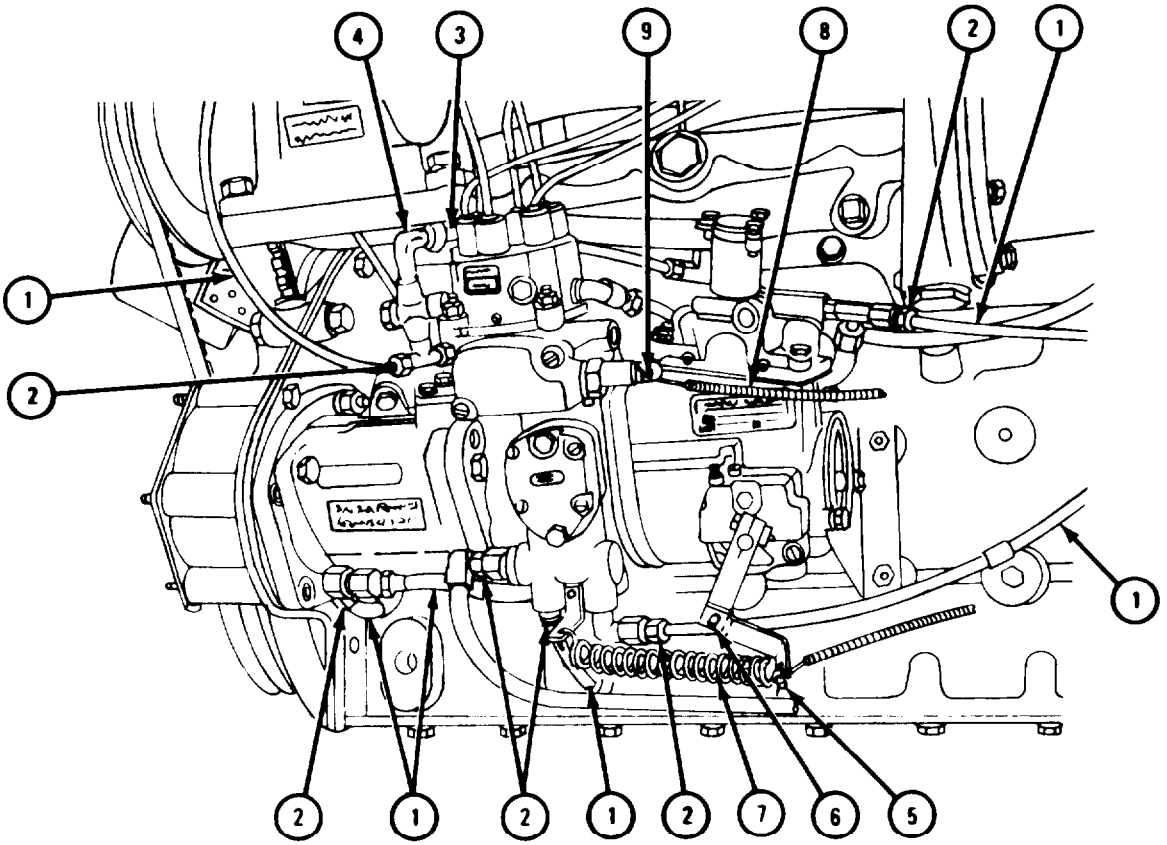
1. Put on six hoses (1).
2. Tighten six nuts (2).
3. Put line (3) on elbow (4).
4. Put on linkage (5). Put in pin (6). Put on spring (7).
5. Put in cable (8). Tighten screw (9).

NOTE

Follow-on Maintenance Action Required:

1. Replace steering hydraulic pump. Refer to Part 2, para 13-7.
2. Replace left front fender. Refer to TM 9-2320-211-20.
3. Replace power steering reservoir. Refer to TM 9-2320-211-20.
4. Replace radiator. Refer to TM 9-2320-211-20.
5. Close hood and left side panel. Refer to TM 9-2320-211-10.

END OF TASK



TA 102123

4-5. FUEL INJECTOR PUMP TIMING.

TOOLS: Inspection mirror

SUPPLIES: Timing cover gasket
Timing window cover gasket

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood and left side panel. Refer to TM 9-2320-211-10.

(2) Time engine. Refer to TM 9-2320-211-20.

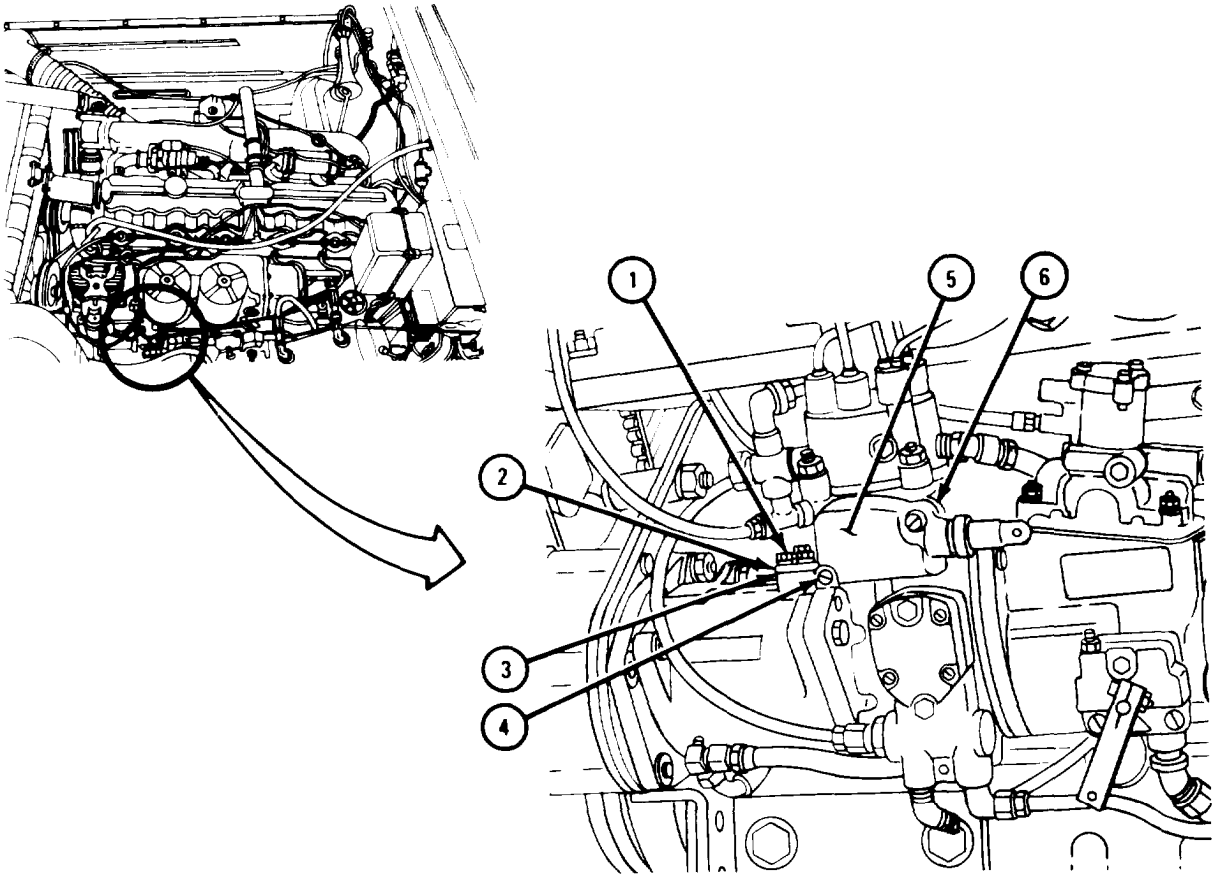
(3) Remove access cover under left fender. Refer to TM 9-2320-211-10.

b. Timing.

FRAME 1

1. Take out four capscrews and lockwashers (1).
2. Take off cover (2). Take out and throw away gasket (3).
3. Take out two screws and lockwashers (4).
4. Take off cover (5). Take out and throw away gasket (6).

GO TO FRAME 2

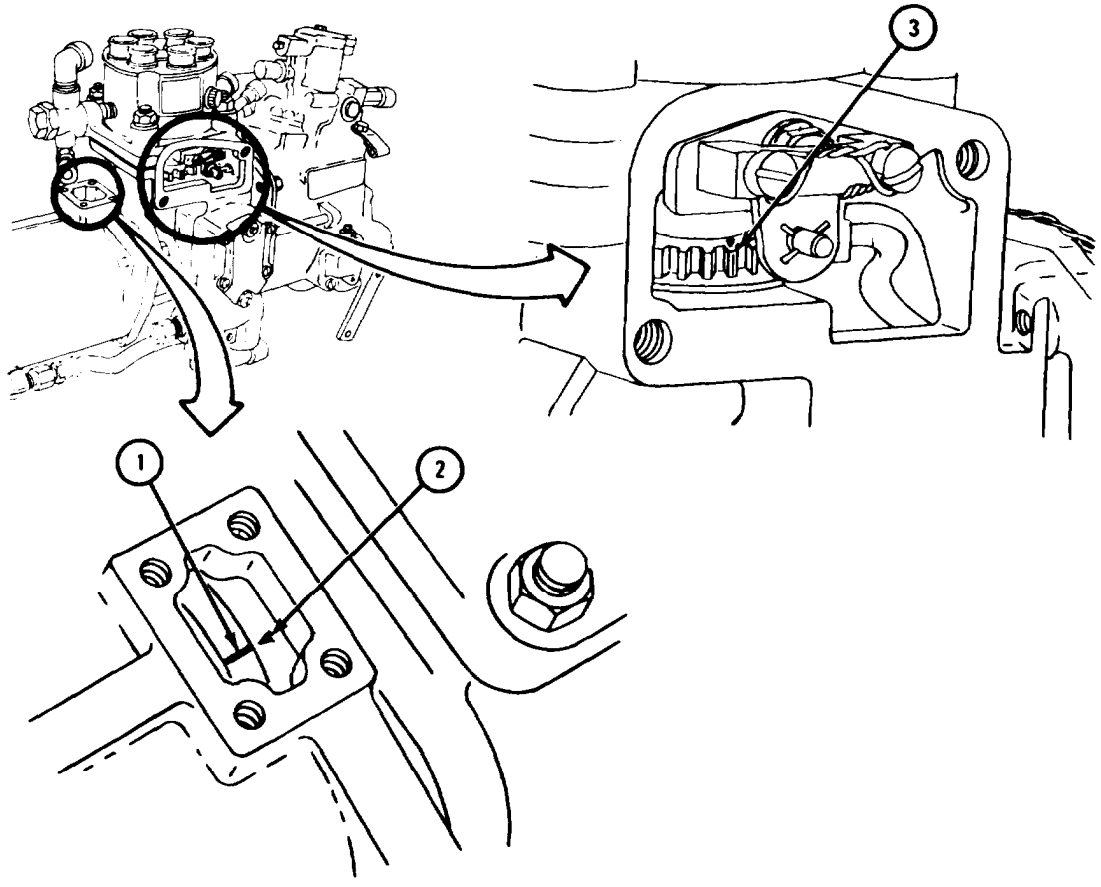


TA 102115

FRAME 2

1. Check that timing mark on hub (1) is lined up with pointer (2).
2. Using inspection mirror, check that marked tooth on plunger drive gear (3) can be seen when mark on hub (1) is lined up with pointer (2).
3. If marked tooth on plunger drive gear (3) cannot be seen, take out power steering pump. Refer to Part 2, para 13-7.

GO TO FRAME 3

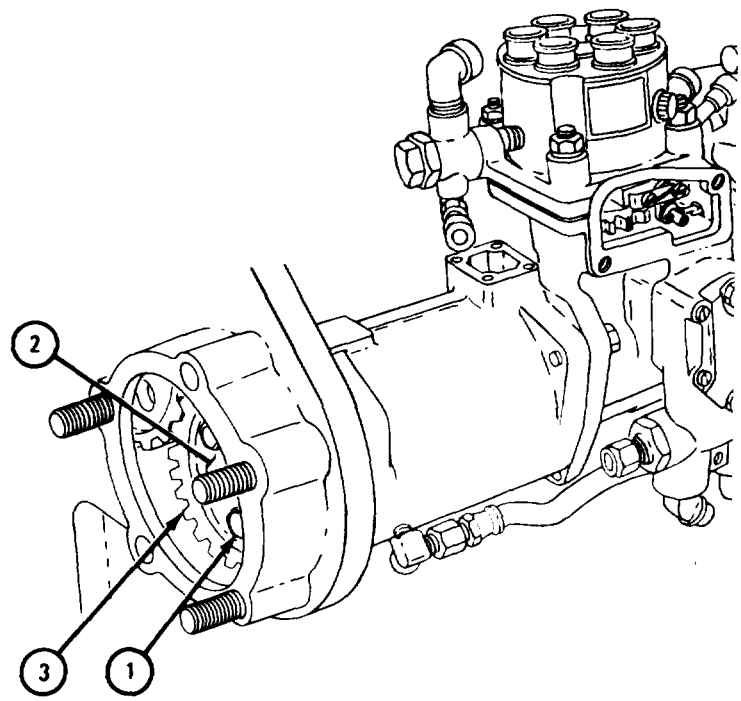


TA 102116

FRAME 3

1. Takeout three capscrews and lockwashers (1).
2. Take off retaining plate (2).
3. Take out drive gear (3).

GO TO FRAME 4

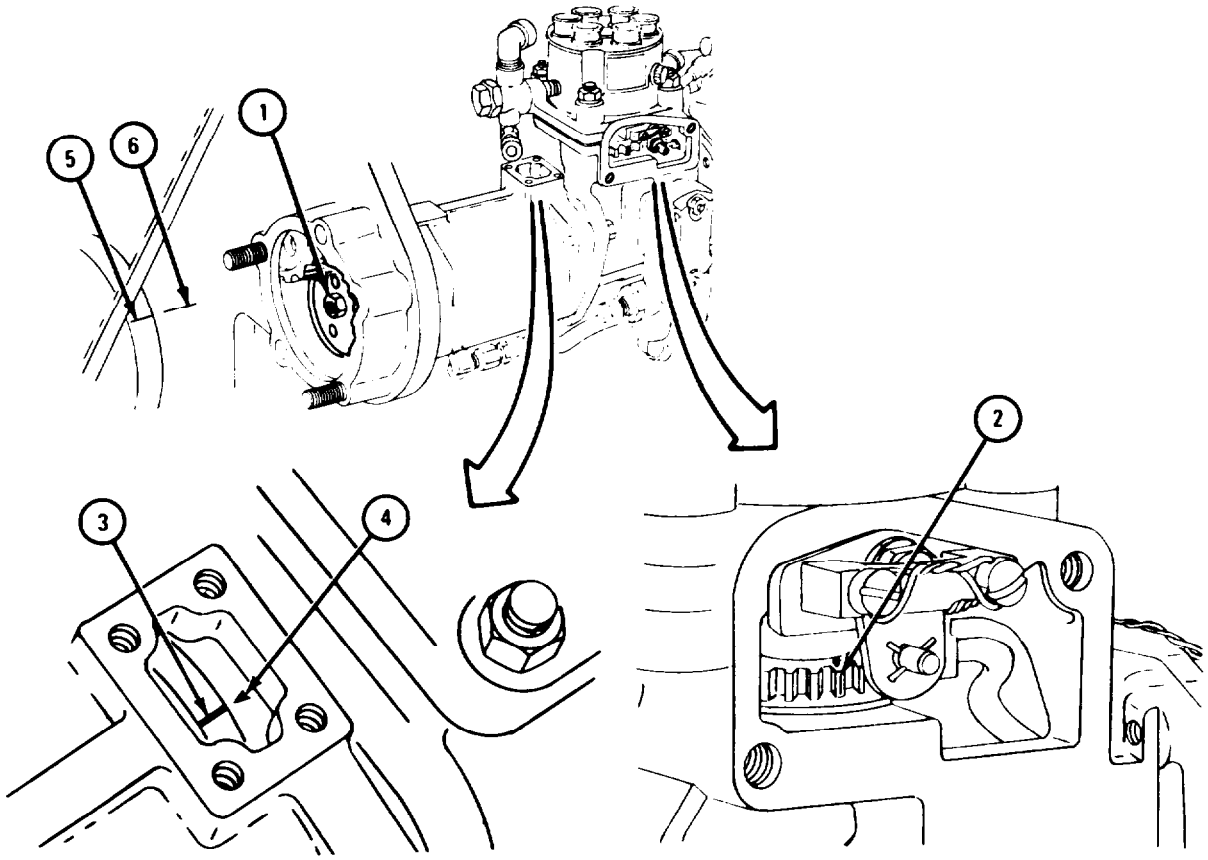


TA 102124

FRAME 4

1. Turn fuel injector pump shaft (1) until the marked tooth (2) can be seen in inspection mirror.
2. Line up timing mark on hub (3) with pointer (4). Check that marked tooth (2) can still be seen. If not, repeat steps 1 and 2.
3. Check that timing mark on crankshaft damper (5) is lined up with mark on timing pointer (6).

GO TO FRAME 5



TA 102684

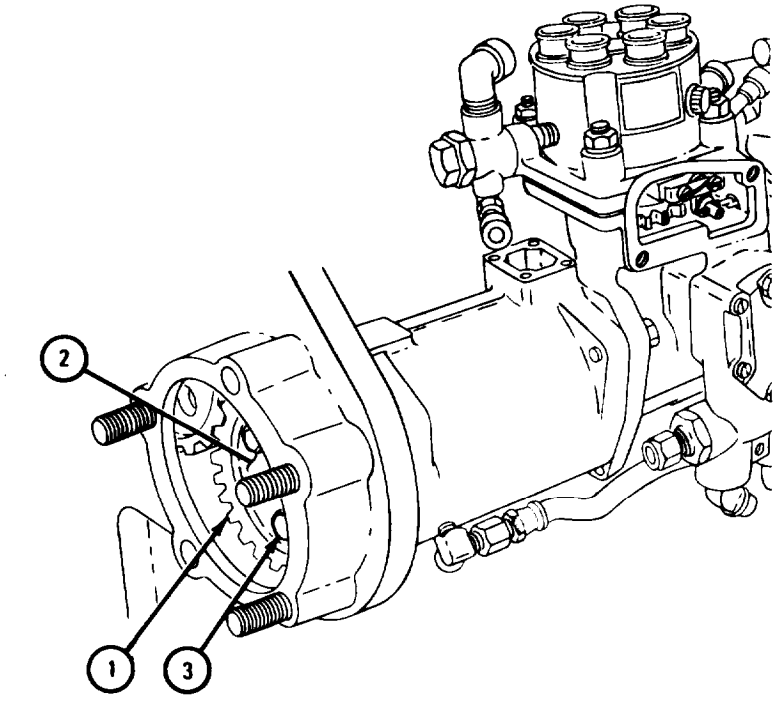
FRAME 5

CAUTION

Be sure timing marks are maintained when putting on drive gear (1).

1. Put on drive gear (1).
2. Put on retaining plate (2).
3. Put on three capscrews and lockwashers (3).

GO TO FRAME 6



TA 102685

FRAME 6

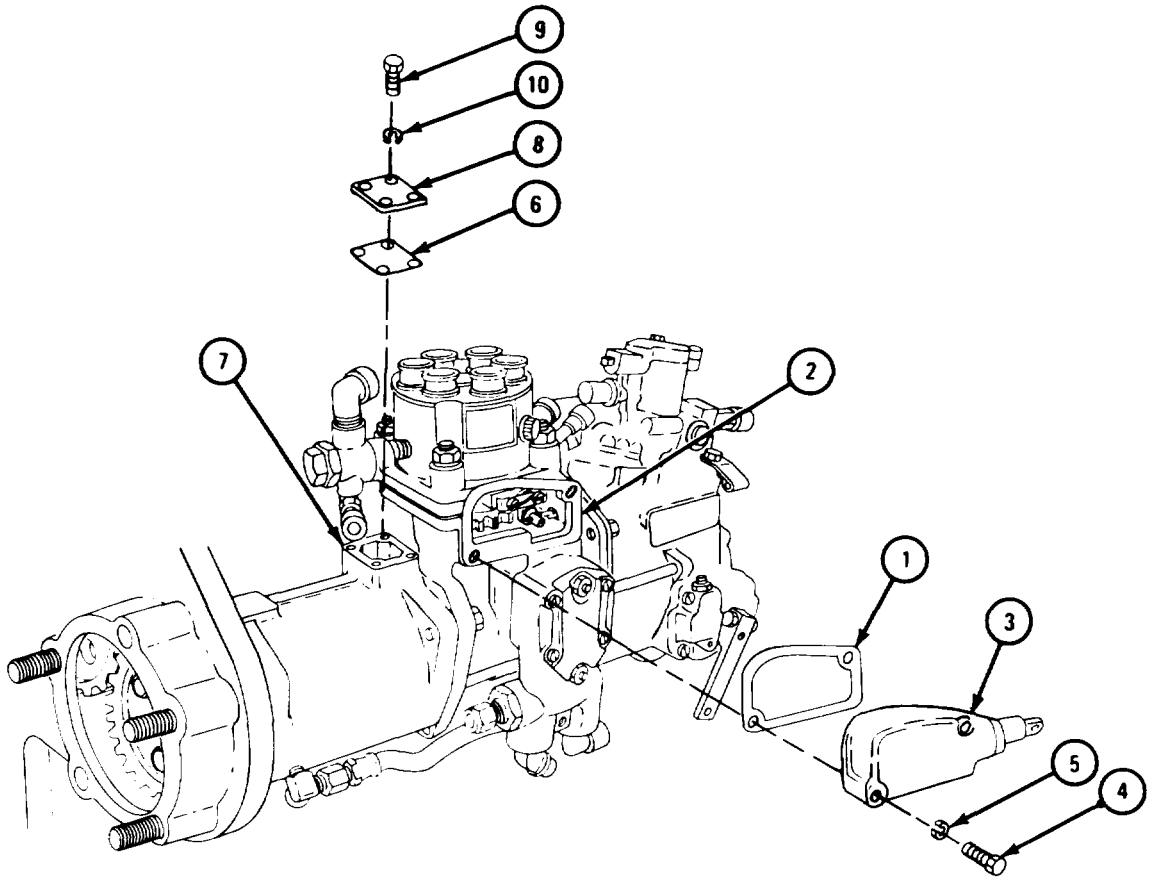
1. Put new gasket (1) on timing window (2).
2. Put on timing window cover (3). Put in two capscrews (4) with two lockwashers (5).
3. Put new gasket (6) on timing device housing (7).
4. Put on timing device housing cover (8). Put in four capscrews (9) with lockwashers (10).

NOTE

Follow-on Maintenance Action Required:

1. Replace power steering pump. Refer to Part 2, para 13-7.
2. Close hood and left side panel. Refer to TM 9-2320-211-10.
3. Replace access cover under left fender. Refer to TM 9-2320-211-10.

END OF TASK



TA 102686

4-6. FUEL INJECTOR TUBES REPAIR.

a. Removal. Refer to TM 9-2815-210-34 to remove the fuel injector tubes.

b. Cleaning, Inspection, and Repair. Refer to TM 9-2815-210-34 for procedures to clean, inspect, and repair the fuel injector tubes.

c. Replacement. Refer to TM 9-2815-210-34 to replace the fuel injector tubes.

Section III. TURBOCHARGER

4-7. TURBOCHARGER REPAIR. To repair trubocharger, refer to TM 9-2990-201-40 & P.

Section IV. FUEL TANKS

4-8. FUEL TANK REPAIR.

TOOLS: No special tools required

SUPPLIES: Filler cap gasket
Intank pump gasket
Sending unit gasket
Vent cover gasket
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Compressed air source, 30 psi max

PERSONNEL: One

EQUIPMENT CONDITION: Fuel tank on workbench.

a. Disassembly.

NOTE

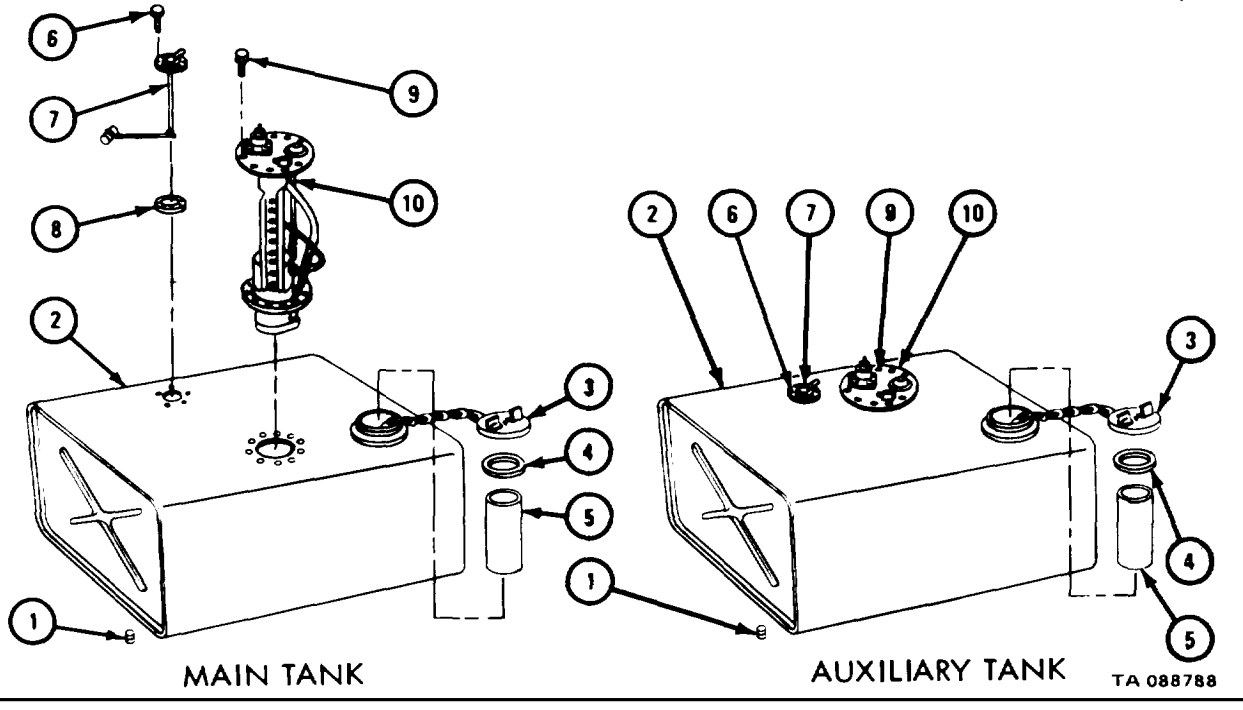
It is not necessary to take apart fuel tank unless inspection shows damage.

Trucks M51A2, M52A2, and M543A2 have two fuel tanks, a main tank and an auxiliary tank. This task is the same for both tanks.

FRAME 1

1. Place container under drain plug (1) to catch any fuel in tank (2).
2. Take out drain plug (1).
3. Take off filler cap (3).
4. Take out filler cap gasket (4).
5. Take off filler sleeve (5).
6. Take out five screws (6). Pull sending unit (7) from tank (2).
7. Take out and throw away gasket (8).
8. Take out 10 screws (9) on main tank (2) and 12 screws (9) on auxiliary tank (2).
9. Take out electric fuel pump with gasket (10) on main tank (2) or vent cover with gasket (10) on auxiliary tank (2). Throw away gasket (10).

END OF TASK



b. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well–ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean outside of tank with solvent.

(2) Using solvent, take off sediment on inside of tank.

(3) Steam clean inside of tank to remove all fumes. Refer to TB 43-0212.

c. Inspection and Repair.

FRAME 1

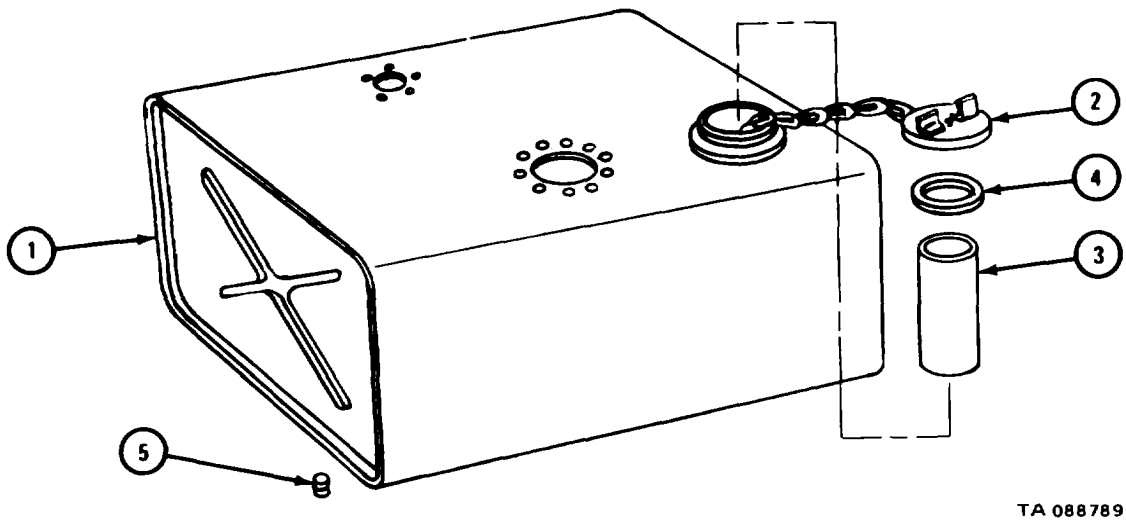
1. Plug all openings in tank (1) except one. Put in air hose and put 6 psi of air pressure into tank. Listen for air leaks.

WARNING

Do not repair unless tank has been cleaned and properly treated to get rid of all inflammable or explosive fumes. Merely draining tank does not make it safe for welding. An "empty" tank can be more dangerous than a full one. Before repairing, thoroughly steam clean tank or use other approved method to completely take out all fumes.

2. Weld small leaks. Refer to TM 9-237. If tank (1) has a large leak, get a new tank.
3. Check that filler cap (2) and filler sleeve (3) are not cracked or dented. If cap or sleeve is damaged, get a new one.
4. Check that filler cap gasket (4) is not worn or dried out. If gasket is worn or dried out, get a new one.
5. Check that drain plug (5) has no damaged threads. If plug has damaged threads, get a new one.

END OF TASK



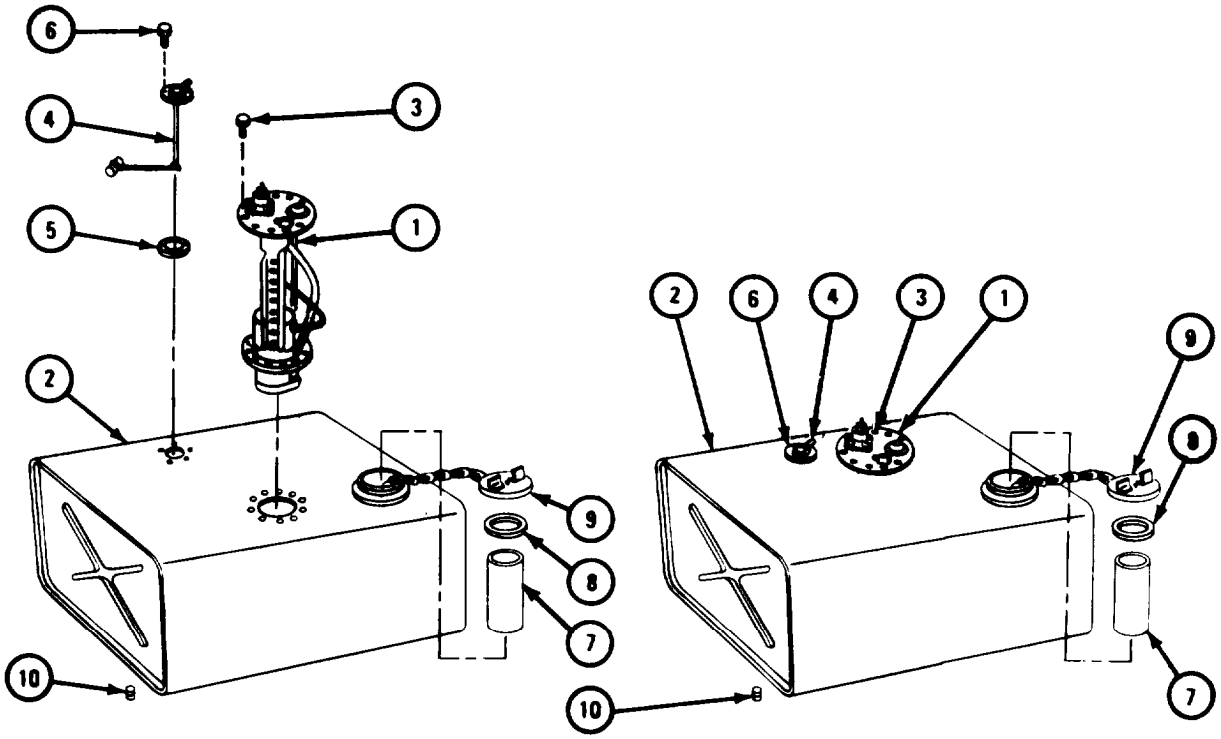
TA 088789

d. Assembly.

FRAME 1

1. Put in electric fuel pump with gasket (1) for main tank (2) for vent cover with gasket (1) for auxiliary tank (2).
2. Put in 10 screws (3) on main tank (2) and 12 screws (3) on auxiliary tank (2).
3. Place sending unit (4) with gasket (5) in fuel tank (2).
4. Put in five screws (6).
5. Put filler sleeve (7) in fuel tank (2).
6. Put gasket (8) in filler cap (9).
7. Screw on filler cap (9).
8. Put drain plug (10) in fuel tank (2).

END OF TASK



Section V. COLD START SYSTEM

4-9. FLAME HEATER (SIDE-MOUNTED, UNCOVERED AND SIDE-MOUNTED, COVERED) REPAIR.

a. Removal. Refer to TM 9-2320-211-20.

b. Repair. Refer to TM 9-2815-210-34.

c. Replacement. Refer to TM 9-2320-211-20.

CHAPTER 5

COOLING SYSTEM GROUP MAINTENANCE

Section I SCOPE

5-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for the radiator, water pump, and fan assembly for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels.

5-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. RADIATOR

5-3. ENGINE COOLING RADIATOR ASSEMBLY REPAIR.

a. Removal. Remove engine cooling radiator assembly. Refer to TM 9-2320-211-20.

b. Repair. Repair engine cooling radiator assembly. Refer to TM 750-25P.

Replacement. Replace engine cooling radiator assembly. Refer to TM 9-2320-211-20.

Section III. WATER PUMP

5-4. WATER PUMP ASSEMBLY REPAIR.

NOTE

Engine model LDS 465-1 may have either an old type or new type of water pump housing assembly. Engine model LDS 465-1A has only the new type of water pump housing assembly. Since the old type of water pump housing assembly is no longer available, only the new type of water pump housing assembly may be put back. Both types are covered in this task.

TOOLS: No special tools required

SUPPLIES: Water pump drive assembly gasket
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Rag

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain cooling system. Refer to TM 9-2320-211-20.

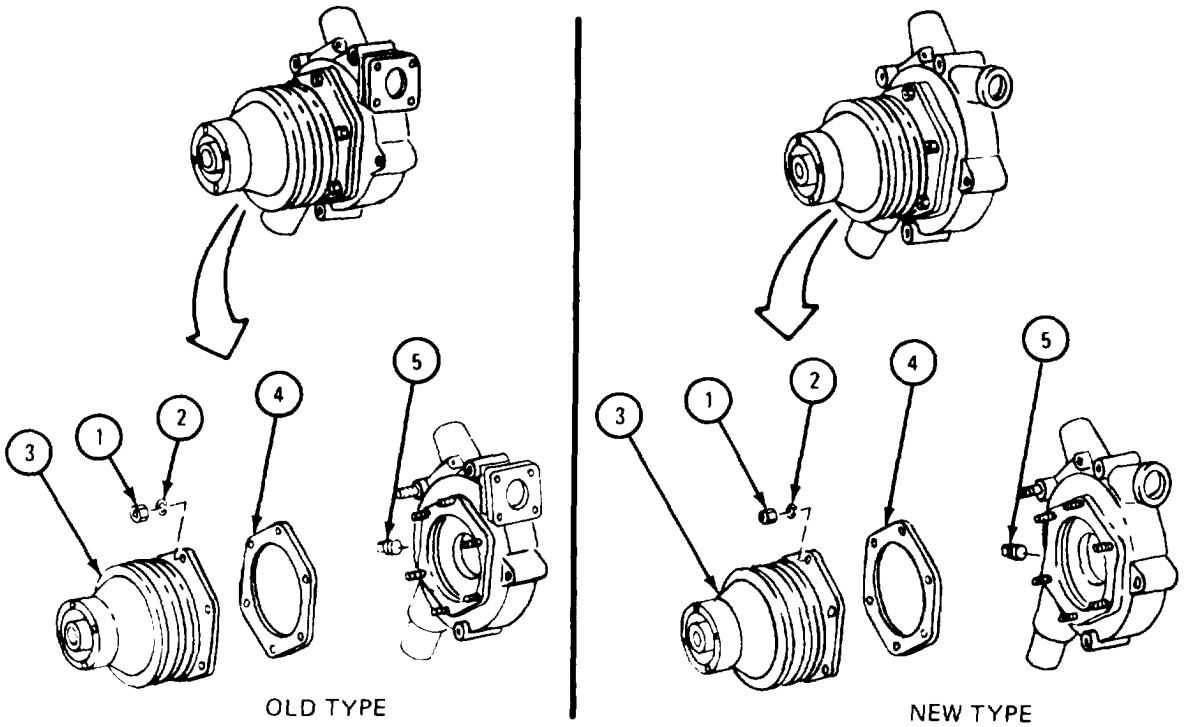
(2) Remove water pump assembly. Refer to TM 9-2320-211-20.

b. Disassemble.

FRAME 1

1. Takeoff six nuts (1) and lockwashers (2).
2. Take off water pump drive assembly (3) and gasket (4). Throw away gasket.
3. Takeout plug (5).

END OF TASK



c. Cleaning.

FRAME 1

WARNING

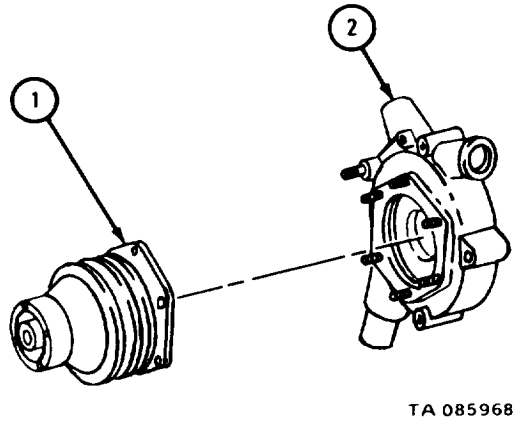
Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

CAUTION

Be careful not to let solvent get on bearings inside of water pump drive assembly (1). Solvent can dissolve grease in bearings.

1. Clean water pump drive assembly (1) using rag lightly dampened with solver
2. Clean housing (2) with solvent.

END OF TASK

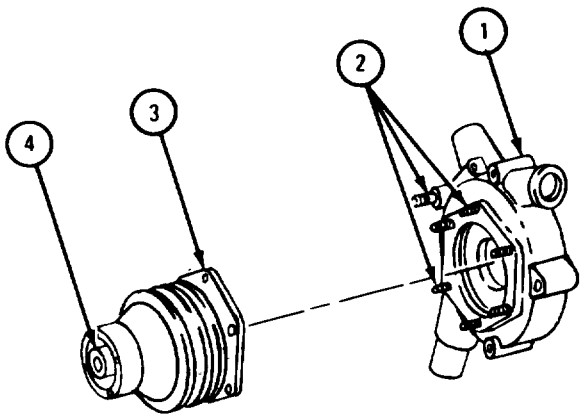


d. Inspection.

FRAME 1

1. Check that water pump housing (1) has no cracks, nicks or stripped threads. Check that studs (2) on water pump housing have no stripped or worn threads.
2. Check that water pump drive assembly (3) has no cracks, nicks, wear or signs of leakage.
3. Turn water pump drive shaft (4), and check that it turns smoothly and evenly.

END OF TASK



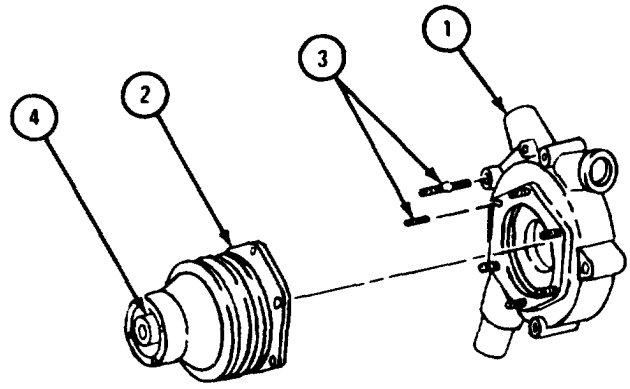
TA 085969

e. Repair.

FRAME 1

1. Throw away cracked or worn parts and get new parts in their place.
2. Take out nicks in water pump housing (1) and water pump drive assembly (2) with fine mill file.
3. Fix studs (3) with a thread chaser.
4. If water pump drive assembly (2) shows signs of leakage, get a new water pump assembly.
5. If water pump drive shaft (4) is loose or turns roughly, get a new water pump assembly.

END OF TASK



TA 085970

f. Assembly.

FRAME 1

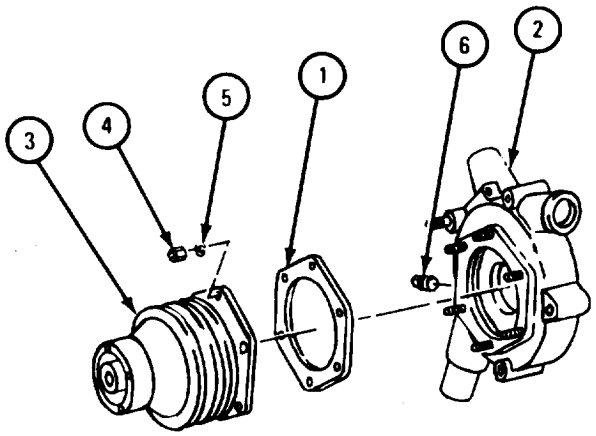
1. Put water pump drive assembly gasket (1) on water pump housing (2).
2. Aline holes in water pump drive assembly (3) with studs of water pump housing (2) and put water pump drive assembly onto water pump housing.
3. Put on six nuts (4) and lockwashers (5).
4. Put in plug (6).

NOTE

Follow-on Maintenance Action Required:

1. Replace water pump. Refer to TM 9-2320-211-20.
2. Fill cooling system. Refer to TM 9-2320-211-20.

END OF TASK



TA 085972

Section IV. FAN ASSEMBLY

5-5. ENGINE COOLING FAN CLEANING, INSPECTION, AND REPAIR.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean, dry rags

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Remove fan. Refer to TM 9-2320-211-20.

b. Cleaning, Inspection, and Repair.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Cleaning. Clean fan with dry cleaning solvent, type II (SD-2) Fed. Spec P-D-680. Wipe with clean, dry rag.

(2) Inspection and repair.

FRAME 1

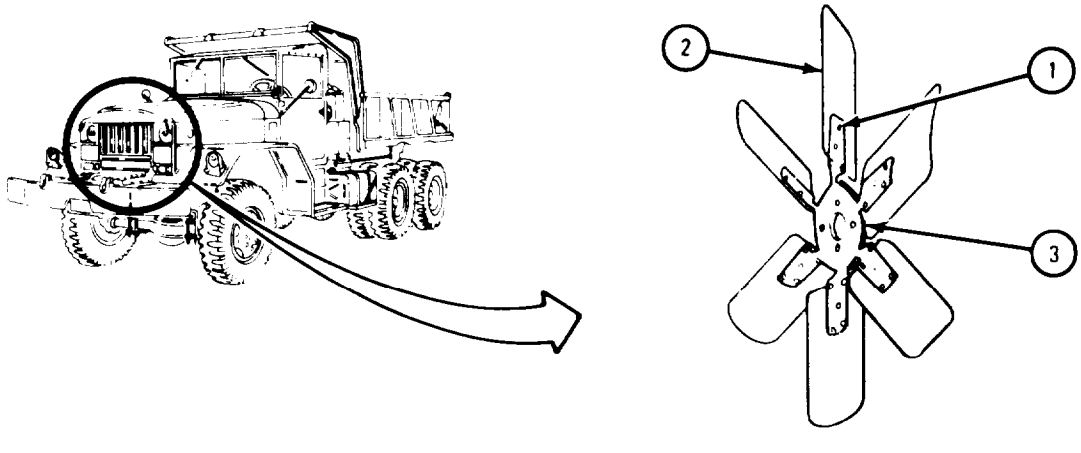
1. Check that rivets (1) are tight. Replace fan if rivets are loose.
2. Check that blades (2) have no nicks. Repair nicks using a mill file.
3. Check that fan blades (2) are not cracked. If fan blades are cracked, get new fan.
4. Check that fan hub (3) is not cracked. If fan hub is cracked, get new fan.

NOTE

Follow-on Maintenance Action Required:

1. Replace fan. Refer to TM 9-2320-211-20.
2. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 102209

CHAPTER 6

ELECTRICAL SYSTEM GROUP MAINTENANCE

Section I. SCOPE

6-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for the charging and starting systems, instrument panel, lighting system, horn assembly, battery system and cab and chassis wiring harnesses for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels.

6-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. CHARGING SYSTEM

6-3. ENGINE GENERATOR REPAIR.

a. Removal. Remove engine generator. Refer to TM 9-2320-211-20.

b. Repair. Repair engine generator. Refer to TM 9-2920-214-35 and TM 9-2920-247-34.

c. Replacement. Replace engine generator. Refer to TM 9-2320-211-20.

6-4. GENERATOR MOUNTING BRACKET REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Disconnect battery ground cable. Refer to TM 9-2320-211-20.

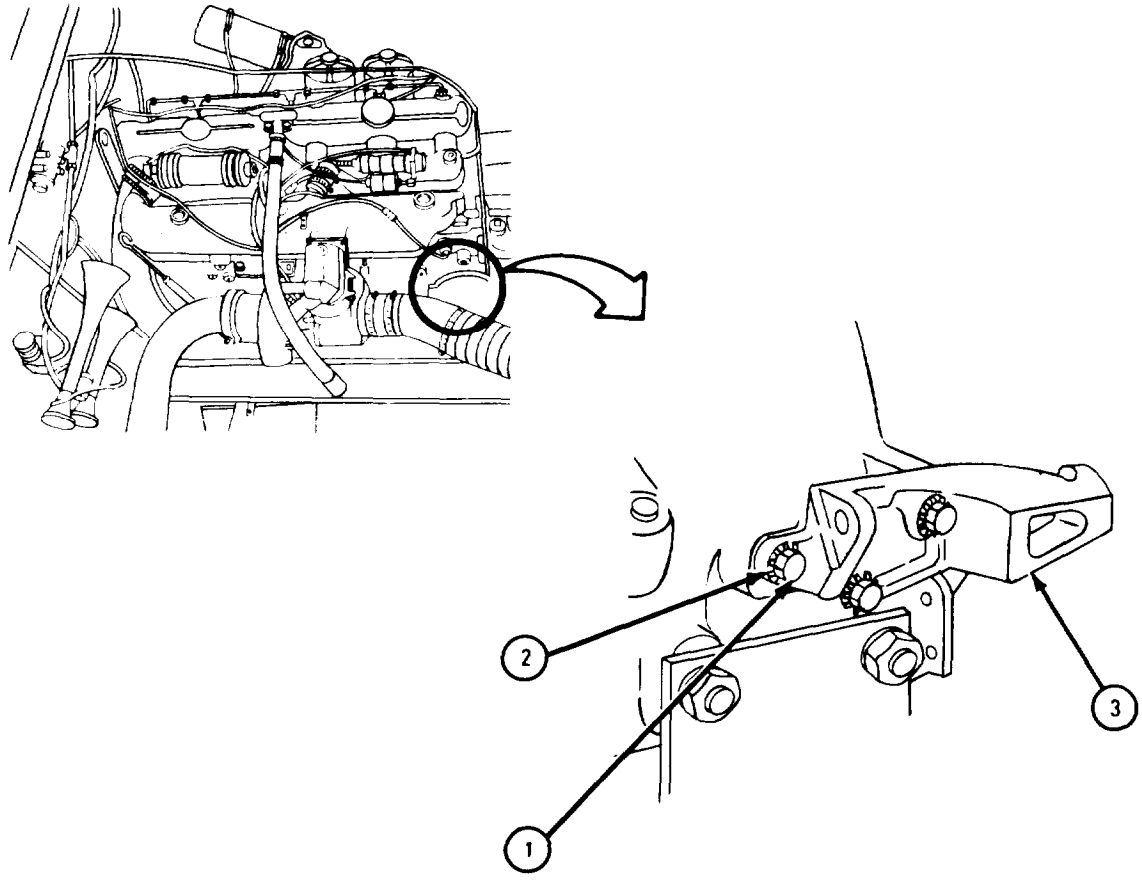
(3) Remove generator. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Working through splash shield, take out three bolts (1) with six washers (2).
2. Take off bracket (3).

END OF TASK



c. Cleaning. There are no peculiar cleaning procedures needed. Refer to cleaning procedures in para 1-3.

d. Inspection. Check that bracket is not cracked or bent. If bracket is damaged, get a new one.

e. Replacement.

FRAME 1

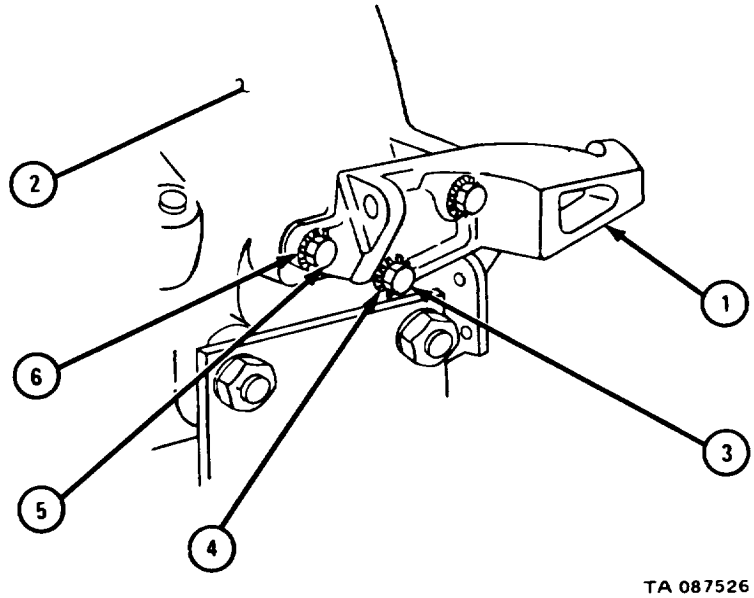
1. Working through splash shield, hold bracket (1) against side of engine (2) as shown.
2. Put in and hand tighten center bolt (3) with two washers (4).
3. Put in and hand tighten two end bolts (5) with four washers (6).
4. Tighten all three bolts (3 and 5).

NOTE

Follow-on Maintenance Action Required:

1. Replace generator. Refer to TM 9-2320-211-20.
2. Reconnect battery ground cable. Refer to TM 9-2320-211-20.
3. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 087526

6-5. ENGINE GENERATOR REGULATOR REMOVAL, REPAIR, AND REPLACEMENT.

a. Removal. Refer to TM 9-2320-211-20.

b. Repair.

(1) Delco-Remy model 1118656 regulator. Replace with Delco Remy (19728) Part No. 1181106 (16764) regulator or Auto-Lite model part no. VBC-4003-UT regulator.

(2) Delco-Remy model 1118606 regulator. Refer to TM 9-8627.

(3) Auto-Lite model VBC-4003-UT regulator. Refer to TM 9-2920-210-34.

c. Replacement. Refer to TM 9-2320-211-20.

Section III. STARTING SYSTEM

6-6. STARTER REPAIR.

a. Removal. Remove starter. Refer to TM 9-2320-211-20.

b. Repair. Rep air starter. Refer to TM 9-2920-242-34&P.

c. Replacement. Replace starter. Refer to TM 9-2320-211-20.

6-7. ENGINE STARTER SOLENOID REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: One

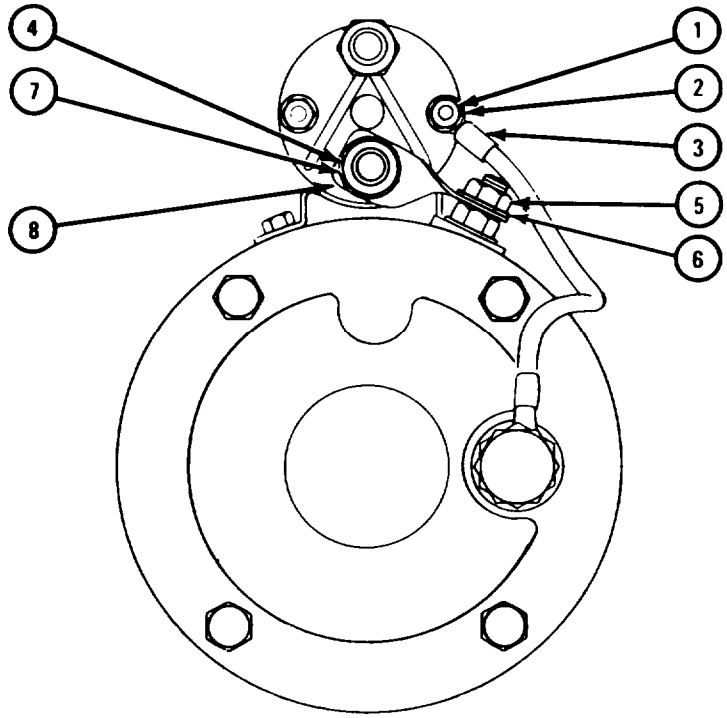
EQUIPMENT CONDITION: Starter assembly on

a. Removal.

FRAME 1

1. Take off nut (1) and washer (2).
2. Take off ground wire (3).
3. Take off two nuts (4 and 5) and washers (6 and 7).
4. Take off connector (8).

GO TO FRAME 2

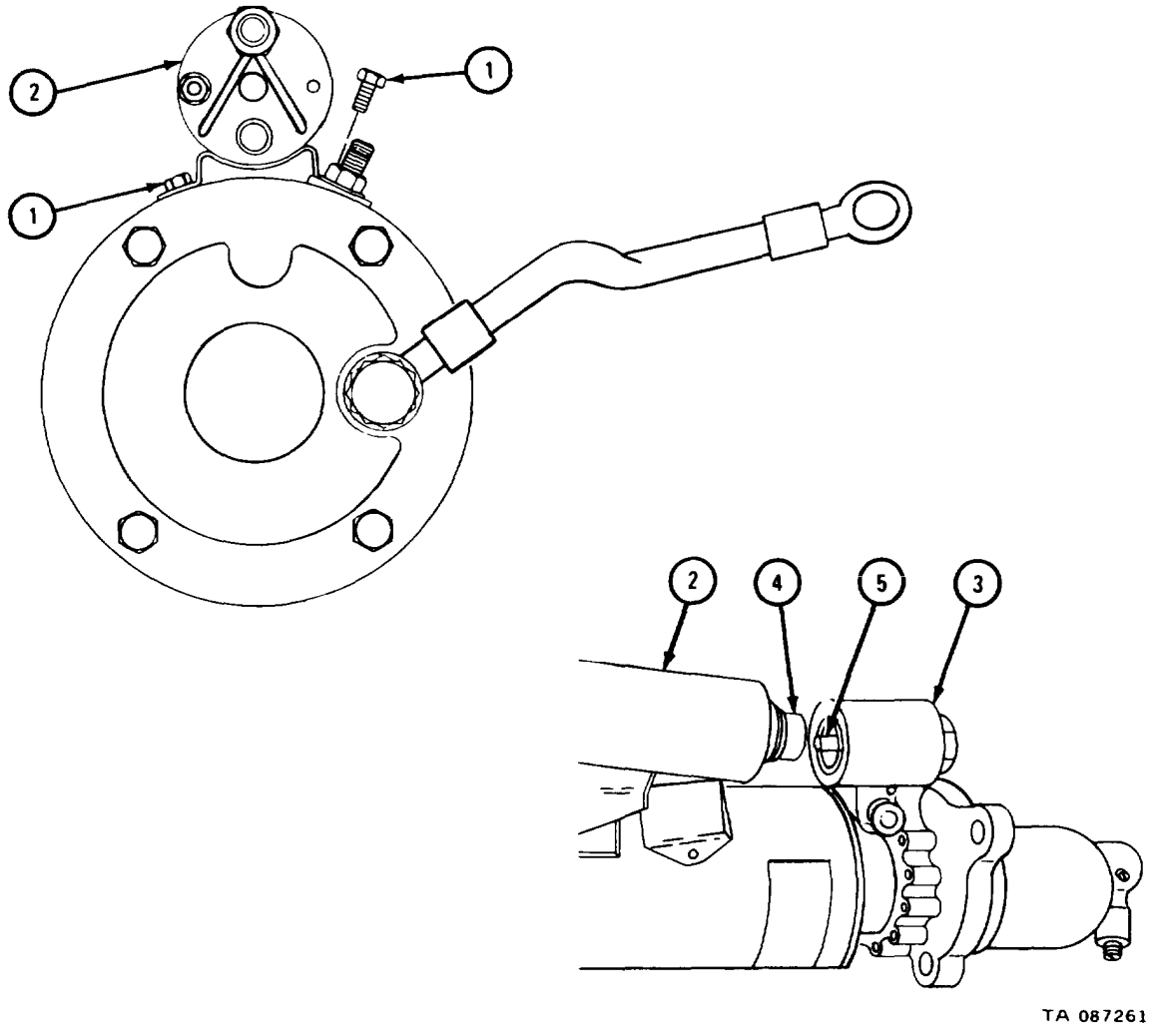


TA 087238

FRAME 2

1. Take out two screws (1).
2. Pull starter solenoid (2) away from starter case (3).
3. Unscrew starter solenoid plunger (4) from linkage (5).
4. Take off starter solenoid (2).

END OF TASK

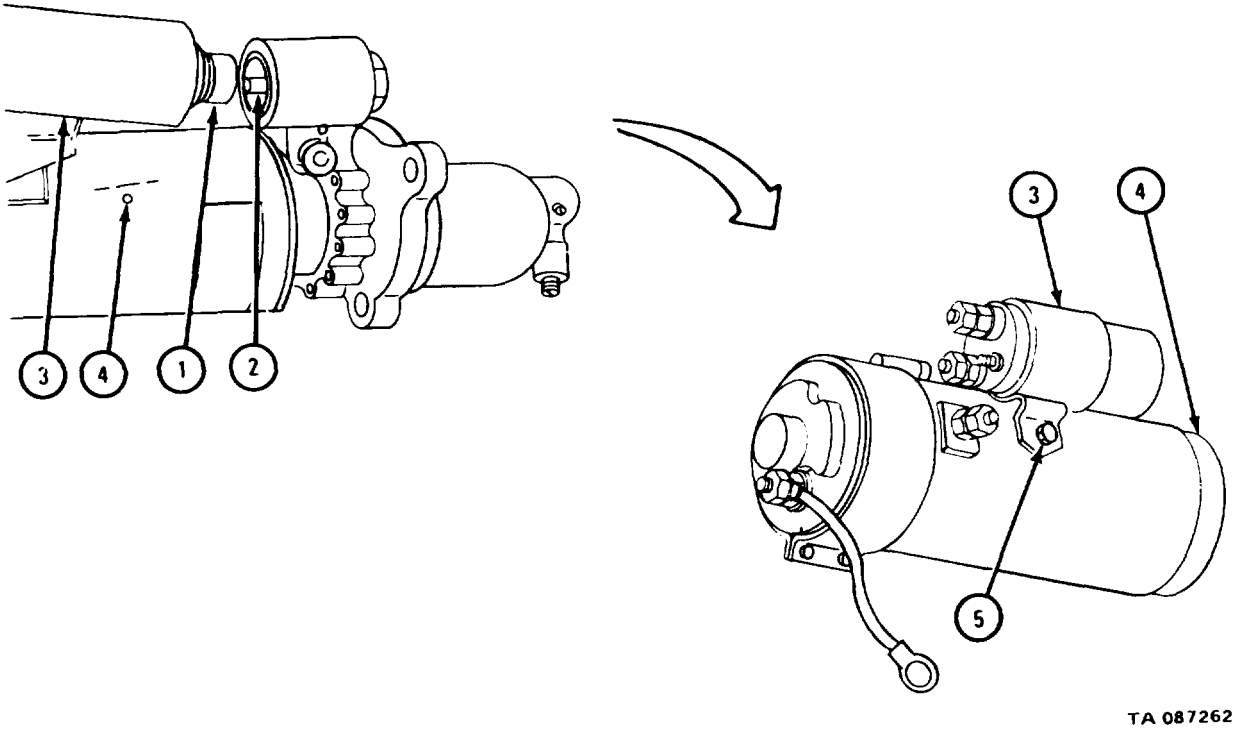


b. Replacement.

FRAME 1

1. Aline starter solenoid plunger (1) with linkage (2).
2. Finger tighten stater solenoid plunger (1) to linkage (2).
3. Aline holes in starter solenoid (3) with holes in stader case (4).
4. Put in two screws (5).

GO TO FRAME 2

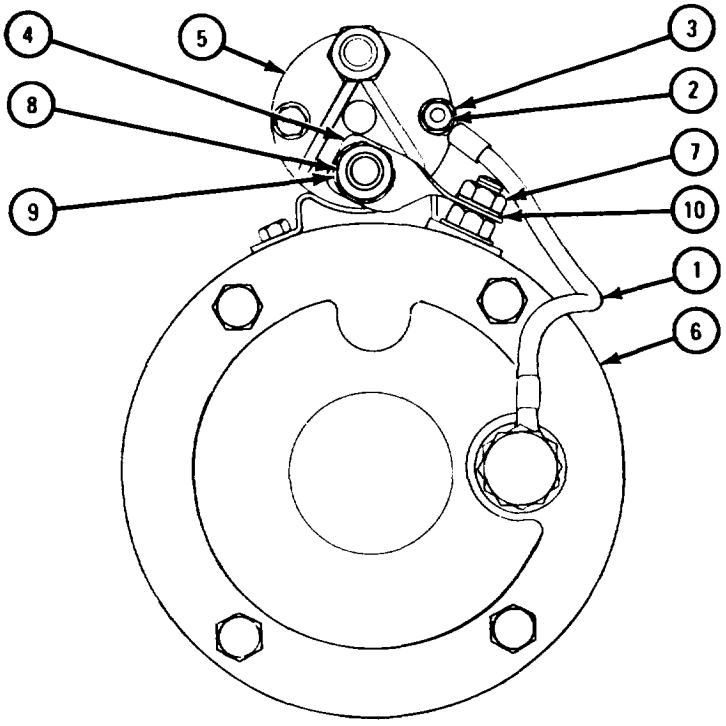


TA 087262

FRAME 2

1. Put on ground wire (1), nut (2), and washer (3).
2. Put connector (4) in place on starter solenoid (5) and starter assembly (6).
3. Put on two washers (7 and 8) and nuts (9 and 10).

END OF TASK



TA 087263

6-8. STARTER RELAY HARNESS REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Tags

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Disconnect battery ground cable at frame. Refer to TM 9-2320-211-20.

(2) Open hood. Refer to TM 9-2320-211-10.

(3) Takeoff side access panels. Refer to TM 9-2320-211-10

(4) Pullback thermal barrier in cab on left side of firewall (if installed). Refer to Part 4, para 19-20.

b. Removal.

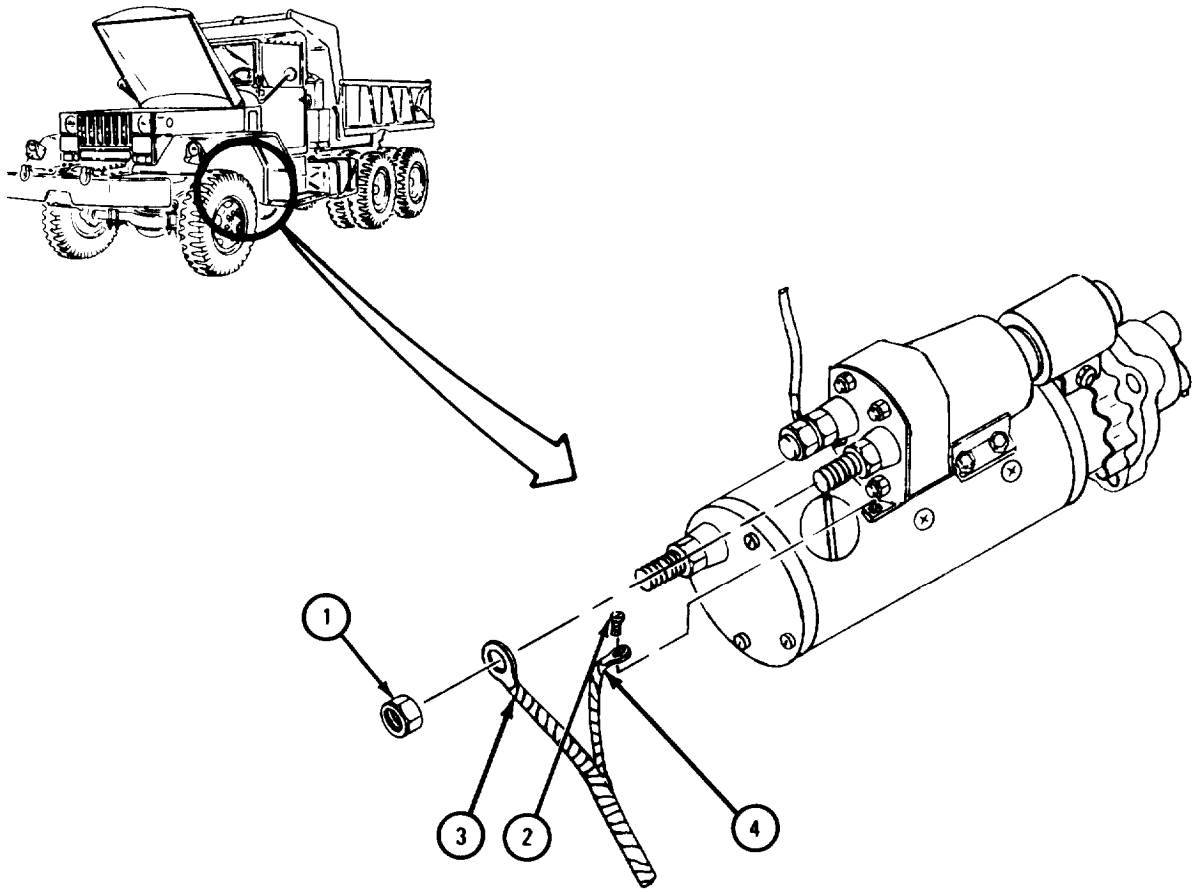
NOTE

Tag leads before taking them off so that they can be put back in the right place.

FRAME 1

1. Working from under truck, take off nut (1) and screw (2). Take off wires (3) and (4).

GO TO FRAME 2



TA 102760

FRAME 2

Soldier A 1. Working in cab, hold screw (1).

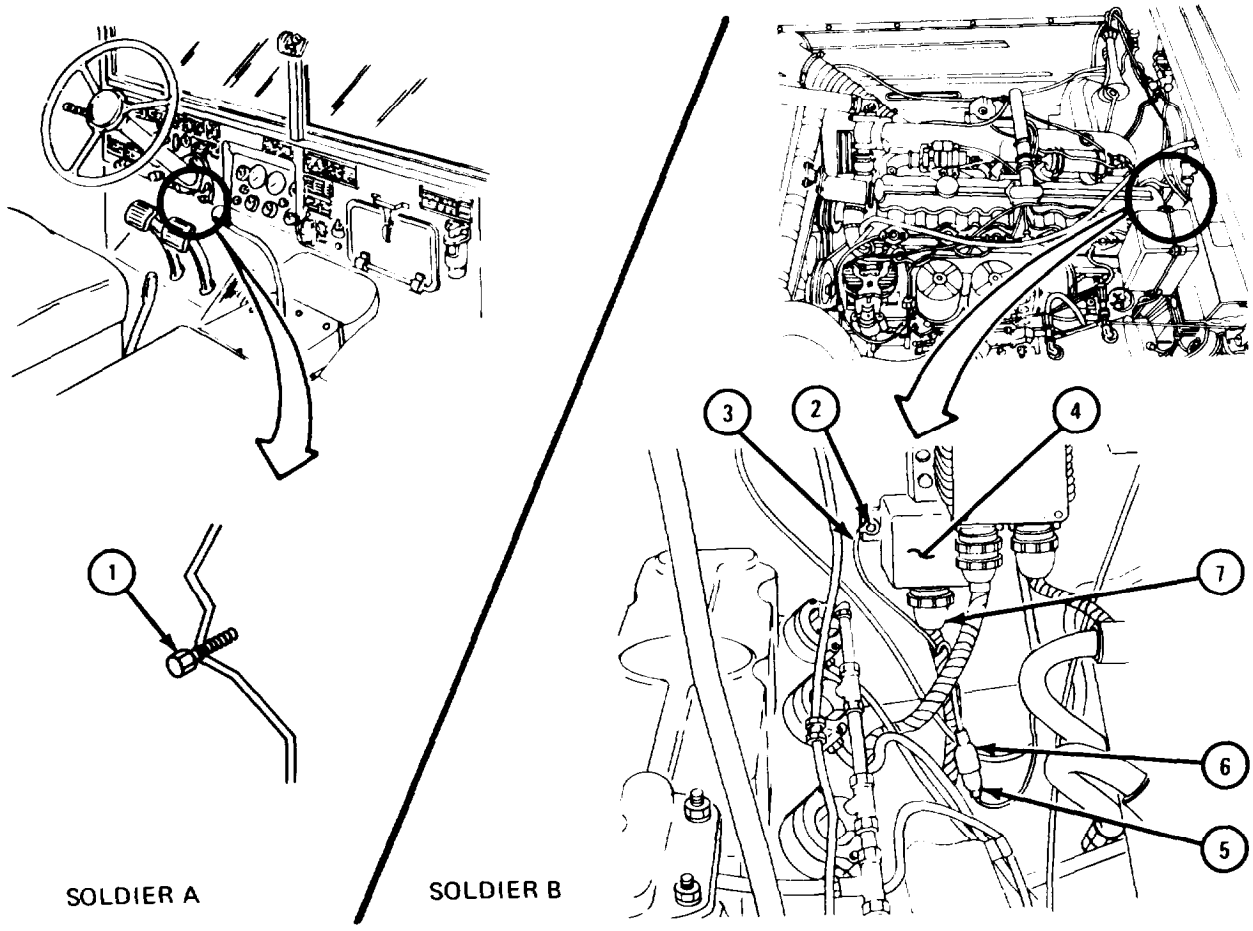
Soldier B 2. Working in rear of engine compartment, take off nut (2) and harness ground wire (3) from starter relay (4).

3. Unplug common ground wire (5) from starter relay harness (6).

4. Unscrew and take off quick disconnect (7) from starter relay (4).

5. Take out starter relay harness (6).

END OF TASK



c. Replacement.

FRAME 1

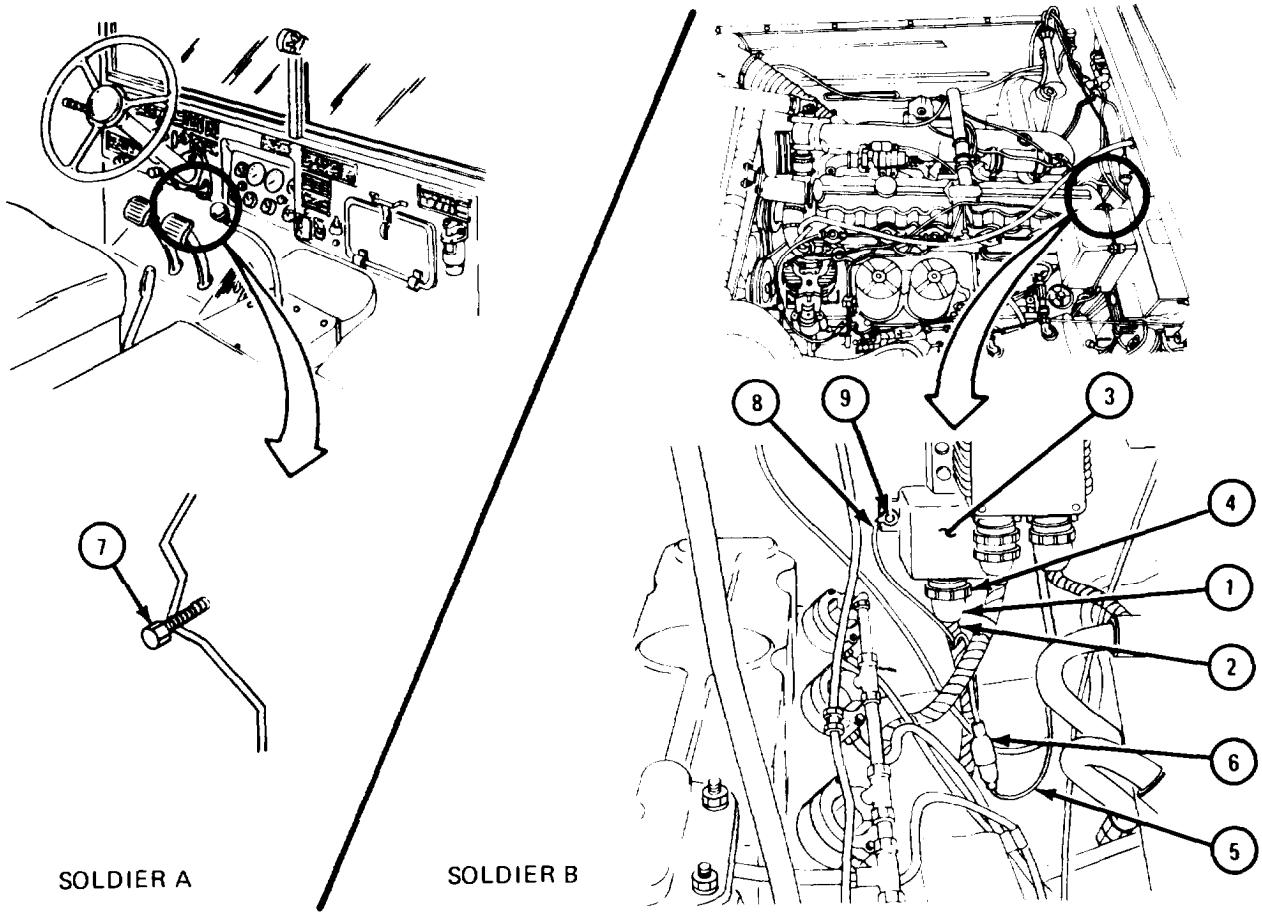
Soldier A 1. Plug quick disconnect (1) on starter relay harness (2) into starter relay (3). Tighten coupling (4).

2. Plug common ground wire (5) into plug (6) from starter relay harness (2).

Soldier B 3. Working in cab of truck, hold head of screw (7).

Soldier A 4. Put ground wire (8) and nut (9) on screw (7).

GO TO FRAME 2



FRAME 2

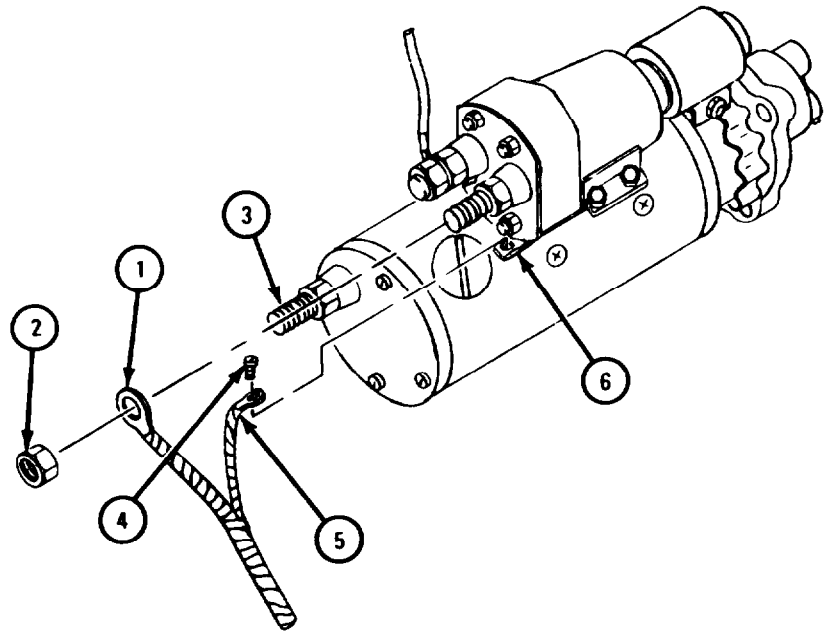
1. Working under truck, put back wire (1) and nut (2) on starter stud (3).
2. Put screw (4) through wire (5) and into starter terminal (6).

NOTE

Follow-on Maintenance Action Required:

1. Replace thermal barrier in cab on left side of firewall (if taken off). Refer to Part 4, para 19-20.
2. Replace side access panels. Refer to TM 9-2320-211-10.
3. Reconnect battery ground cable at frame. Refer to TM 9-2320-211-20.
4. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 102763

Section IV. INSTRUMENT PANEL

6-9. INSTRUMENT PANEL REPAIR.

TOOLS : No special tools required

SUPPLIES : None

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Remove instrument panel. Refer to TM 9-2320-211-20.

b. Cleaning. There are no special cleaning procedures required. Refer to cleaning procedures given in para 1–3.

c. Inspection and Repair.

(1) Inspect the instrument panel for dents, cracks, warping, damaged screw holes, damaged instrument cut-out holes and burrs.

(2) Repair the instrument panel by straightening out dents. Use a file to smooth out burrs and screw holes that are damaged.

(3) Repair cracks by welding. Refer to TM 9-237.

NOTE

Follow-on Maintenance Action Required:

Replace instrument panel. Refer to TM 9-2320-211-20.

6-10. ACCESSORY WIRING CIRCUIT BREAKERS REMOVAL AND REPLACEMENT.

NOTE

This task shows three circuit breakers on firewall. The M543A2 truck has one more circuit breaker on firewall. The task for the fourth circuit breaker is the same.

TOOLS: No special tools required

SUPPLIES: Tags

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

(2) Disconnect battery ground cable. Refer to TM 9-2320-211-20.

b. Removal.

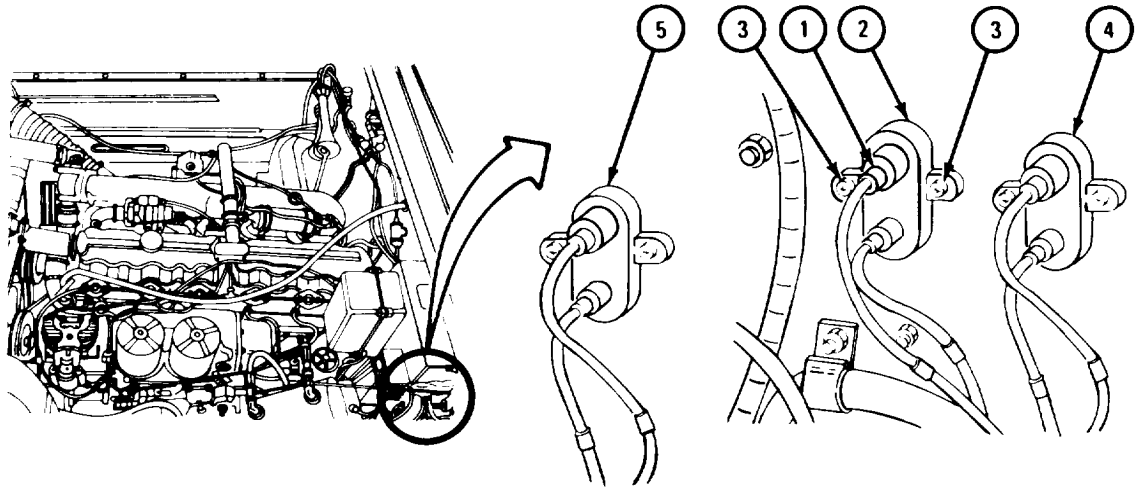
FRAME 1

NOTE

Tag wires on circuit breakers so wires can be put back in the same places.

1. Unplug two connectors (1) from circuit breaker (2).
2. Take out two screws (3). Take off circuit breaker (2).
3. Do steps 1 and 2 again for circuit breakers (4 and 5).

END OF TASK



TA 102540

c. Replacement.

FRAME 1

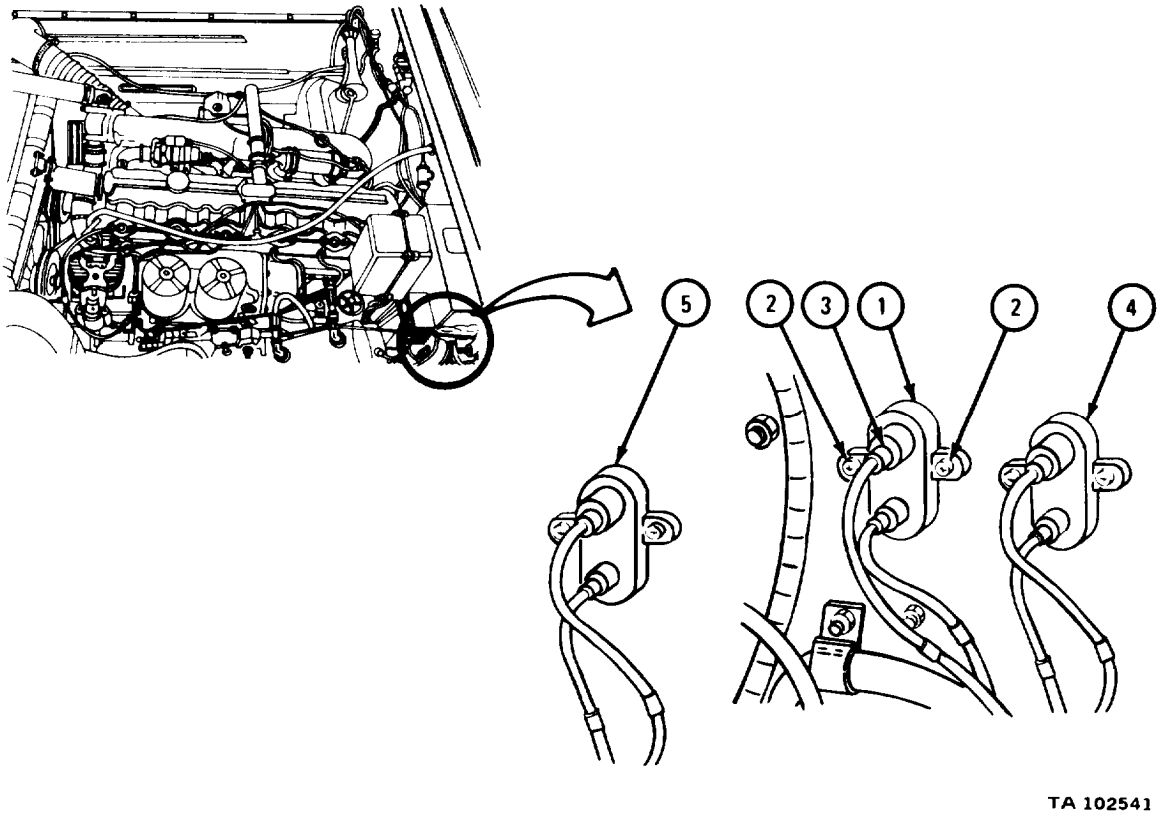
1. Put circuit breaker (1) in place and aline holes for two screws (2). Put in two screws. Plug in two connectors (3).
2. Do step 1 again for circuit breakers (4 and 5).

NOTE

Follow-on Maintenance Action Required:

1. Close Hood. Refer to TM 9-2320-211-10.
2. Reconnect battery ground cable. Refer to TM 9-2320-211-20.

END OF TASK



TA 102541

Section V. LIGHTING SYSTEM

6-11. FLOODLIGHT ASSEMBLY REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIE: Solvent, dry cleaning, type II (SD-2) , Fed. Spec P-D-680
Soapy water
Lint free cloth
Electrical contact cleaner, pn MS 230

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Remove floodlight assembly. Refer to TM 9-2320-211-20

b. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well–ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean metal parts with dry cleaning solvent. Thoroughly dry parts.

(2) Clean light door with soap and water. Dry light door with clean lint-free cloth.

(3) Clean electrical parts with electrical contact cleaner.

c. Inspection and Repair.

FRAME 1

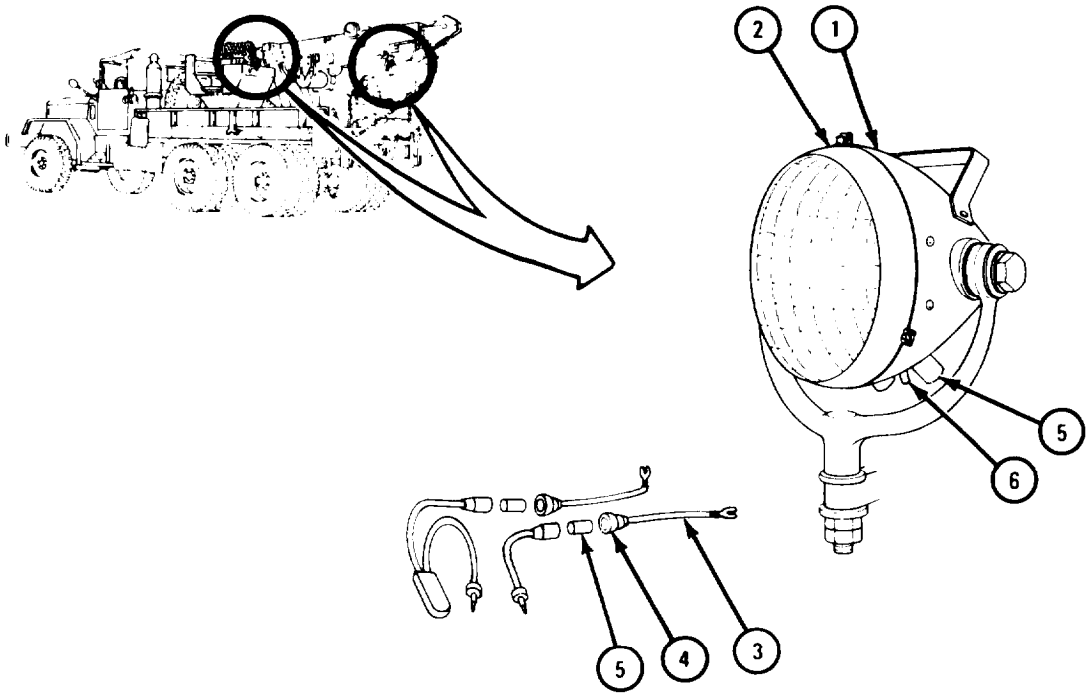
1. Check that body (1) and light door (2) have no cracks or signs of leaks. If parts are damaged, get new ones in their place.
2. Check that two cables (3), sockets (4), and connectors (5) are not damaged. If parts are damaged, get new ones in their place.
3. Check that switch assembly (6) is not damaged. If switch assembly is damaged, get a new one.

NOTE

Follow-on Maintenance Action Required:

Replace floodlight assembly. Refer to TM 9-2320-211-20.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 085973

Section VI. HORN ASSEMBLY

6-12. HORN ASSEMBLY REPAIR.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2) , Fed. Spec P-D-680.
Rag

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

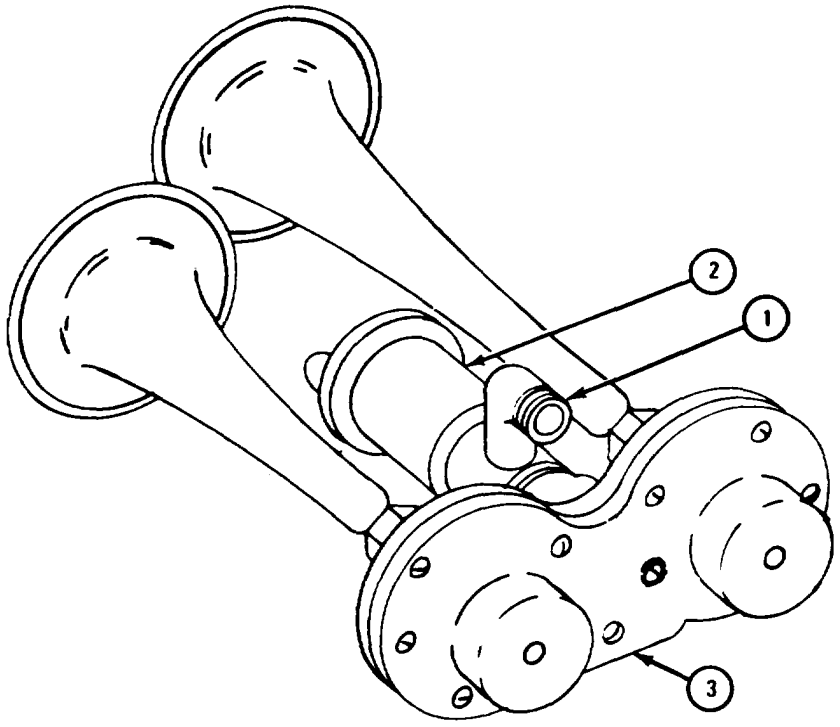
a. Preliminary Procedure. Remove horn. Refer to TM 9–2320-211-20.

b. Disassembly.

FRAME 1

1. Take off elbow (1).
2. Take off solenoid (2) from horn assembly base (3).

END OF TASK



TA 085974

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

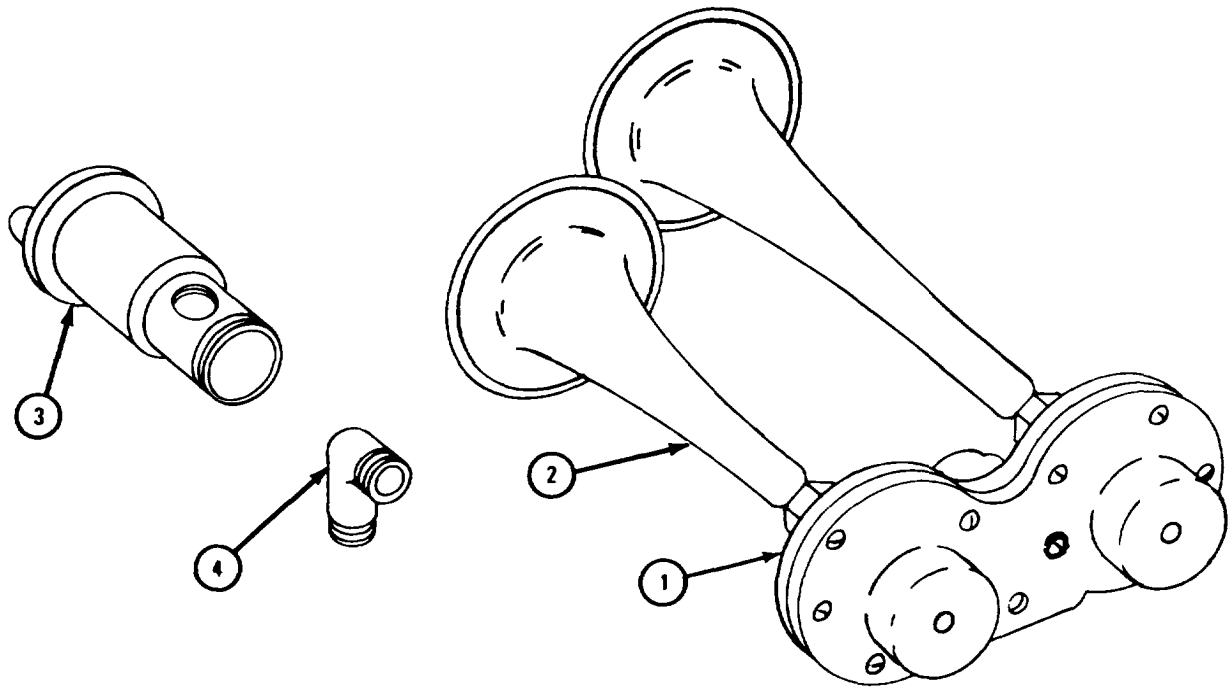
c. Cleaning. Clean outside of horn with cloth dipped in dry cleaning solvent.

d. Inspection and Repair.

FRAME 1

1. Check that horn assembly (1) is not damaged. Straighten projectors (2) if they are bent. If more repair is needed, get a new horn assembly.
2. Check that solenoid (3) is not damaged. If solenoid is damaged, get a new one.
3. Check that threads on elbow (4) are not stripped or damaged. If elbow is damaged, get a new one.

END OF TASK



TA 085975

e. Assembly.

FRAME 1

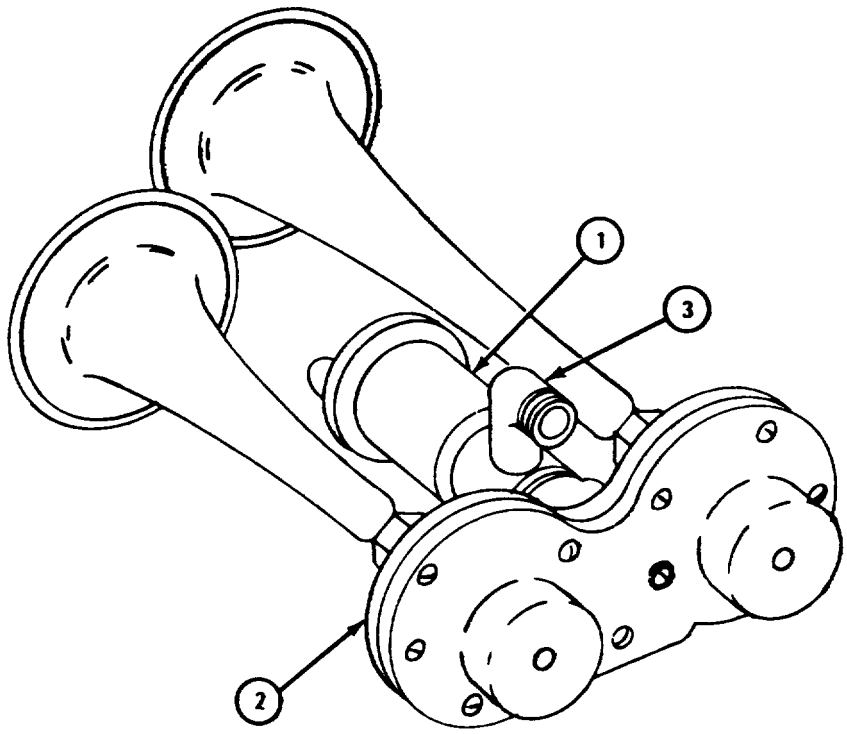
1. Put solenoid (1) into horn assembly (2).
2. Put on elbow (3).

NOTE

Follow-on Maintenance Action Required:

Replace horn assembly. Refer to TM 9-2320-211-20.

END OF TASK



TA 085976

6-13. HORN CONTACT BRUSH ASSEMBLY REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Cover gasket
Brush holder gasket

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Open hood. Refer to TM 9-2320-211-10.

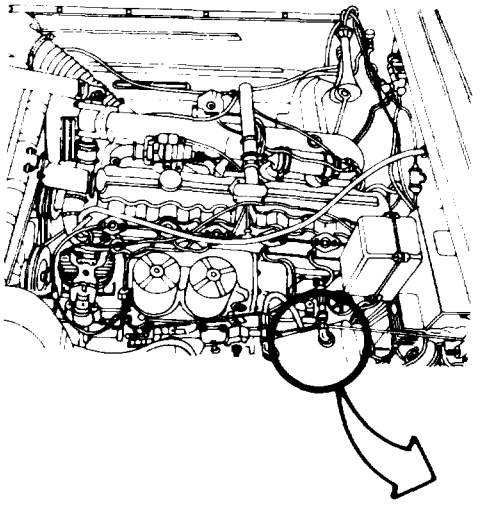
(2) Takeoff left side access panel. Refer to TM 9-2320-211-10.

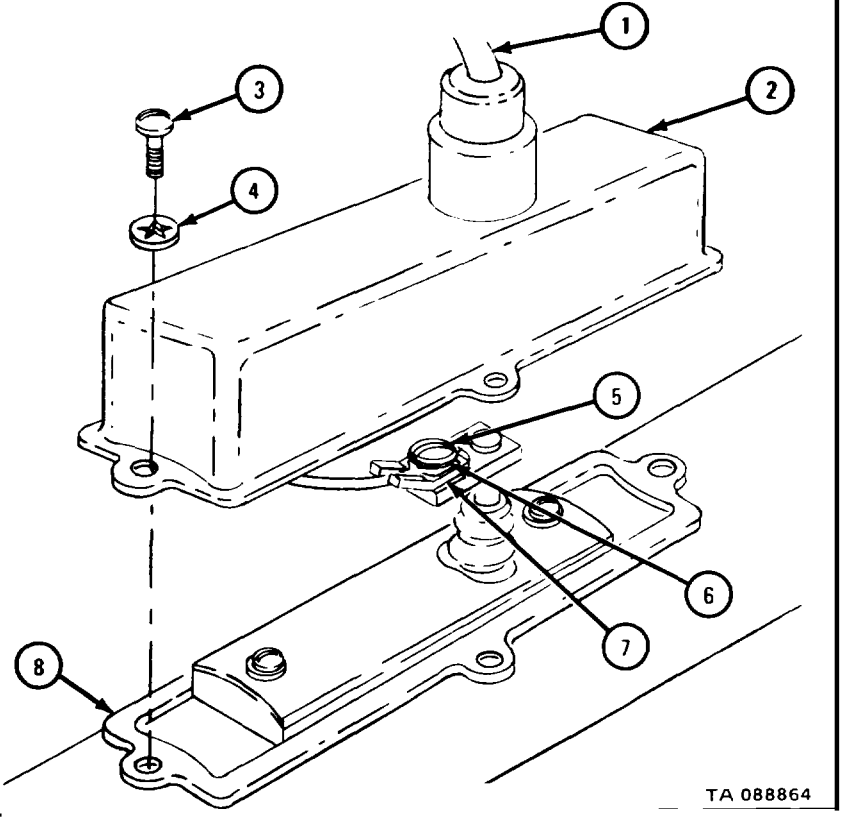
b. Removal.

FRAME 1

1. Takeout lead (1) from cover (2).
2. Take out four screws (3) and washers (4).
3. Lift up cover (2).
4. Take out screw (5), washer (6), and electrical lead (7).
5. Take off cover (2) and gasket (8). Throw away gasket.

GO TO FRAME 2

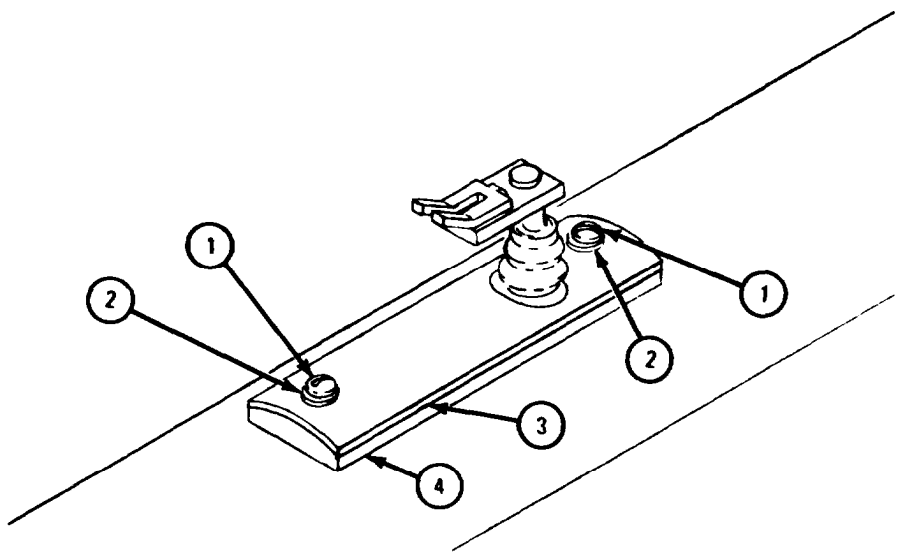




FRAME 2

1. Take out two screws (1), and two washers (2).
2. Take out contact brush (3) and gasket (4). Throw away gasket.

END OF TASK



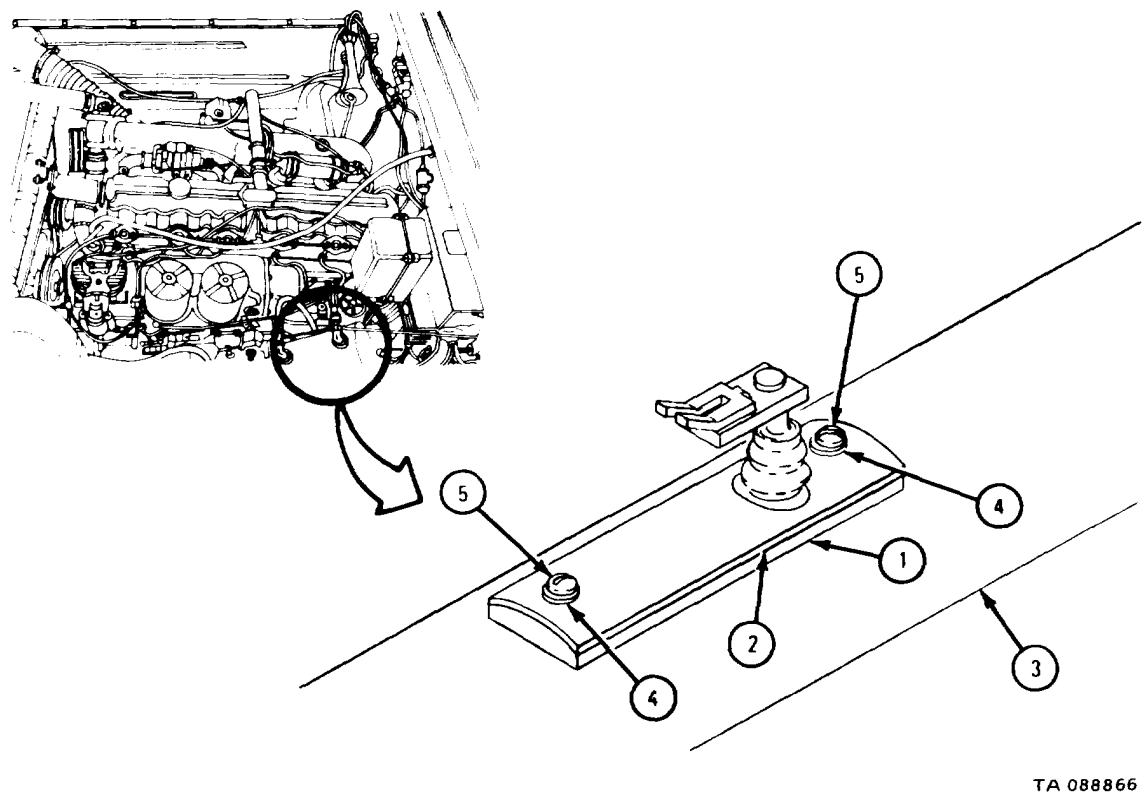
TA 088865

c. Replacement.

FRAME 1

1. Place gasket (1) and contact brush (2) on steering column (3).
2. Put washer (4) on each of two screws (5). Put in screws.

GO TO FRAME 2



FRAME 2

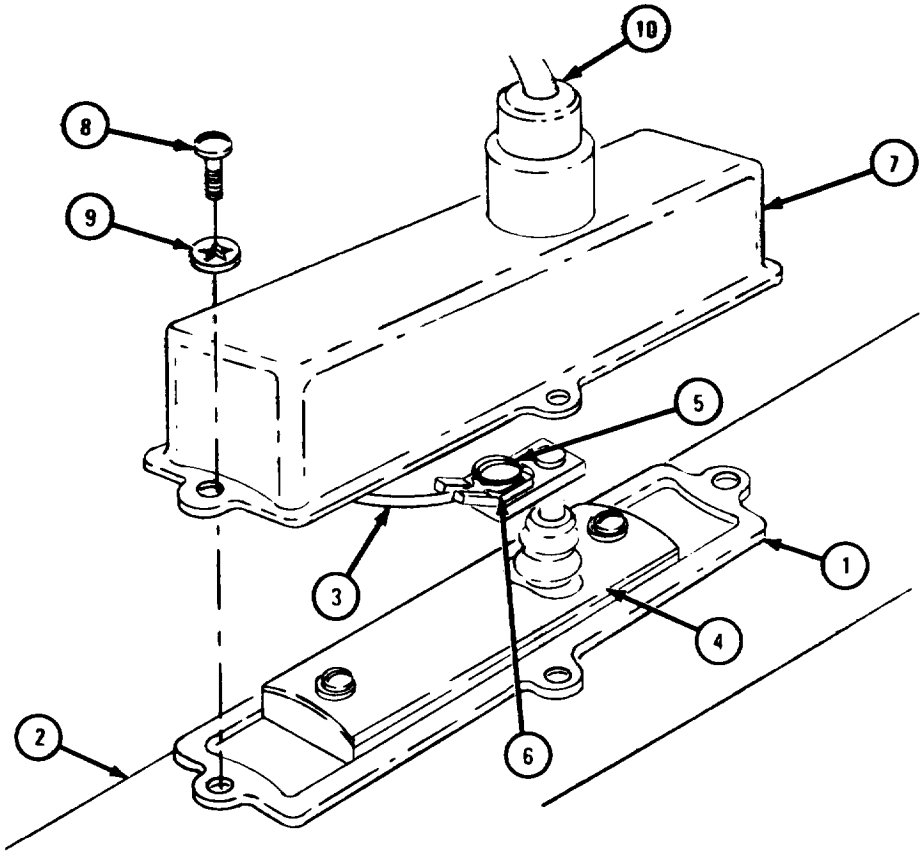
1. Put gasket (1) on steering wheel column (2).
2. Put lead (3) on contact brush (4).
3. Put in screw (5) and washer (6).
4. Put cover (7) over gasket (1).
5. Put in four screws (8) and washers (9).
6. Plug in lead (10) to cover (7).

NOTE

Follow-on Maintenance Action Required:

1. Put on left side access panel. Refer to TM 9-2320-211-10).
2. Close hood. Refer to TM 9-2320-211-10.

END OF TASK



TA 088867

Section VII. BATTERY SYSTEM

6-14. BATTERY REPAIR.

a. Removal. Remove battery. Refer to TM 9-2320-211-20.

b. Repair. Repair battery. Refer to TM 9-6140-200-14.

c. Replacement. Replace battery. Refer to TM 9-2320-211-20.

Section VIII. CAB AND CHASSIS WIRING HARNESSES

6-15. WIRE CLAMPS REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Chalk, SS-C-266F

PERSONNEL: One

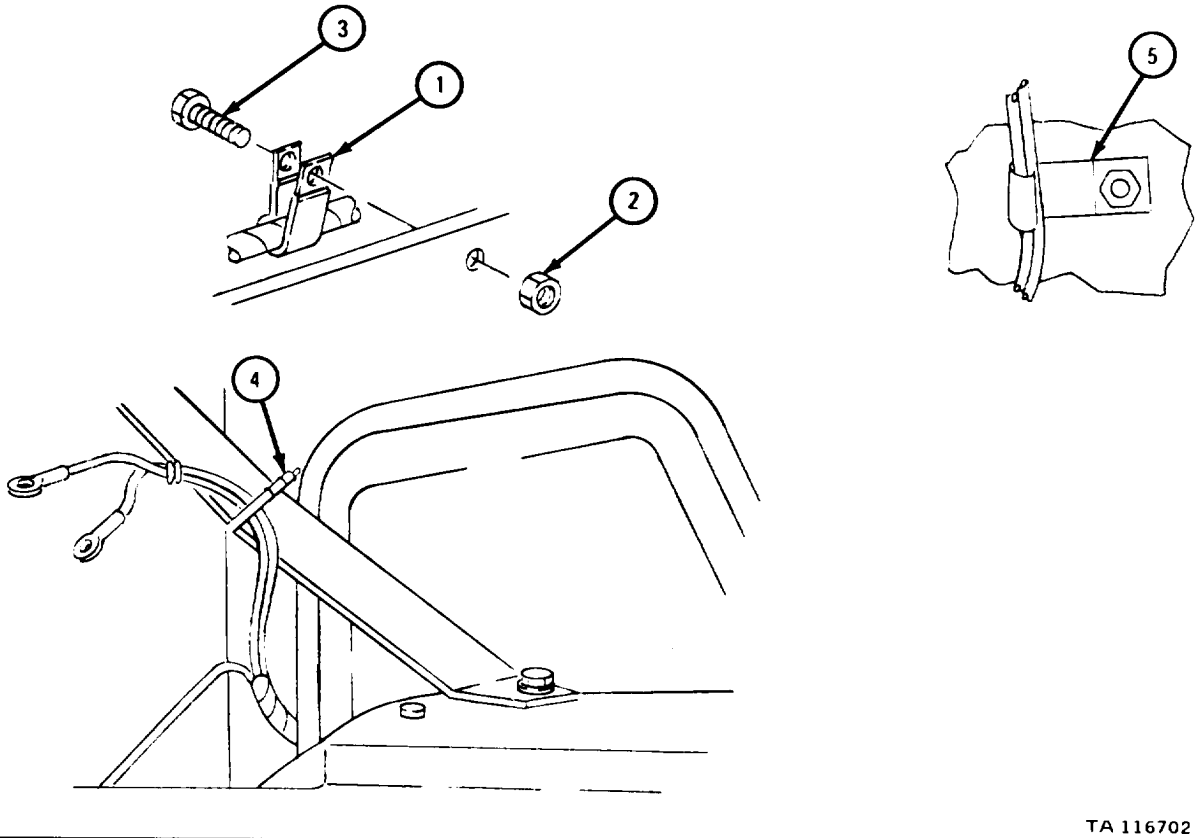
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Follow wire to clamp. If clamp is screw type (1), using 7/16-inch wrench, take off nut (2) from screw (3). Take off clamp (1). Circle hole in chassis with chalk.
2. If clamp is disposable plastic type (4) , cut off clamp and mark straight line with chalk on chassis.
3. If clamp is wrap-around type (5) , unwrap and take out wire.

END OF TASK

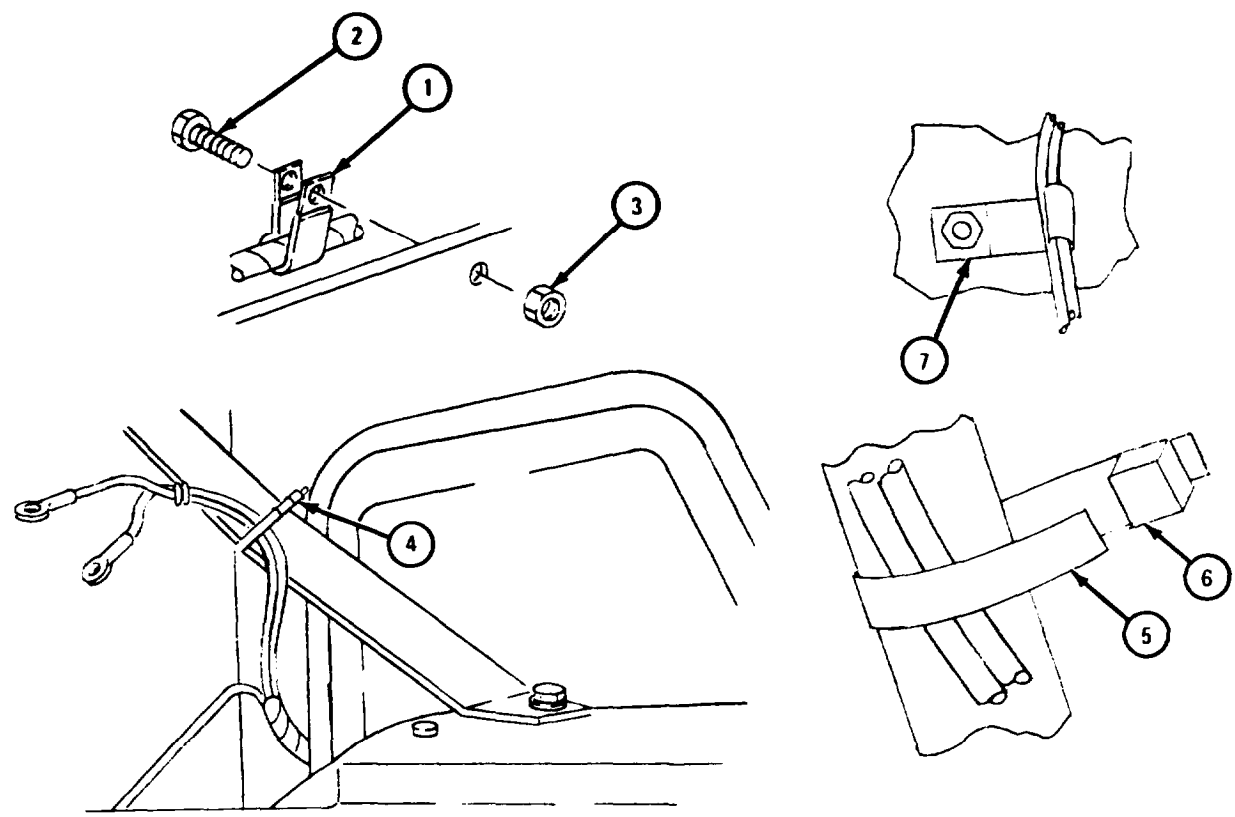


b. Replacement.

FRAME 1

1. If hole on chassis is circled with chalk, put on screw type clamp (1). Put in screw (2). Put on nut (3), using 7/16-inch wrench.
2. If chassis has straight chalk line, put on disposable plastic clamp (4). Put clamp around wire. Put end of clamp (5) through loop (6) and pull end of clamp until clamp is tight.
3. If clamp is wrap-around type (7), place wire in clamp and wrap metal strip around wire.

END OF TASK



TA 116703

6-16. FRONT WIRING HARNESS REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Tags
Chalk

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Disconnect battery negative (-) lead. Refer to TM9-2320-211-20.

b. Removal.

NOTE

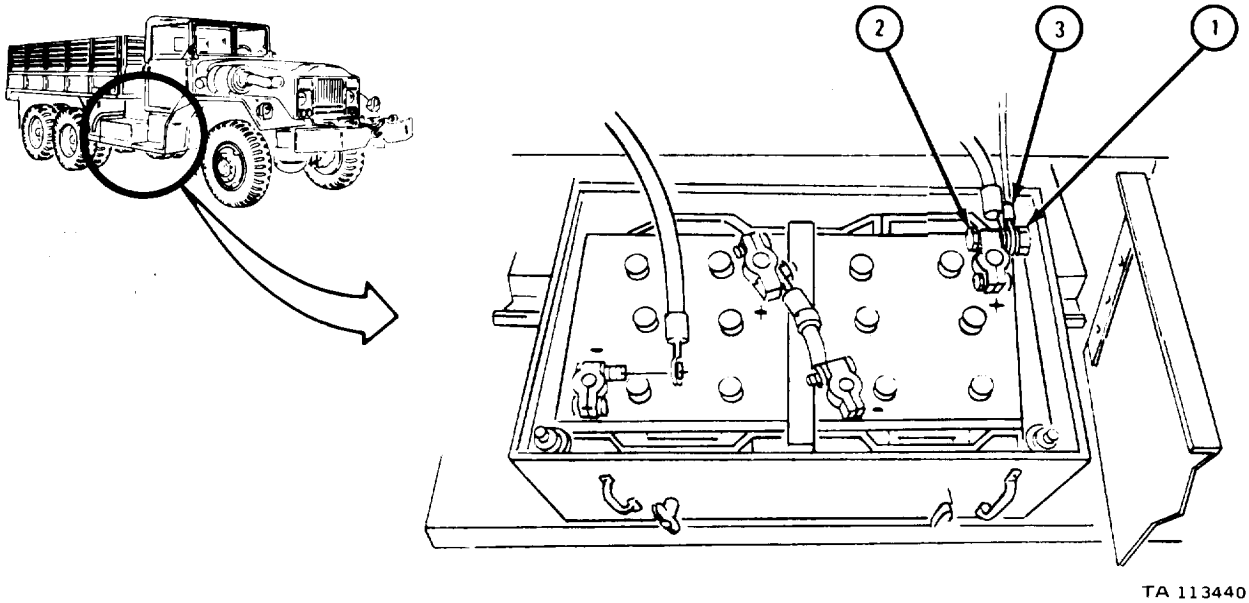
Tag both sides of a connector before taking it apart, so it can be put back the same way.

Before taking out harness, mark routing along chassis and engine with chalk so that it can be put back the same way.

FRAME 1

1. Take off nut (1) from bolt (2).
2. Take off two leads (3) from bolt (2).

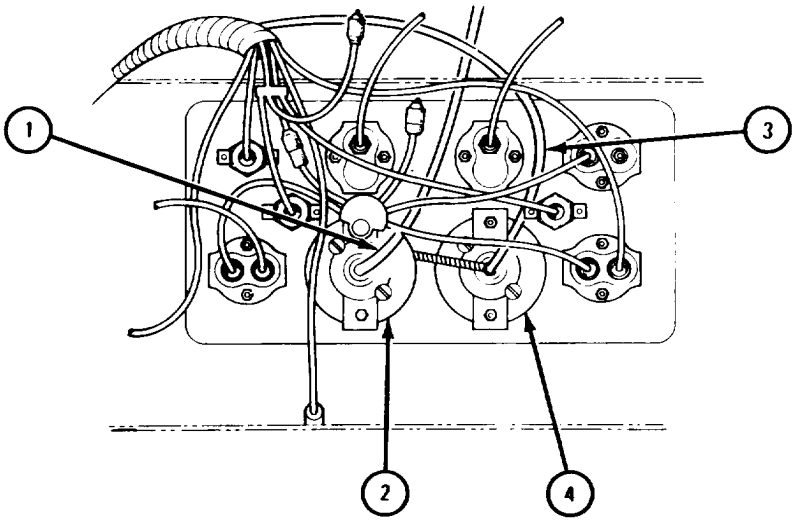
GO TO FRAME 2



FRAME 2

1. Working behind instrument cluster, take off speedometer shaft (1) from speedometer (2).
2. Take off tachometer shaft (3) from tachometer (4).

GO TO FRAME 3

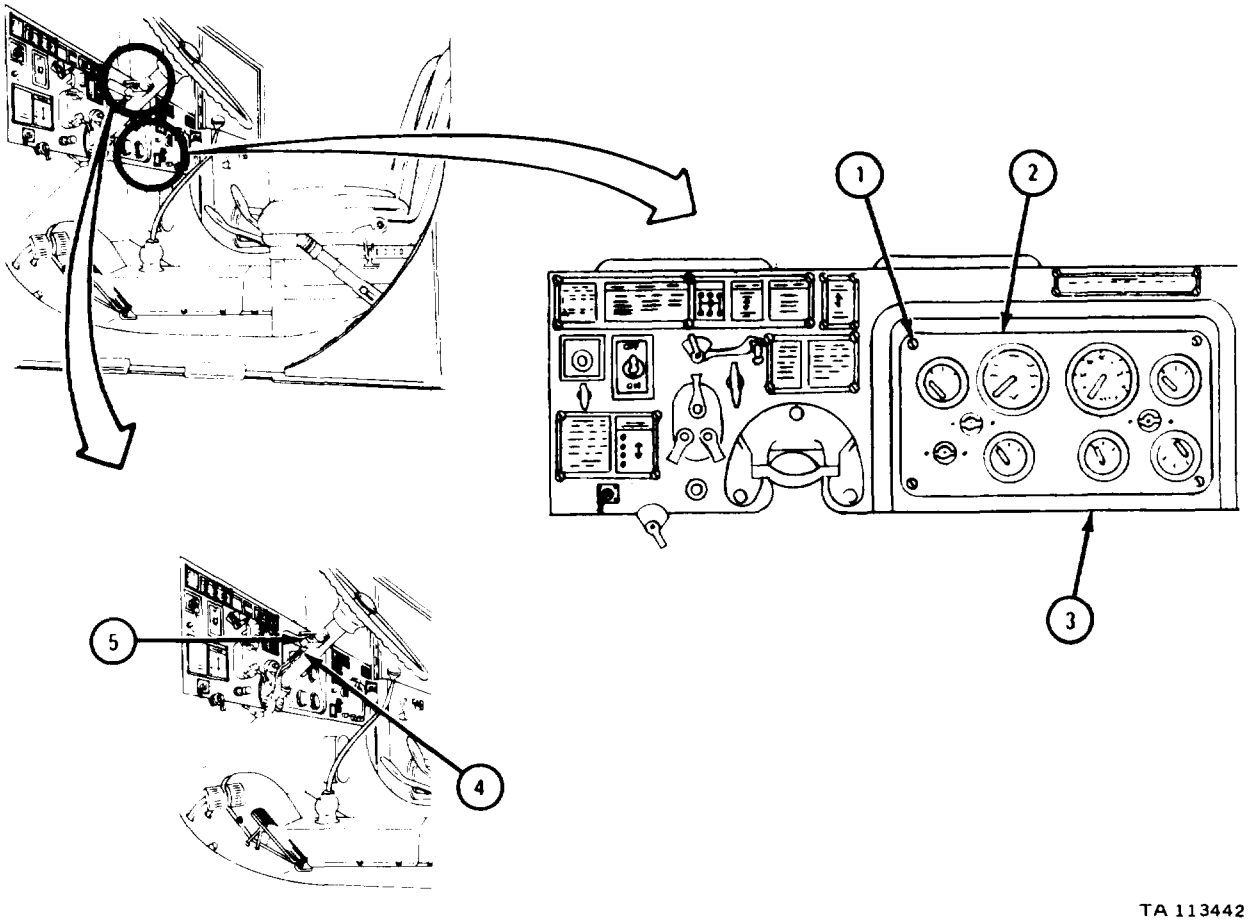


TA 113441

FRAME 3

1. Loosen four quick disconnect mounting studs (1).
2. Pull instrument cluster (2) away from instrument panel (3).
3. Unplug connector (4) from turn signal control arm (5).

GO TO FRAME 4

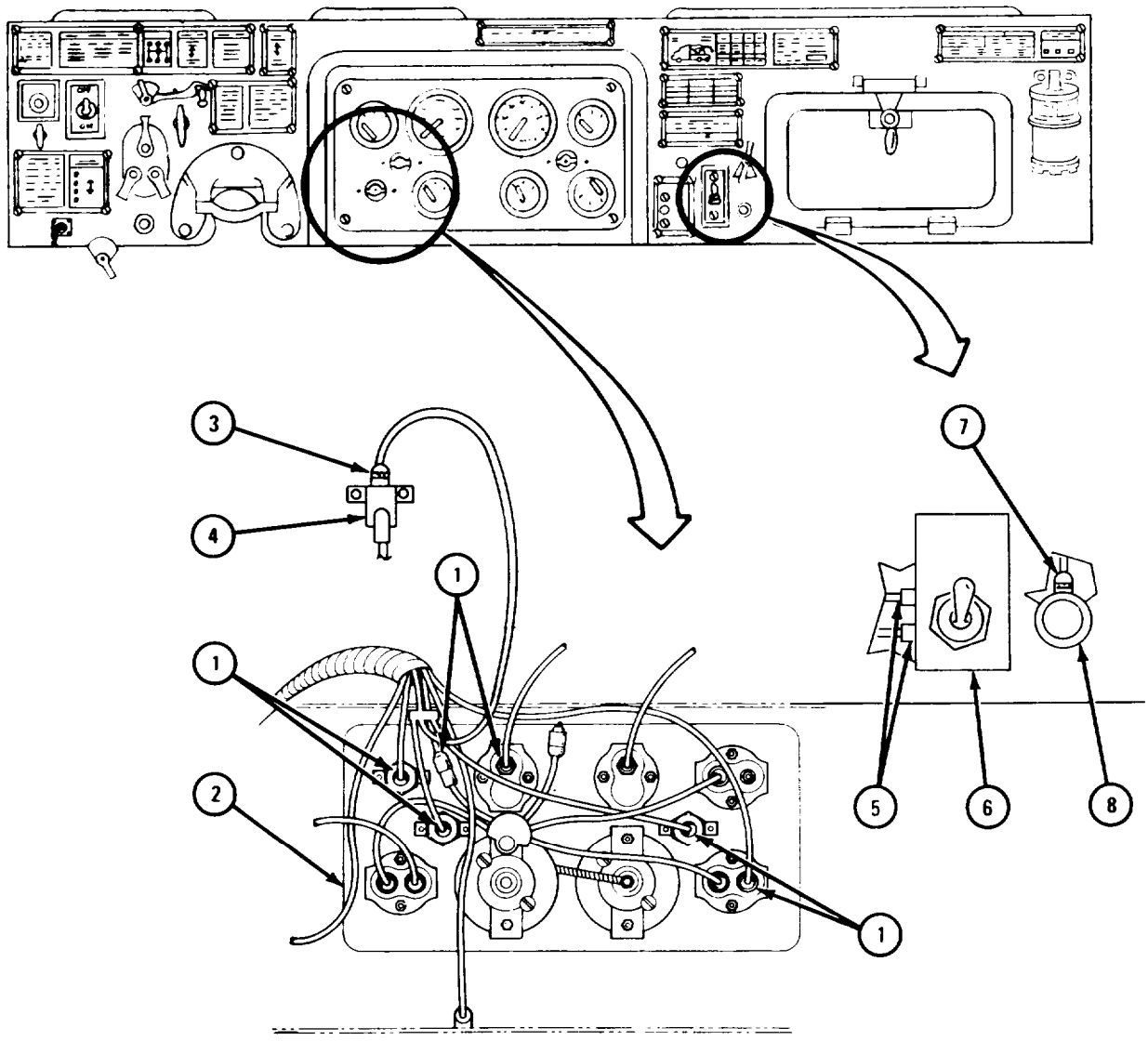


TA 113442

FRAME 4

1. Unplug six leads (1) from instrument cluster (2).
2. Unplug lead (3) from top of low air pressure switch (4).
3. Unplug two leads (5) from FUEL TRANSFER SWITCH (6).
4. Unplug lead (7) from FUEL TRANSFER SWITCH indicator light (8).

GO TO FRAME 5

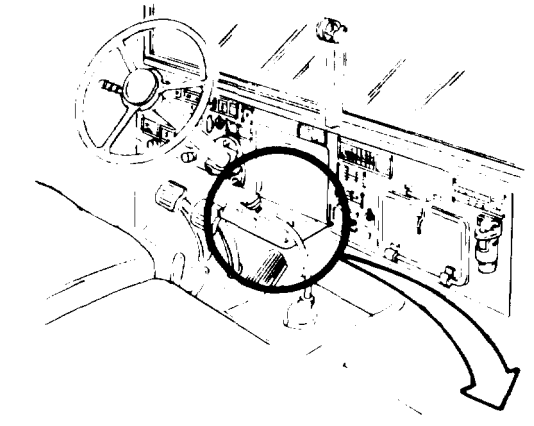


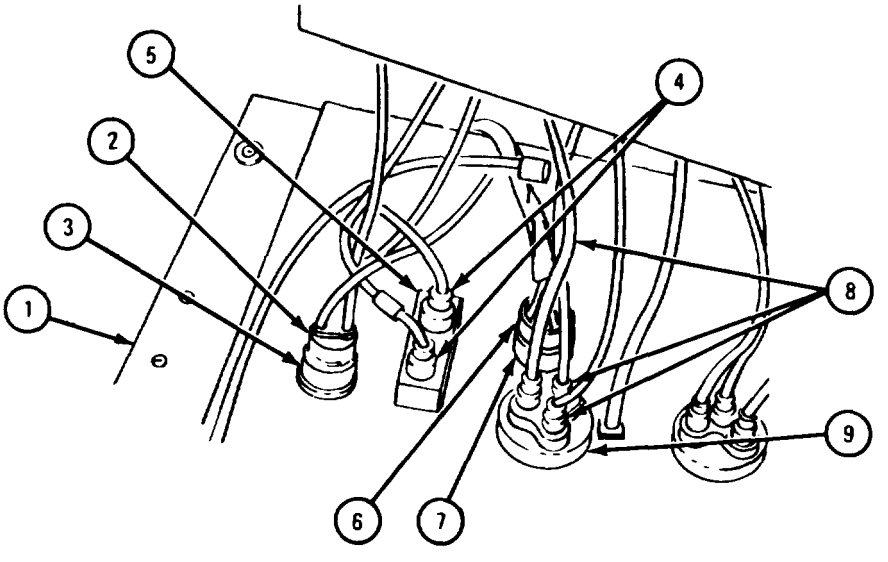
TA 113443

FRAME 5

1. Tilt instrument panel (1) forward.
2. Unplug lead (2) from STARTER switch (3).
3. Unplug two leads (4) from manifold heater switch (5).
4. Unscrew and unplug connector (6) from MASTER light switch (7).
5. Unplug three harness leads (8) from IGNITION switch (9).

GO TO FRAME 6



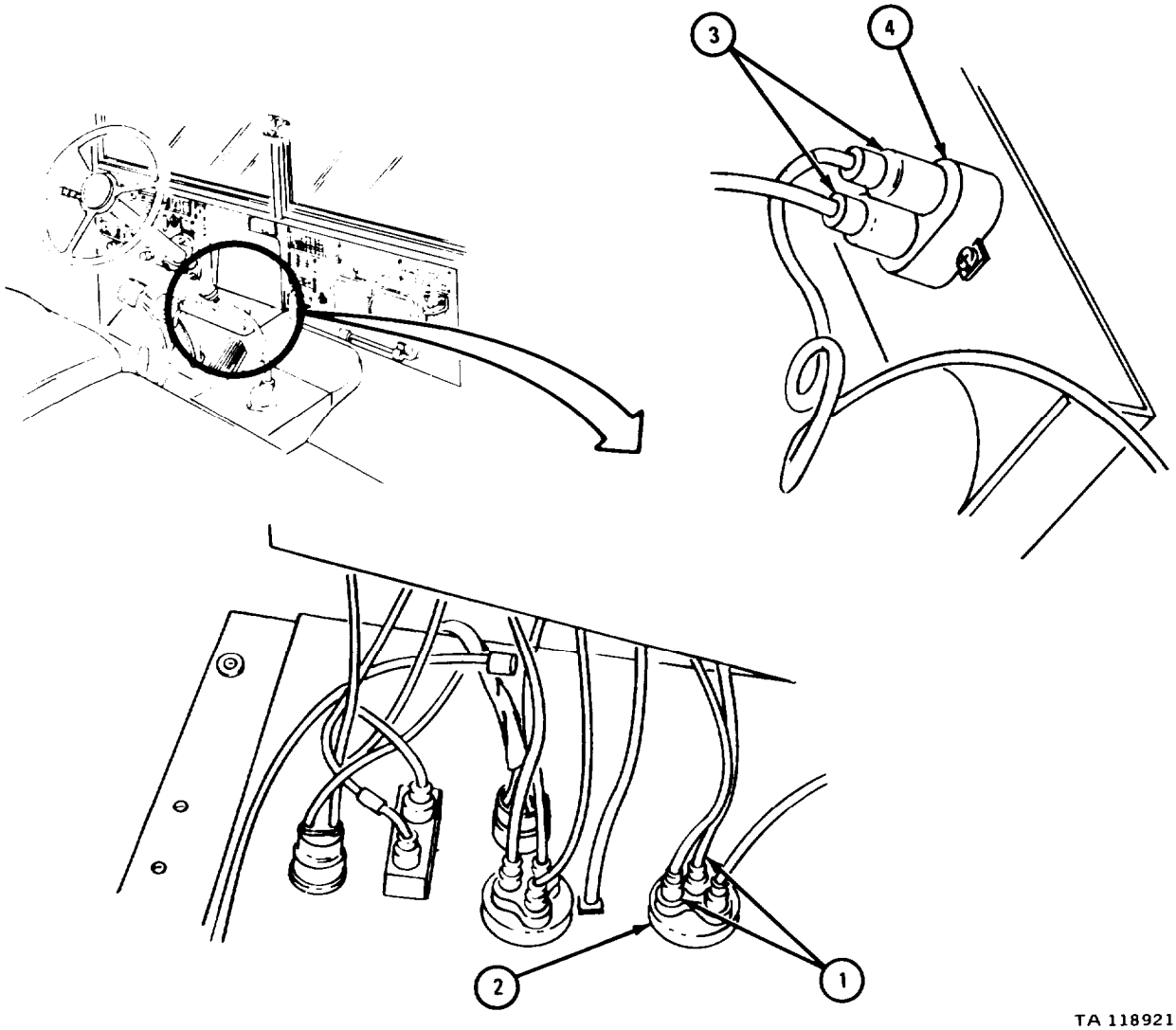


TA 113444

FRAME 6

1. Unplug two leads (1) from fuel selector switch (2).
2. Unplug two leads (3) from circuit breaker (4).

GO TO FRAME 7

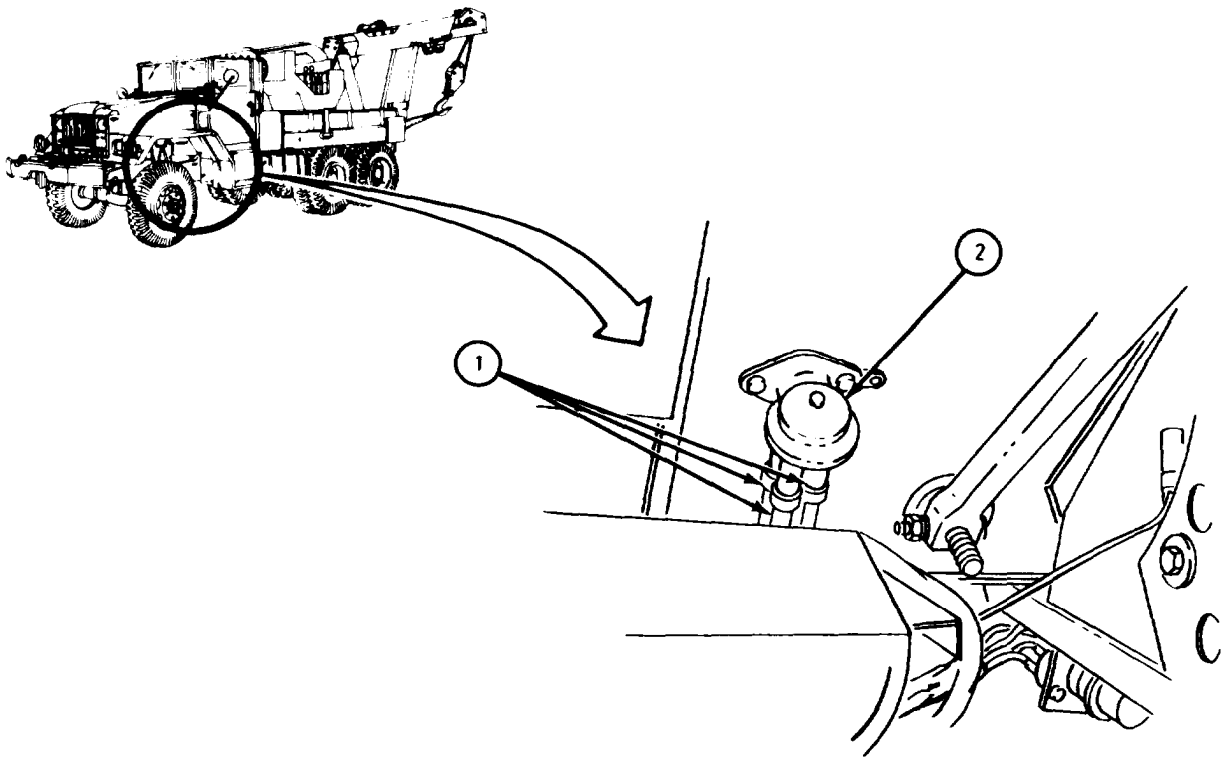


TA 118921

FRAME 7

1. Take off three leads (1) from dimmer switch (2).

GO TO FRAME 8



FRAME 8

Soldier A 1. Loosen four quick disconnect screws (1).

2. Loosen capscrew (2).

3. Slide accessory panel (3) down.

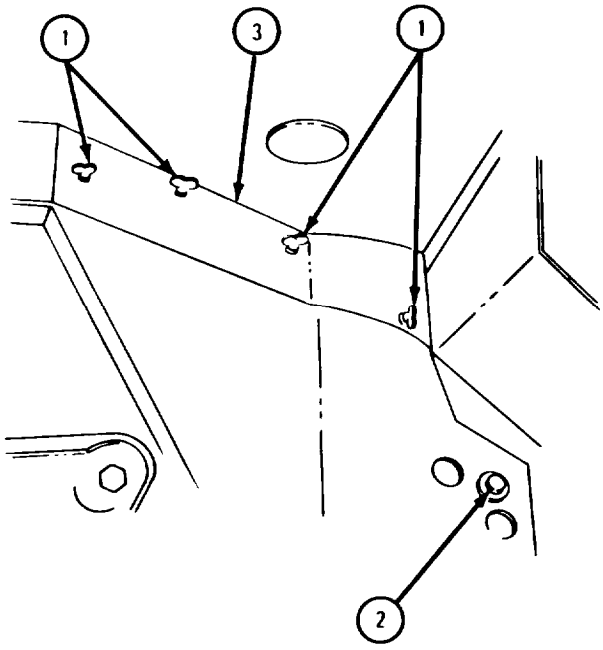
4. Unplug rear wiring harness connector (4) from front wiring harness connector (5).

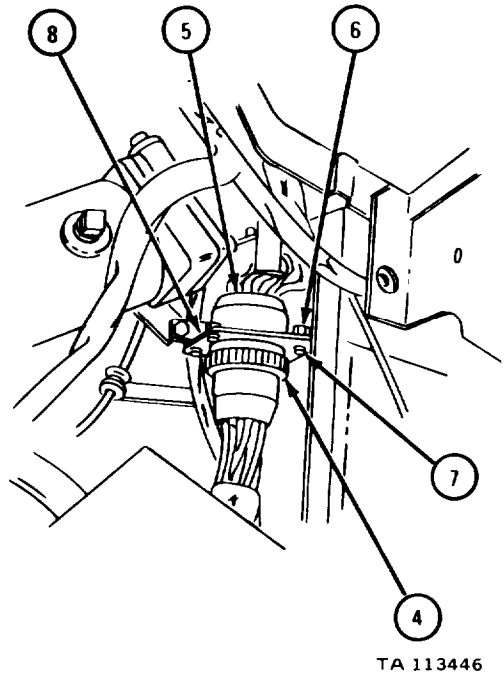
Soldier B 5. Hold four nuts (6) from turning.

Soldier A 6. Take out four screws (7) from front wiring harness connector (5).

7. Take out front wiring harness connector (5) from bracket (8).

GO TO FRAME 9



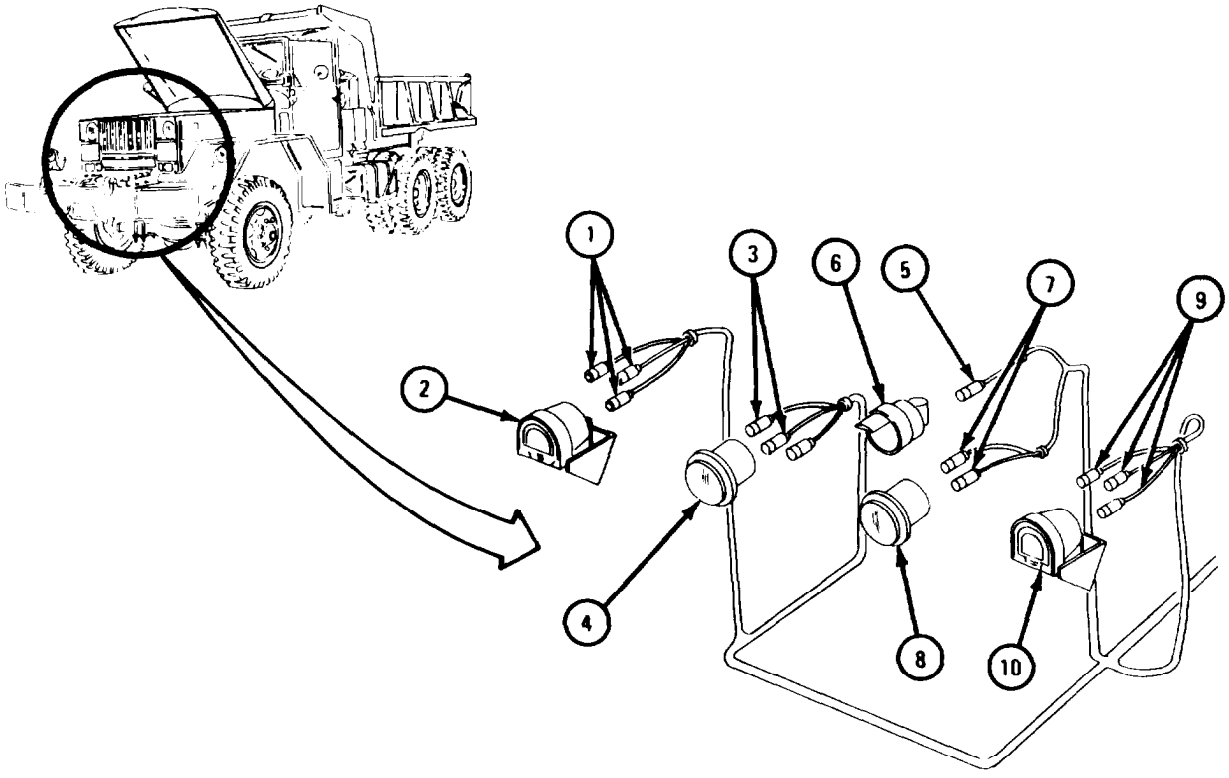


TA 113446

FRAME 9

1. Unplug three leads (1) from right parking and blackout marker light (2).
2. Unplug two top leads (3) from right headlight (4).
3. Unplug lead (5) from blackout driving light (6).
4. Unplug two top leads (7) from left headlight (8).
5. Unplug three leads (9) from left parking and blackout marker light (10).

GO TO FRAME 10

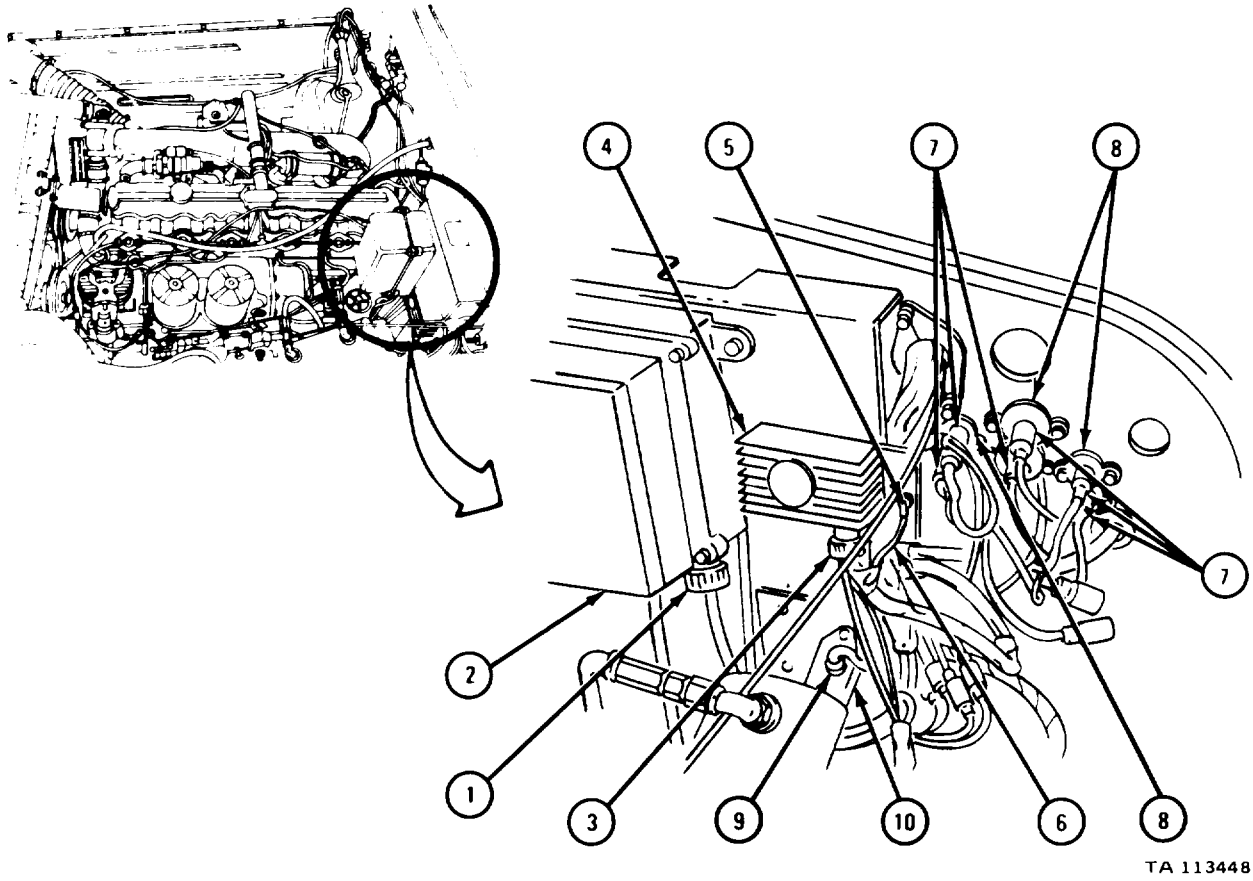


TA 113447

FRAME 10

1. Unplug connector (1) from regulator (2).
2. Unplug connector (3) from flasher unit (4).
3. Take out screw, washer, and nut (5) holding lead (6).
4. Unplug six leads (7) from circuit breakers (8).
5. Unplug lead (9) from horn relay (10).

GO TO FRAME 11



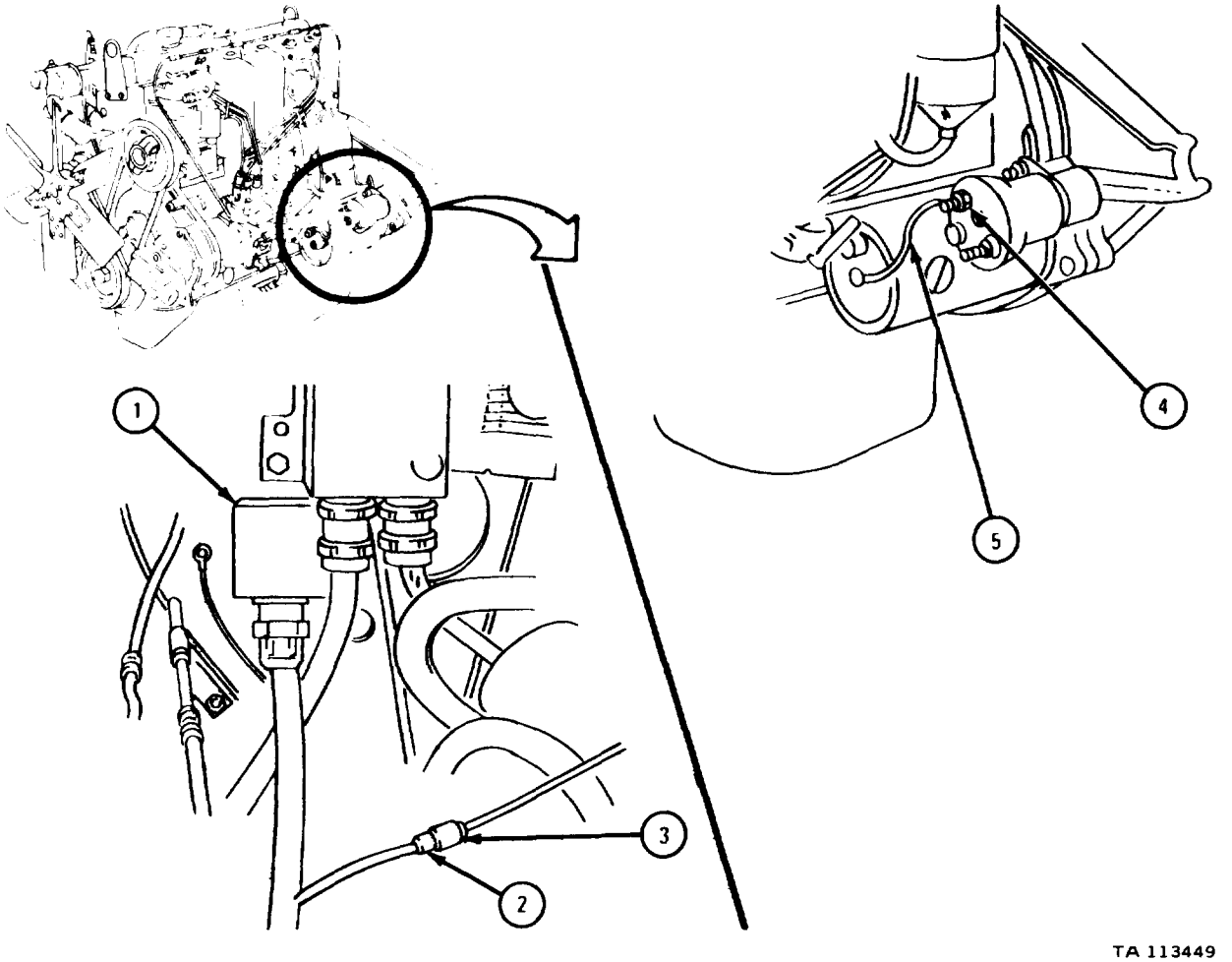
FRAME 11

NOTE

If truck has starter relay (1) mounted on firewall, go to step 1. If truck does not have starter relay mounted on firewall, go to step 2.

1. Unplug starter relay lead (2) from front harness lead (3).
2. Take off nut and washer (4) from starter solenoid. Take off lead (5).

GO TO FRAME 12

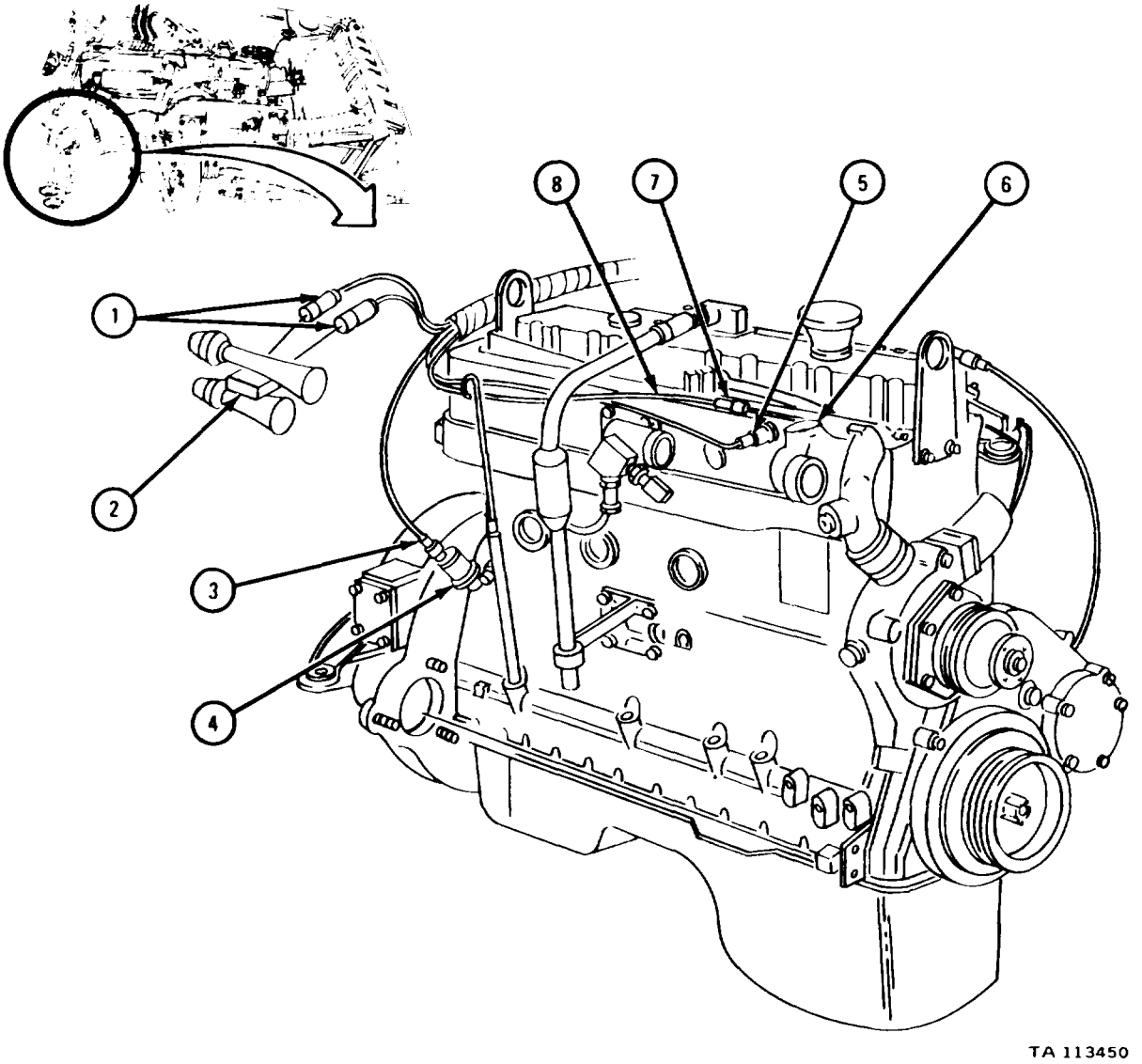


TA 113449

FRAME 12

1. Unplug two leads (1) from horn (2).
2. Unplug lead (3) from oil pressure sending unit (4).
3. Unplug lead (5) from water temperature sending unit (6).
4. Unplug lead (7) from manifold heater harness lead (8).

GO TO FRAME 13



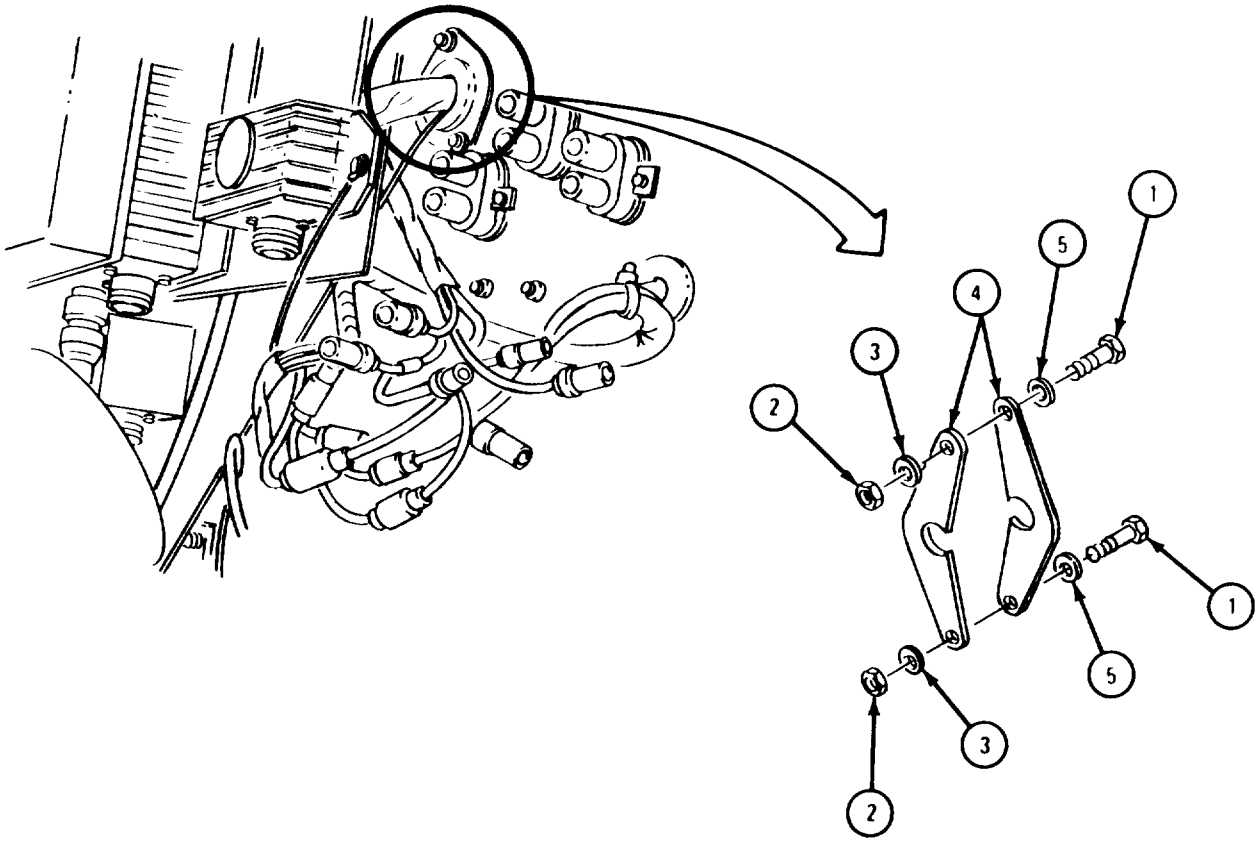
NOTE

On trucks M543A2, brake lock and floodlight switches must be disconnected from under instrument panel. Emergency warning light must be disconnected. Truck M543A2 has two clamps with leads going through fire wall.

FRAME 13

Soldier A	1.	Working in cab behind instrument panel, hold cap screws (1).
Soldier B	2.	Take off two nuts (2) and washers (3).
	3.	Take off grommets (4).
Soldier A	4.	Take out capscrews (1) and washers (5).
Soldiers A and B	5.	Take all clamps off wiring harness. Refer to para 6-15.
	6.	Take wiring harness out of truck.

END OF TASK



c. Replacement.

NOTE

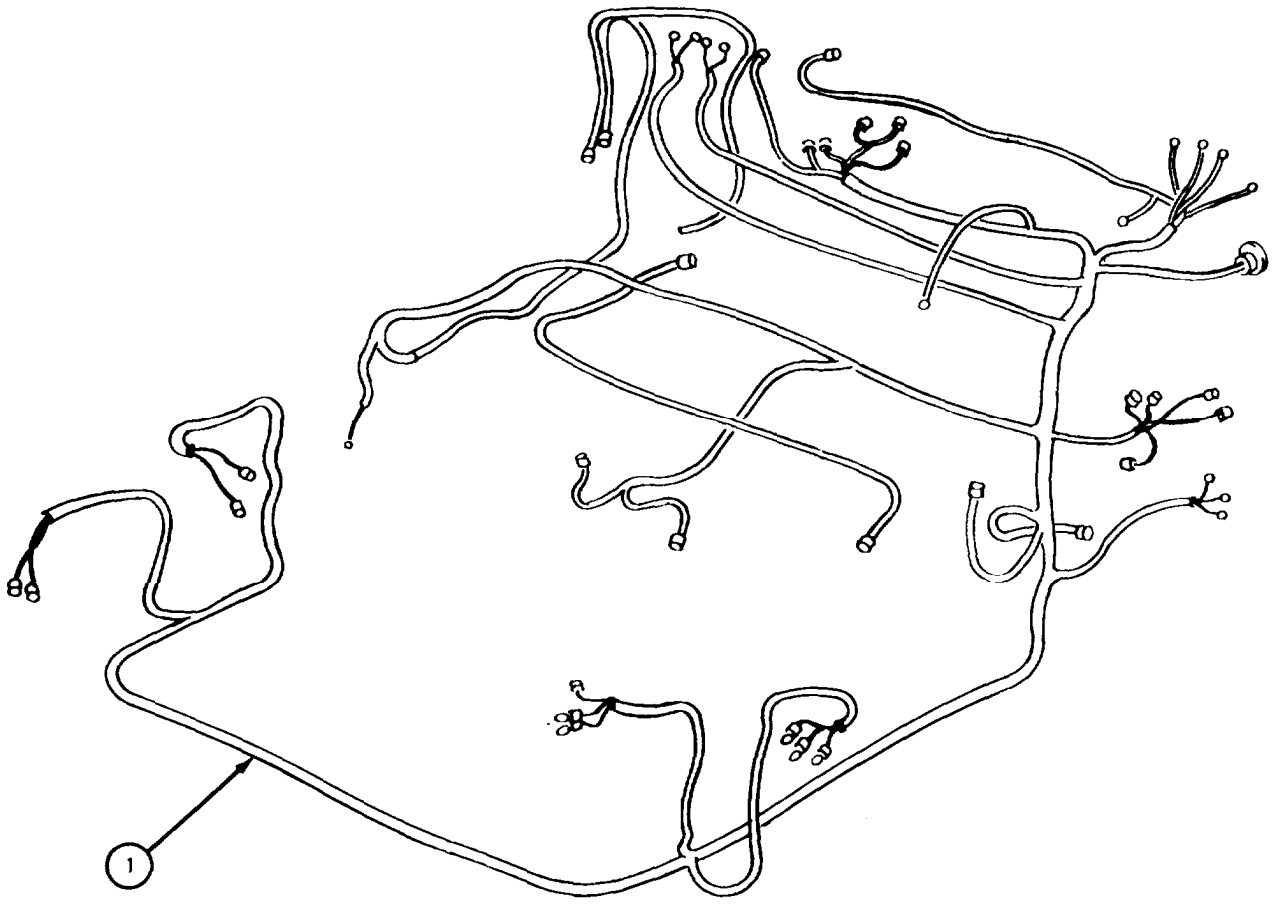
When putting in new harness, lay old and new harnesses side by side and tag wires on new harness to match old harness. If there is any questions about which wire in a group gets a particular tag, match the numbers on the small metal tags on the new harness with ones on old harness.

FRAME 1

Soldiers A and B

1. Route harness (1) in engine compartment and through firewall as noted.
2. Put all clamps on wiring harness. Refer to para 6-15.

GO TO FRAME 2



NOTE

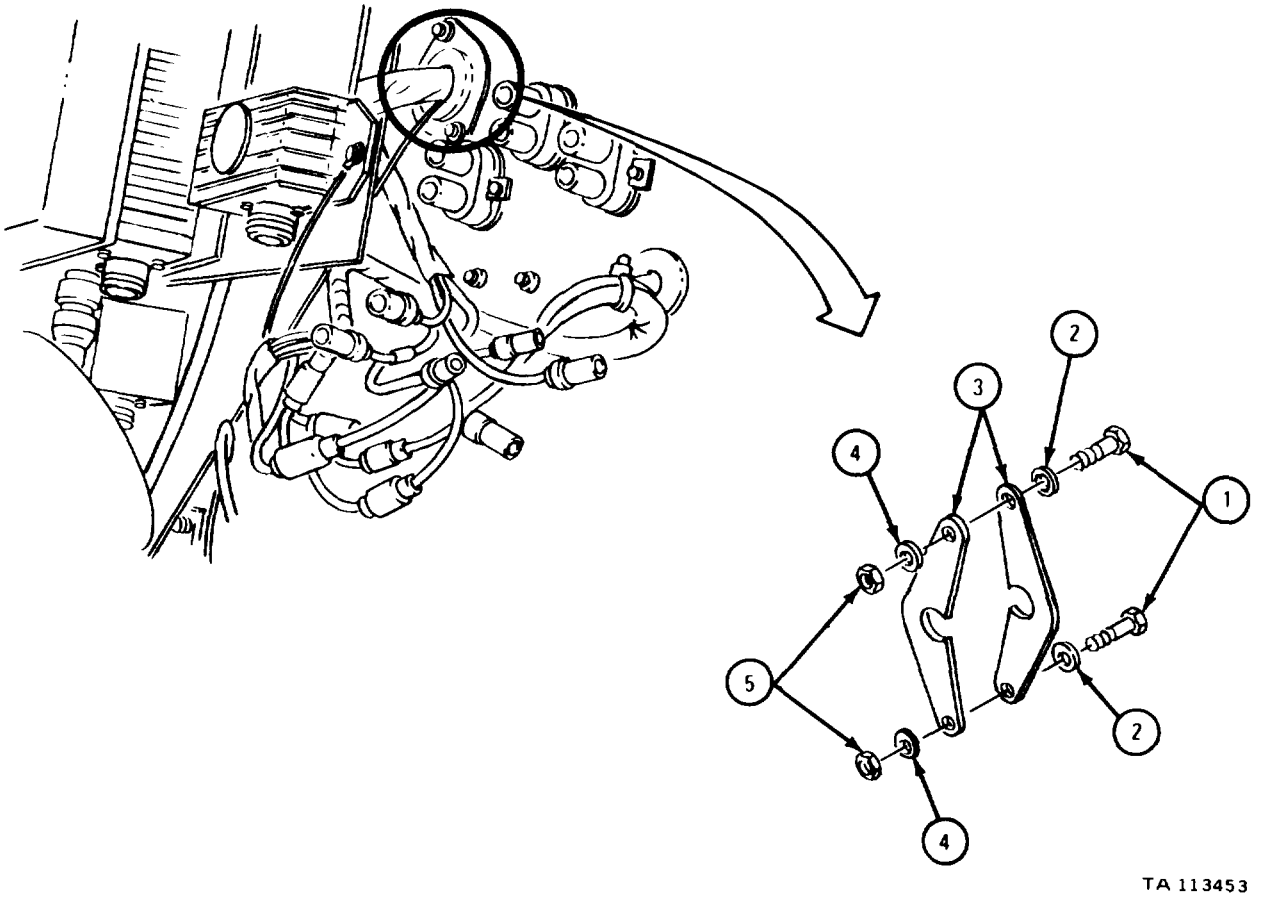
On trucks M543A2, brake lock and floodlight switches must be connected from under instrument panel. Emergency warning light must be connected. Route two clamps with leads through fire wall.

FRAME 2

Soldier A 1. Working in cab behind instrument panel, put two capscrews (1) with washers (2) through holes in firewall.

Soldier B 2. Put two grommets (3), washers (4), and nuts (5) on capscrews (1).

GO TO FRAME 3



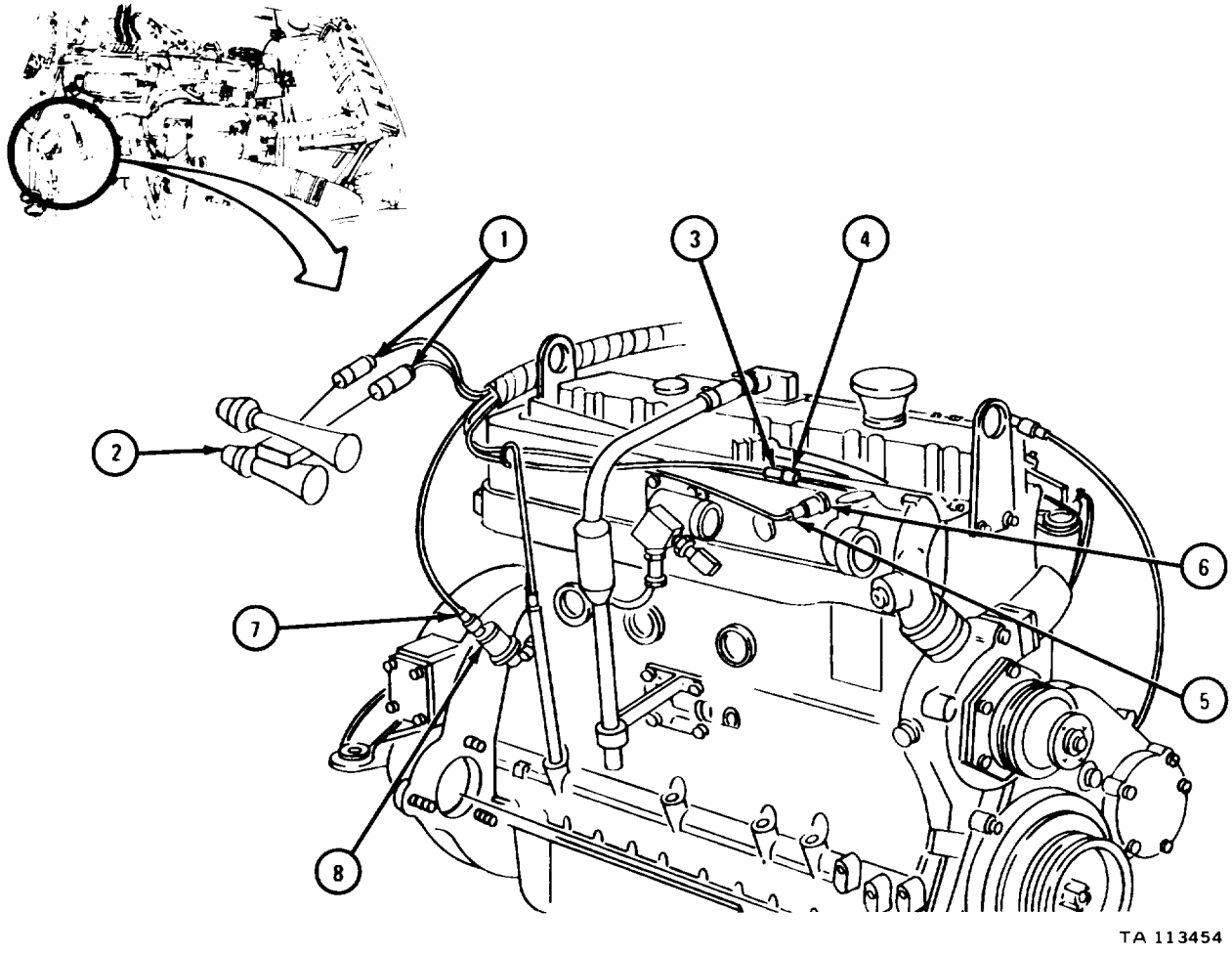
FRAME 3

NOTE

After leads are plugged into connectors, take off tags.

1. Plug two harness leads (1) into horn (2).
2. Plug harness lead (3) into manifold heater lead (4).
3. Plug harness lead (5) into temperature sending unit (6).
4. Plug harness lead (7) into oil pressure sending unit (8).

GO TO FRAME 4



TA 113454

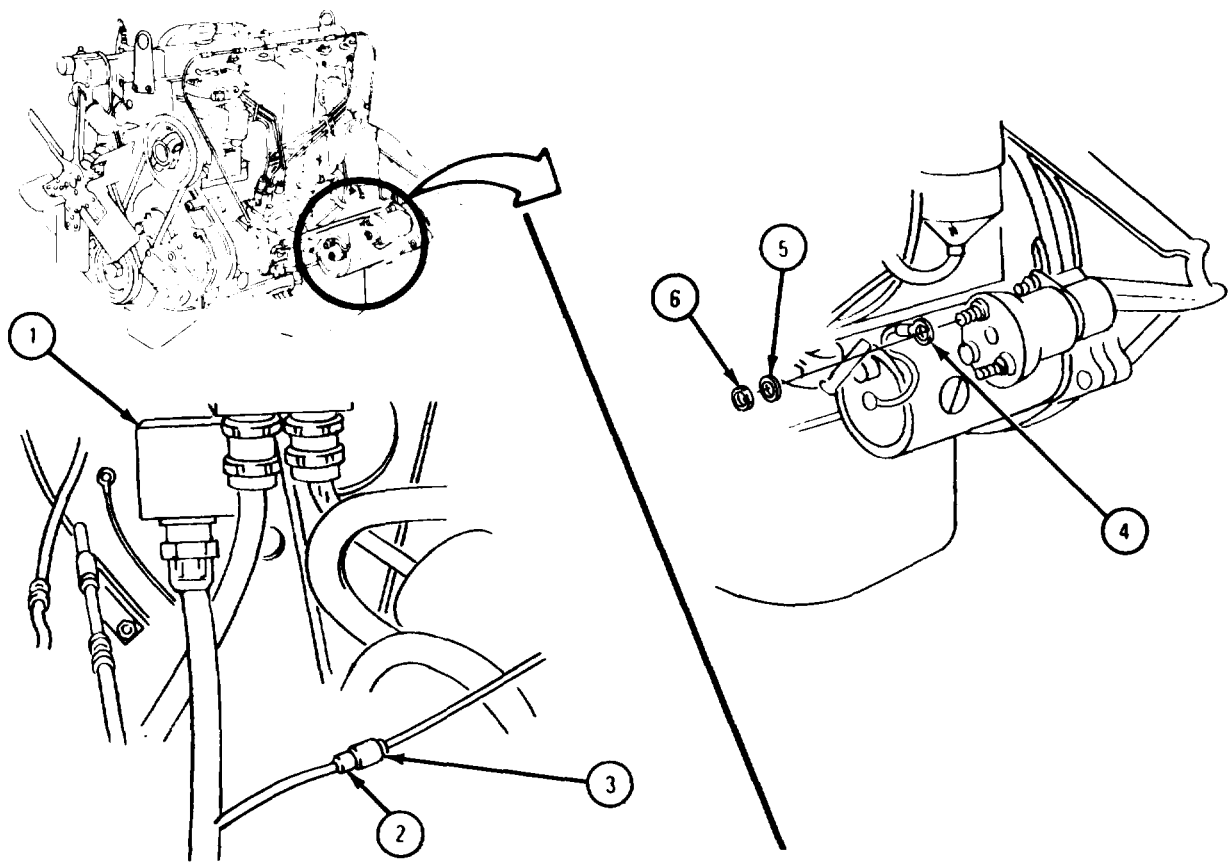
FRAME 4

NOTE

If truck has starter relay (1) mounted on firewall, go to step 1. If truck does not have starter relay, go to step 2.

1. Plug starter relay lead (2) into harness lead (3).
2. Put on lead (4), washer (5), and nut (6).

GO TO FRAME 5

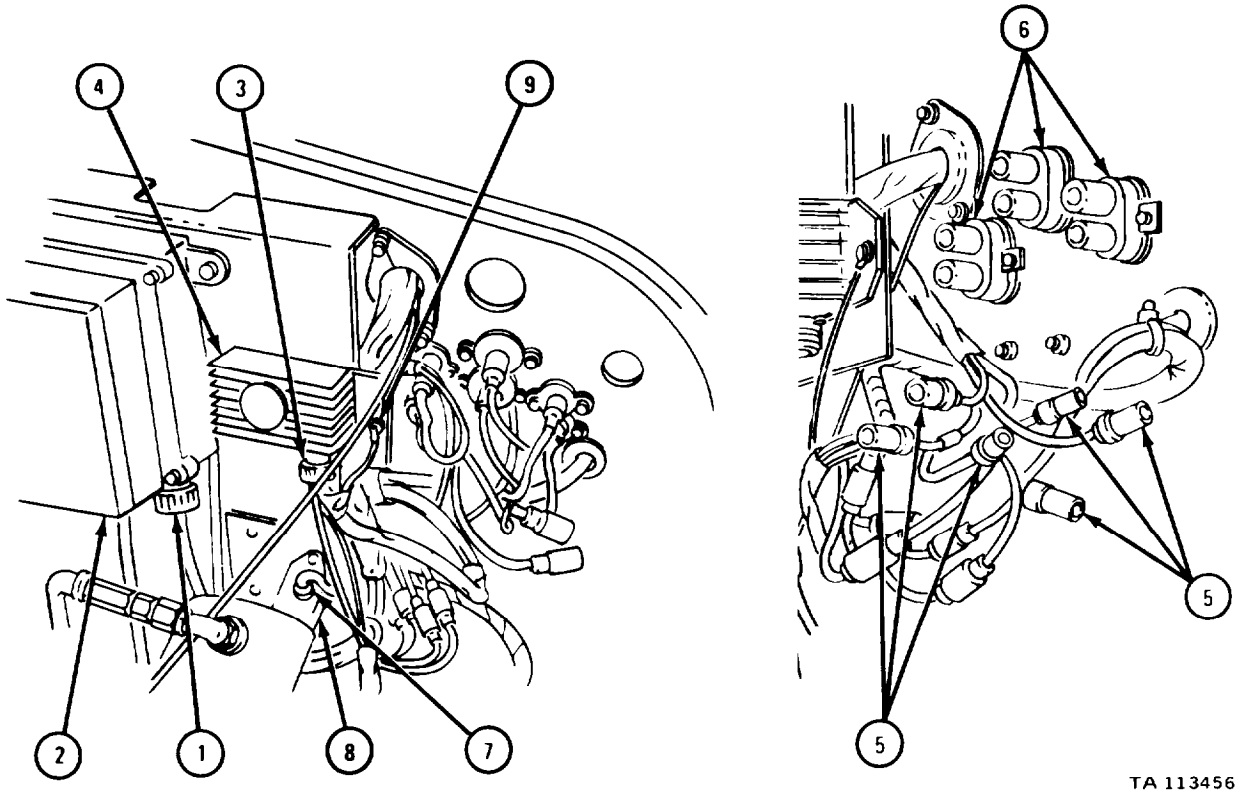


TA 113455

FRAME 5

1. Screw in connector (1) into regulator (2).
2. Screw connector (3) into flasher unit (4).
3. Plug six leads (5) into circuit breakers (6).
4. Plug lead (7) into horn relay (8).
5. Hook up ground lead (9) to flasher unit (4).

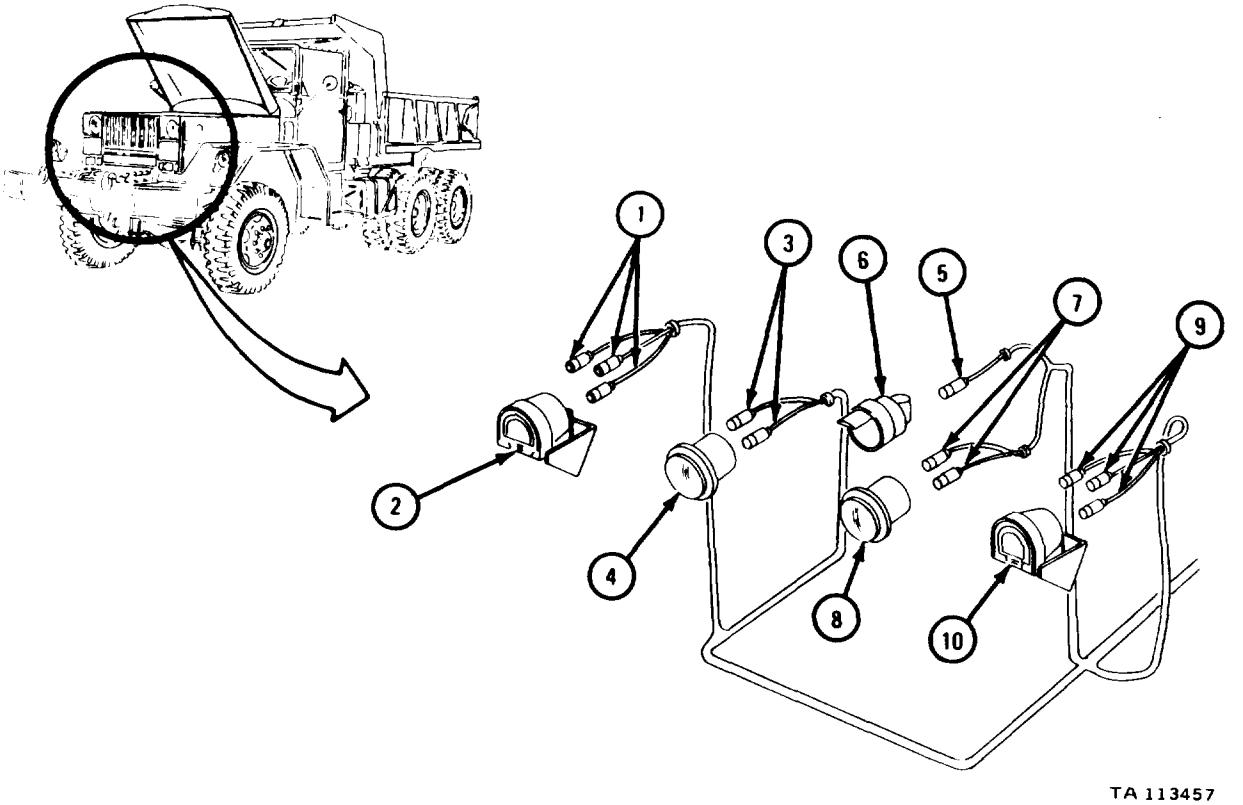
GO TO FRAME 6



FRAME 6

1. Plug three leads (1) into right parking and blackout marker light (2).
2. Plug two leads (3) into top of right headlight (4).
3. Plug lead (5) into blackout driving light (6).
4. Plug two leads (7) into top of left headlight (8).
5. Plug three leads (9) into left parking and blackout marker light (10).

GO TO FRAME 7

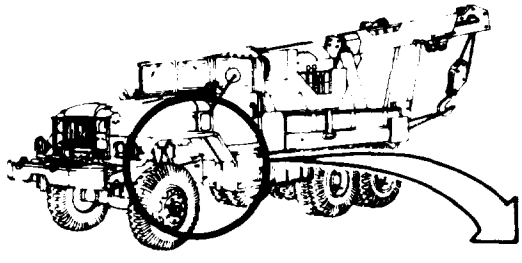


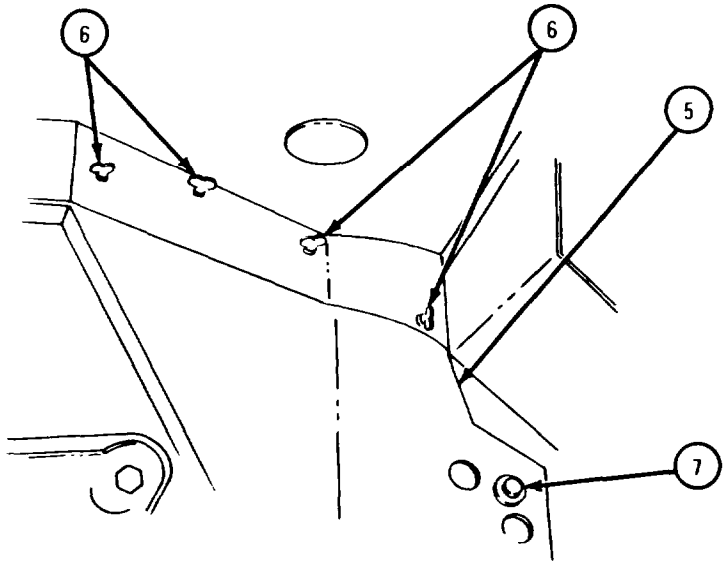
TA 113457

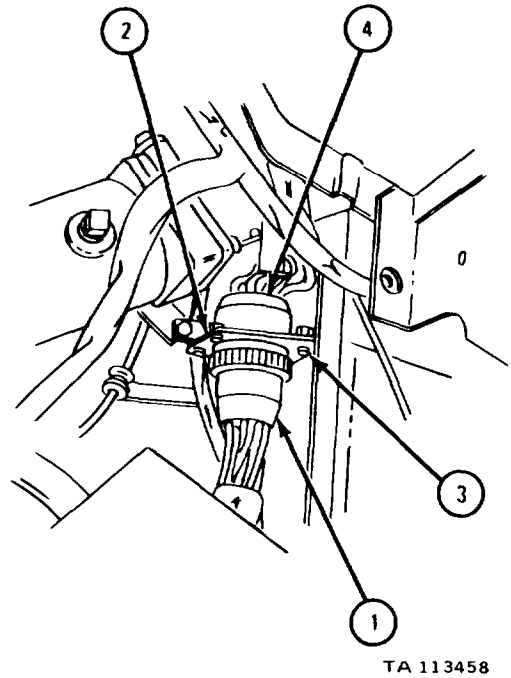
FRAME 7

1. Put front wiring harness connector (1) into bracket (2).
2. Put in and tighten four screws (3).
3. Screw in rear harness connector (4) into front harness connector (1).
4. Slide accessory panel (5) up.
5. Screw in four quick disconnect screws (6).
6. Tighten capscrew (7).

GO TO FRAME 8





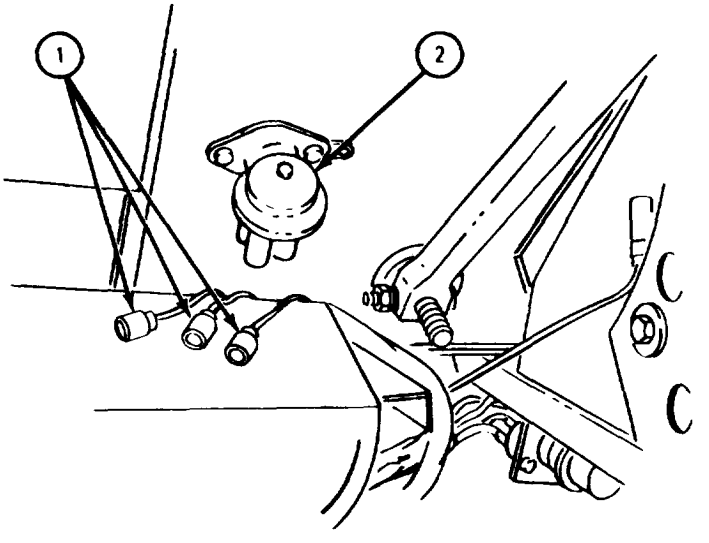


TA 113458

FRAME 8

1. Plug three leads (1) into dimmer switch (2).

GO TO FRAME 9

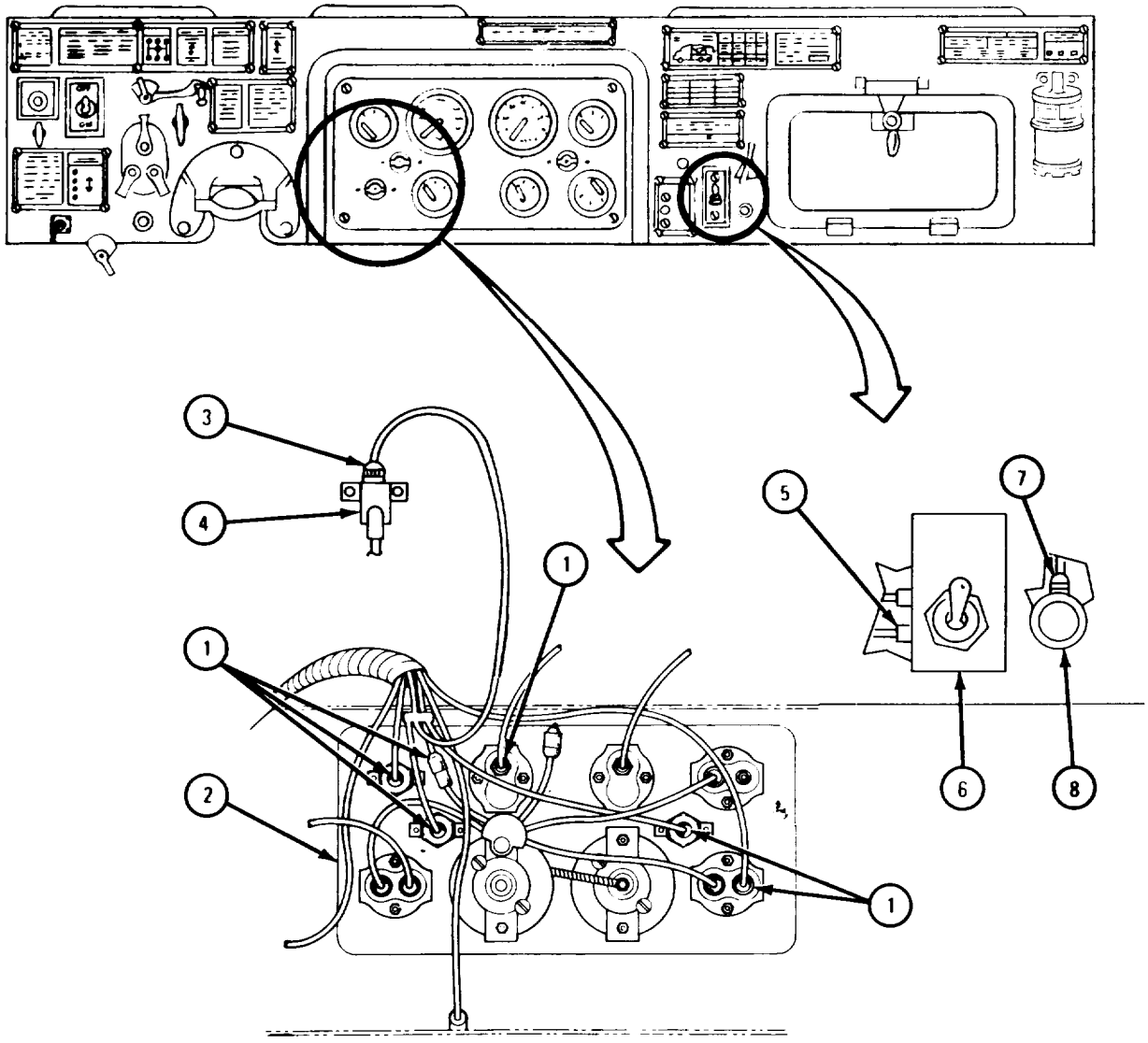


TA 113459

FRAME 9

1. Plug six leads (1) into instrument cluster (2).
2. Plug lead (3) into top of low air pressure switch (4).
3. Plug two leads (5) into FUEL TRANSFER SWITCH (6).
4. Plug lead (7) into FUEL TRANSFER SWITCH indicator light (8).

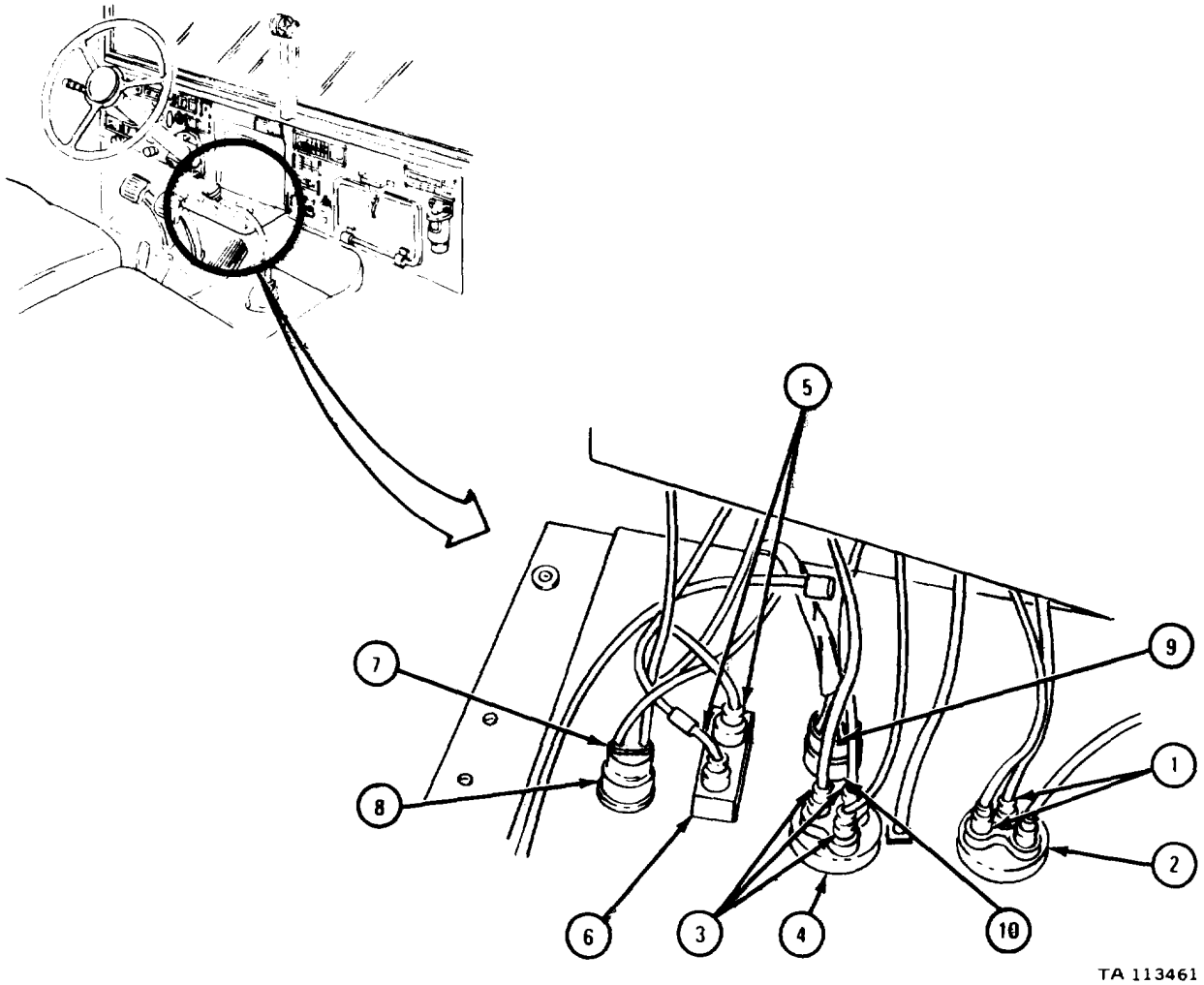
GO TO FRAME 10



FRAME 10

1. Plug two leads (1) into FUEL TRANSFER SWITCH (2).
2. Plug three leads (3) into IGNITION switch (4).
3. Plug two leads (5) into manifold heater switch (6).
4. Plug lead (7) into STARTER switch (8).
5. Screw in connector (9) into MASTER light switch (10).

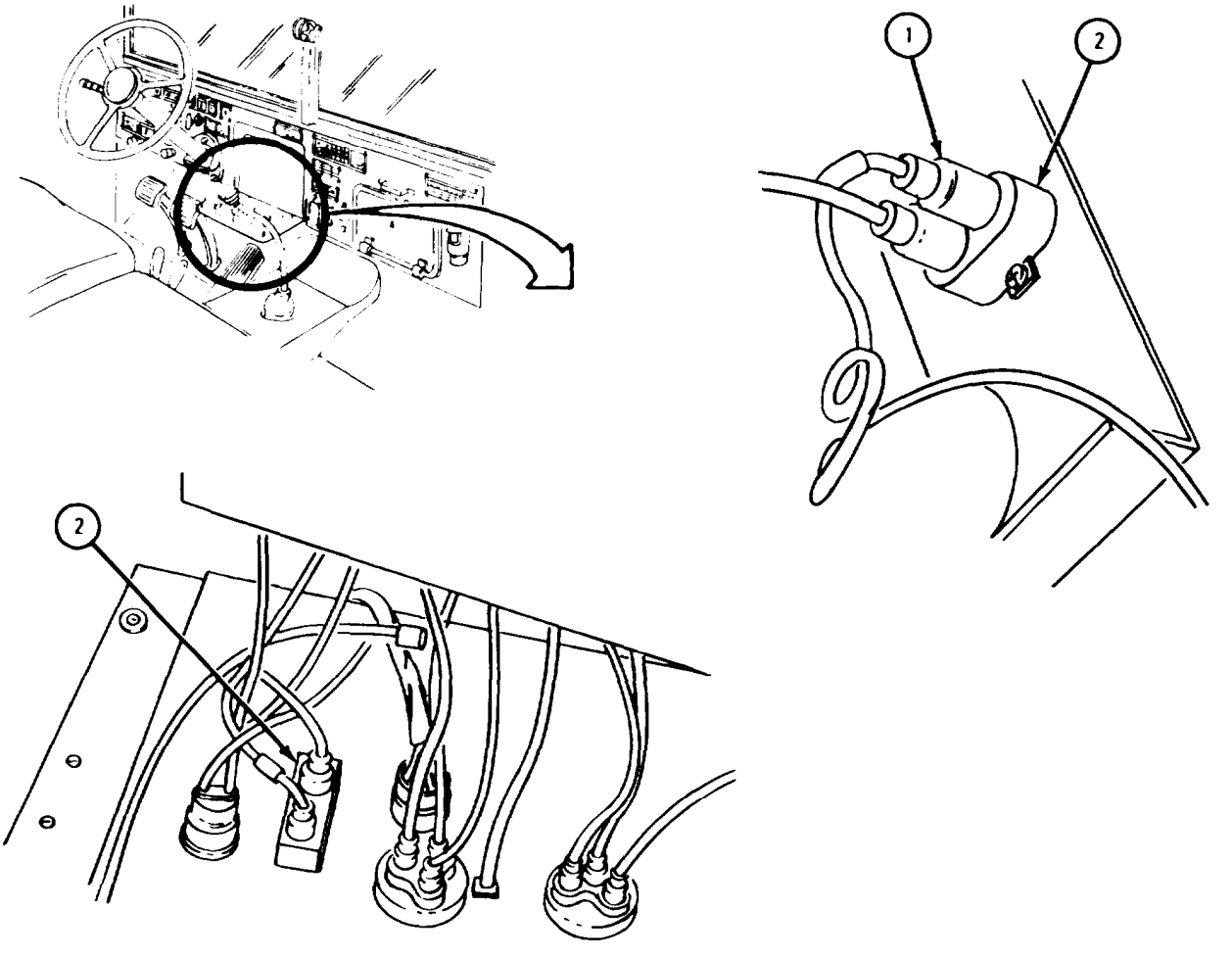
GO TO FRAME 11



FRAME 11

1. Plug lead (1) into circuit breaker (2).

GO TO FRAME 12

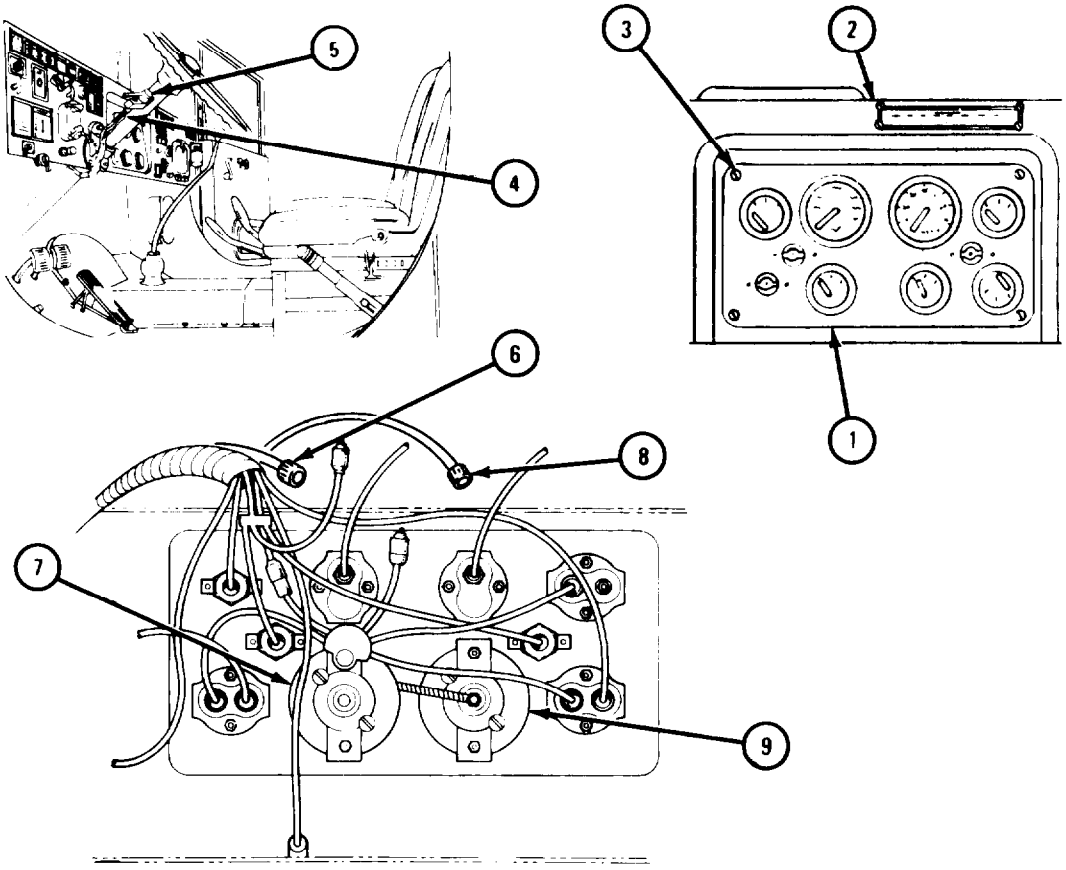


TA 113464

FRAME 12

1. Put instrument cluster (1) back into instrument panel (2).
2. Tighten four quick disconnect mounting screws (3).
3. Screw connector (4) into turn signal control arm (5).
4. Working behind instrument panel, screw speedometer shaft (6) into speedometer (7).
5. Screw tachometer shaft (8) into tachometer (9).

GO TO FRAME 13



TA 113462

FRAME 13

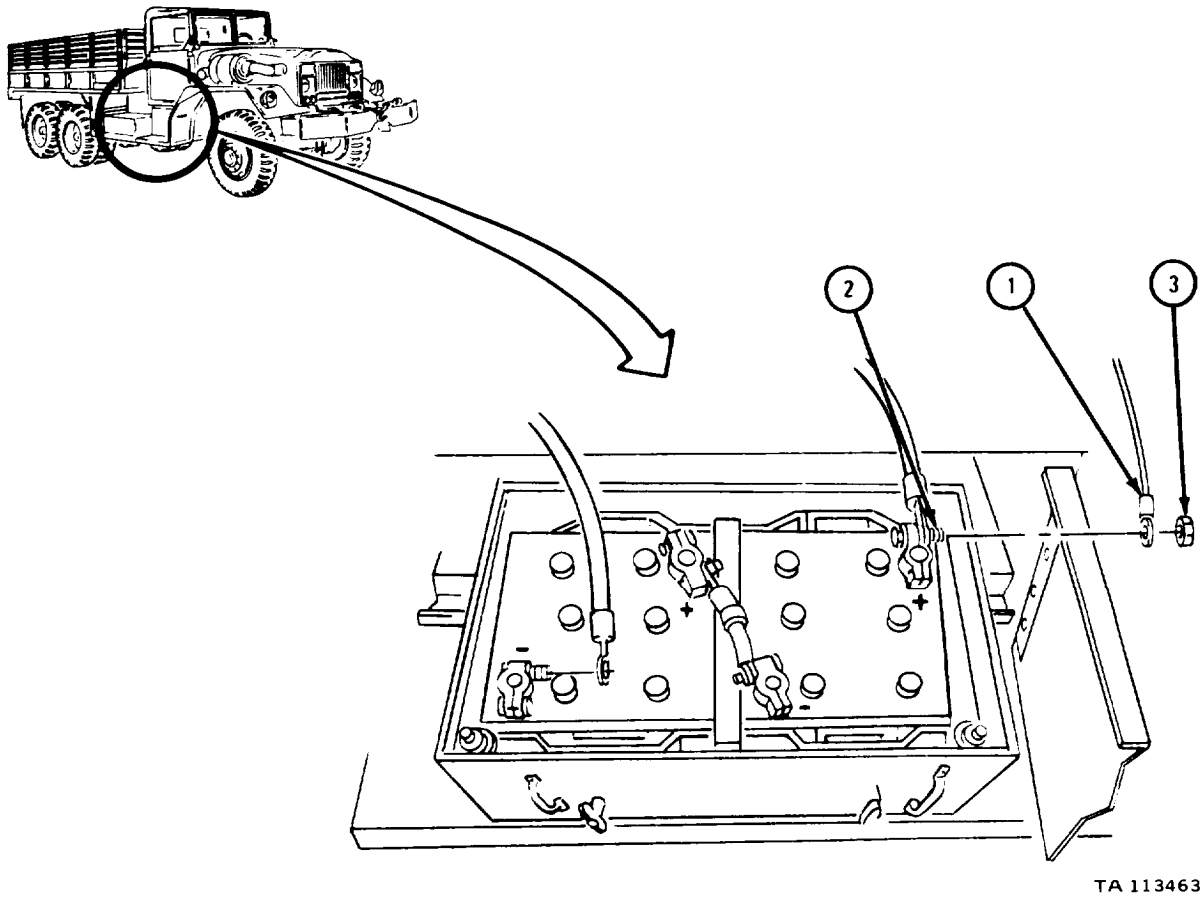
1. Put lead (1) on bolt (2).
2. Put nut (3) on bolt (2) and tighten.
3. Take off all tags on wires.

NOTE

Follow-on Maintenance Action Required:

Connect battery negative (-) cable. Refer to TM 9-2320-211-20.

END OF TASK



6-17. TRAILER CONNECTOR CABLE HARNESS REMOVAL AND REPLACEMENT.

TOOLS: None

SUPPLIES: None

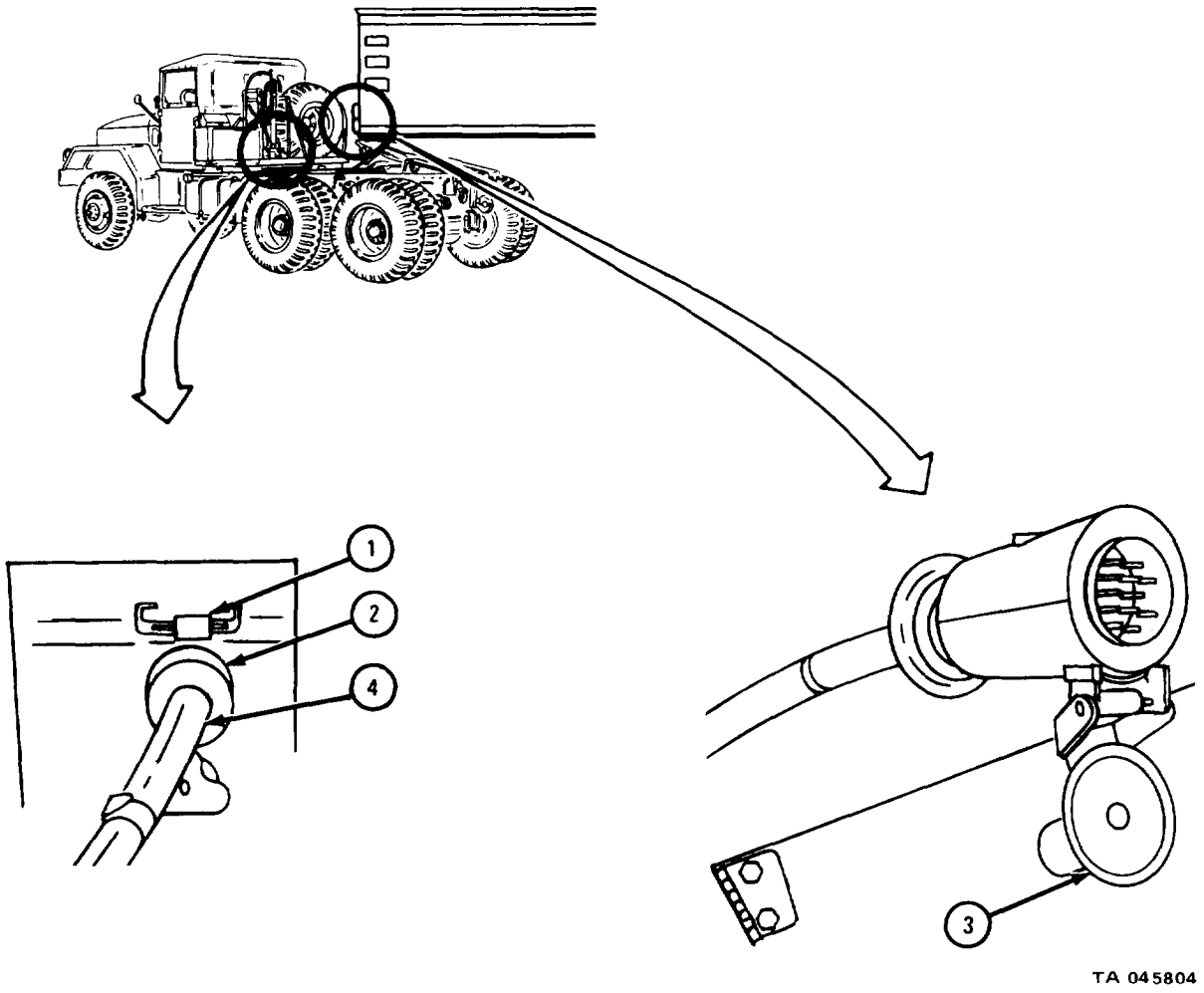
PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

1. Lift up tractor and trailer hinge covers (1) and pull out connectors (2).
2. Unlock and close cable harness hinge covers (3). Take out cable harness (4).

END OF TASK



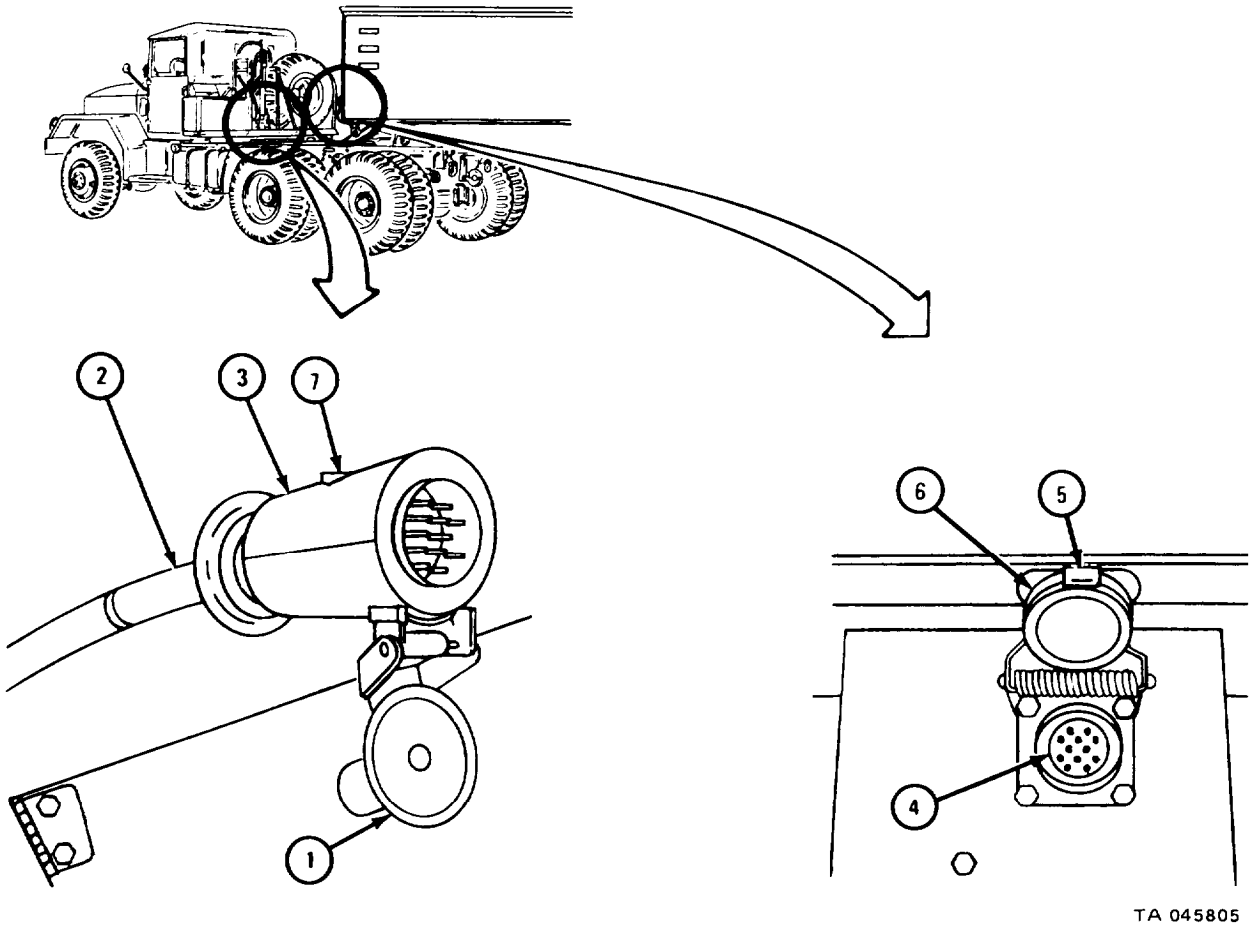
b. Inspection. Look over trailer cable harness for cuts, breaks or folds. Check that cable harness cover is not worn. Open hinge covers on two ends of cable harness and check for dirt or corrosion. Check electrical pins to see if any are loose. If cable harness is damaged, refer to TM 9-2320-211-20.

c. Replacement.

FRAME 1

1. Open and lock cable hinge cover (1) on both ends of cable harness (2).
2. Push cable harness end (3) into receptacle (4) until lip (5) on hinge cover (6) snaps into slot (7).
3. Do step 2 again for tractor end of cable harness (2).

END OF TASK



6-18. REAR WIRING HARNESS REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Tags

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Disconnect battery ground cable. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

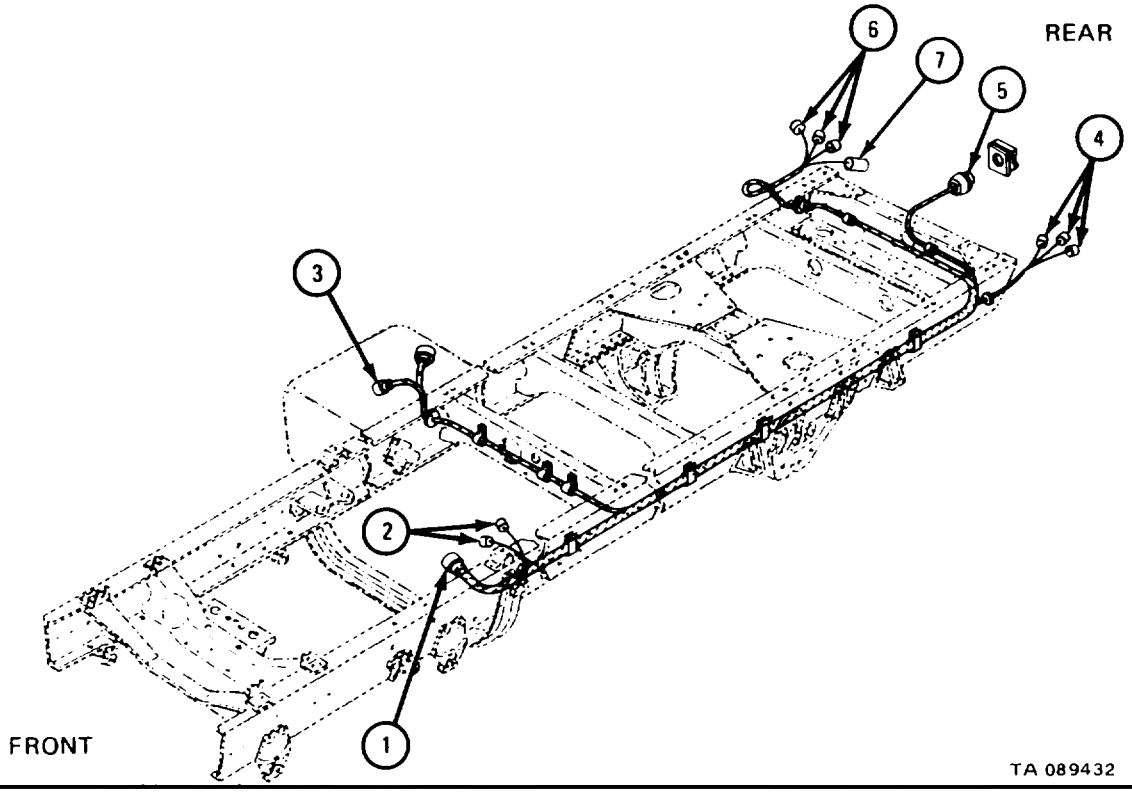
NOTE

Refer to removal procedures given for each part in TM 9-2320-211–20, if needed, to work on connectors and electrical leads covered in this task.

Tag all wires so that they are put back in the right places.

1. Take off rear harness plug (1) from rear harness connector.
2. Unplug two leads (2) from stoplight switch.
3. Unplug two leads (3) from fuel tank.
4. Unplug three leads (4) from left taillight.
5. Take off trailer coupling receptacle (5).
6. Unplug three leads (6) from right taillight.
7. Unplug lead (7) from blackout stoplight.
8. Take off all clamps. Refer to para 6-15.
9. Take rear harness off truck frame.

END OF TASK



c. Replacement.

NOTE

If new harness is being put on, put old harness next to new harness and put tags in the same places as on old harness.

Refer to replacement procedures given for each part in TM 9-2320-211-20, if needed, to work on connectors and electrical leads covered in this task.

FRAME 1

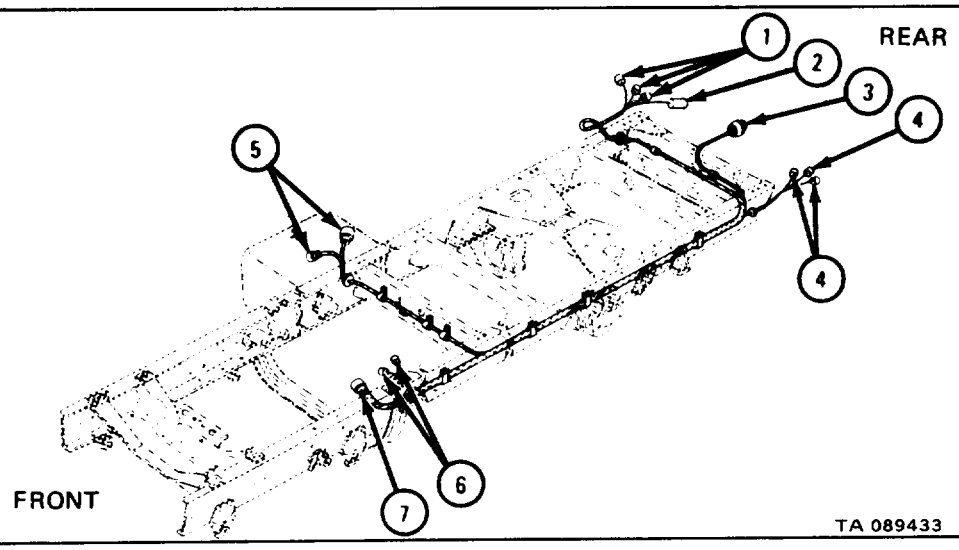
1. Put rear harness back on truck as noted.
2. Put back all clamps. Refer to para 6-15.
3. Plug three leads (1) into right taillight.
4. Plug lead (2) into blackout stoplight.
5. Put on trailer coupling receptacle (3).
6. Plug three leads (4) into left taillight.
7. Plug two leads (5) into fuel tank.
8. Plug two leads (6) into stoplight switch.
9. Put rear harness plug (7) into rear harness receptacle.
10. Remove all tags.

NOTE

Follow-on Maintenance Action Required:

Reconnect battery ground cable. Refer to TM 9-2320-211-20.

END OF TASK



CHAPTER 7

TRANSMISSION SYSTEM GROUP MAINTENANCE

Section I. SCOPE

7-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for the transmission assembly for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels. Since bearings in the transmission assembly must be maintained, the procedure for the maintenance of bearings is also included in this chapter.

7-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. TRANSMISSION ASSEMBLY

7-3. TRANSMISSION ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: Automotive maintenance hoisting unit, pn 8387771
Transmission reverse idler shaft puller, pn 8708669
Engine and transmission sling, pn 11595523
Transmission flange yoke replacer, pn 7950147
Soft-faced hammer
Pry bar
Lightweight hammer
Punch

SUPPLIES: Eye shields
Solvent, dry cleaning, type II (SD-2) , Fed. Spec P-D-680
Main shaft front bearing cover seal
Rear main shaft cap seal
Transmission gasket set
Countershaft nut, cotter pin (2)
Main shaft cotter pin
Whte lead pigment, Fed. Spec TT-W-261C
Safety wire, MS-20995E
Artillery and automotive grease, type GAA, MIL-G-10924
Snap ring
Hardening sealer, MIL-S-3927C
Compressed air source, 30 psi max

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain transmission. Refer to LO 9-2320-211-12.

(2) Remove transmission-to-transfer case propeller shaft. Refer to TM 9-2320-211-20.

(3) Remove front winch propeller shaft (trucks with front winches). Refer to TM 9-2320-211-20.

(4) Remove hoist pump propeller shaft (truck M51A2). Refer to TM 9-2320-211-20.

(5) Remove power takeoff linkage (truck M51A2 and trucks with front winches). Refer to TM 9-2320-211-20.

(6) Remove cab floor tunnel and clutch housing toe board. Refer to TM 9-2320-211-20.

(7) Remove clutch actuating link rod assembly. Refer to TM 9-2320-211-20.

(8) Remove outer auxiliary release clutch lever (truck M543A2). Refer to TM 9-2320-211-20.

(9) Remove rotochamber (truck M543A2). Refer to Part 3, para 17-47

(10) Remove transmission shift lever. Refer to TM 9-2320-211-20.

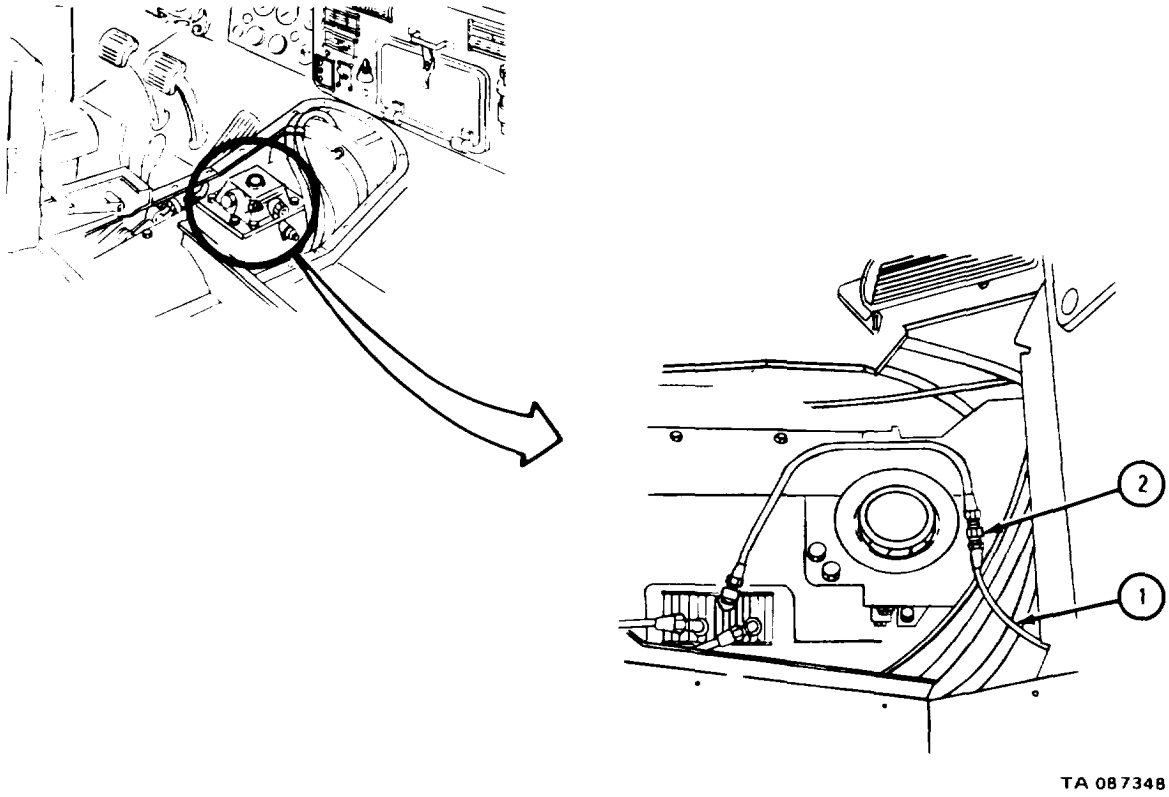
(11) Remove transmission power takeoff (truck M51A2 and trucks with front winches). Refer to Part 3, para 17-60.

b. Removal.

FRAME 1

1. Unhook transmission vent line (1) at tee connection (2).

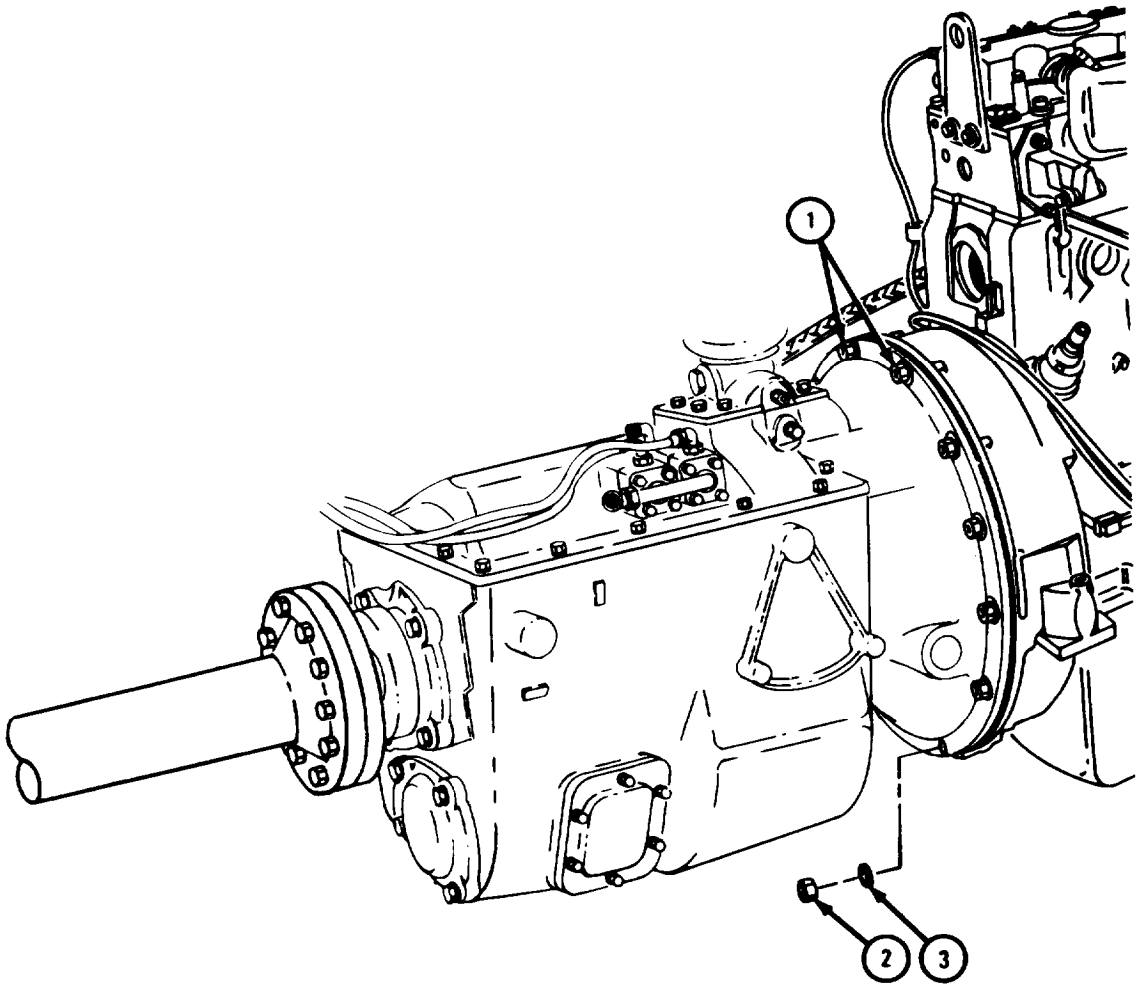
GO TO FRAME 2



FRAME 2

1. Loosen but do not takeoff top two nuts (1).
2. Take off other 10 nuts (2) and washers (3).

GO TO FRAME 3



TA 087349

FRAME 3

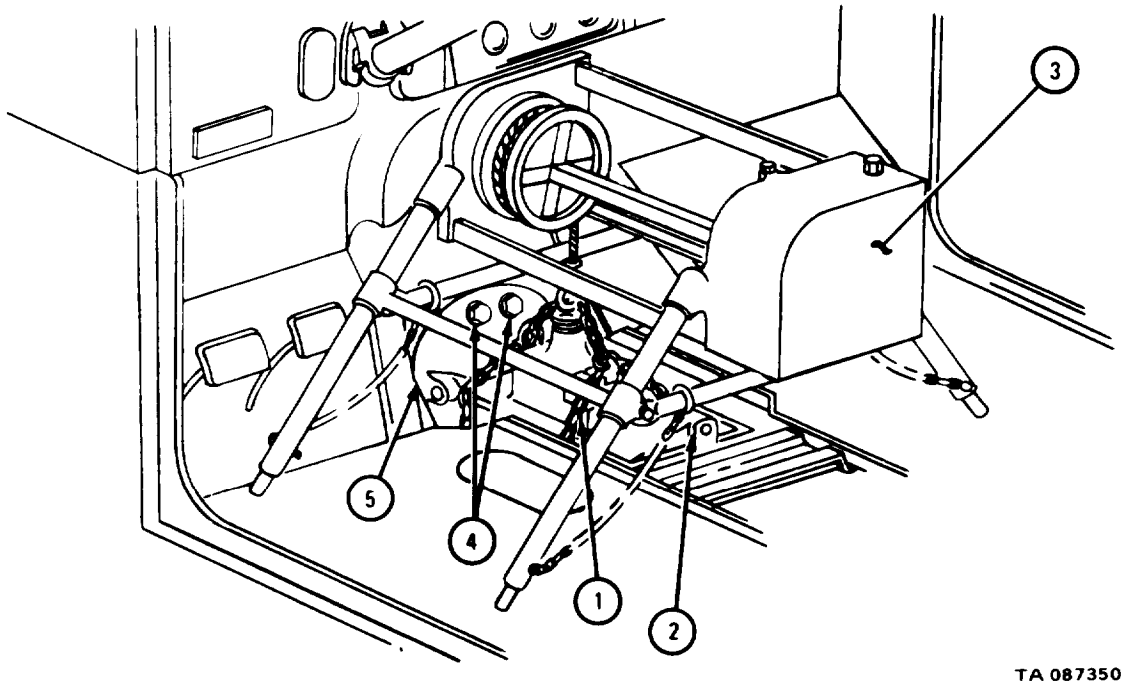
1. Put chain (1) on transmission (2).
2. Put hoist (3) over transmission (2) and hook chain (1) to hoist.
3. Using hoist (3), take up slack in chain (1).

CAUTION

Support weight of transmission (2) until it is all the way out of housing (5). Drive gear splines must be clear of driven member or clutch may be damaged.

4. Take off two nuts and washers (4) on housing (5).
5. Pull transmission (2) toward rear of truck until shaft is out of housing (5).
6. Using hoist (3), lower transmission (2) onto low wheel dolly and push transmission out from under truck.

END OF TASK



TA 087350

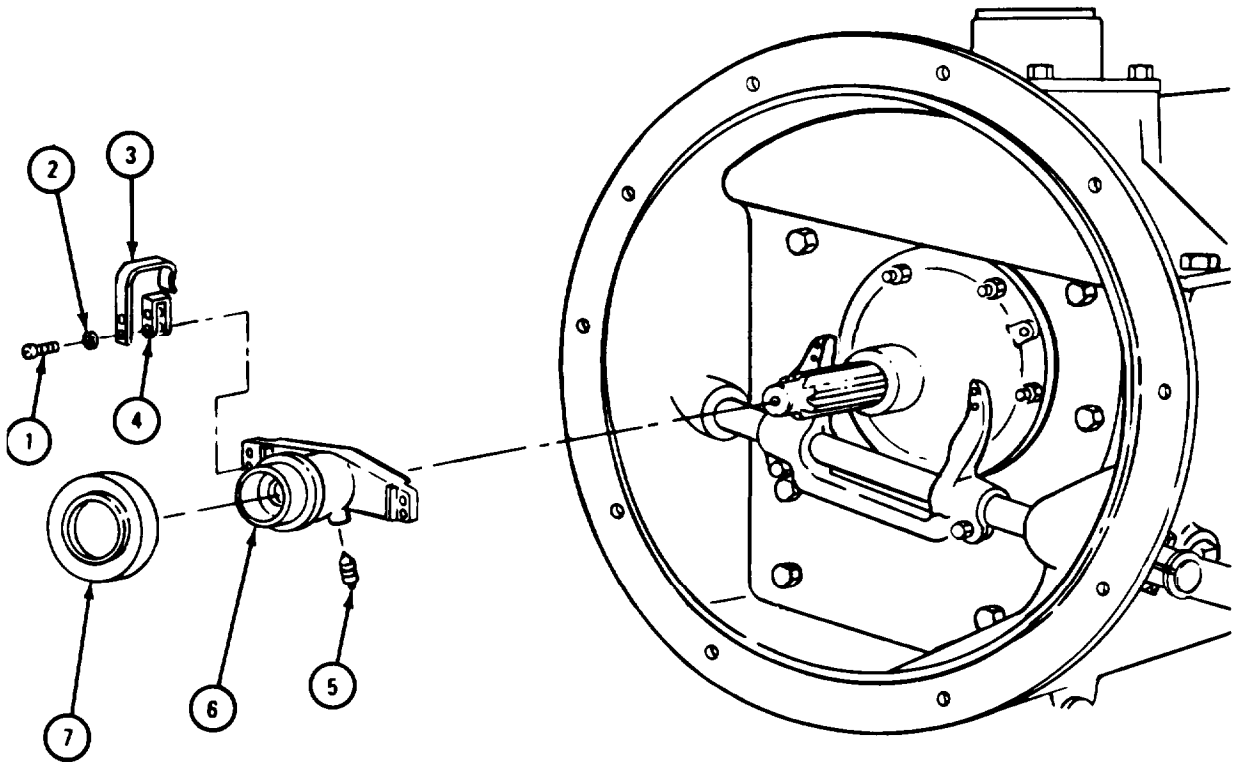
c. Disassembly of Transmission into Subassemblies.

(1) Clutch release mechanism and housing.

FRAME 1

1. Take out four screws (1) and lockwashers (2).
2. Take off two spring clips (3) and pads (4).
3. Take out plug (5).
4. Slide off sleeve (6) with clutch release bearing (7).
5. Using bearing remover, take clutch release bearing (7) off sleeve (6). Refer to para 7-7.

GO TO FRAME 2

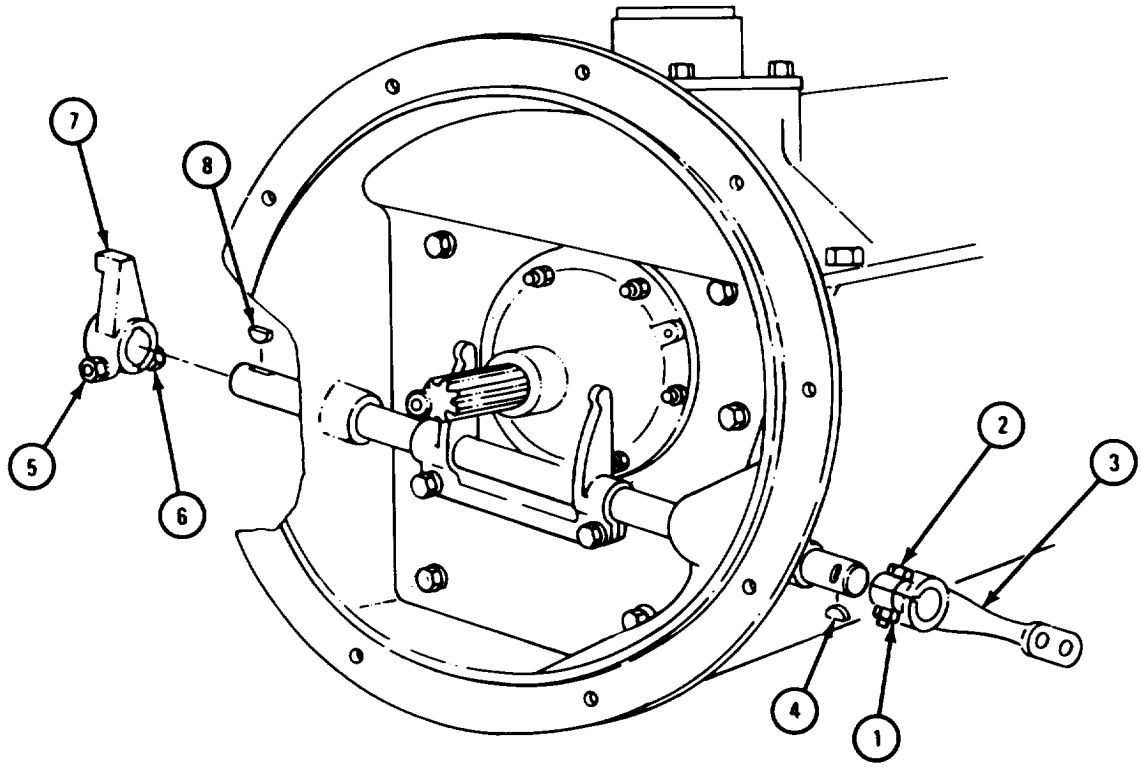


TA 087351

FRAME 2

1. Loosen locknut (1) while holding bolt (2). Slide off clutch release lever (3).
2. Take out woodruff key (4).
3. For truck M543A2:
   a. Loosen locknut (5) while holding bolt (6). Slide off clutch release lever (7).
   b. Take out woodruff key (8).

GO TO FRAME 3



FRAME 3

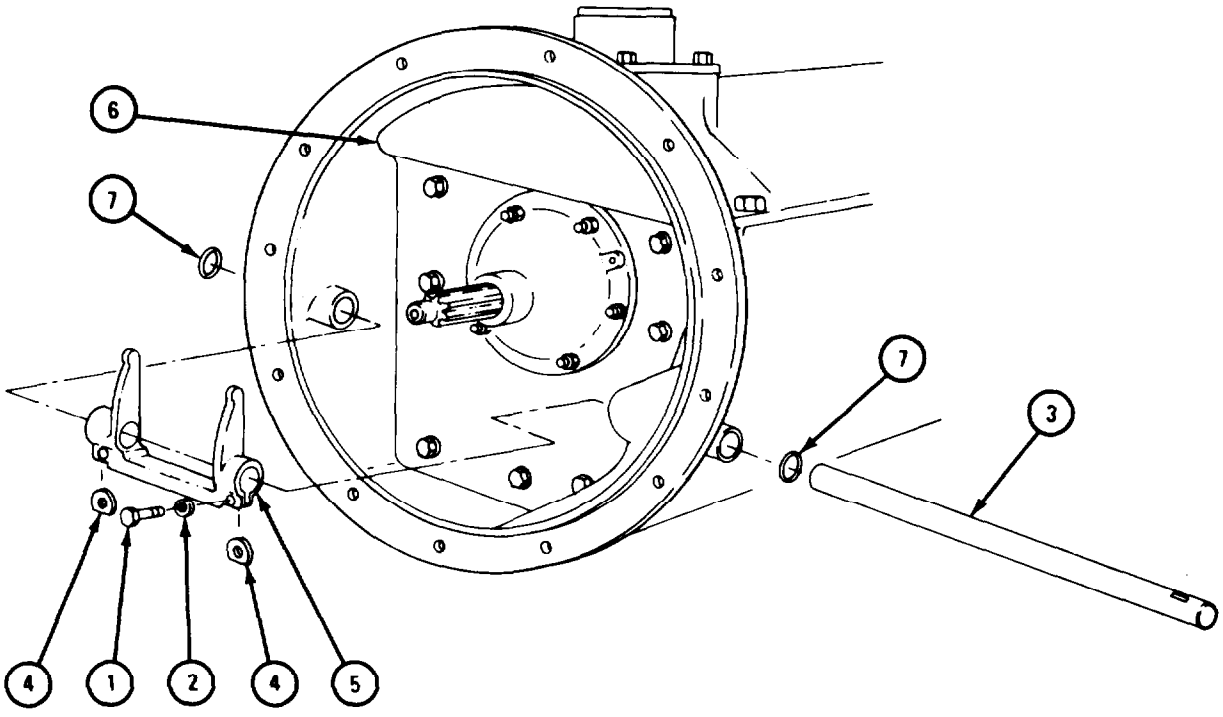
1. Take out two screws (1) and lockwashers (2).
2. Slide clutch release shaft (3) abuut two inches to the right and take out two keys(4).
3. Slide clutch release shaft (3) to the right far enough to slide off clutch release yoke (5).
4. Slide clutch release shaft (3) out of clutch housing (6).

NOTE

Truck M543A2 has two oil seals (7), one on each side.

5. Take out and throw away oil seal (7).

GO TO FRAME 4

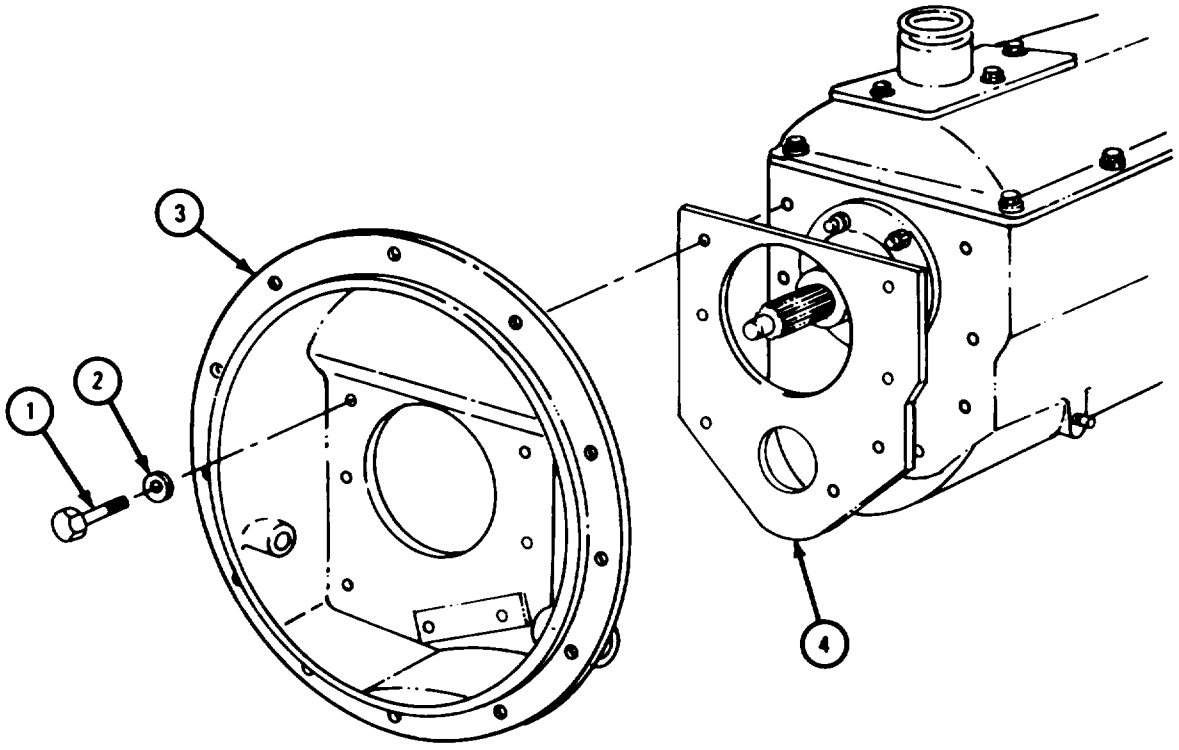


TA 089165

FRAME 4

1. Take out seven screws (1) and lockwashers (2).
2. Takeoff clutch housing (3) and gasket(4). Throwaway gasket.

END OF TASK

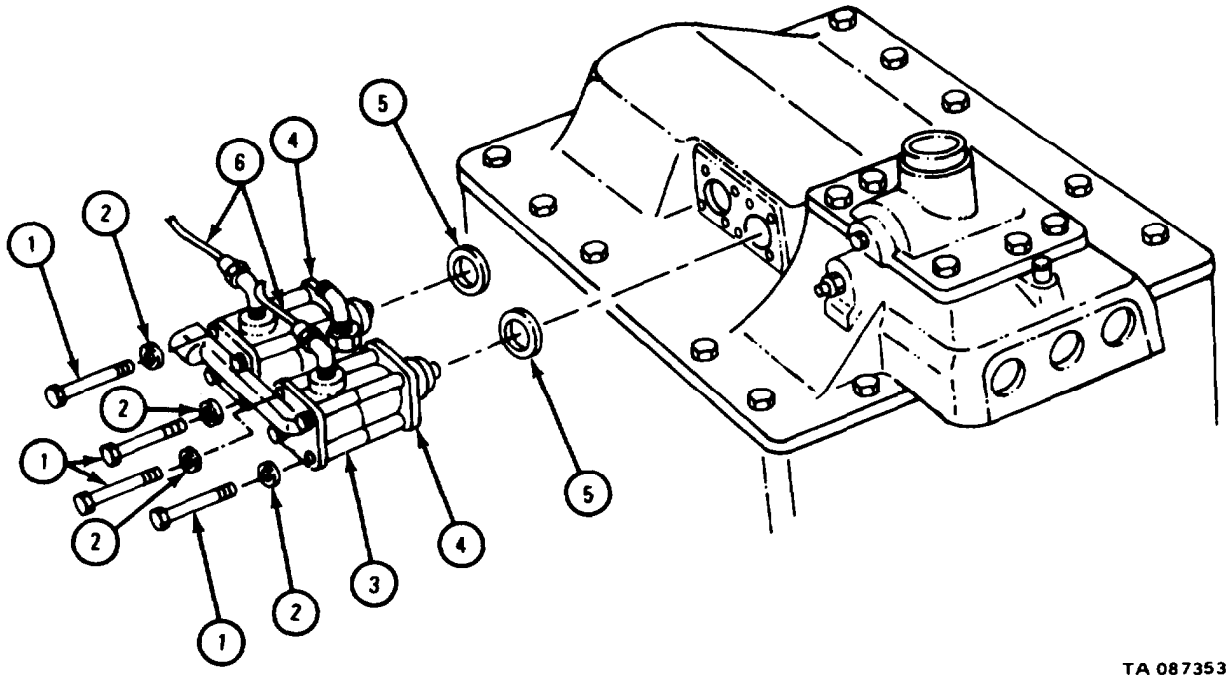


TA 089166

(2) Shifter housing assembly.

1. Take out eight screws (1) and lockwashers (2).
2. Take off poppet valve assembly (3), two plates (4), and two preformed packings (5). Throw away preformed packings.
3. Take off two transfer shift lines (6).

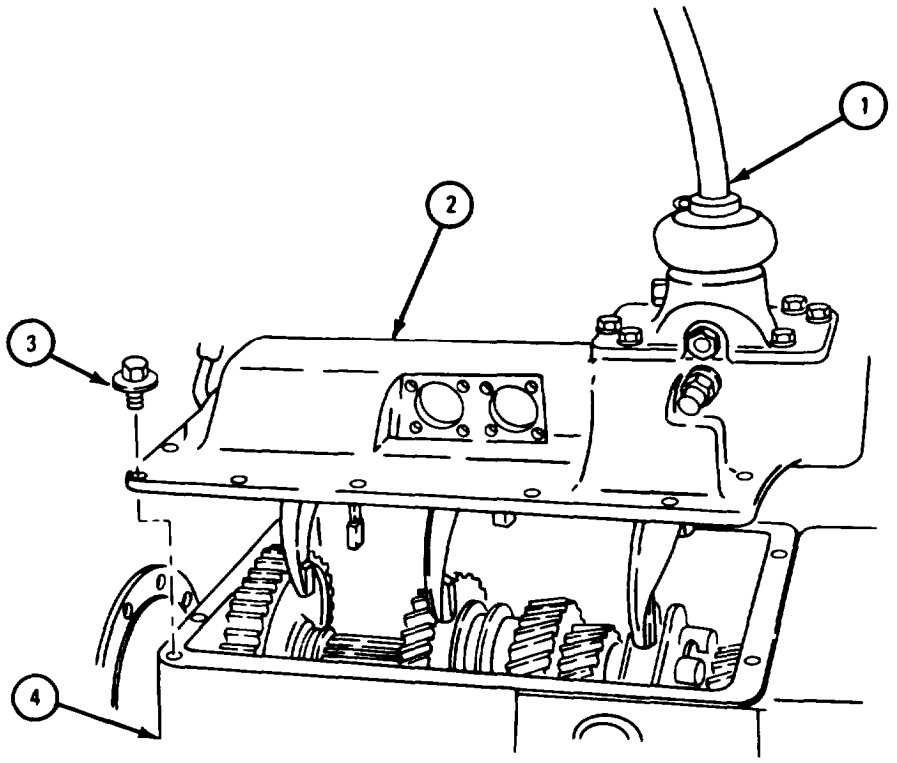
GO TO FRAME 2



FRAME 2

1. Put shifter lever (1) in place in shifter housing cover (2) and shift lever to neutral position.
2. Take out 14 screws and lockwasher assemblies (3).
3. Take shifter housing cover (2) off transmission case (4).
4. Take out shifter lever (1).

END OF TASK



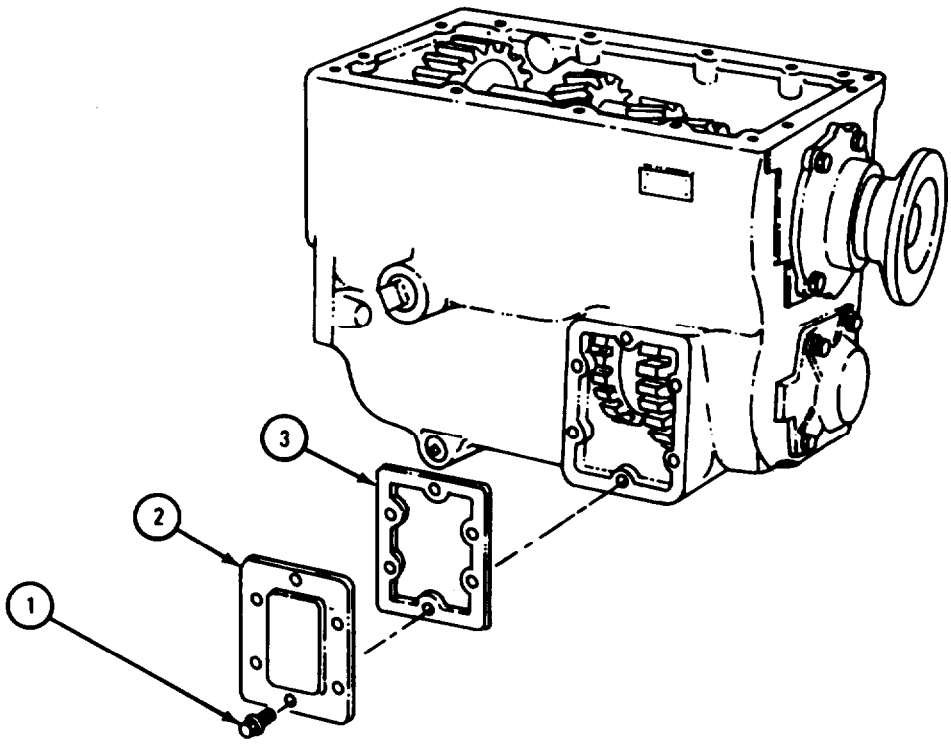
TA 087354

(3) Covers.

FRAME 1

1. Take out six screws and lockwasher assemblies (l).
2. Take off cover (2).
3. Take off gasket (3) and throw it away.
4. If transmission does not have power takeoff, do steps 1 through 3 again on other side of transmission.

END OF TASK



(4) Backlash check.

FRAME 1

NOTE

This frame tells how to check backlash for all gears. Do this frame when measuring backlash for each set of gears in frames 2 through 4.

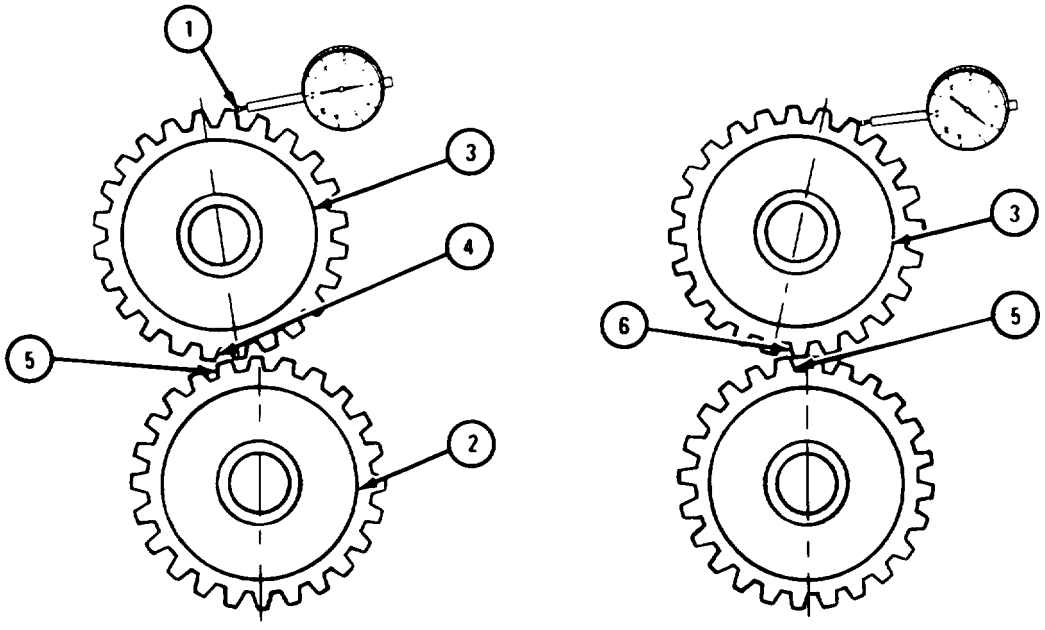
1. Mount dial indicator on housing and set stem against side of gear tooth (1) as shown.

NOTE

When measuring backlash, make sure gear (2) does not turn. If gear turns, backlash readings will be wrong.

2. Turn gear (3) away from dial indicator until gear tooth (4) touches gear tooth (5) as shown in view A.
3. Set dial indicator to read 0.
4. Turn gear (3) towards dial indicator until gear tooth (6) touches other side of gear tooth (5) as shown in view B.
5. Check that dial indicator readings are within wear limits given for each set of gears.

GO TO FRAME 2



VIEW A VIEW B

TA 087357

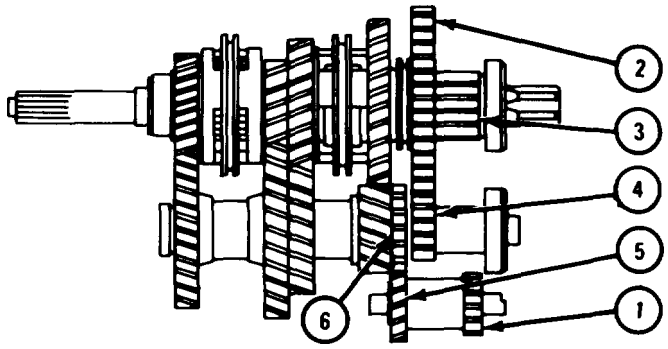
FRAME 2

NOTE

Readings must be within limits given in table 7-1. If readings are not within given limits, throw away both gears and get new ones. Some gears on countershaft cannot be taken off. If these gears are damaged, throw away countershaft and get a new one.

1. Measure backlash between reverse idler drive gear (1) and first and reverse speed gear (2).
2. Measure backlash between first and reverse speed gear (2) and main shaft (3).
3. Measure backlash between first and reverse speed gear (2) and countershaft first speed drive gear (4) .
4. Measure backlash between reverse idler drive gear (5) and countershaft reverse idler gear (6).

GO TO FRAME 3



TA 087358

Table 7-1. Transmission Reverse Idler Gear and First and Reverse Speed Gear Backlash Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	Reverse idler drive gear to first and reverse speed gear	0.005 to 0.011	None
2 and 3	First and reverse speed gear to main shaft	0.004 to 0.007	None
2 and 4	First and reverse speed gear to countershaft first speed drive gear	0.008 to 0.011	None
5 and 6	Reverse idler drive gear to countershaft reverse idler drive gear	0.008 to 0.011	None

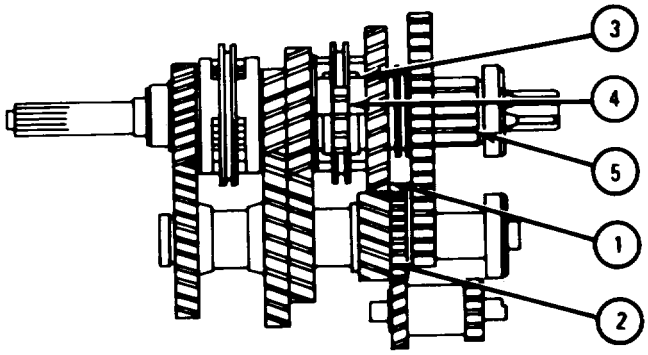
FRAME 3

NOTE

Readings must be within limits given in table 7-2. If readings are not within given limits, throw away both gears and get new ones. Some gears on countershaft cannot be taken off. If these gears are damaged, throw away counter shaft and get a new one.

1. Measure backlash between second speed gear (1) and countersha.ft second speed gear (2).
2. Measure backlash between second speed gear (1) and synchronizer (3).
3. Measure backlash between synchronizer (3) and second and third speed clutch gear (4).
4. Measure backlash between second and third speed clutch gear (4) and main shaft (5).

GO TO FRAME 4



TA 087359

Table 7-2. Transmission Second Speed Gear Backlash Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	Second speed gear to counter-shaft second speed gear	0.006 to 0.009	None
1 and 3	Second speed gear to synchron-izer	0.004 to 0.009	None
3 and 4	Synchronizer to second and third speed clutch gear	0.004 to 0.007	None
4 and 5	Second and third speed clutch gear to main shaft	0.000 to 0.003	None

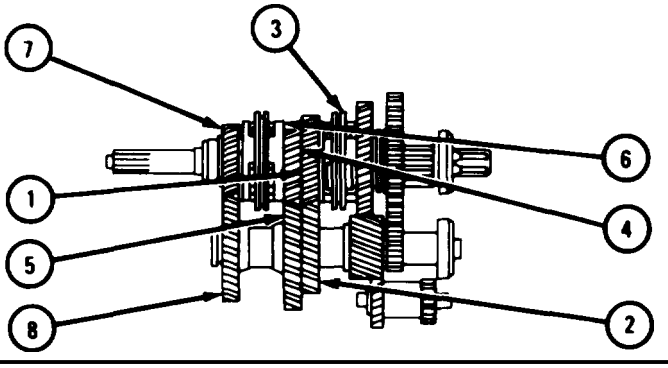
FRAME 4

NOTE

Readings must be within limits given in table 7-3. If readings are not within given limits, throw away both gears and get new ones. Some gears on countershaft cannot be taken off. If these gears are damaged, throw away countershaft and get a new one.

1. Measure backlash between third speed gear (1) and countershaft third speed gear (2).
2. Measure backlash between third speed gear (1) and synchronizer (3).
3. Measure backlash between fourth speed gear (4) and countershaft fourth gear (5).
4. Measure backlash between fourth speed gear (4) and synchronizer (6).
5. Measure backlash between input gear (7) and synchronizer (6).
6. Measure backlash between input gear (7) and countershaft input gear (8).

END OF TASK



TA 087360

Table 7-3. Transmission Input Gear and Third and Fourth Speed Gear Backlash Wear Limits

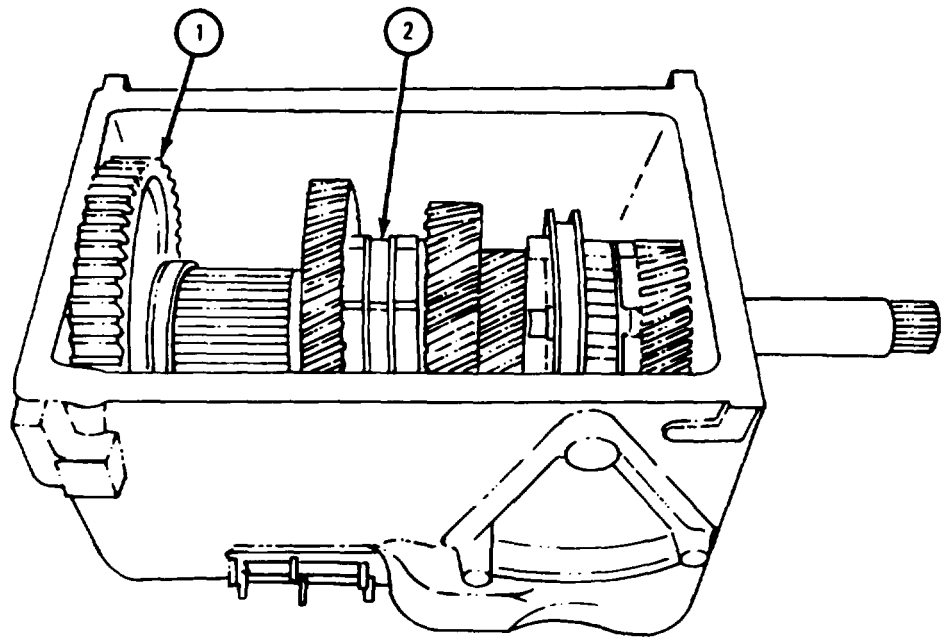
Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limits (inches)
1 and 2	Third speed gear to countershaft third speed gear	0.006 to 0.009	None
1 and 3	Third speed gear to synchronizer	0.004 to 0.009	None
4 and 5	Fourth speed gear to countershaft fourth gear	0.006 to 0.009	None
4 and 6	Fourth speed gear to synchronizer	0.004 to 0.009	None
6 and 7	Input gear to synchronizer	0.004 to 0.009	None
7 and 8	Input gear to countershaft input gear	0.006 to 0.009	None

(5) Transmission gears and shafts.

FRAME 1

1. Slide first and reverse speed gear (l) and second and third speed synchronizer (2) into mesh with countershaft gears. This will keep transmission gears and shafts from turning during this task.

GO TO FRAME 2

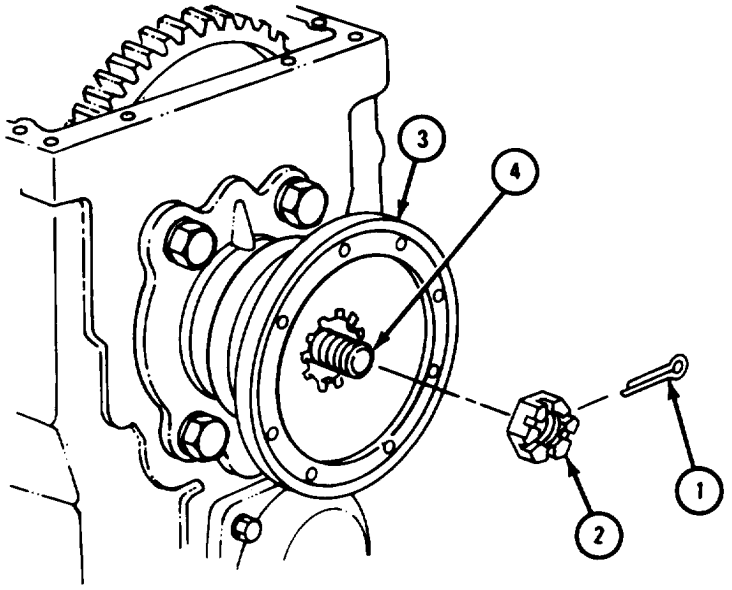


TA 087361

FRAME 2

1. Take out and throw away cotter pin (1).
2. Take off slotted nut (2).
3. Using mechanical puller, pull companion flange (3) off main shaft (4).

GO TO FRAME 3

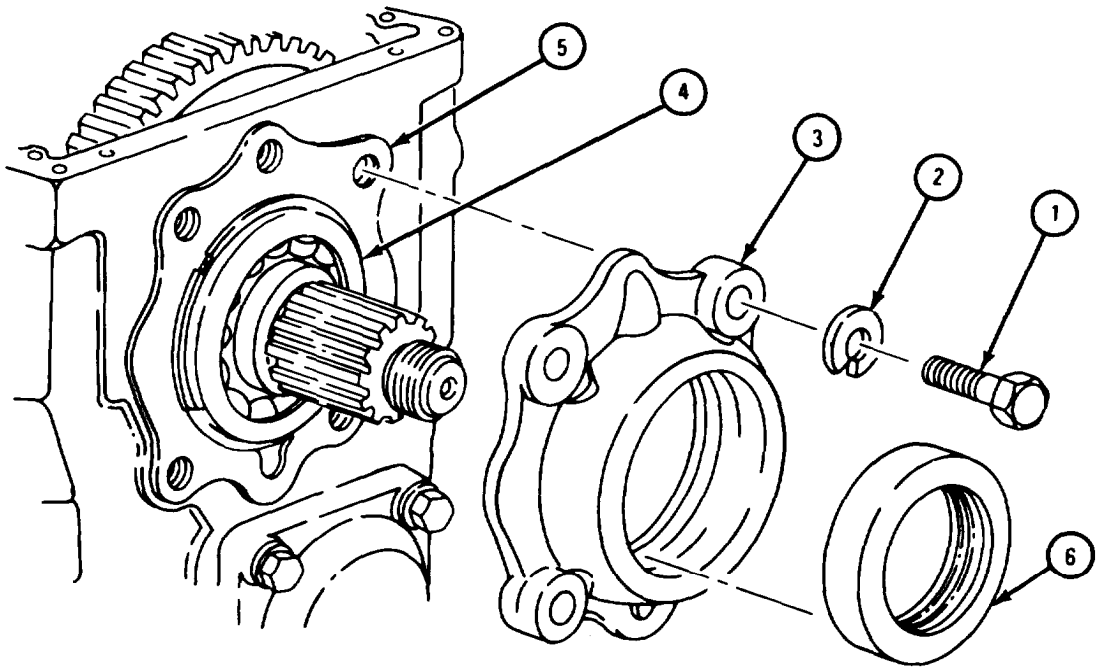


TA 087364

FRAME 3

1. Take out four screws (1) and lockwashers (2).
2. Using lightweight hammer, tap rear output shaft cover (3) lightly to free it from main shaft rear bearing outer race (4).
3. Take off rear output shaft cover (3), cover gasket (5), and oil seal (6). Throw away gasket.
4. Using hammer and punch, drive oil seal (6) out of rear output shaft cover (3). Throw away oil seal.

GO TO FRAME 4

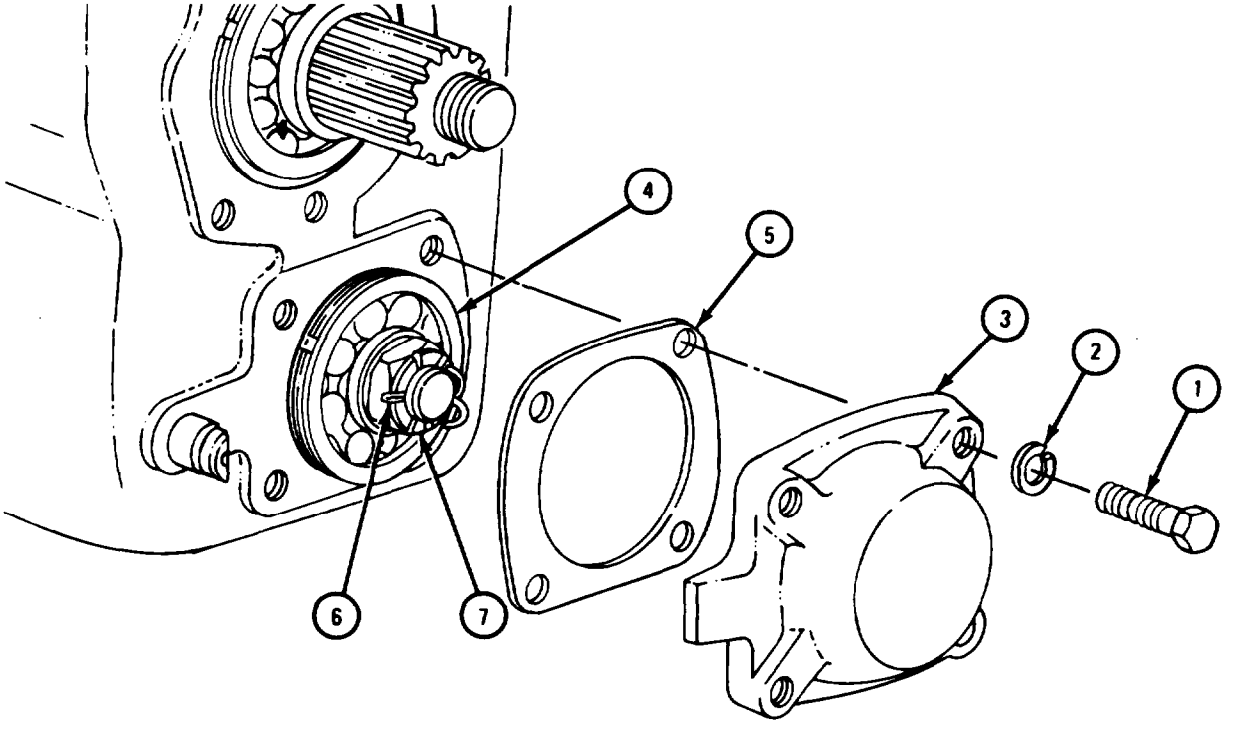


TA 087365

FRAME 4

1. Take out four screws (1) and lockwashers (2).
2. Using lightweight hammer, tap countershaft rear bearing cover (3) to unseat it from rear bearing (4). Lift off cover.
3. Take off countershaft rear bearing cover gasket (5) and throw it away.
4. Take out and throw away cotter pin (6).
5. Take off slotted nut (7).

GO TO FRAME 5

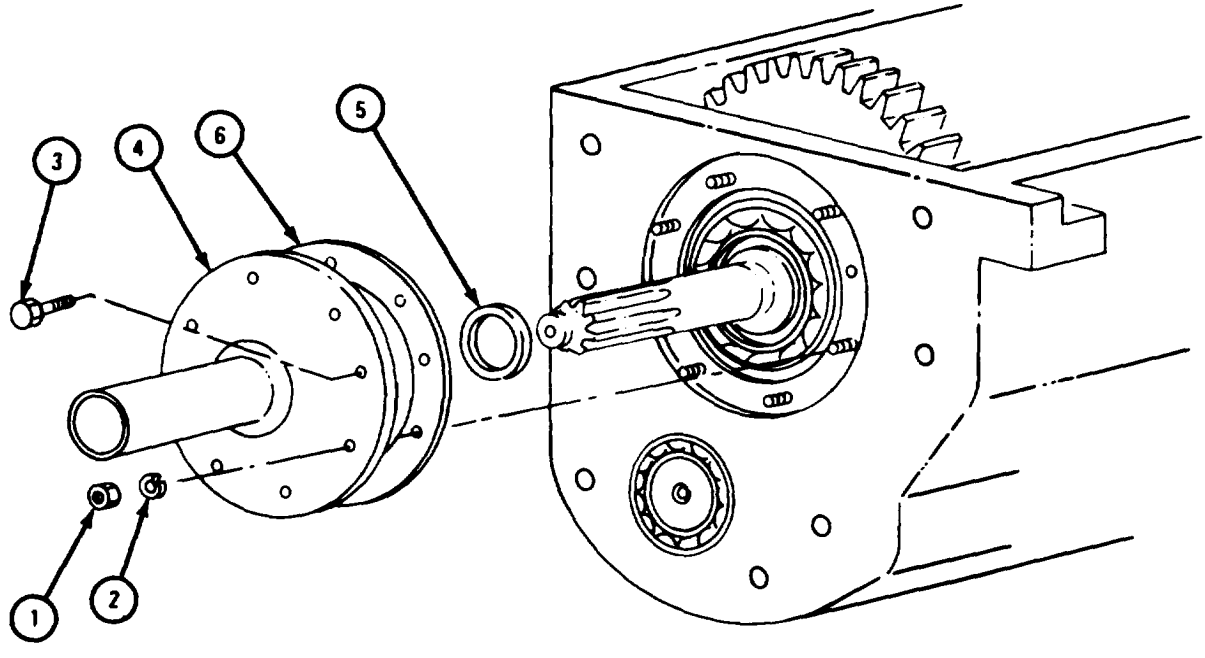


TA 087366

FRAME 5

1. Take off six nuts (1) and lockwashers (2).
2. Put two 3/8-16-UNC screws (3) evenly into threaded holes in input shaft cover (4) until cover is free.
3. Take off input shaft cover (4) with seal (5) and gasket (6). Throw away gasket.
4. Using hammer and punch, take out seal (5). Throw away seal
5. Take out two screws (3).

GO TO FRAME 6



TA 087362

FRAME 6

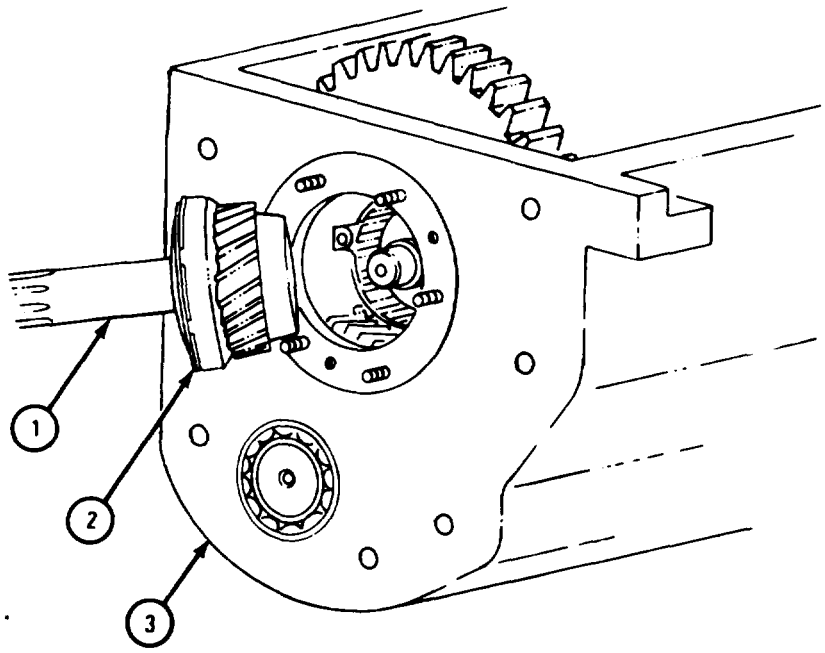
1. Using soft-faced hammer, lightly tap end of input shaft (1) to unseat input shaft bearing assembly (2).

NOTE

As input shaft (1) is pulled out, 14 pilot roller bearings will fall into bottom of transmission case (3). They can be taken out of transmission case after it is taken apart.

2. Pull out input shaft (1) with input shaft bearing assembly (2).

GO TO FRAME 7

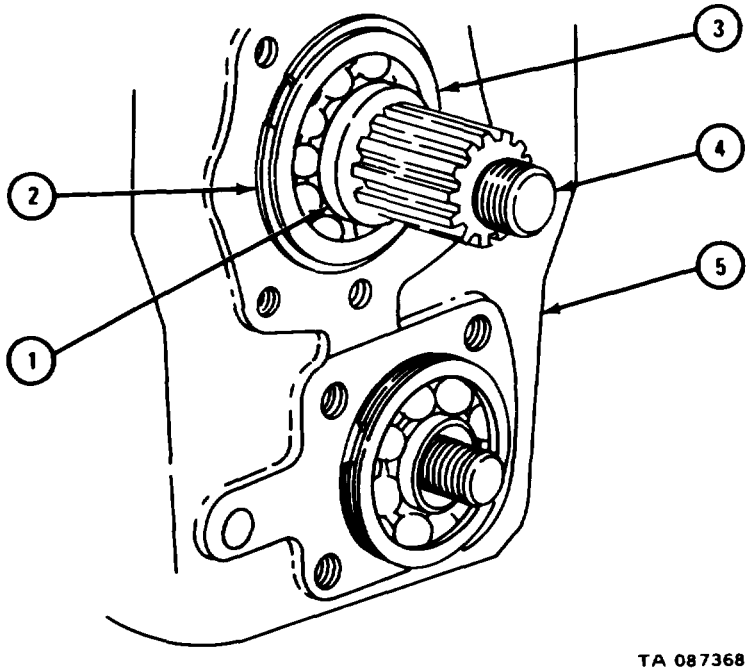


TA 087363

FRAME 7

1. Slide off spacer washer(1).
2. Takeoff rear bearing snapring (2) and throw it away.
3. Using wrench and mechanical puller, pull main shaft rear bearing (3) off main shaft (4) and bore of transmission case (5).

GO TO FRAME 8

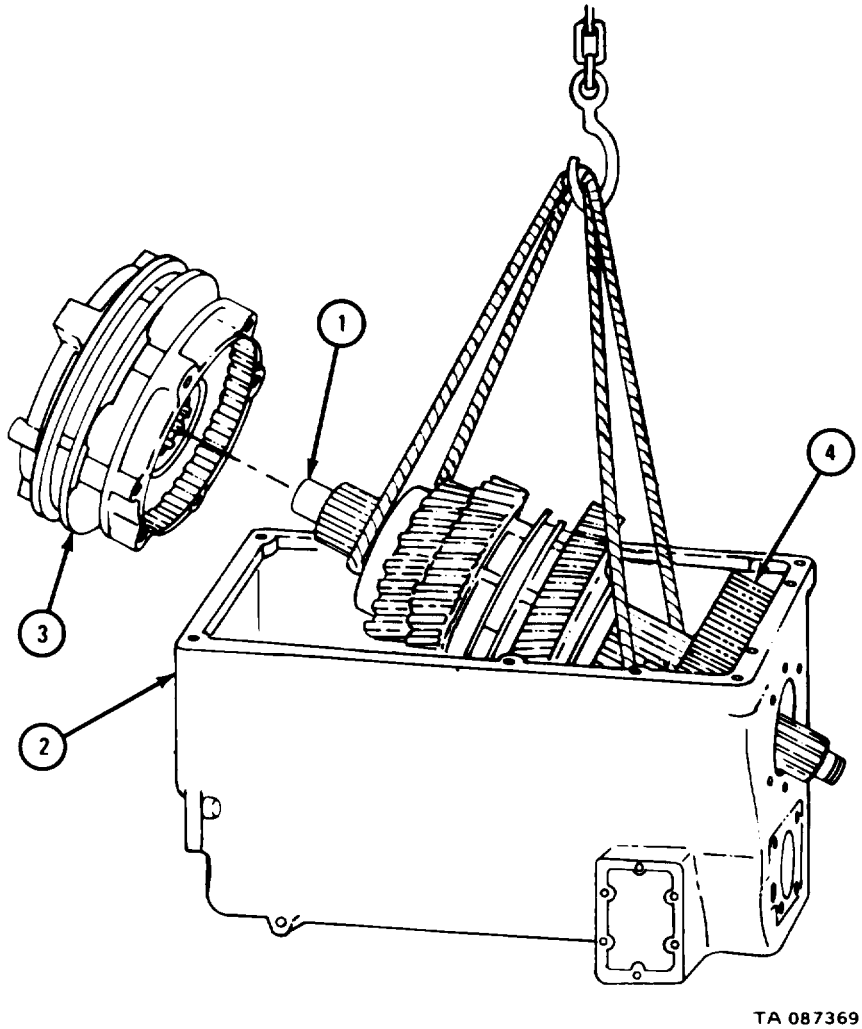


TA 087368

FRAME 8

1. Slide main shaft assembly (1) to rear of transmission case (2).
2. Slide fourth and fifth speed gear synchronizer (3) off front end of main shaft assembly (1).
3. Tie rope to front and rear end of main shaft assembly (1) as shown.
4. Lift main shaft assembly (1) out of first and reverse speed gear (4) and out of transmission case (2).
5. Take off rope sling.
6. Take out first and reverse speed gear (4).

GO TO FRAME 9

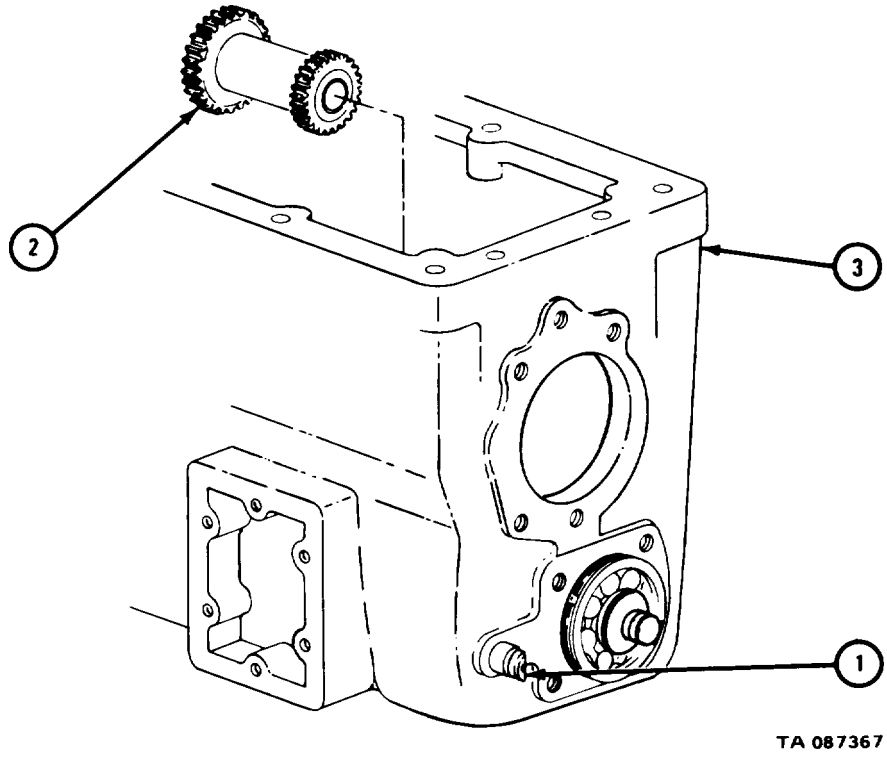


TA 087369

FRAME 9

1. Using prybar, pull out reverse idler gear shaft (1).
2. Lift reverse idler gear assembly (2) from transmission case (3).

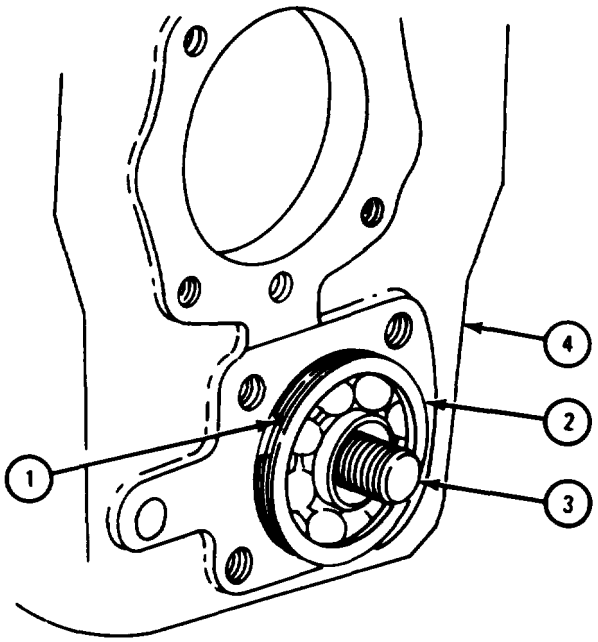
GO TO FRAME 10



FRAME 10

1. Take off snapring (1).
2. Using wrench and mechanical puller, pull countershaft rear bearing (2) off countershaft (3) and out of bore of transmission case (4).

GO TO FRAME 11

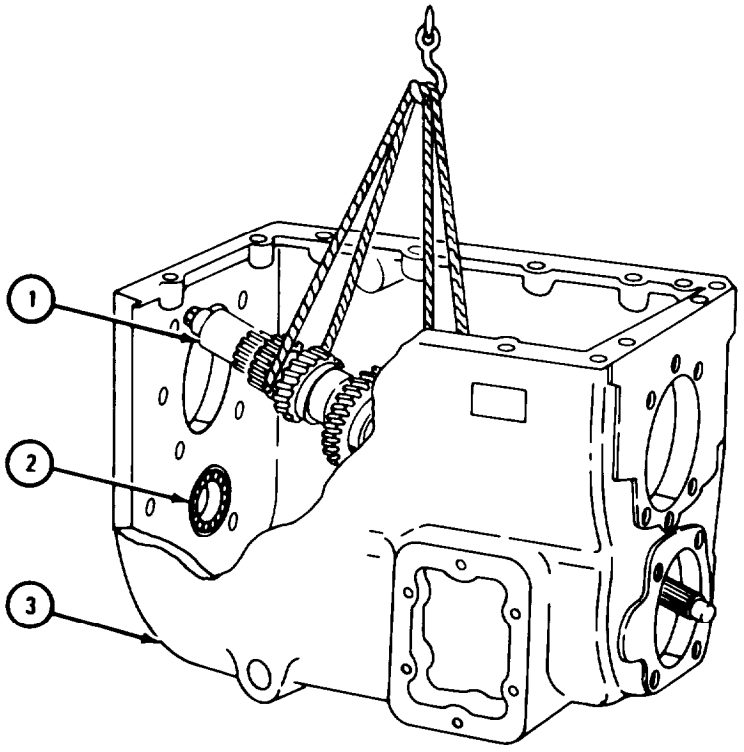


TA 087370

FRAME 11

1. Using hoist and rope sling, slide countershaft assembly (1) out of front bearing(2). Lift countershaft assembly out of transmission case (3) and onto workbench.
2. Take off hoist and rope sling.
3. Take out front bearing (2).

END OF TASK



TA 087371

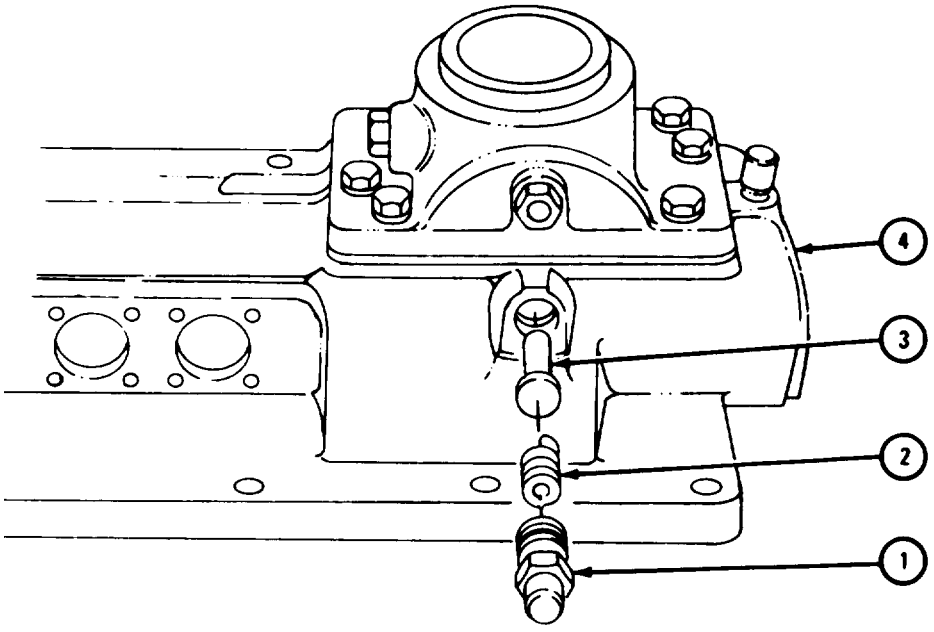
d. Disassembly of Transmission Subassemblies.

(1) Shifter housing assembly.

FRAME 1

1. Take out retainer (1).
2. Take out spring (2) and finger plunger (3) from shifter housing (4).

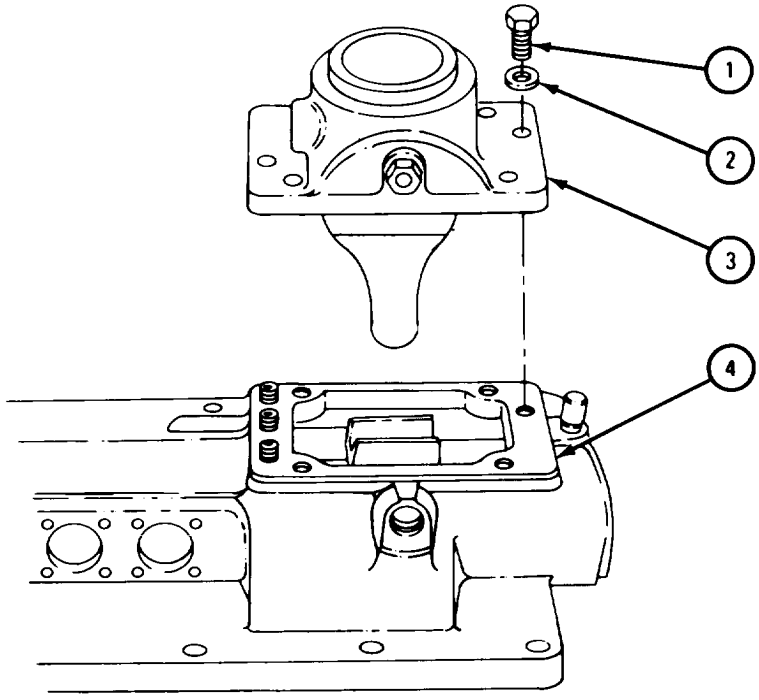
GO TO FRAME 2



FRAME 2

1. Takeout six screws (1) and lockwashers (2).
2. Take off shifter housing cover assembly (3) and housing cover gasket (4). Throw away gasket.

GO TO FRAME 3

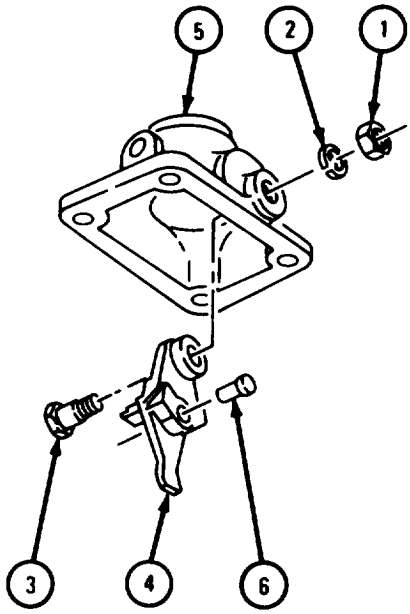


TA 087373

FRAME 3

1. Take nut (1) and lockwasher (2) off shoulder bolt (3).
2. Take shoulder bolt (3) and shift lever finger (4) out of shifter housing cover assembly (5).
3. Take shift lever finger (4) off shoulder bolt (3).
4. Take shift lever finger plunger (6) out of shift lever finger (4).

GO TO FRAME 4

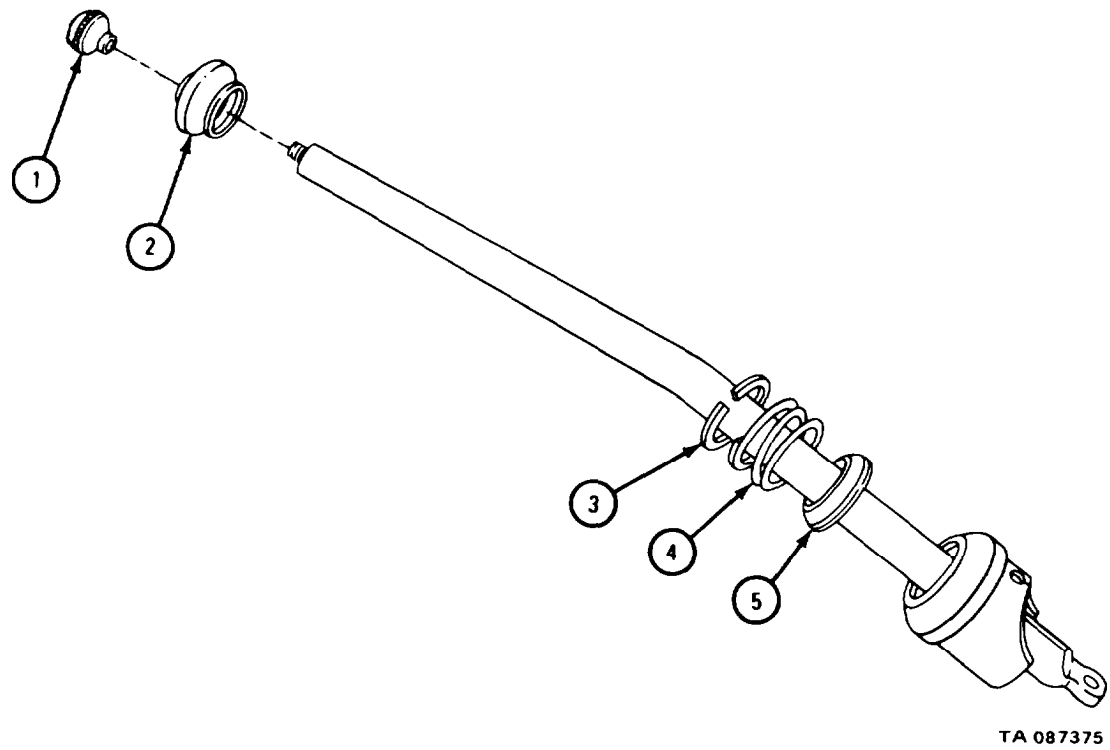


TA 087374

FRAME 4

1. Take off knob (1).
2. Slide off grommet (2).
3. Take out snapring (3).
4. Slide off spring (4) and spring cup (5).

GO TO FRAME 5

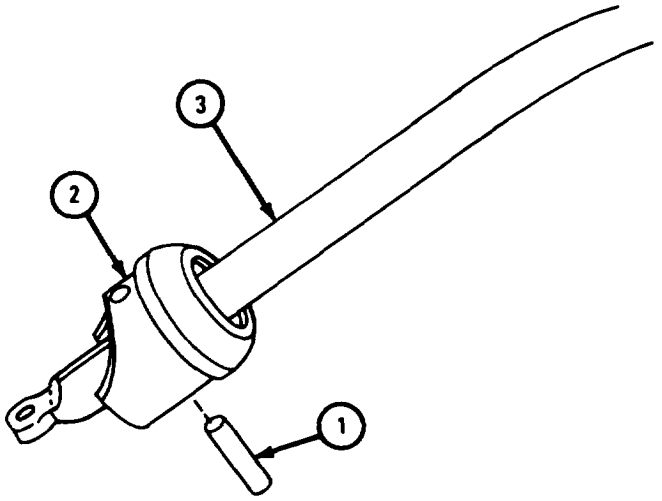


TA 087375

FRAME 5

1. Using punch and lightweight hammer, drive out pivot pin (1) from shift lever retainer (2) and shift lever (3).
2. Take apart shift lever retainer (2) and shift lever (3).

GO TO FRAME 6

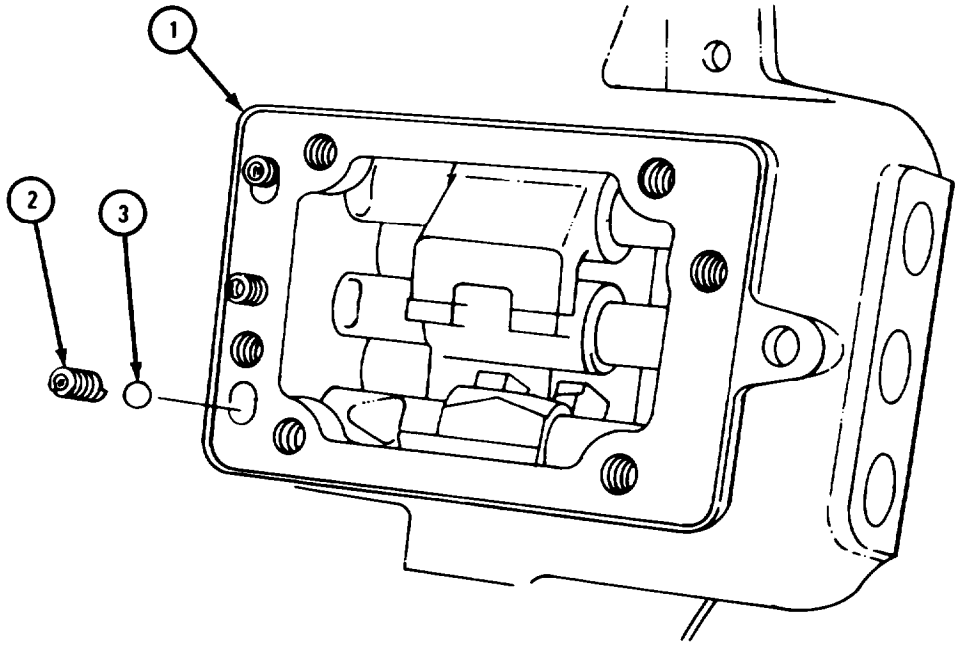


TA 087376

FRAME 6

1. Turn shifter housing (1) on one side as shown.
2. Take out three poppet ball compression springs (2) and three poppet balls (3). Place springs and balls in safe place so they will not get lost or damaged.

GO TO FRAME 7

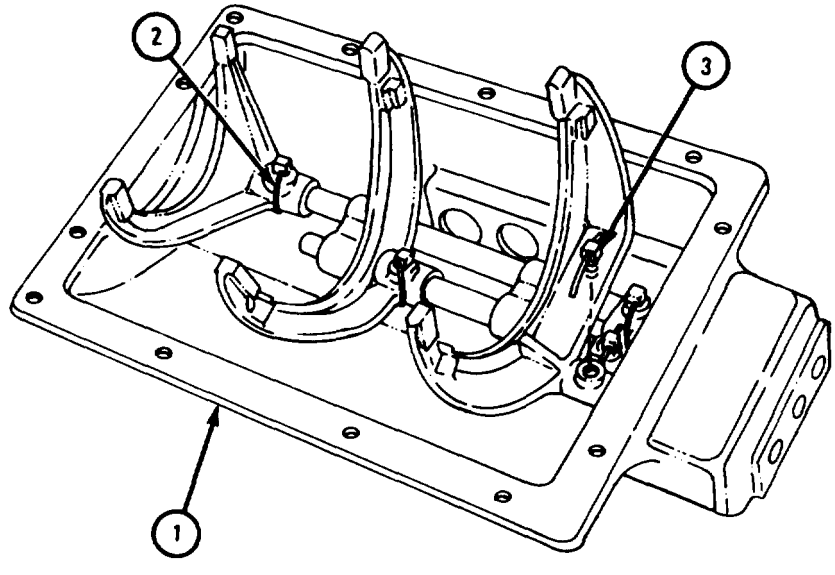


TA 087377

FRAME 7

1. Turn shifter housing assembly (1) upside down on workbench.
2. Take off safety wire (2) from five setscrews (3).
3. Take out five setscrews (3).

GO TO FRAME 8



TA 087378

FRAME 8

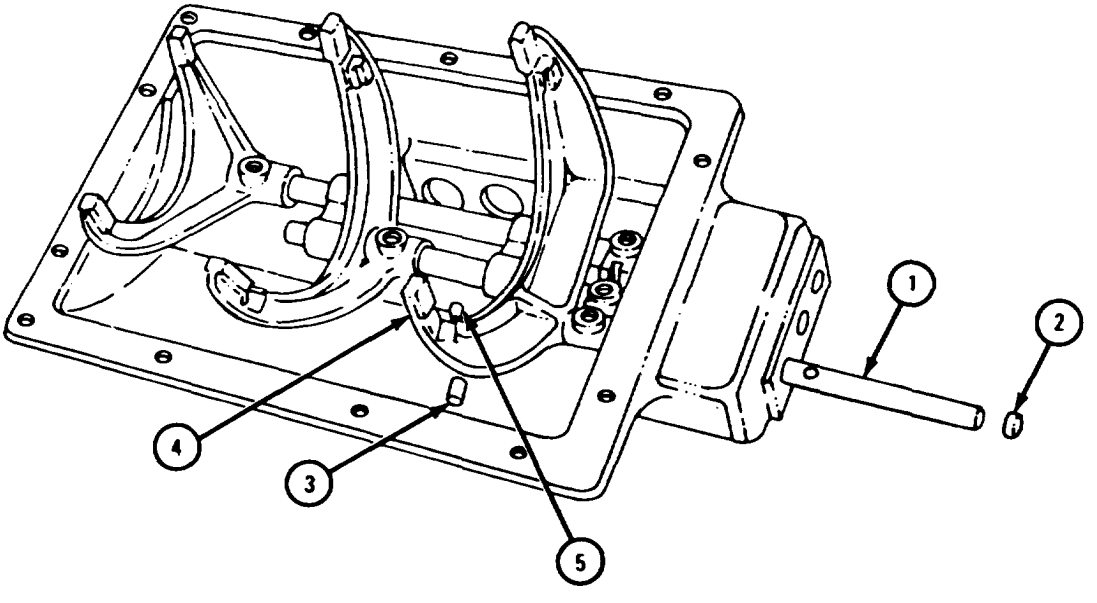
1. Using punch and lightweight hammer, tap on fourth and fifth speed shifter shaft (1) to drive out expansion plug (2).

NOTE

Interlock pin (3) will fall into housing when shifter shaft (1) is taken out.

2. Slide out fourth and fifth speed shifter shaft (l).
3. Take out fourth and fifth speed shifter fork (4) and interlock pin (3).
4. Take out second and third speed interlock pin (5).

GO TO FRAME 9

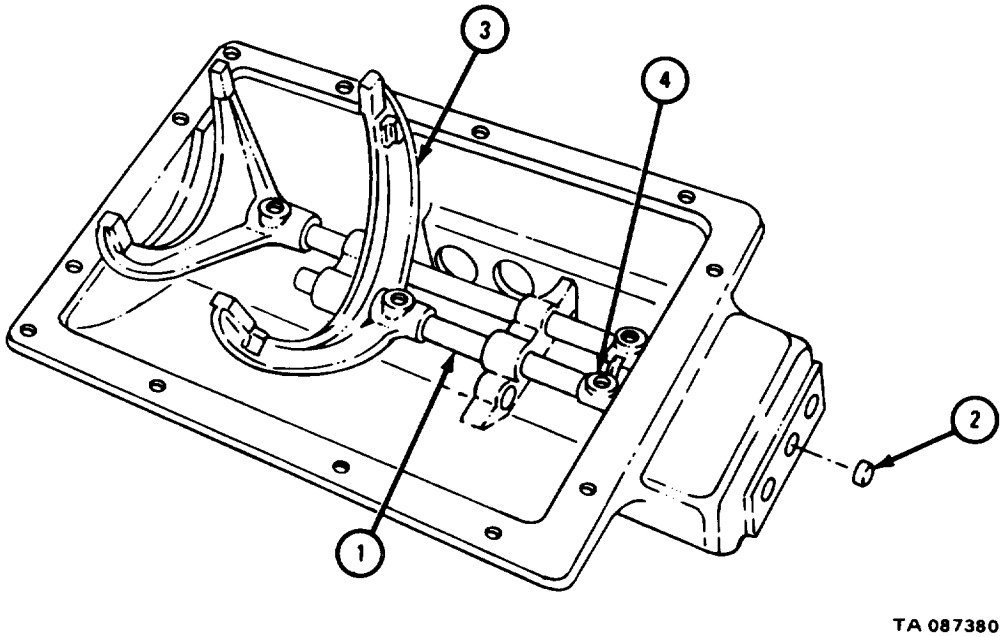


TA 087379

FRAME 9

1. Using punch and lightweight hammer, tap on second and third speed shifter shaft (1) to drive out expansion plug (2).
2. Slide out second and third speed shifter shaft(l).
3. Takeout second and third speed shifter fork (3) and bracket(4).

GO TO FRAME 10

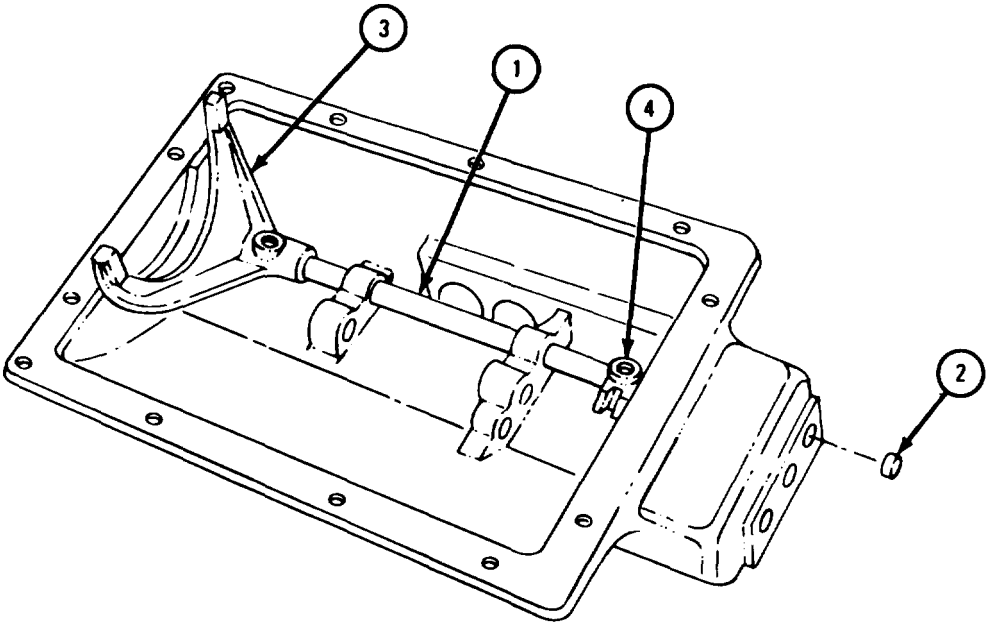


TA 087380

FRAME 10

1. Using punch and lightweight hammer, tap first and reverse speed shifter shaft (1) to drive out expansion plug (2).
2. Slide out first and reverse speed shifter shaft (1).
3. Take out first and reverse speed shifter fork (3) and bracket (4).

END OF TASK



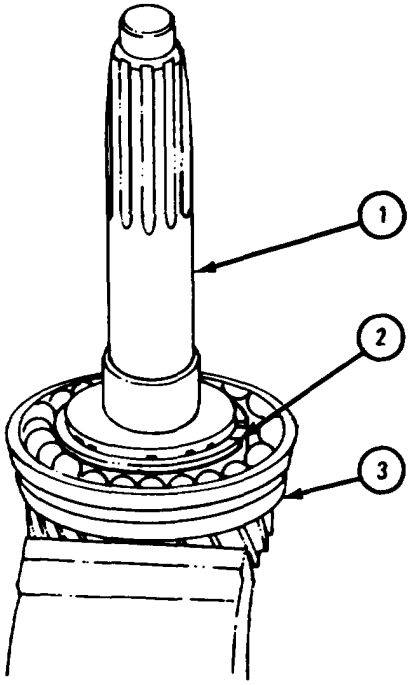
TA 087381

(2) Transmission gears and shafts.

FRAME 1

1. Carefully clamp input shaft assembly (1) in soft-jawed vise.
2. Take out snapring (2).
3. Using mechanical puller wrench, take off bearing (3).
4. Take input shaft assembly (1) out of vise.

GO TO FRAME 2

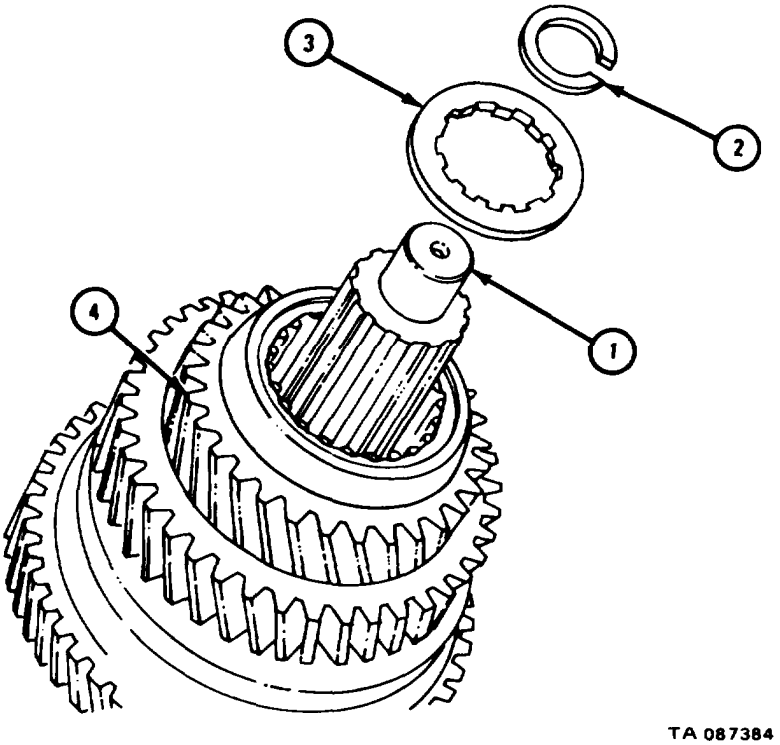


TA 087382

FRAME 2

1. Carefully clamp main shaft assembly (1) in soft-jawed vise.
2. Take off snapring (2).
3. Slide thrust washer (3) and fourth speed gear (4) off main shaft (1).

GO TO FRAME 3

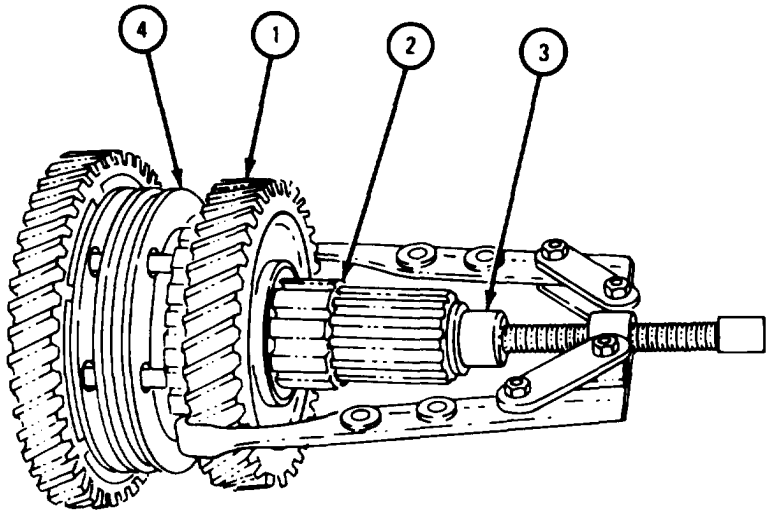


TA 087384

FRAME 3

1. Using mechanical puller and wrench, pull third speed gear (1) and fourth speed gear sleeve (2) from main shaft (3).
2. Slide off second and third speed gear synchronizer (4).

GO TO FRAME 4



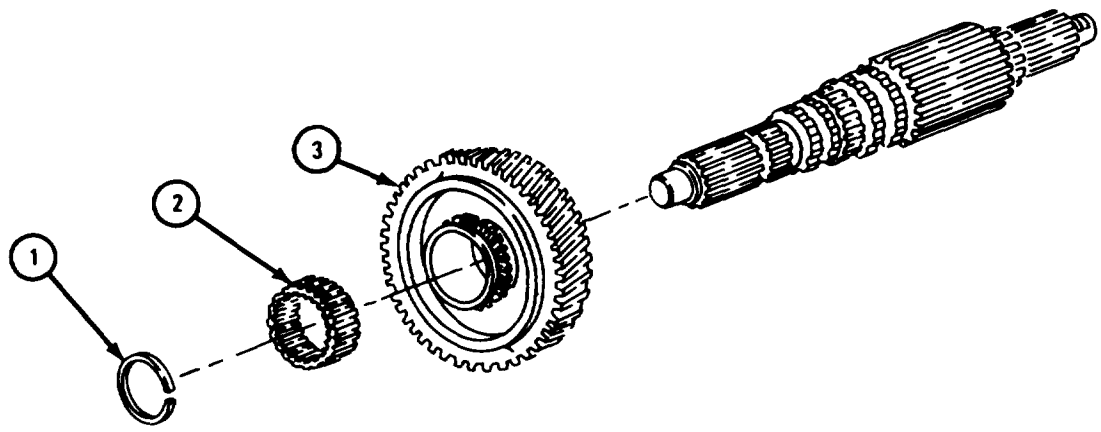
TA 087385

FRAME 4

1. Takeout snapring (1).

2 Slide off second and third speed clutch gear (2) and second speed gear (3).

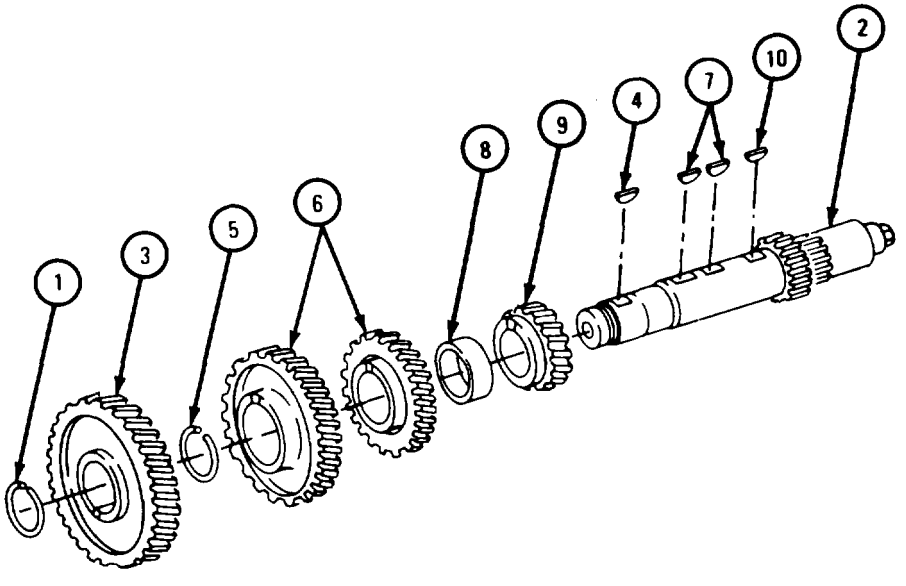
GO TO FRAME 5



FRAME 5

1. Take out snapring (1).
2. Press countershaft (2) out of countershaft driven gear (3). Take out woodruff key (4).
3. Take off snapring (5).
4. Press countershaft (2) out of countershaft fourth speed gear and countershaft third speed gear (6). Take out two woodruff keys (7) and take off spacer (8).
5. Press countershaft (2) out of countershaft second speed gear (9). Take out woodruff key (10).

GO TO FRAME 6

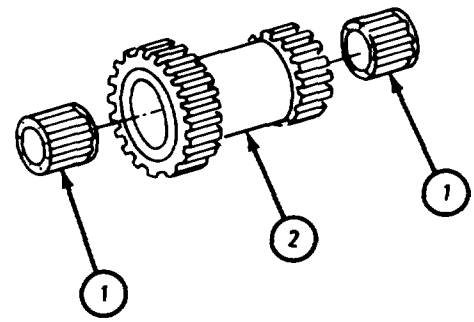


TA 087387

FRAME 6

1. Slide two bearings (1) out of reverse idler gear (2).

END OF TASK



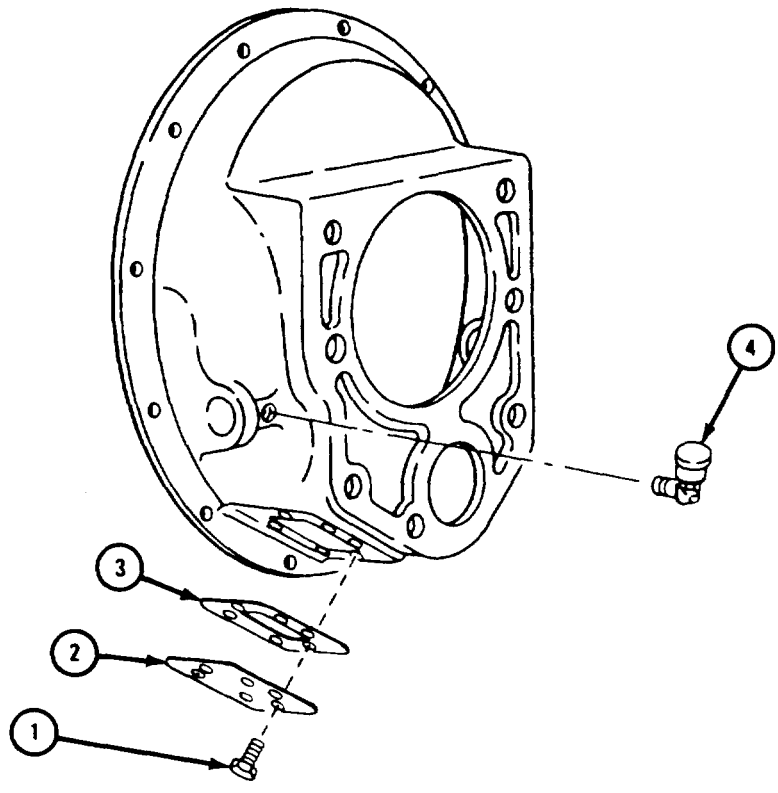
TA 087388

(3) Clutch housing and transmission case.

FRAME 1

1. Take out six lockscrews (1).
2. Take off inspection hole cover (2) and gasket(3). Throwaway gasket.
3. Take out two grease cup assemblies(4).

GO TO FRAME 2



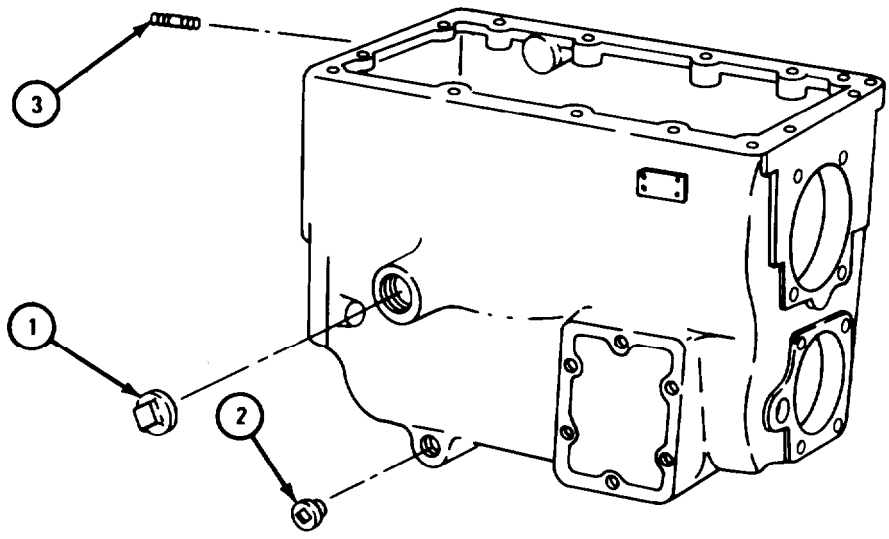
FRAME 2

NOTE

Do not take studs out unless they are damaged.

1. Take out filler hole plug (l).
2. Take out drain hole plug (2).
3. Take out five studs (3).

END OF TASK



TA 087390

e. Cleaning.

(1) Clean all bearings. Refer to para 7-7.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(2) Clean all other parts with solvent.

WARNING

Eye shields must be worn when using compressed air. Eye injury can occur if eye shields are not used.

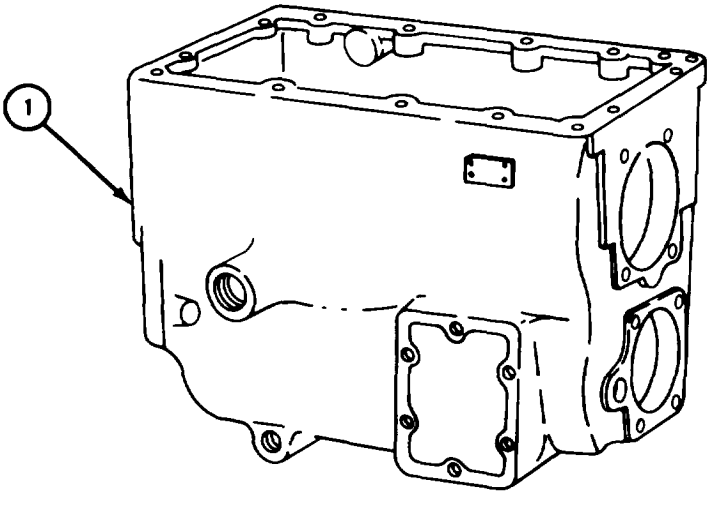
(3) Make sure all oil passages are open. Open clogged passages with compressed air or by working a wire back and forth. Flush with solvent.

f. Inspection and Repair.

FRAME 1

1. Check that bearing bores in transmission case (l) are not cracked, burred or scored. Take off burrs with crocus cloth or honing stone. If bores are cracked or badly scored, get a new transmission case.
2. Check that mounting surfaces and all other machined surfaces of transmission case (1) are not nicked, burred or scratched. Smooth surfaces with crocus cloth or honing stone. If more repair is needed, get a new transmission case.
3. Check that tapped holes in transmission case (1) are not stripped or crossthreaded. Repair damaged threads with correct size tap.

GO TO FRAME 2

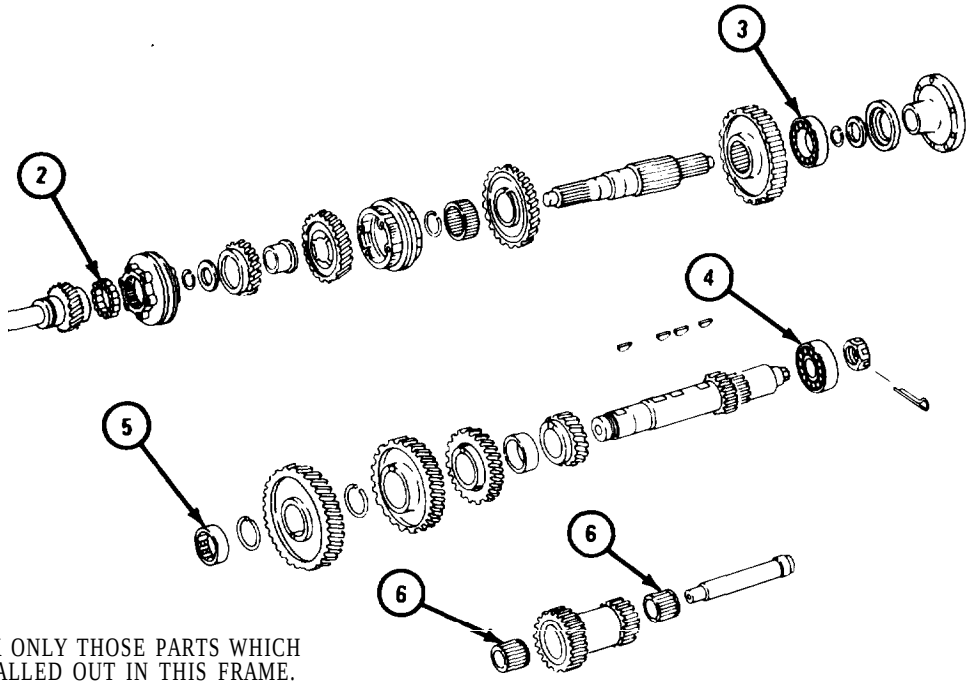


TA 087391

FRAME 2

1. Check that input shaft bearing (1), 14 pilot roller bearings (2), main shaft rear bearing (3), countershaft rear bearing (4), countershaft front bearing (5), and two reverse idler gear bearings (6) are not damaged. Refer to para 7-7.

GO TO FRAME 3



NOTE : CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

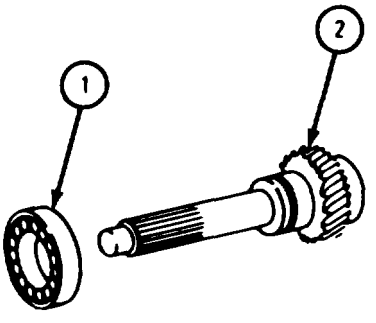
FRAME 3

NOTE

Readings must be within limits given in table 7-4. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure fit of bearing (1) on input shaft (2).

GO TO FRAME 4



TA 087393

Table 7-4. Transmission Input Gear to Shaft Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	Fit of input gear bearing on input shaft	0.0001L to 0. 001T	None

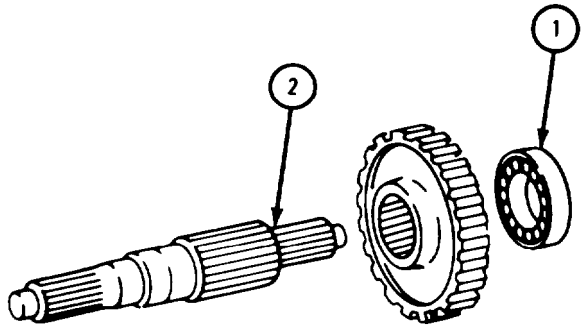
FRAME 4

NOTE

Readings must be within limits given in table 7-5. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure fit of main shaft bearing (1) on shaft (2).

GO TO FRAME 5



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT
PARTS WITHOUT CA LLOUTS ARE SHOWN ONLY FOR
REFERENCE PURPOSES,

TA 087394

Table 7-5. Transmission Mainshaft Bearing to Shaft Wear Limits

Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	Fit of mainshaft bearing on shaft	0.0004L to 0.0007T	None

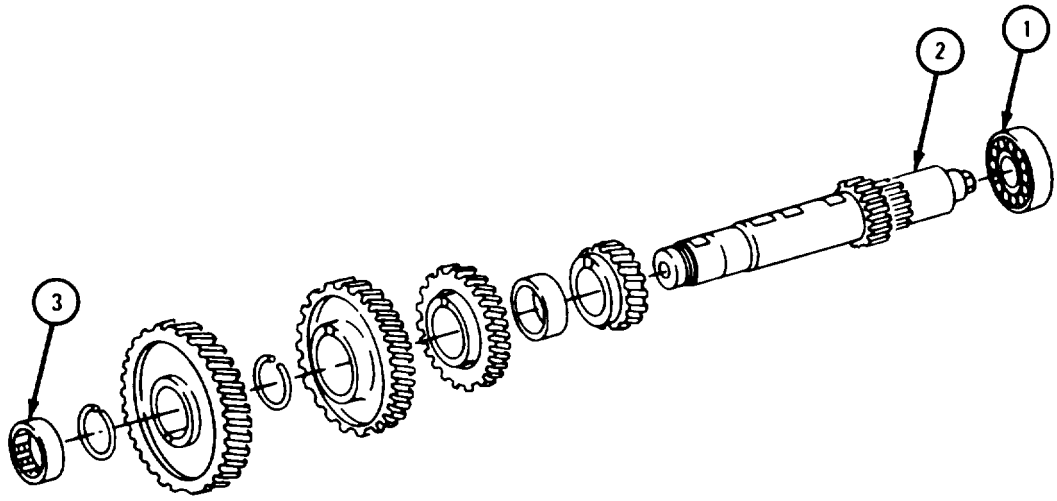
FRAME 5

NOTE

Readings must be within limits given in table 7-6. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure fit of countershaft rear bearing (1) on shaft (2).
2. Measure fit of countershaft front bearing (3) on shaft (2).

GO TO FRAME 6



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087395

Table 7-6. Transmission Countershaft Front and Rear Bearing to Shaft Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limits (inches)
1 and 2	Fit of countershaft rear bearing on shaft	0.0002L to 0.0007T	None
2 and 3	Fit of countershaft front bearing on shaft	0.0005L to 0.0015L	None

FRAME 6

NOTE

Readings must be within limits given in table 7-7. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure fit of input gear bearing (1) in transmission case (2).
2. Measure fit of countershaft rear bearing (3) in transmission case (2).
3. Measure fit of countershaft front bearing (4) in transmission case (2).

GO TO FRAME 7

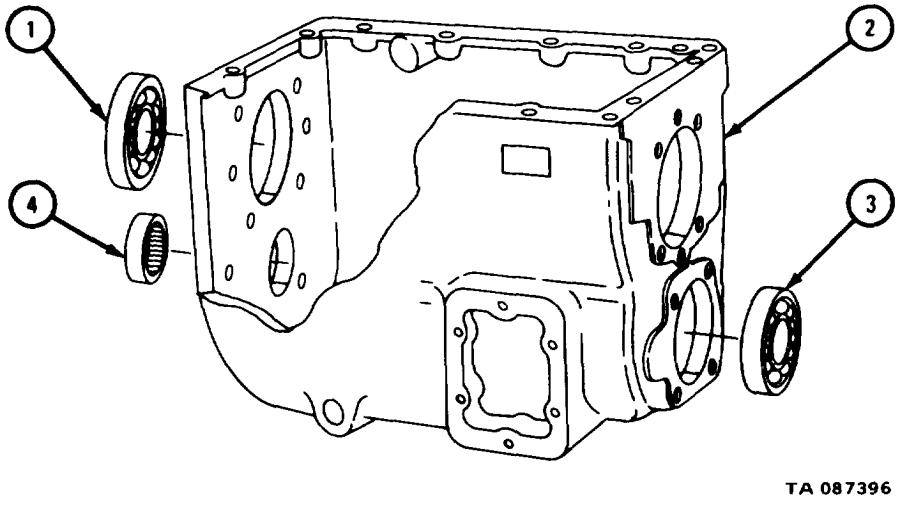


Table 7-7. Transmission Bearing to Case Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limits (inches)
1 and 2	Fit of input gear bearing in transmission case	0.000 to 0.002L	None
2 and 3	Fit of rear bearing in transmission case	0.0016 to 0.000T	None
2 and 4	Fit of front bearing in transmission case	0.0018L to 0.000T	None

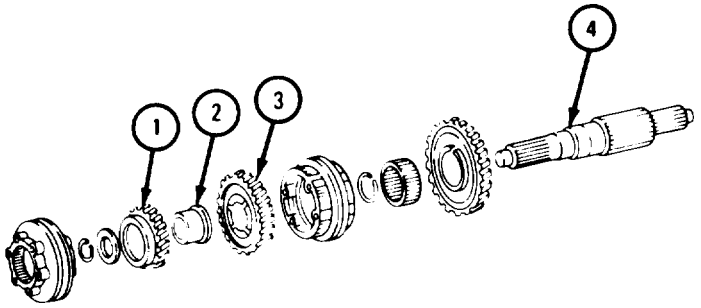
FRAME 7

NOTE

Readings must be within limits given in table 7-8. The letter L shows a loose fit. If readings are not within given limits, throw away part and get a new one.

1. Measure inside diameter of fourth speed gear (1).
2. Measure outside diameter of fourth speed gear sleeve (2).
3. Measure fit of fourth speed gear (1) and sleeve (2).
4. Measure inside diameter of third speed gear (3).
5. Measure outside diameter of main shaft (4).

GO TO FRAME 8



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087397

Table 7-8. Transmission Third and Fourth Speed Gear Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit: (inches)
1	Fourth speed gear inside diameter	2.7535 to 2.7540	None
2	Gear sleeve outside diameter	2.7490 to 2.7495	None
1 and 2	Fit of fourth speed and sleeve	0.004L to 0.005L	None
3	Third speed gear inside diameter	2.6250 to 2.6255	None
4	Main shaft outside diameter	2.6210 to 2.6215	None
3 and 4	Fit of third speed gear and main shaft	0.0035L to 0.0045L	None

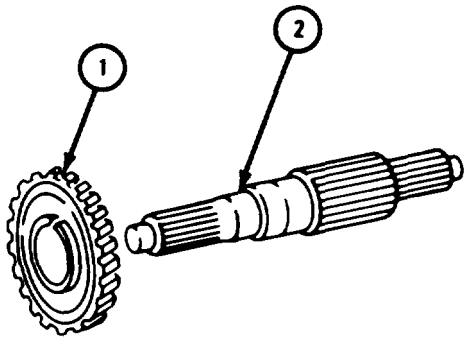
FRAME 8

NOTE

Readings must be within limits given in table 7-9. The letter L shows a loose fit. If readings are not within given limits, throw away part and get a new one.

1. Measure inside diameter of second speed gear (1).
2. Measure outside diameter of main shaft (2).
3. Measure fit of second speed gear (1) on main shaft (2).

GO TO FRAME 9



TA 087398

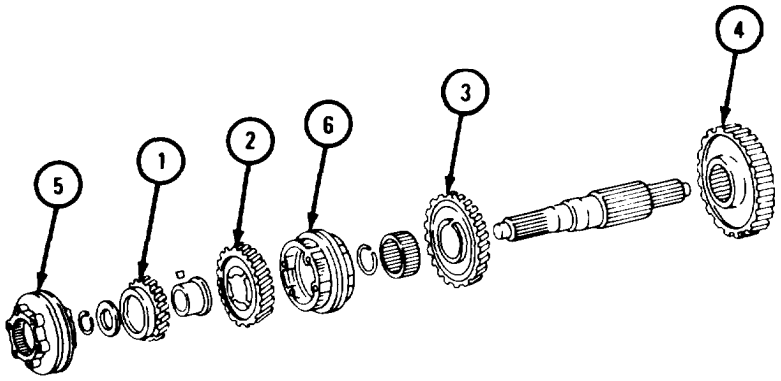
Table 7-9. Transmission Second Gear to Main Shaft Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Second speed gear inside diameter	2.8725 to 2.8730	None
2	Main shaft outside diameter	2.8725 to 2.8730	None
1 and 2	Fit of second speed gear on main shaft	0.0035L to 0.0045L	None

FRAME 9

1. Check that teeth on gears (1 through 4) are not twisted, nicked, burred, worn or broken. Take off raised metal with a honing stone. If more repair is needed, get a new gear.
2. Check that synchronizers (5 and 6) have no nicks, scratches or wear. If damaged, get a new part.
3. Check that splines in bores of synchronizers (5 and 6) are not damaged. If splines are damaged, get a new synchronizer.

GO TO FRAME 10



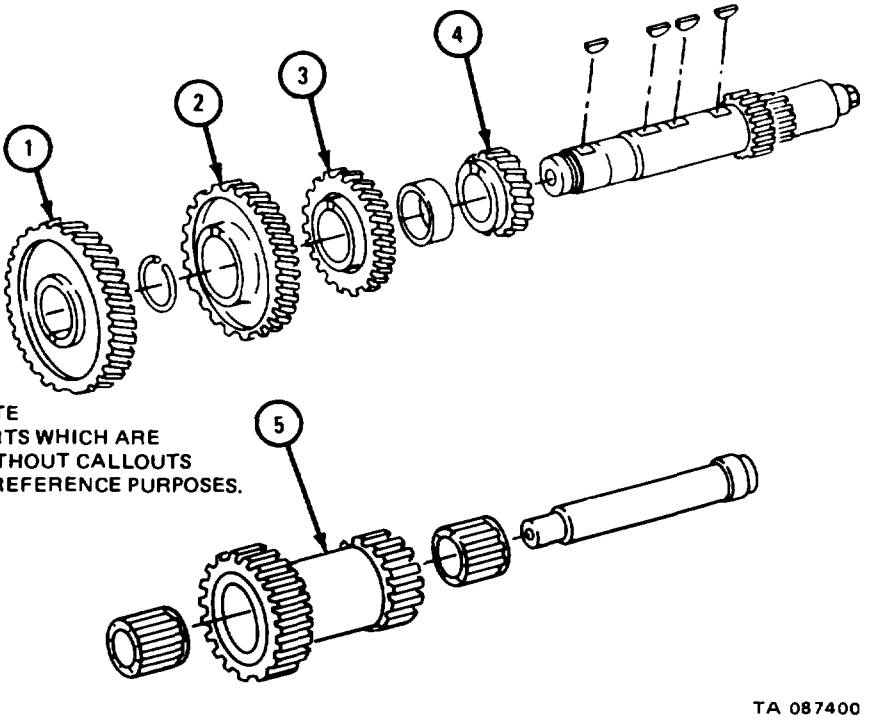
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087399

FRAME 10

1. Check that teeth on gears (1 through 5) are not twisted, nicked, burred, chipped, cracked, worn or broken. Take off raised metal with a honing stone. If more repair is needed, get a new gear.

GO TO FRAME 11



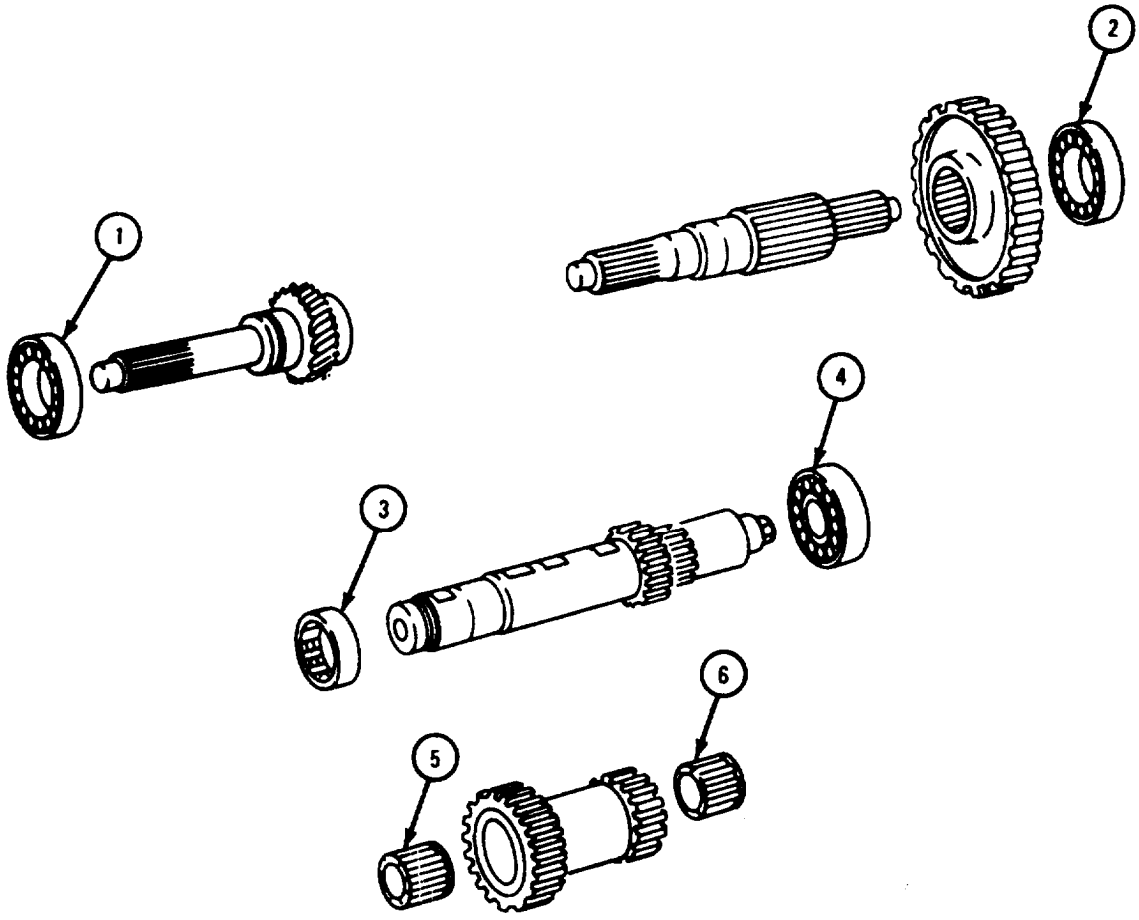
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087400

FRAME 11

1. Put a coat of clean engine lubricating oil on bearings (1 through 6).
2. Turn bearings slowly. Ball bearings must turn freely and smoothly.
3. Check that bearings (1 through 6) are not pitted, chipped, scored, rough or worn. If bearings are damaged, get new ones.

GO TO FRAME 12



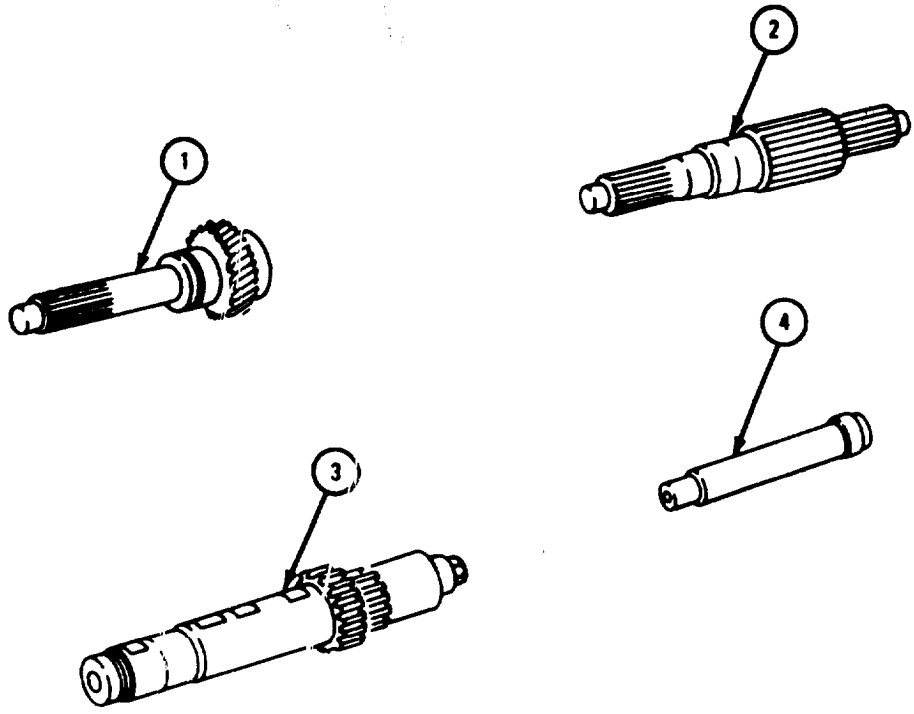
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087401

FRAME 12

1. Check that shafts (1 through 4) are not cracked, pitted, scored, worn or broken. Check that splines are not twisted or worn.
2. Check that shafts (1 through 4) have not been crossthreaded. If shaft is damaged, get a new one.

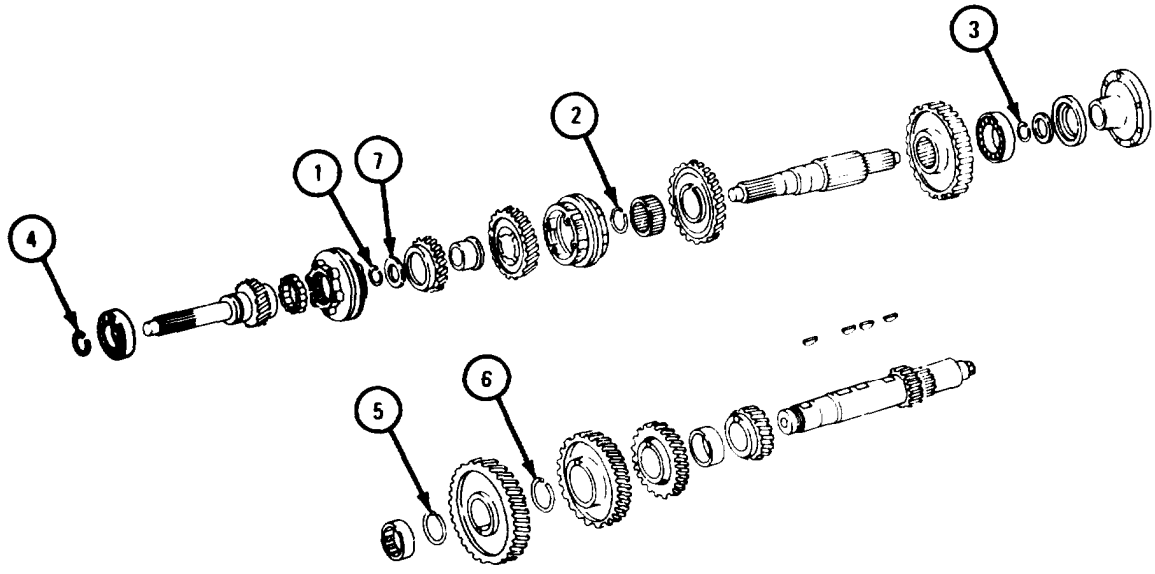
GO TO FRAME 13



FRAME 13

1. Check that snaprings (1 through 6) are not damaged. If snaprings are damaged, get new ones.
2. Check that thickness of thrust washer (7) is between 0.151 and 0.153 inch. If washer is not within given limits, get a new one.

GO TO FRAME 14



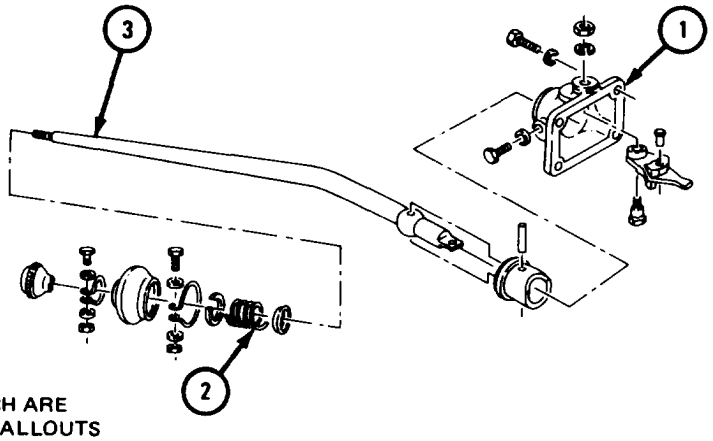
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087403

FRAME 14

1. Check that mounting flange of shifter housing cover (1) is not cracked, nicked, burred or scratched. Smooth with crocus cloth or honing stone. If more repair is needed, get a new housing cover.
2. Check that tapped holes in cover (1) are not stripped or crossthreaded. Chase damaged threads with right size tap.
3. Check that spring (2) is not bent or broken. If spring is damaged, get a new one.
4. Check that free length of spring (2) is 1 23/64 inches. Check that spring measures 31/32 inch under pressure of 21 to 25 pounds. If spring is not within given limits, get a new one.
5. Check that shifter lever (3) is not bent or cracked. Straighten lever if bent. If lever is cracked or broken, get a new shifter lever.

GO TO FRAME 15



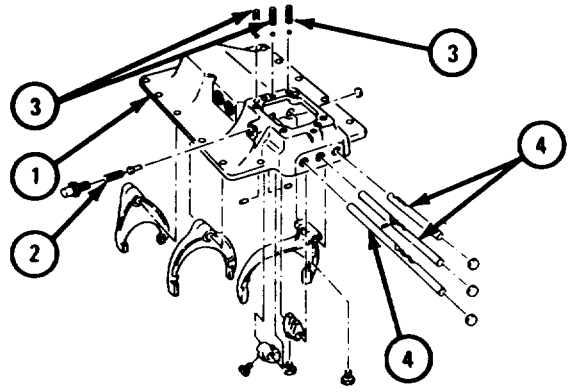
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087404

FRAME 15

1. Check that mounting flanges of shifter housing (1) are not nicked, burred or scratched. Smooth with crocus cloth or honing stone. If more repair is needed, get a new housing.
2. Check that tapped holes in housing (1) are not stripped or crossthreaded. Chase damaged threads with correct size tap.
3. Check that springs (2 and 3) are not broken or twisted. If springs are damaged, get new ones.
4. Check that free length of spring (2) is 2 1/32 inches. Check that spring measures 1 5/8 inches under pressure of 56 to 64 pounds. If spring is not within given limits, get a new one.
5. Check that three shafts (4) are not cracked or bent. If shafts are damaged get new ones.

GO TO FRAME 16



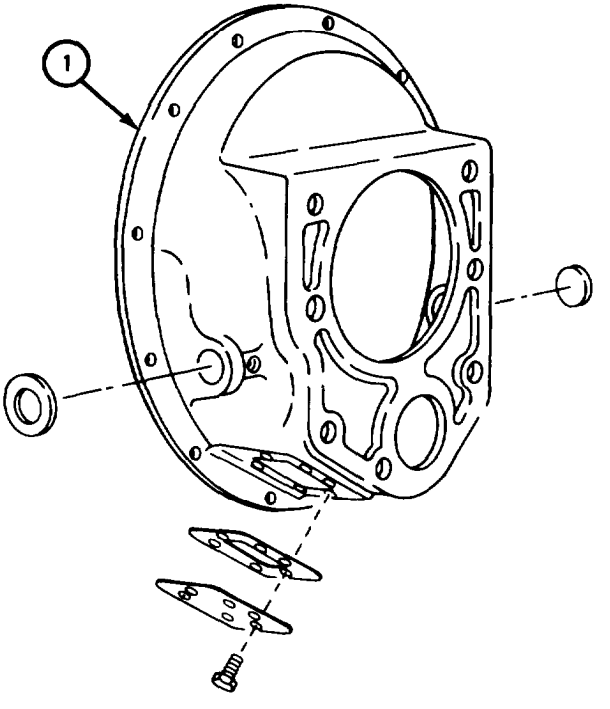
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087405

FRAME 16

1. Check that mounting flanges of clutch housing (1) are not nicked, burred or scratched. If flanges are damaged, get a new housing.
2. Check that tapped holes in housing (1) are not stripped or crossthreaded. If threads are damaged, chase threads with right size tap.

GO TO FRAME 17



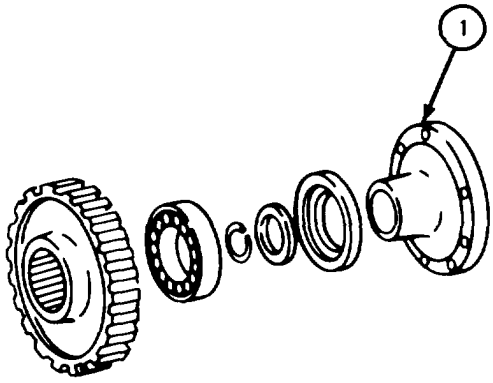
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087406

FRAME 17

1. Check that groove made by oil seal on companion flange (1) is not deeper than 0.003 inch. If worn beyond given limit, get a new companion flange.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087407

g. Assembly of Transmission Subassemblies.

(1) Clutch housing and transmission case.

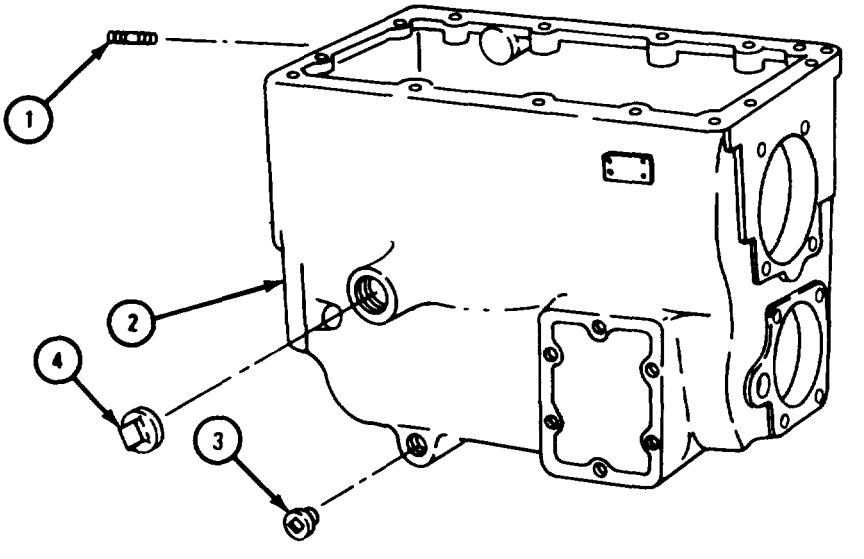
FRAME 1

NOTE

Replace only damaged studs.

1. Put five studs (1) into transmission case (2).
2. Put in drain hole plug (3).
3. Put in filler hole plug (4).

GO TO FRAME 2

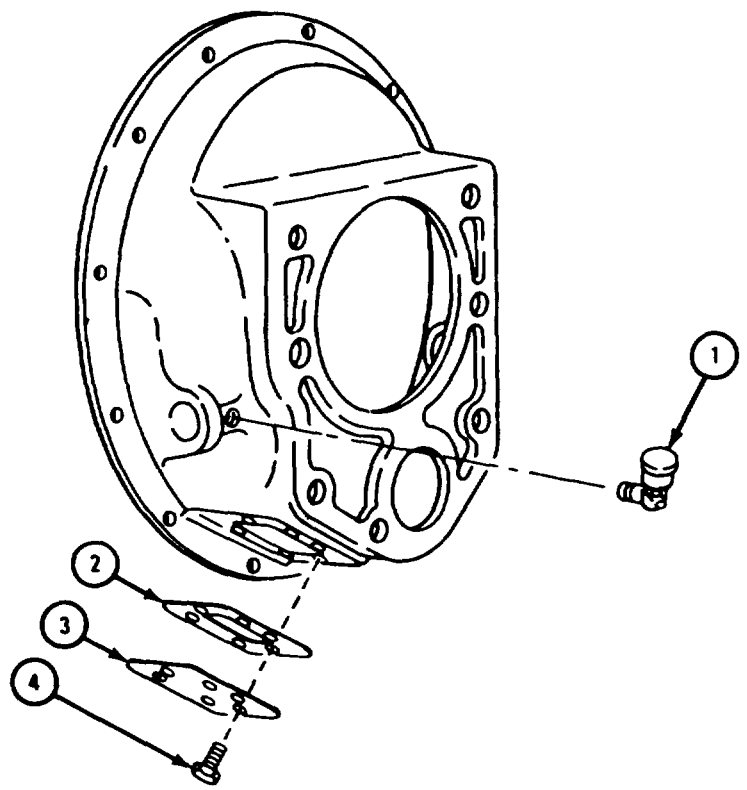


TA 087408

FRAME 2

1. Put in two grease cup assemblies (1).
2. Put inspection hole cover gasket (2) and inspection hole cover (3) in place.
3. Put in six lockscrews (4).

END OF TASK



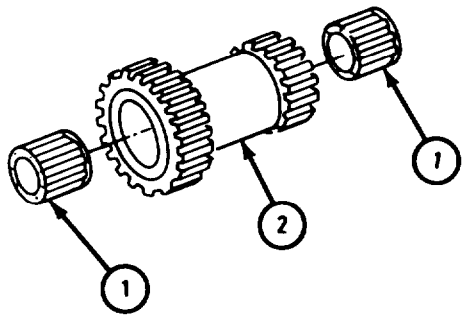
TA 087409

(2) Transmission gears and shafts.

FRAME 1

1. Slide two bearings (1) into bore of reverse idler gear (2).
2. Cover reverse idler gear (2) with a clean rag.

GO TO FRAME 2

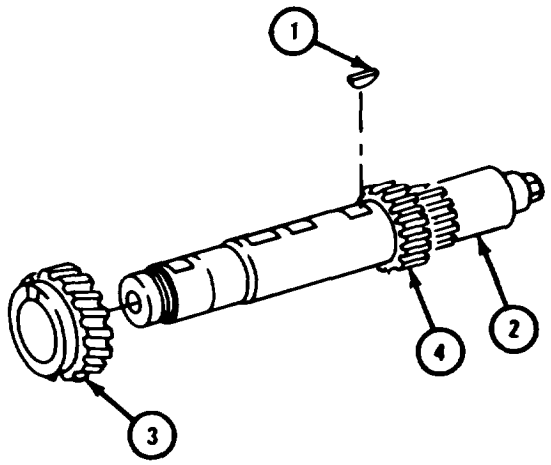


TA 087410

FRAME 2

1. Put woodruff key (1) in keyway in countershaft (2).
2. Coat counter shaft (2) and bore of countershaft second speed gear (3) with white lead pigment.
3. Slide second speed gear (3) on countershaft (2) with long side of hub facing away from fixed gear (4). Aline keyway in second speed gear with woodruff key (1).
4. Press second speed gear (3) flush against fixed gear (4).

GO TO FRAME 3

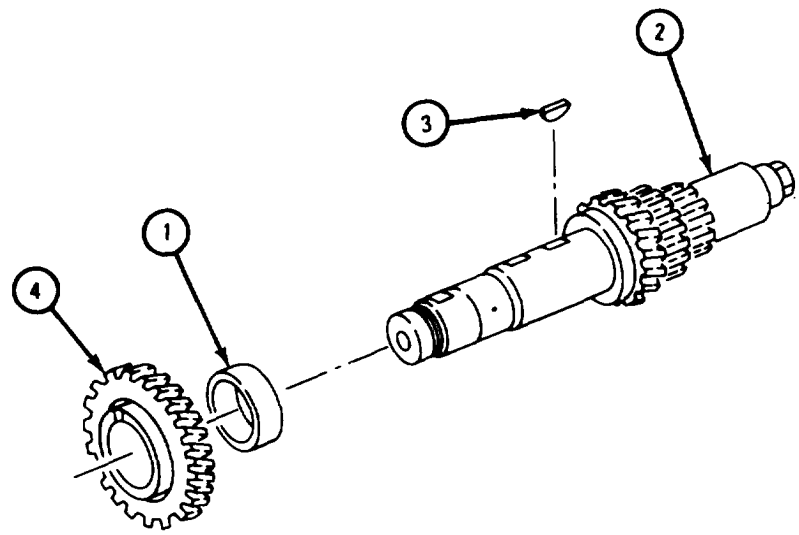


TA 087411

FRAME 3

1. Slide spacer (1) onto countershaft (2).
2. Put woodruff key (3) in keyway in countershaft (2).
3. Coat countershaft (2) and bore of countershaft third speed gear (4) with white lead pigment.
4. Slide third speed gear (4) on countershaft (2) with long side of hub facing away from spacer (1). Aline keyway in gear with woodruff key (3).
5. Press third speed gear (4) flush against spacer (1).

GO TO FRAME 4

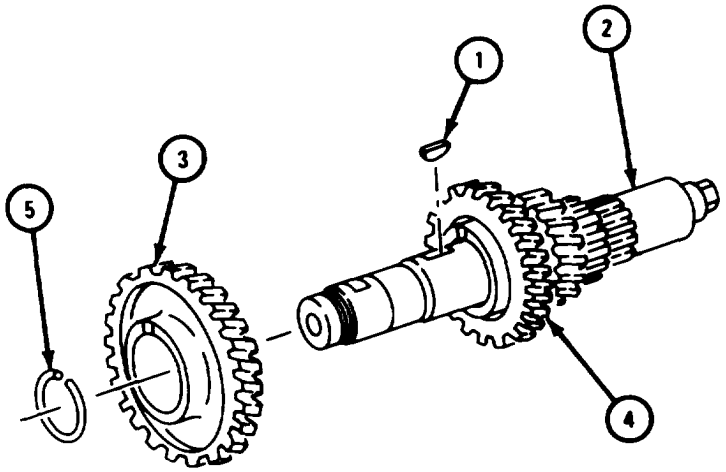


TA 087412

FRAME 4

1. Put woodruff key (1) in keyway in countershaft (2).
2. Coat countershaft (2) and bore of countershaft fourth speed gear (3) with white lead pigment.
3. Slide fourth speed gear (3) on countershaft (2) with long side of hub facing away from third speed gear (4). Aline keyway in fourth speed gear with woodruff key (1).
4. Press fourth speed gear (3) flush against third speed gear (4).
5. Put snapring (5) in place.

GO TO FRAME 5

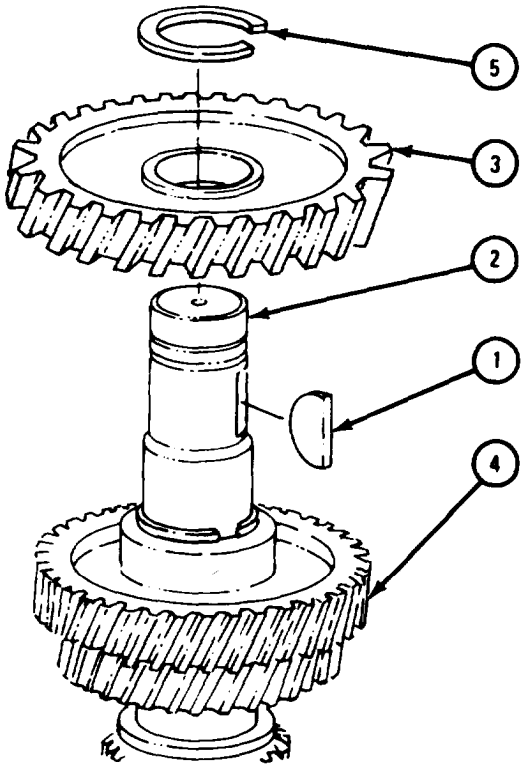


TA 087413

FRAME 5

1. Put woodruff key (1) in keyway in countershaft (2).
2. Coat countershaft (2) and bore of countershaft drive gear (3) with white lead pigment.
3. Slide drive gear (3) onto countershaft (2) with long side of hub facing toward fourth speed gear (4). Aline keyway in drive gear with woodruff key (1).
4. Press drive gear (3) flush against shoulder of countershaft (2).
5. Put snapring (5) in place. Make sure that snapring is seated in groove of countershaft (2).
6. Cover countershaft assembly with a clean rag.

GO TO FRAME 6

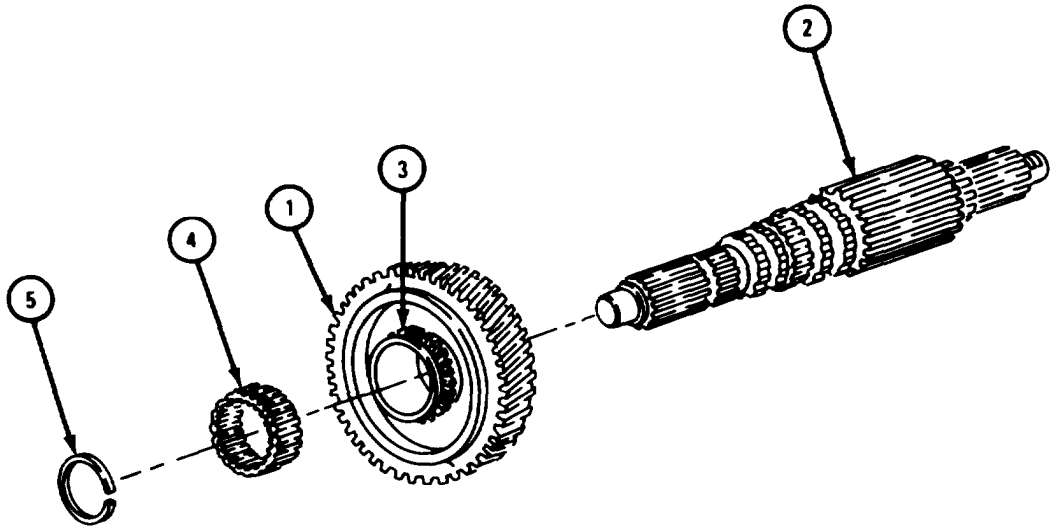


TA 087414

FRAME 6

1. Slide second speed gear (1) onto main shaft (2) with synchronizer cone (3) toward front of main shaft.
2. Slide on second and third speed clutch gear (4).
3. Put snapring (5) in groove in main shaft (2).

GO TO FRAME 7

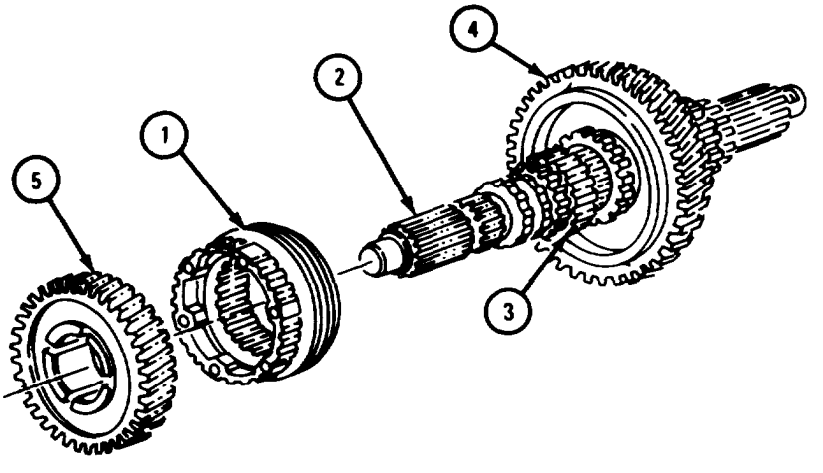


TA 087415

FRAME 7

1. Slide second and third speed gear synchronizer (1) onto main shaft (2) and into place over second and third speed clutch gear (3). Make sure front side of synchronizer faces away from second speed gear (4).
2. Slide third speed gear (5) onto main shaft (2) with internal synchronizer cone facing toward rear of main shaft (2).

GO TO FRAME 8

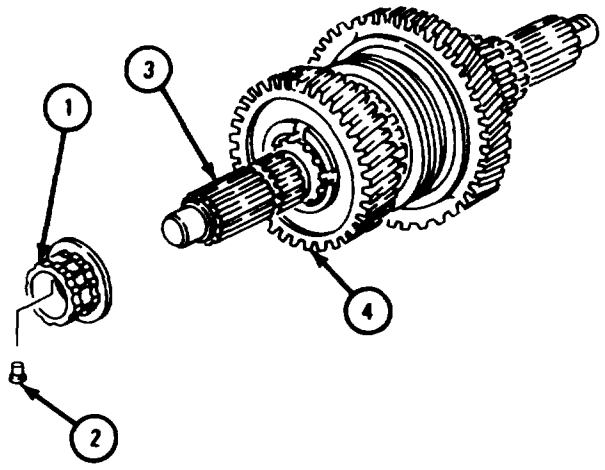


TA 087416

FRAME 8

1. Coat bore of fourth speed gear sleeve (1) with white lead pigment.
2. Put pin (2) in fourth speed gear sleeve (1).
3. Press sleeve (1) into position on main shaft (3) with flange facing toward third speed gear (4).

GO TO FRAME 9

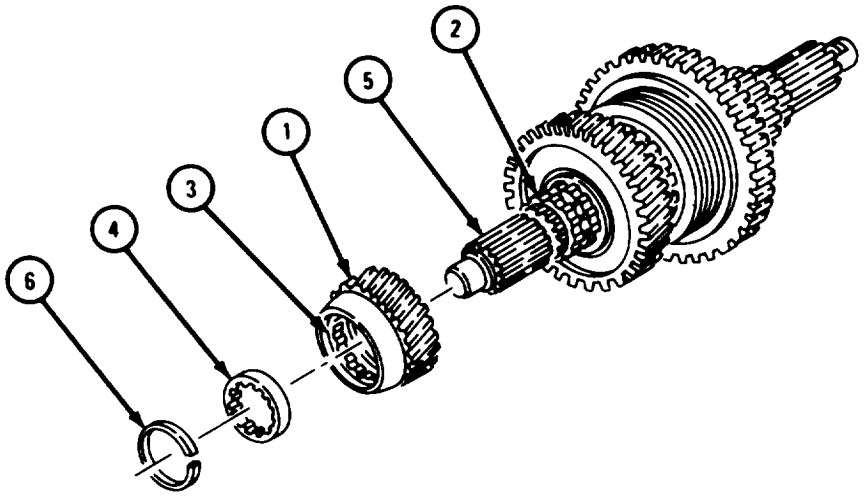


TA 087417

FRAME 9

1. Slide fourth speed gear (1) into position over fourth gear sleeve (2). Synchronizer internal cone (3) must face forward.
2. Slide thrust washer (4) onto main shaft (5) flush against fourth gear sleeve (2).
3. Put snapring (6) into place.
4. Cover main shaft assembly with a clean cloth.

END OF TASK



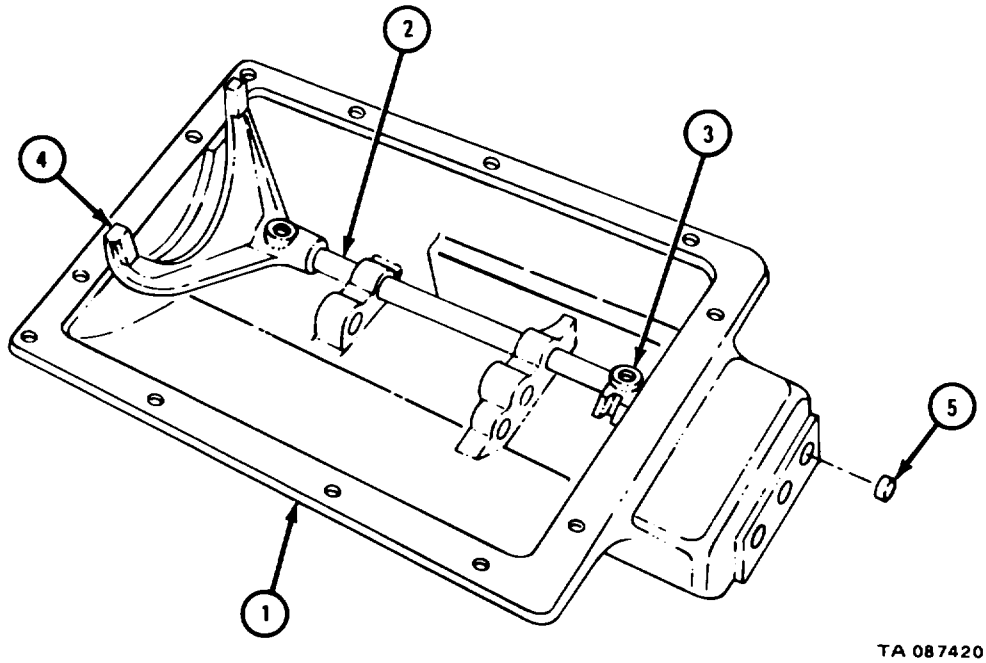
TA 087418

(3) Shifter housing assembly.

FRAME 1

1. Place shifter housing (1) upside down on workbench.
2. Using lightweight hammer, tap first and reverse speed shifter shaft (2) partway through bore of shifter housing (1).
3. Put first and reverse speed shifter shaft bracket (3) and shifter fork (4) on shifter shaft (2).
4. Using lightweight hammer and punch, drive shifter shaft (2) into place in shifter housing (1).
5. Tap expansion plug (5) into place.

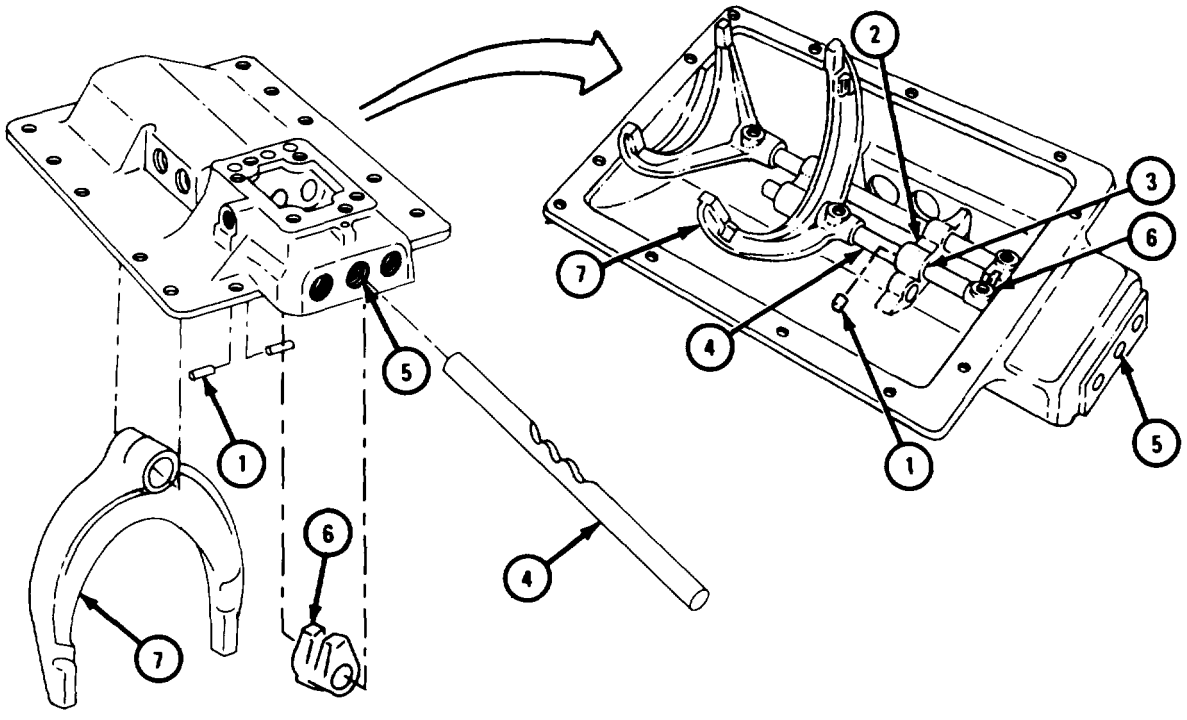
GO TO FRAME 2



FRAME 2

1. Push interlock pin (1) into shifter shaft support (2) past hole (3).
2. Tap second and third speed shifter shaft (4) half way through hole in shifter shaft housing (5).
3. Put second and third speed shifter bracket (6) on end of shifter shaft (4). Tap shifter shaft through shifter shaft support hole (3).
4. Put second and third speed shifter fork (7) on end of shifter shaft (4).

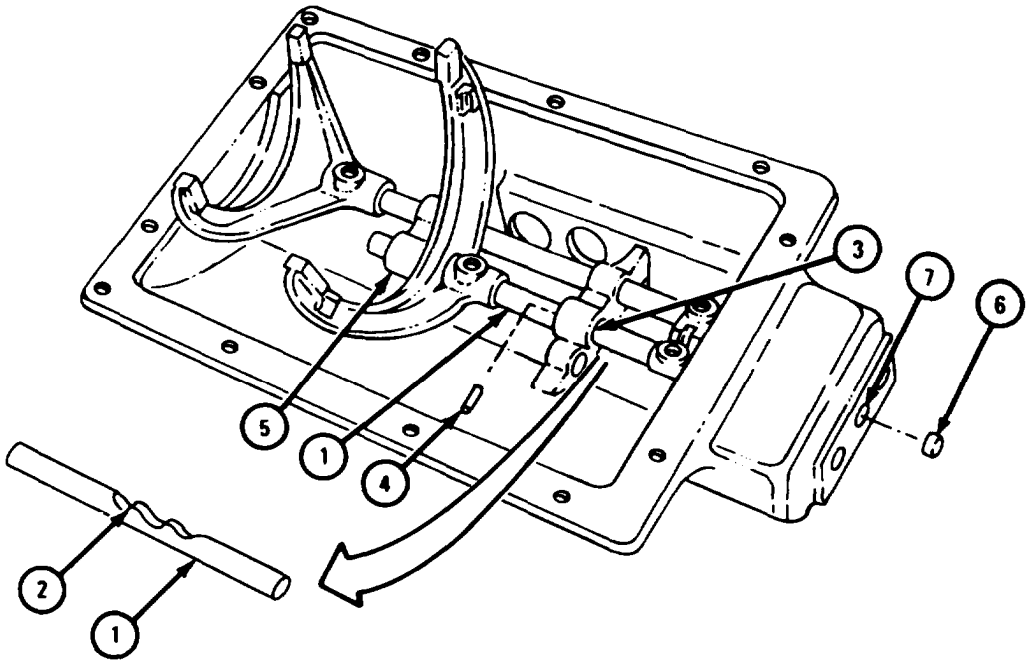
GO TO FRAME 3



FRAME 3

1. Tap shifter shaft (1) until edge of interlock detent notch (2) is even with shifter shaft support hole (3).
2. Put interlock pin (4) in hole in shifter shaft interlock detent notch (2).
3. Tap shifter shaft (1) into place through rear shifter shaft support (5).
4. Tap expansion plug (6) into place in hole (7).

GO TO FRAME 4

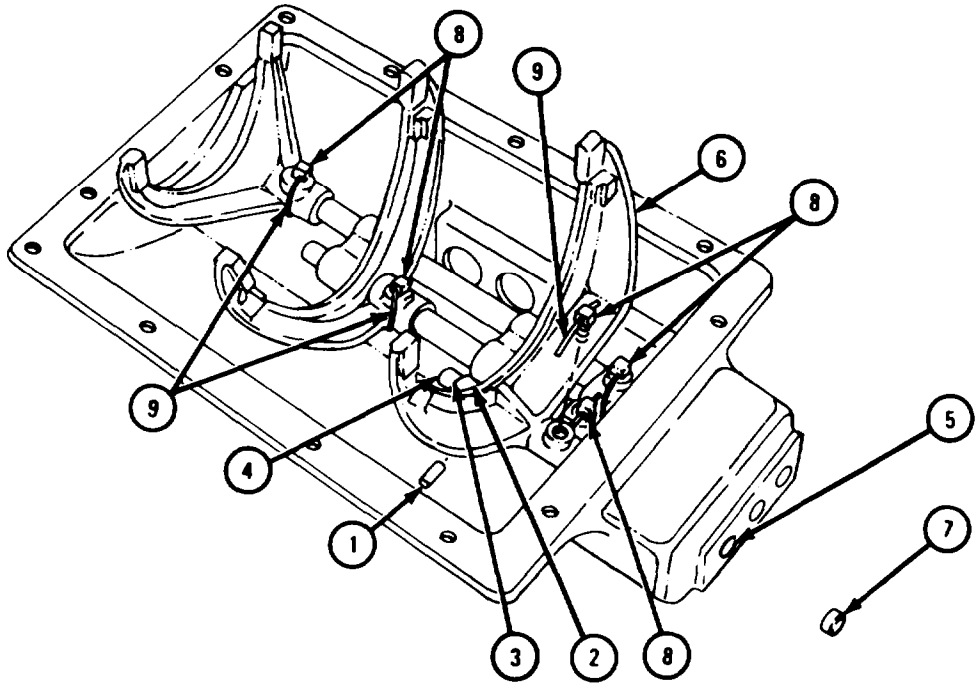


TA 087383

FRAME 4

1. Put interlock pin (1) into shifter shaft support (2) past hole (3).
2. Tap fourth and fifth speed shifter shaft (4) halfway through hole (5) in housing.
3. Put fourth and fifth speed shifter fork (6) on end of shifter shaft (4).
4. Tap shifter shaft (4) past shifter shaft support (2).
5. Put on expansion plug (7).
6. Put in five setscrews (8).
7. Put safety wire (9) on five setscrews (8).

GO TO FRAME 5

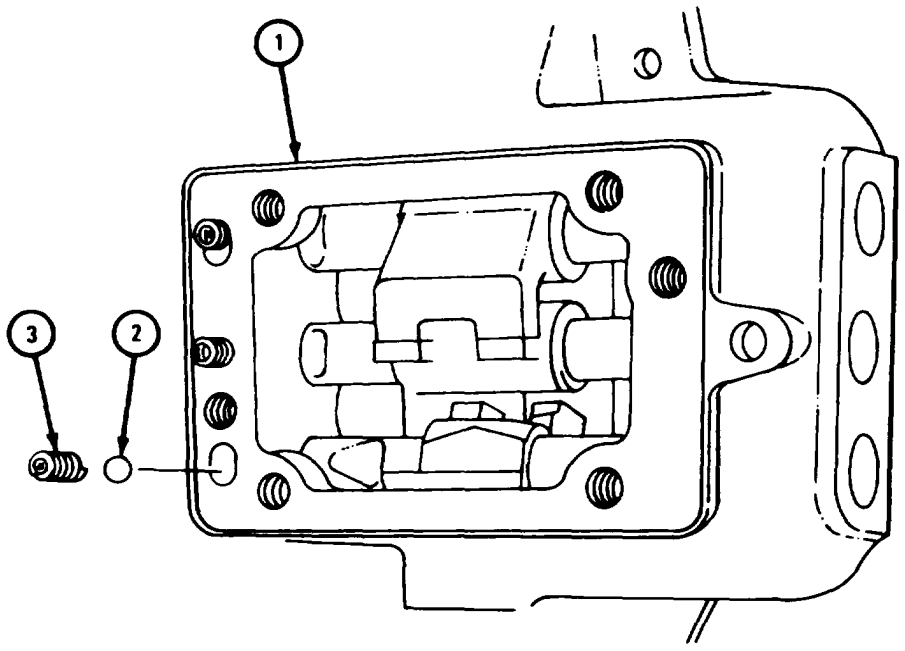


TA 087422

FRAME 5

1. Turn shifter housing (1) on one side as shown.
2. Put in three poppet balls (2) and poppet ball springs (3).

GO TO FRAME 6

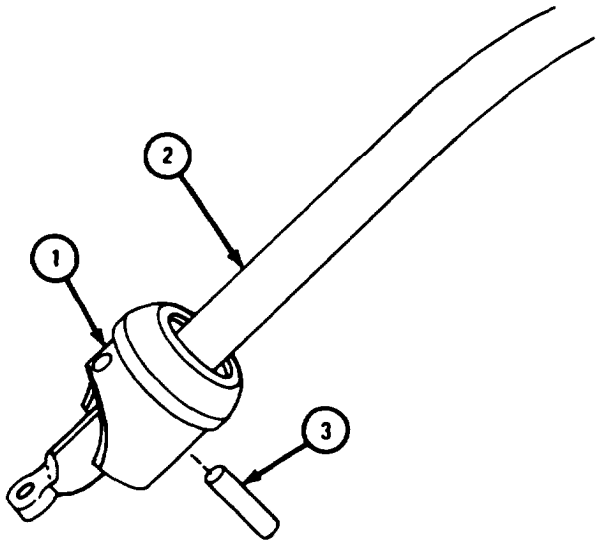


TA 102213

FRAME 6

1. Join shift lever retainer (1) and shift lever (2) as shown.
2. Using a light weight hammer, tap in pivot pin (3).

GO TO FRAME 7

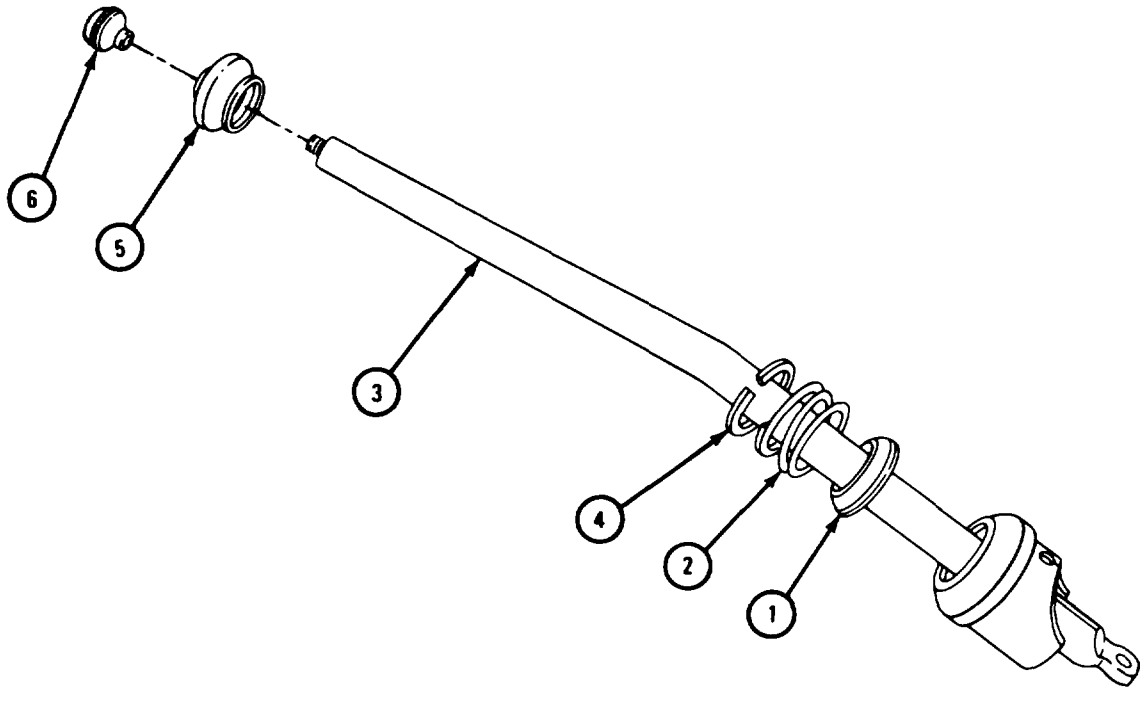


TA 102214

FRAME 7

1. Slide spring cup (1) and spring (2) on shift lever (3).
2. Put on snapring (4).
3, Put on grommet (5).
4. Put on knob (6).

GO TO FRAME 8

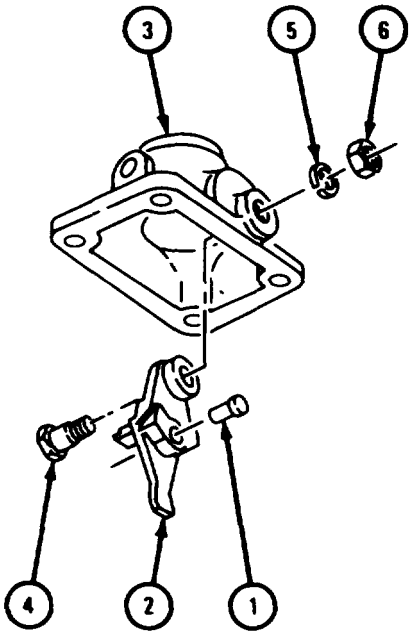


TA 102215

FRAME 8

1. Put shift lever finger plunger (1) on shift lever finger (2).
2. Put shift lever finger (2) in shifter housing cover assembly (3).
3. Put on bolt (4), lockwasher (5), and nut (6).

GO TO FRAME 9

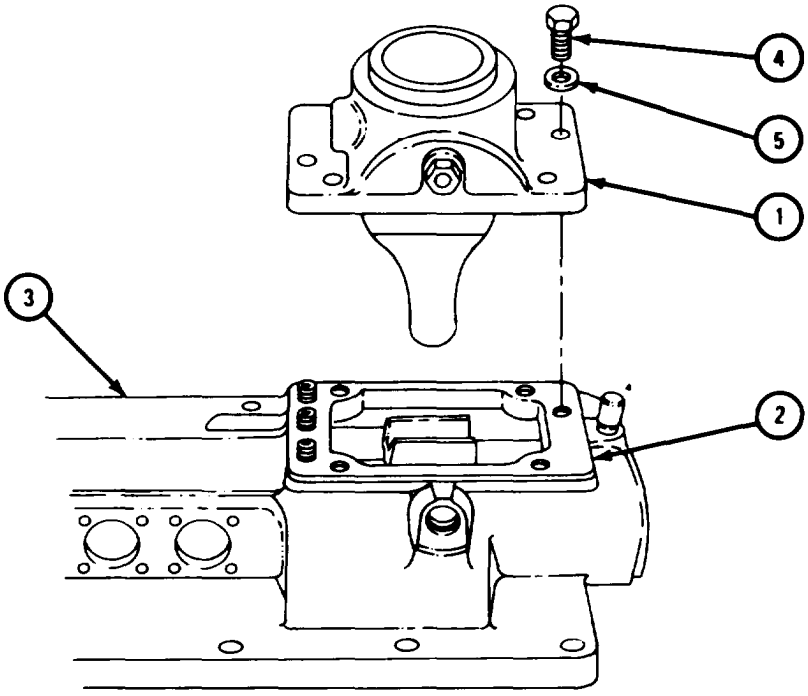


TA 102216

FRAME 9

1. Put shifter housing cover assembly (1) and housing cover gasket (2) on shifter housing assembly (3).
2. Put on six screws (4) and lockwashers (5).

GO TO FRAME 10

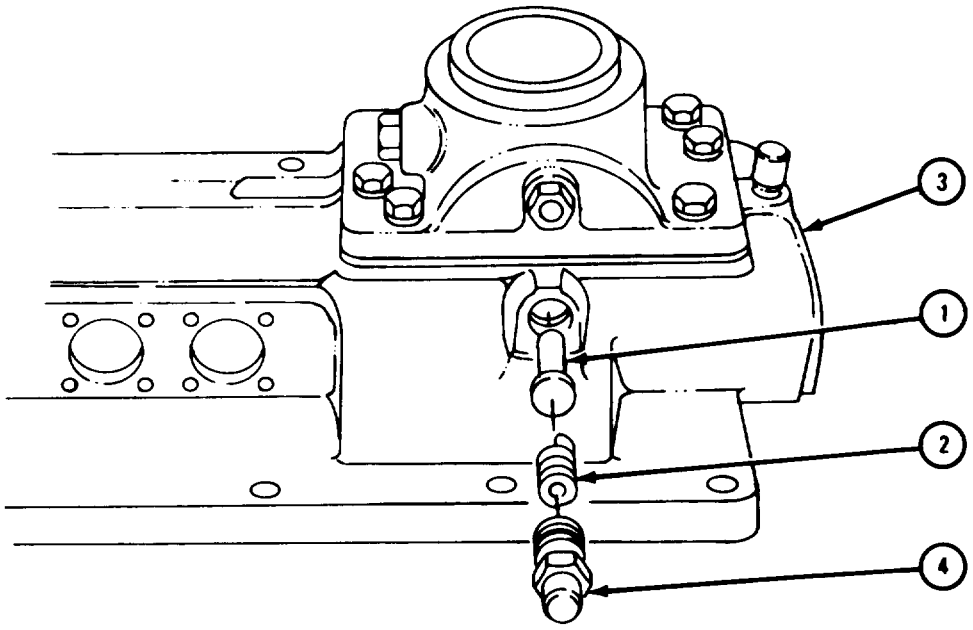


TA 102217

FRAME 10

1. Put finger plunger (1) and spring (2) into shifter housing (3).
2. Put on retainer (4).

END OF TASK



TA 102218

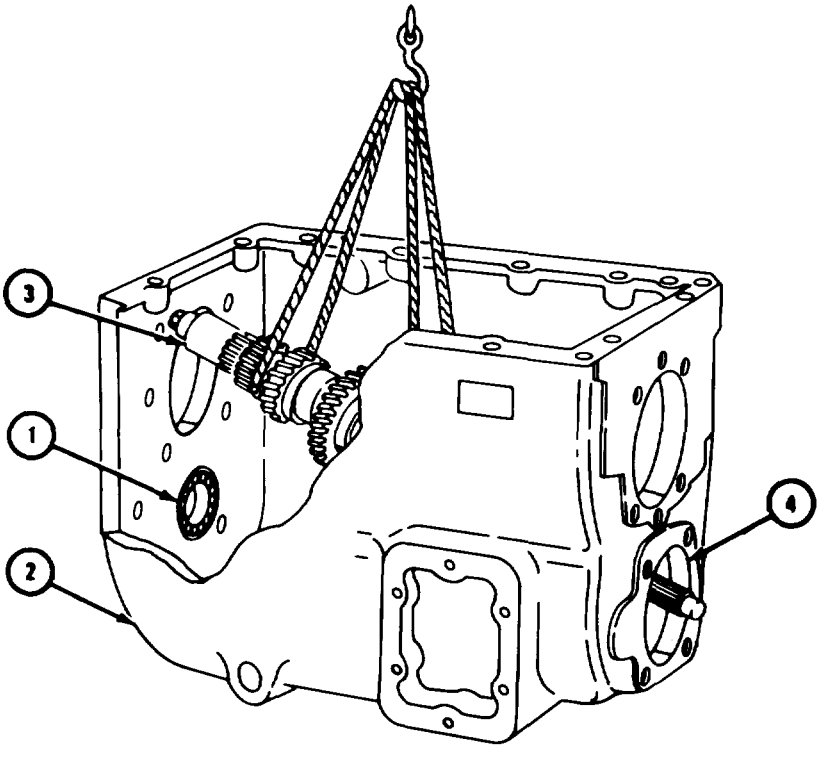
h. Assembly of Subassemblies into Transmission.

(1) Gears and shafts.

FRAME 1

1. Press front bearing (1) into transmission case (2).
2. Using hoist and rope sling, put countershaft assembly (3) into transmission case (2).
3. Lower rear end of countershaft assembly (3) through rear bearing bore (4) of transmission case (2).
4. Slide countershaft assembly (3) forward into front bearing (1).
5. Take off hoist and rope sling.

GO TO FRAME 2

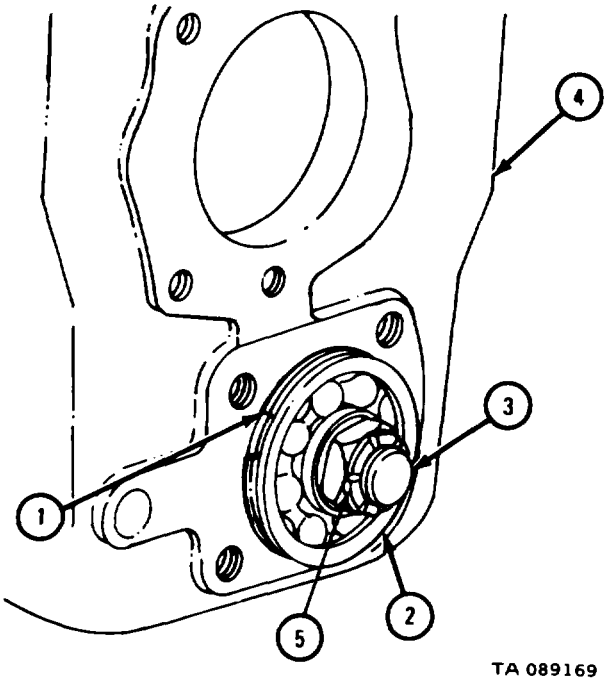


TA 089168

FRAME 2

1. Put snapring (1) in place on rear bearing (2).
2. Using bearing replacer, put rear bearing (2) on countershaft (3) and into bore of transmission case (4).
3. Put on slotted nut (5) against bearing (2).
4. Check that countershaft (3) turns freely.

GO TO FRAME 3

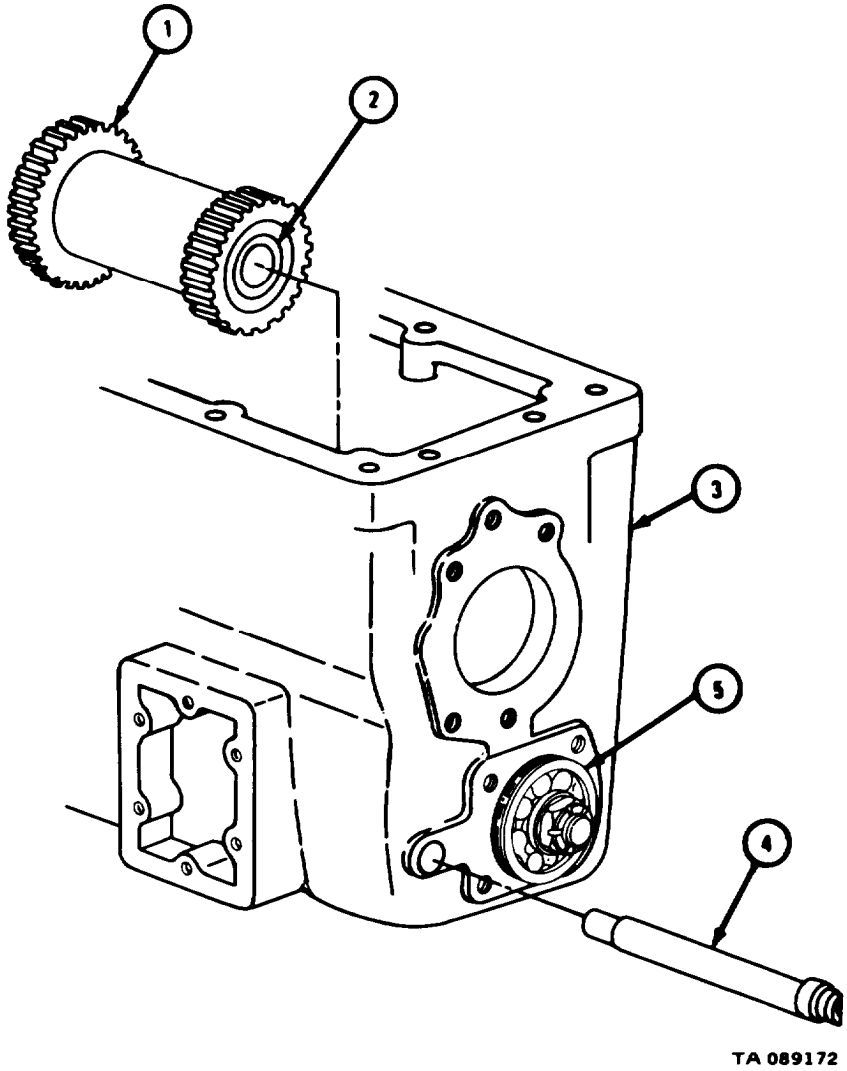


TA 089169

FRAME 3

1. Put reverse idler gear (1) with two roller bearings (2) into transmission case (3). Larger gear must face towards front of transmission case and mesh with countershaft gears.
2. Slide reverse idler gear shaft (4) through bore in rear of transmission case (3) with flat milled side towards countershaft rear bearing (5).

GO TO FRAME 4

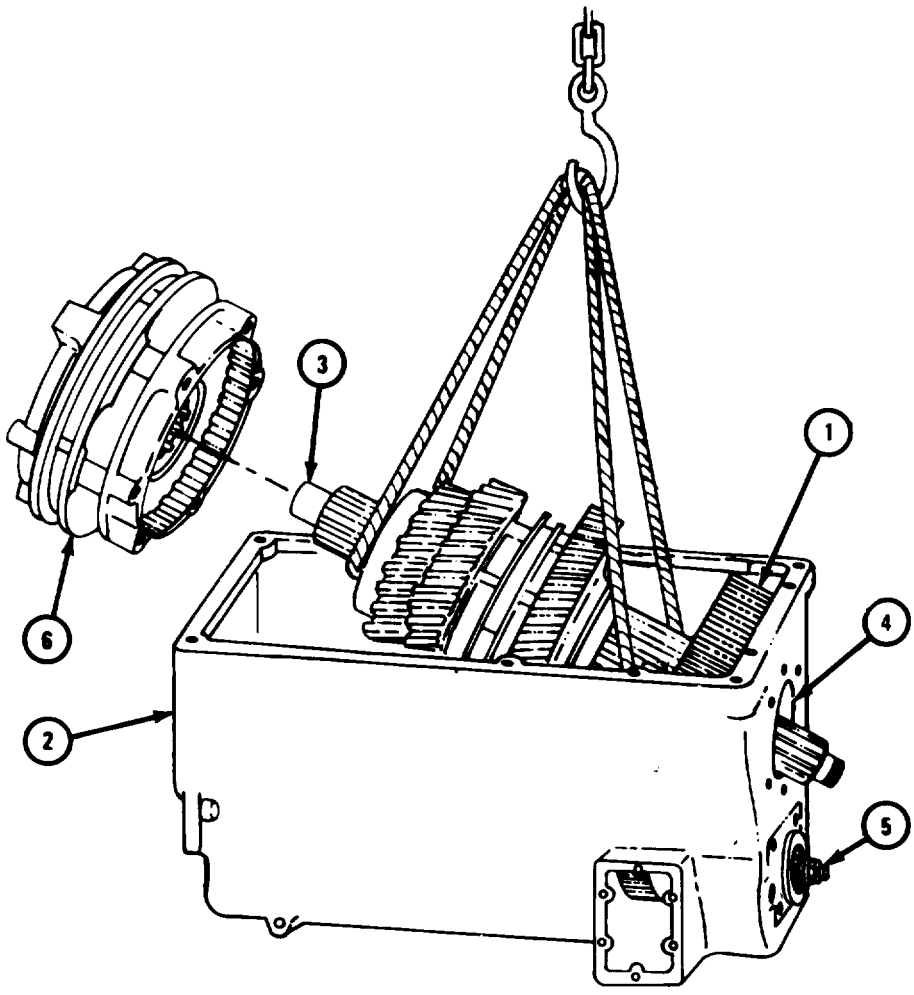


TA 089172

FRAME 4

1. Put first and reverse gear (1) into transmission case (2) as shown.
2. Using hoist and rope sling, lower main shaft assembly (3) into transmission case (2) through first and reverse gear (1) and bearing bore (4).
3. Lower front end of main shaft assembly (3) to mate gears with gears on countershaft assembly (5).
4. Take off hoist and rope sling.
5. Put fourth and fifth speed gear synchronizer (6) onto front end of main shaft assembly (3) with small bronze end facing rear as shown.

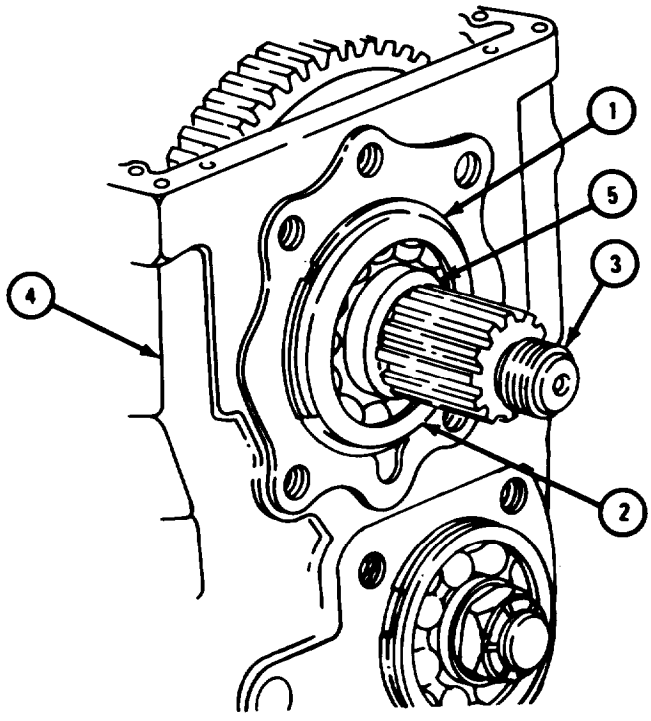
GO TO FRAME 5



FRAME 5

1. Put snapring (1) in place on main shaft rear bearing (2).
2. Slide main shaft rear bearing (2) with snapring (1) onto rear end of main shaft (3).
3. Using bearing replacer, put main shaft rear bearing (2) onto main shaft (3) and into bore of transmission case (4).
4. Slide spacer washers (5) onto main shaft (3).

GO TO FRAME 6

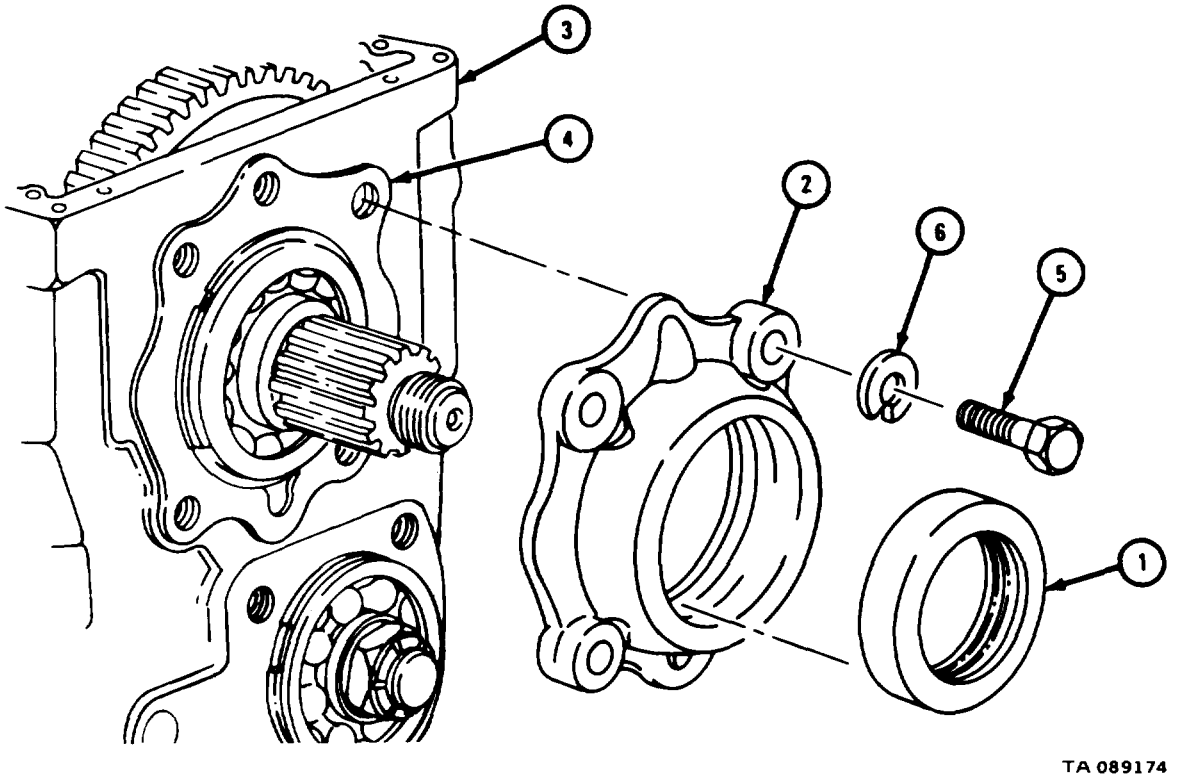


TA 089171

FRAME 6

1. Put hardening sealer on outside of oil seal (1). Pack inside lip of seal with small amount of grease.
2. Drive oil seal (1) into place in rear output shaft cover (2). Lip of oil seal must face transmission case (3).
3. Put rear output shaft cover gasket (4) and cover (2) with oil seal (1) in place on transmission case (3). Aline oil holes in transmission case, gasket, and cover.
4. Put in and tighten four screws (5) and lockwashers (6) to 65 to 75 pound-feet.

GO TO FRAME 7



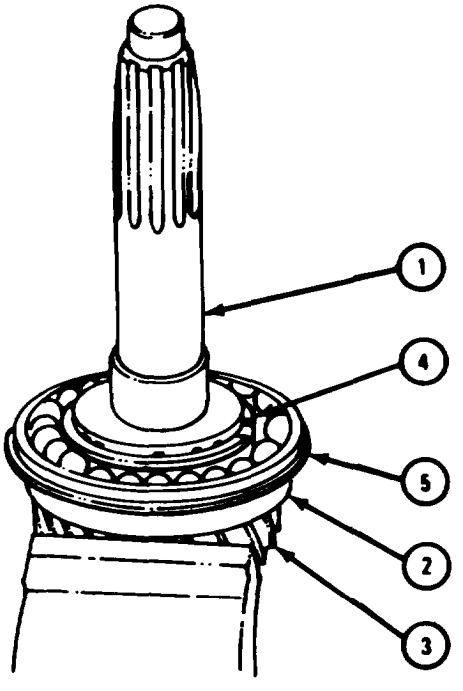
FRAME 7

CAUTION

Be careful not to damage gear teeth when tightening vise.

1. Clamp input shaft (1) in soft-jawed vise as shown.
2. Put bearing (2) on input shaft (1) with closed side of bearing facing gear (3).
3. Put snapring (4) on input shaft (1).
4. Put snapring (5) in place on bearing (2).

GO TO FRAME 8



TA 087419

FRAME 8

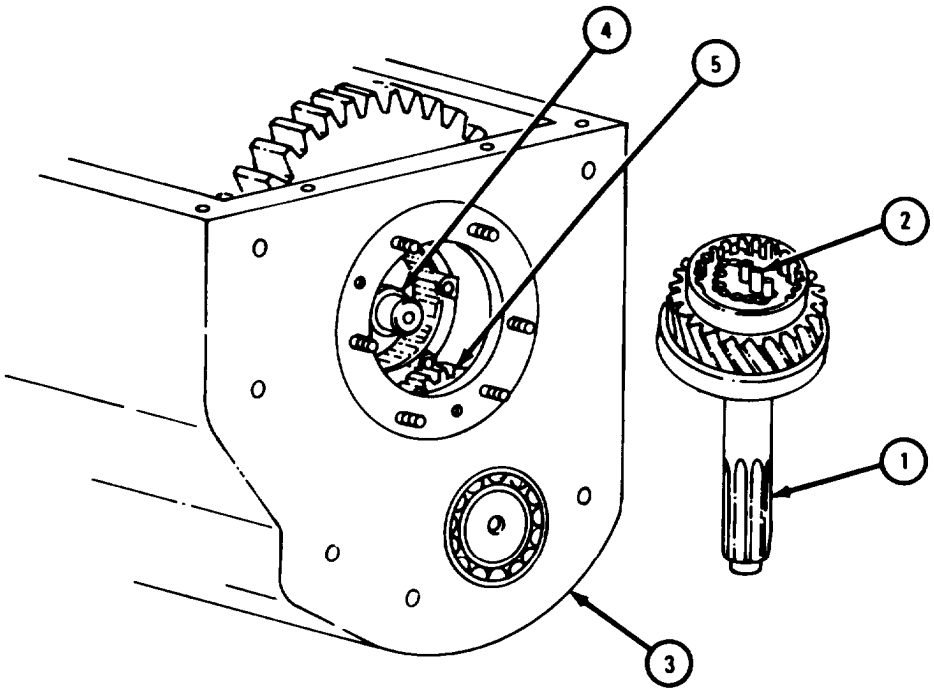
1. Pack grease into pocket of input shaft assembly (1).
2. Put 14 pilot roller bearings (2) into pocket of input shaft (1).

NOTE

Synchronizer shift collar should be in neutral position when putting in input shaft assembly (1).

3. Put input shaft (1) in transmission case (3) and onto main shaft (4). Mate gear on input shaft assembly with countershaft driver gear (5).
4. Turn input shaft assembly (1) to seat pilot roller bearing (2).

GO TO FRAME 9

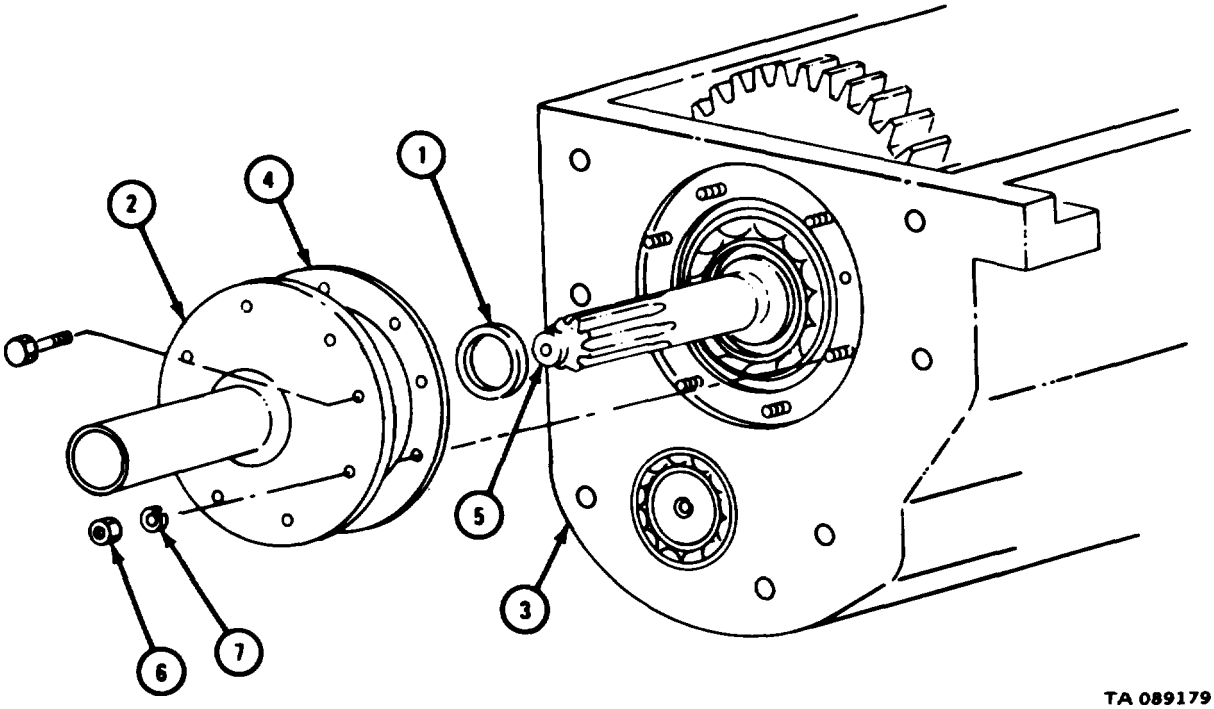


TA 089178

FRAME 9

1. Coat outside of oil seal (1) with hardening sealer. Pack inside of lip with a small amount of grease.
2. Put oil seal (1) in place to input shaft cover (2). Lip of oil seal must face towards transmission case (3) .
3. Put input shaft cover gasket (4) in place.
4. Slide cover (2) with oil seal (1) onto input shaft (5). Using flange replacer, press cover into place.
5. Put in and tighten six nuts (6) and lockwashers (7) to 25 to 30 pound-feet.

GO TO FRAME 10

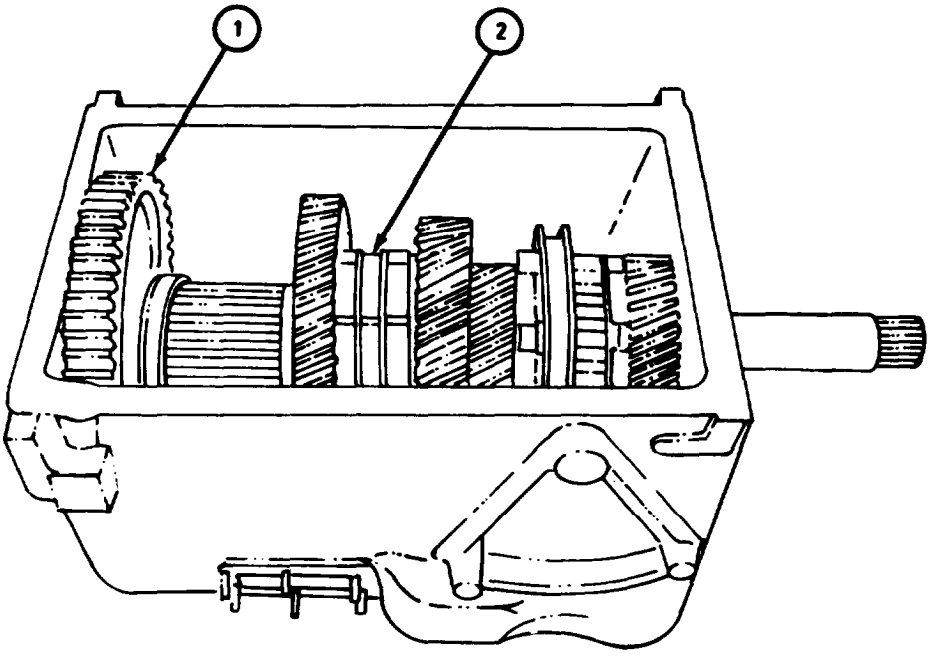


TA 089179

FRAME 10

1. Slide first and reverse speed gear (1) and second and third speed synchronizer (2) into mesh with countershaft gears. This will keep transmission gears and shafts from turning.

GO TO FRAME 11

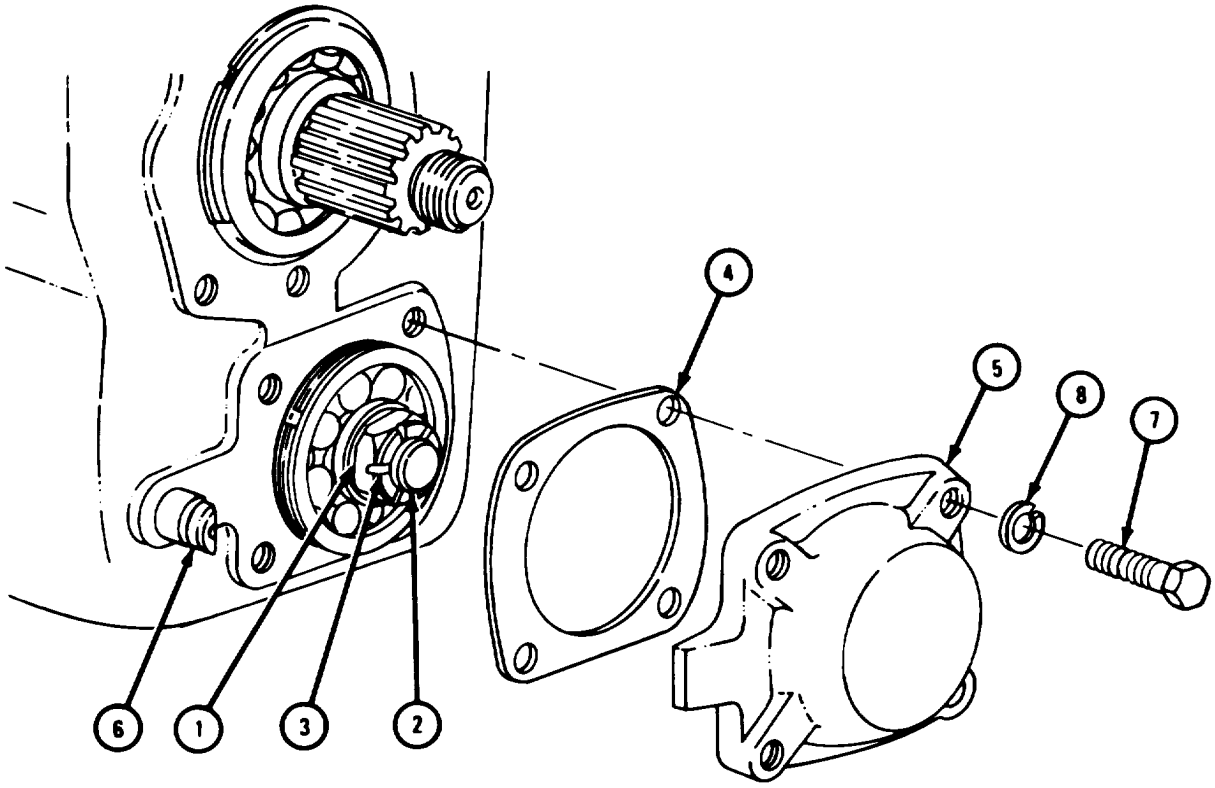


TA 089175

FRAME 11

1. Tighten slotted nut (1) to 400 to 500 pound-feet. If slot in nut does not aline with hole in countershaft (2), tighten nut until it does.
2. Put in cotter pin (3).
3. Put countershaft rear bearing cover gasket (4) and cover (5) in place. Tab of cover must lock against reverse idler gear shaft (6).
4. Put in four screws (7) and lockwashers (8).

GO TO FRAME 12

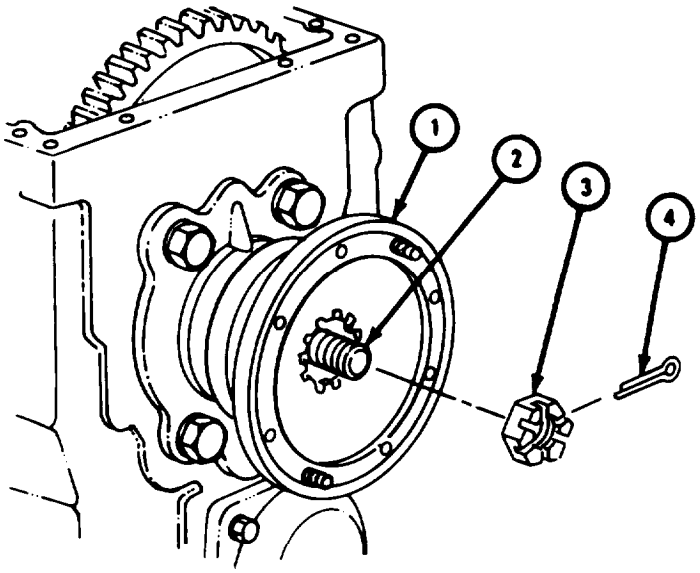


TA 089173

FRAME 12

1. Using flange replacer and wrench, press companion flange (1) onto main shaft (2).
2. Put on and tighten slotted nut (3) to 500 to 550 pound-feet. If slot in nut does not aline with hole in main shaft (2), tighten nut until it does.
3. Put in cotter pin (4).

GO TO FRAME 13

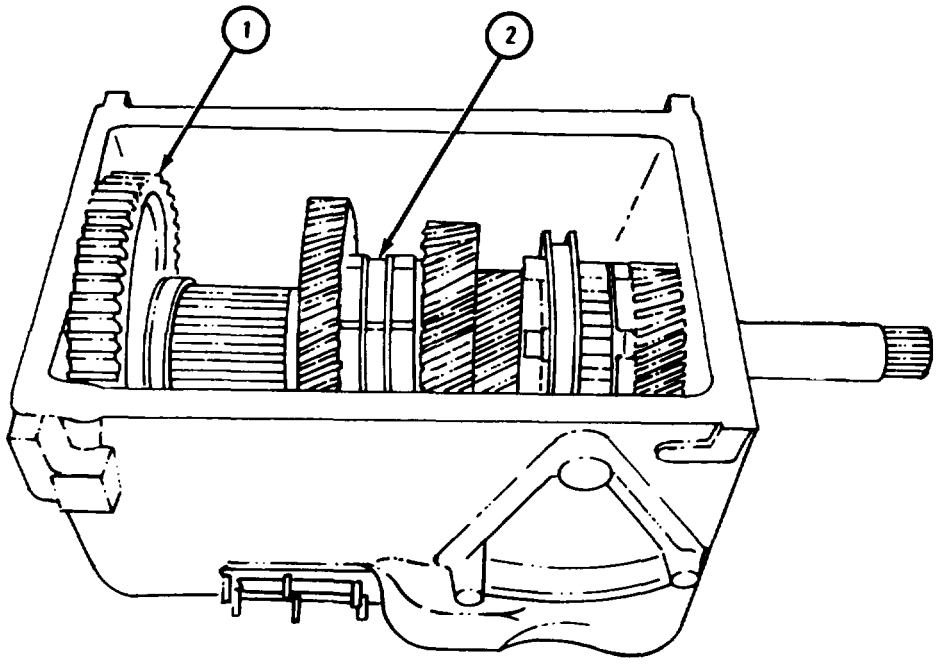


TA 089176

FRAME 13

1. Slide first and reverse speed gear (1) and second and third speed synchronizer (2) out of mesh with countershaft gears.
2. Check backlash between main shaft gears and countershaft gears. Refer to para 7-3c(4).

END OF TASK



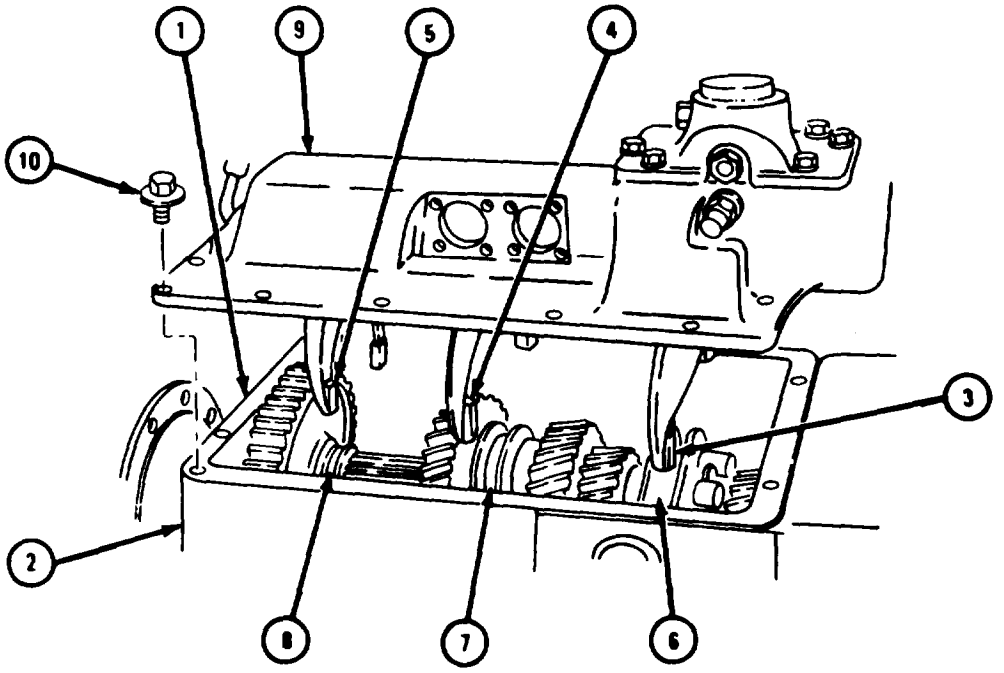
TA 089175

(2) Shifter housing assembly.

FRAME 1

1. Put shifter housing gasket (1) in place on transmission case (2).
2. Aline shifter forks (3, 4, and 5) with collars on synchronizers (6 and 7) and gear(8). Set shifter housing assembly (9) in place.
3. Put in 14 screw and lockwasher assemblies (10). Tighten screws to 35 to 40 pound-feet.

GO TO FRAME 2

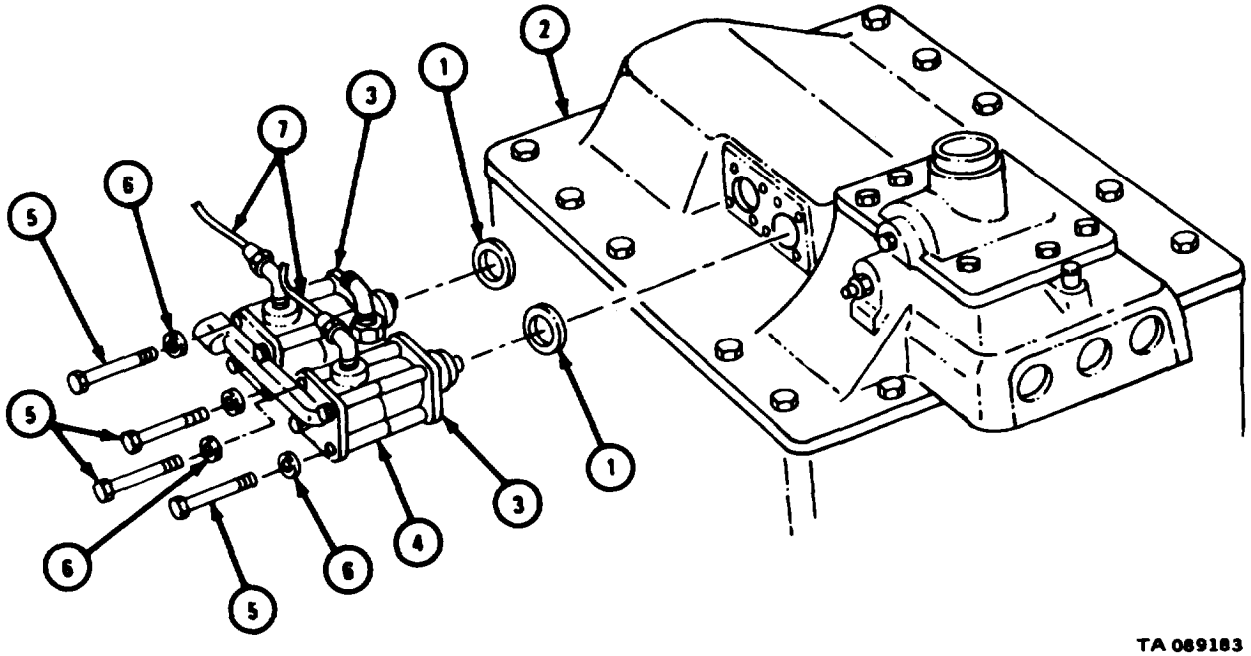


TA 089182

FRAME 2

1. Put two preformed packings (1) in place in poppet valve bores in shifter housing (2).
2. Put two plates (3) on poppet valve assembly (4).
3. Put poppet valve assembly (4) in place in shifter housing (2).
4. Put in and tighten four screws (5) and lockwashers (6) to 10 to 15 pound-feet.
5. Put on two transfer shift lines (7).

END OF TASK

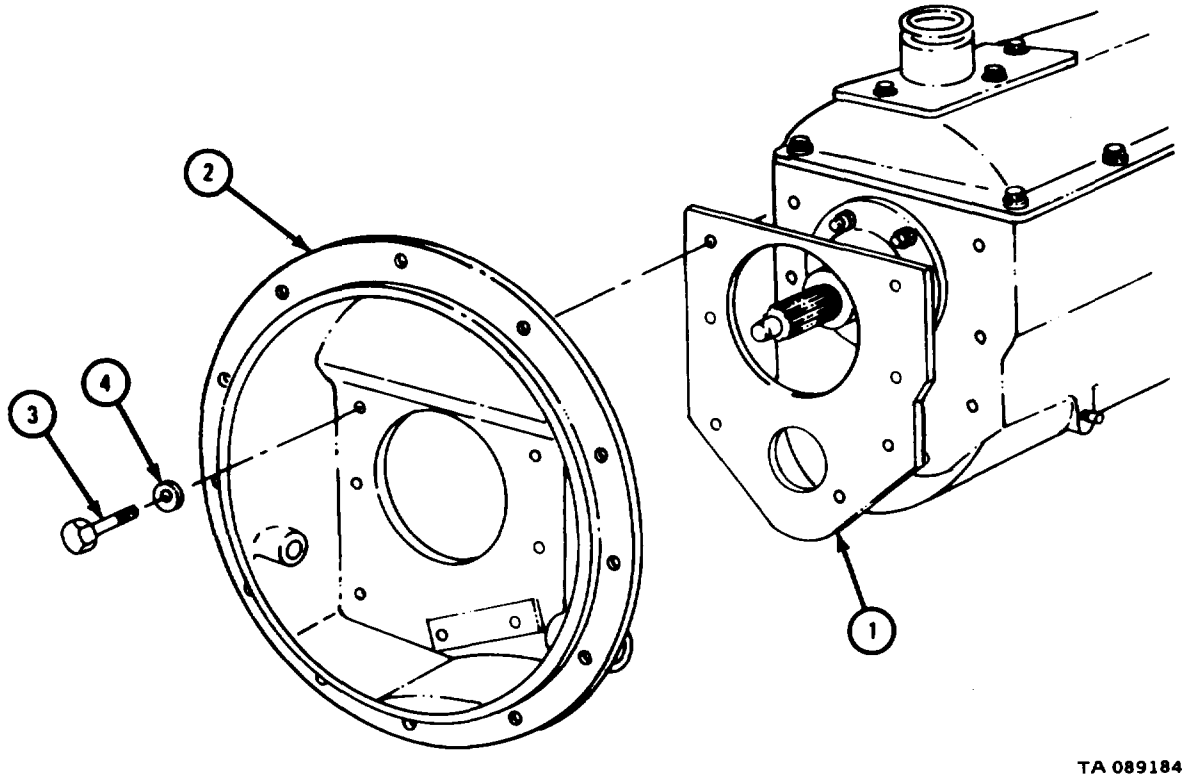


(3) Clutch release mechanism and housing.

FRAME 1

1. Put clutch housing gasket (1) and clutch housing (2) in place.
2. Put in six screws (3) and lockwashers (4).

GO TO FRAME 2



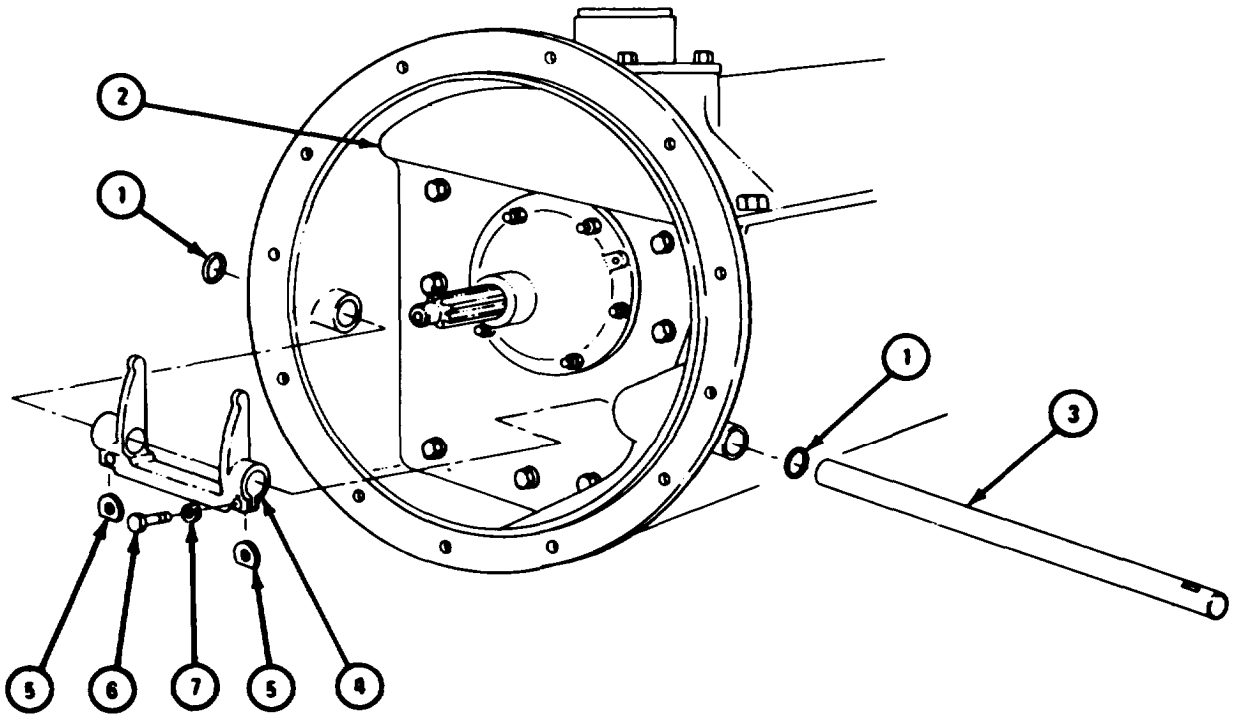
FRAME 2

NOTE

Truck M543A2 has two oil seals (1), one on each side.

1. Put oil seal (1) in place in clutch housing (2).
2. Starting from left side of clutch housing (2), slide clutch release shaft (3) about six inches into housing.
3. Hold clutch release yoke (4) in place. Slide clutch release shaft (3) through clutch release yoke.
4. Put two keys (5) into position in each bottom end of clutch release yoke (4) and slide clutch release shaft (3) into right shaft bore in clutch housing (2).
5. Put in two screws (6) and lockwashers (7).

GO TO FRAME 3

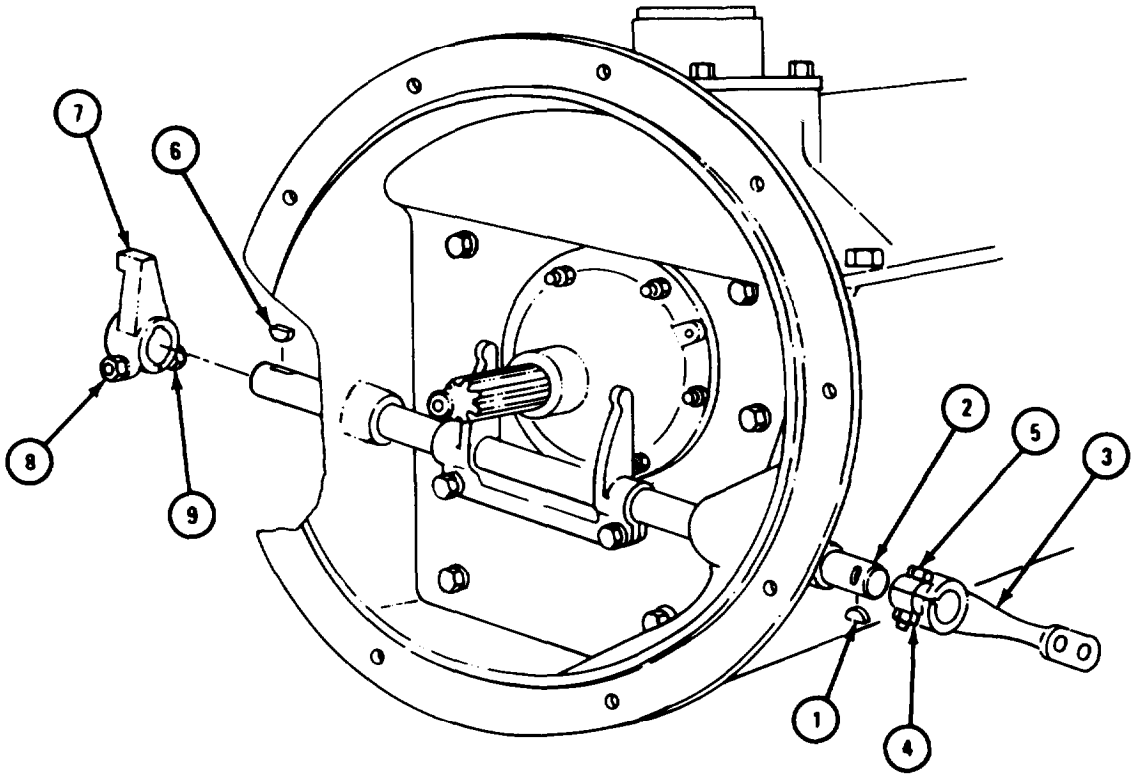


TA 089185

FRAME 3

1. Put woodruff key (1) into keyway in clutch release shaft (2).
2. Slide clutch release lever (3) into place.
3. Tighten locknut (4) while holding bolt (5).
4. For truck M543A2:
   a. Put woodruff key (6) into keyway in clutch release shaft (2).
   b. Slide clutch release lever (7) into place.
   c. Tighten locknut (8) while holding bolt (9).

GO TO FRAME 4

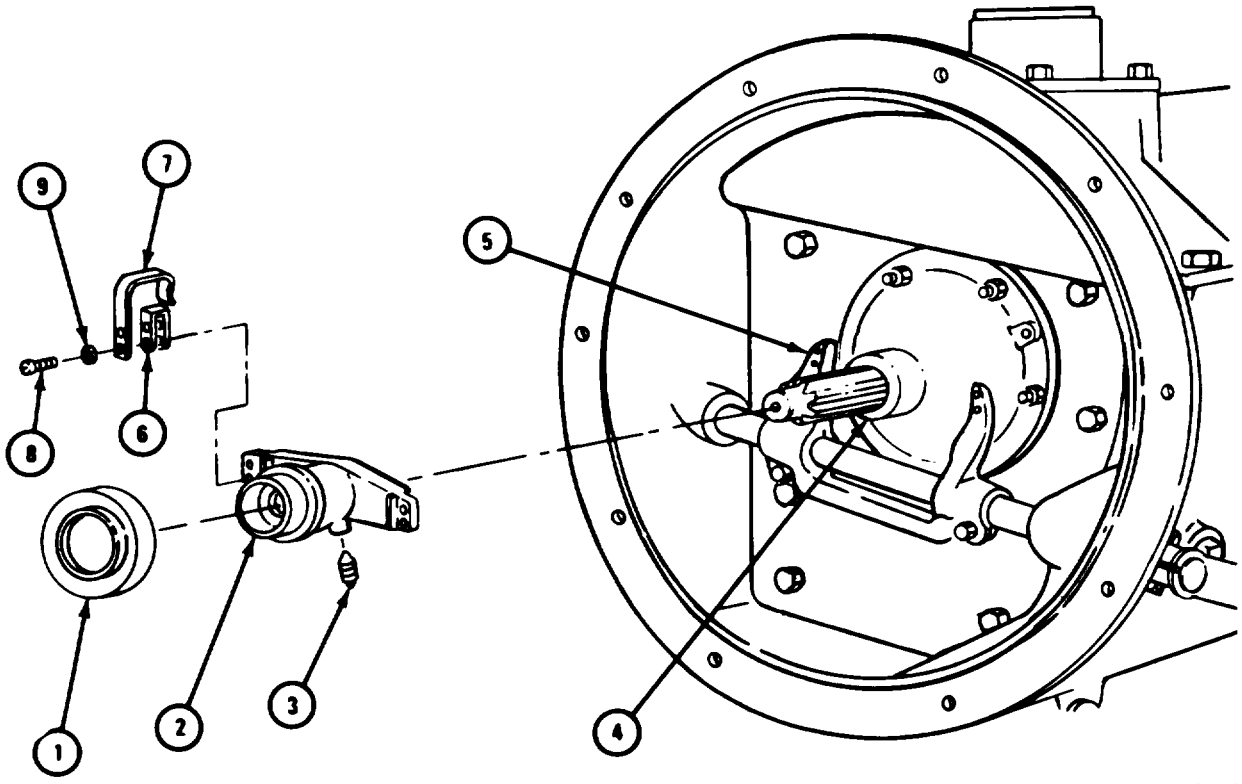


TA 089186

FRAME 4

1. Press clutch release bearing (1) on clutch release sleeve (2).
2. Put in plug (3).
3. Put a small amount of grease on main shaft bearing cover (4).
4. Slide clutch release sleeve (2) with bearing (1) to main shaft bearing cover (4) and aline holes in clutch release yoke (5).
5. Put two pads (6) and spring clips (7) in place on clutch release sleeve (2) and clutch release yoke (5).
6. Put in four screws (8) with lockwashers (9).

END OF TASK



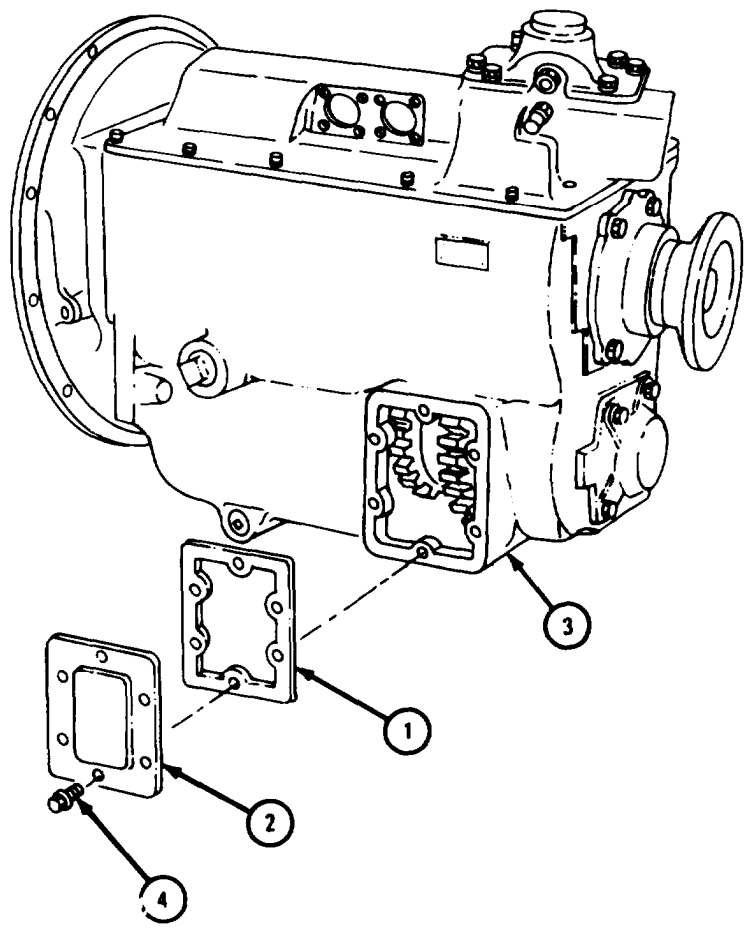
TA 089187

(4) Covers.

FRAME 1

1. Put cover gasket (1) and cover (2) in place on left side of transmission case (3).
2. Put in six screws and lockwasher assemblies (4).
3. If transmission does not have power takeoff, do steps 1 and 2 again on right side.

END OF TASK



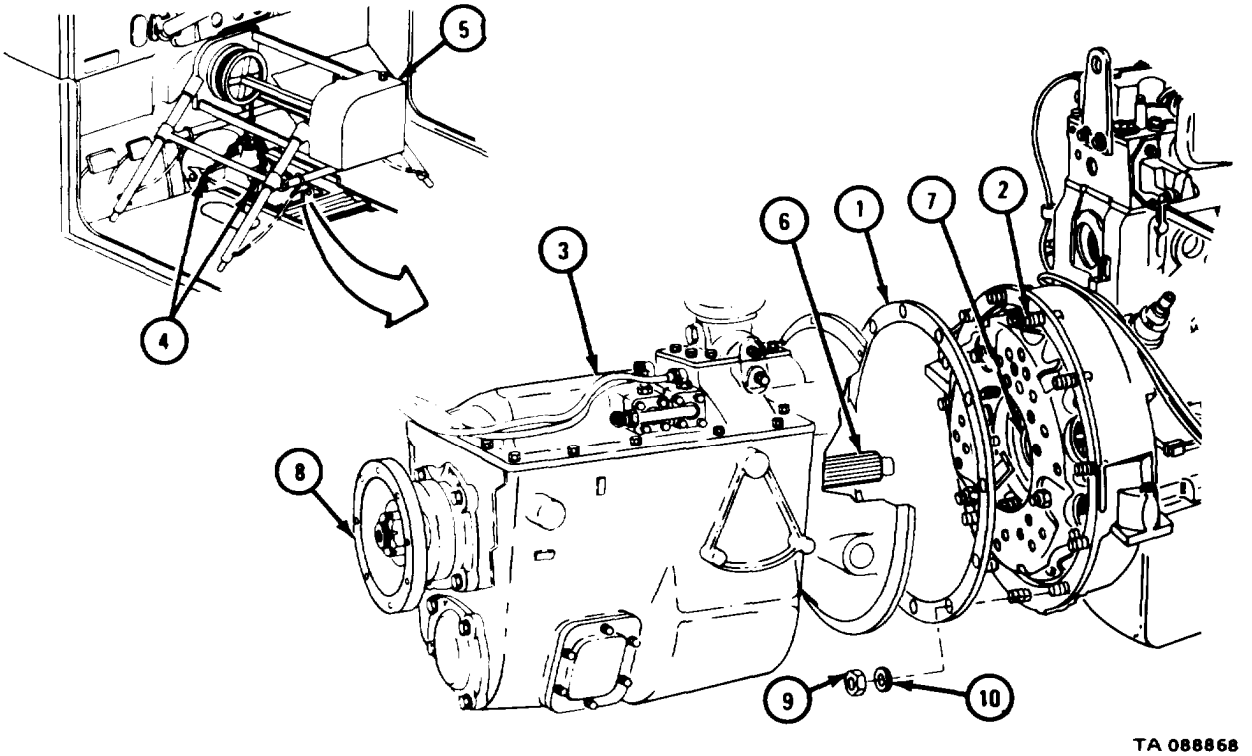
TA 089189

i. Replacement.

FRAME 1

1. Put gasket (1) on engine flywheel housing studs (2).
2. Using dolly, push transmission (3) under truck.
3. Put chain (4) around transmission (3) and hook it to hoist (5). Take slack out of chain.
4. Raise transmission (3) so input shaft (6) will slide straight into clutch (7). Mate splines of input shaft and clutch. If splines do not mate, put transmission (3) in fourth or fifth gear and turn output shaft (8) by hand to mate splines.
5. Slide transmission (3) onto flywheel housing studs (2).
6. Put on 12 nuts (9) and washers (10).
7. Take off chain (4) and hoist (5).

GO TO FRAME 2



FRAME 2

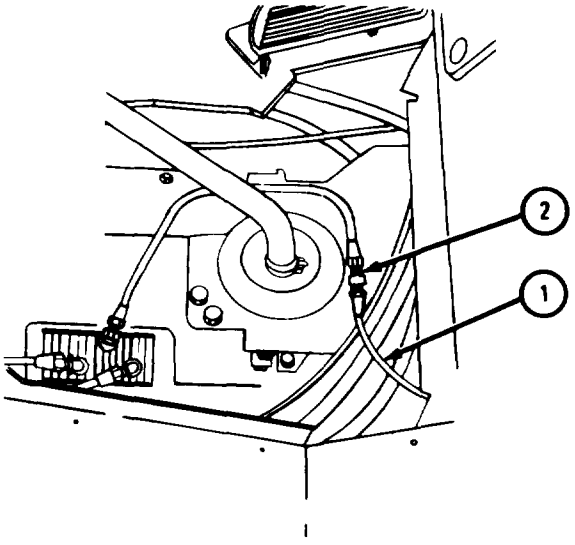
1. Hook up transmission vent line (1) at tee connection (2).

NOTE

Follow-on Maintenance Action Required:

1. Replace power takeoff (truck M51A2 and trucks with front winches). Refer to Part 3, para 17-60.
2. Replace transmission shift lever. Refer to TM 9-2320-211-20.
3. Replace rotochamber (truck M543A 2). Refer to Part 3, para 17-47.
4. Replace outer auxiliary release clutch lever (truck M543A2). Refer to TM 9-2320-211-20.
5. Replace clutch actuating link rod assembly. Refer to TM 9-2320-211-20.
6. Replace cab floor tunnel and clutch housing toe board. Refer to TM 9-2320-211-20.
7. Replace power takeoff linkage (truck M51A2 and trucks with front winches). Refer to TM 9-2320-211-20.
8. Replace hoist pump propeller shaft (truck M51A2). Refer to TM 9-2320-211-20.
9. Replace front winch propeller shaft (trucks with front winches). Refer to TM 9-2320-211-20.
10. Replace transmission-to-transfer case propeller shaft. Refer to TM 9-2320-211-20.
11. Fill transmission. Refer to LO 9-2320-211-12.

END OF TASK



TA 088869

7-4. TRANSMISSION POWER TEST.

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Check level of transmission oil and add if necessary. Refer to LO 9-2320-211-12.

b. Test.

FRAME 1

1. Start engine. Refer to TM 9-2320-211-10.
2. Put handbrake (1) in down (brake off) position.
3. Set truck in motion. Refer to TM 9-2320-211-10.
4. Move gearshift lever (2) through all positions at different speeds. Listen for any unusual noises.

NOTE

Unusual noises might mean transmission gears are not fully in mesh or that there is more than. normal clearance between gear teeth.

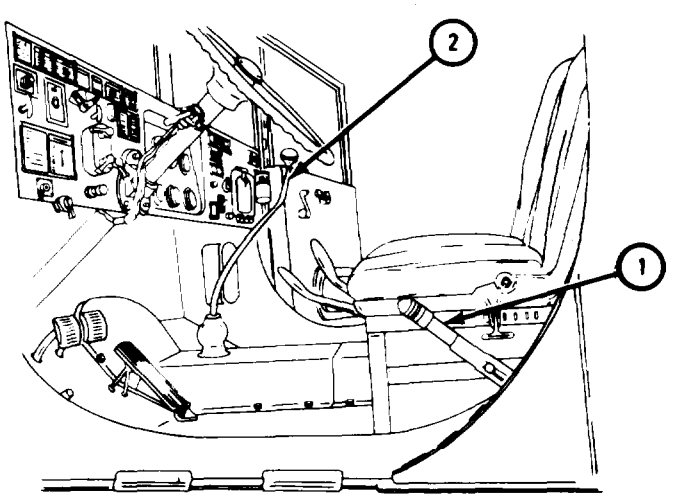
5. Make sure gearshift lever (2) does not go back to neutral position by itself.
6. Stop truck and turn off engine. Refer to TM 9-2320-211-10.
7. Put handbrake (1) in up (brake on) position.

NOTE

Follow-on Maintenance Action Required:

1. Check outside of transmission case for leaks at gasket joints.
2. If any unusual noises were heard, if gearshift lever went back to neutral position by itself or if fluid leaks are noted, repair transmission. Refer to para 7-3.

END OF TASK



TA 087137

7-5. TRANSMISSION INPUT SHAFT SEAL REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Input shaft cover seal
Input shaft cover gasket
Clutch housing gasket
Clutch housing seal (2)
Hardening sealer, MIL-S-3927C
Automotive and artillery grease, type GAA, MIL-G-10924
Clean rags

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain transmission. Refer to LO 9-2320-211-12.

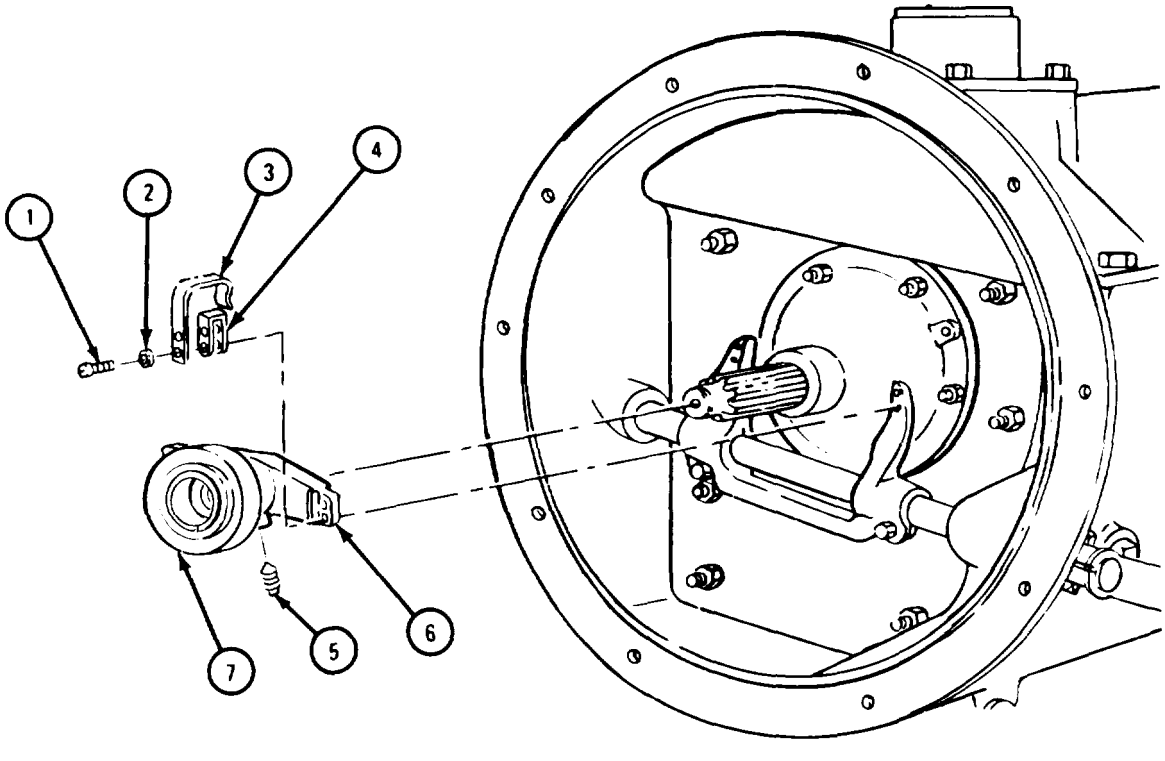
(2) Remove transmission. Refer to para 7-3.

b. Removal.

FRAME 1

1. Take out four screws (1) and lockwashers (2).
2. Take off two spring clips (3) and pads (4).
3. Take out plug (5).
4. Slide off sleeve (6) with clutch release bearing (7).

GO TO FRAME 2



TA 087138

FRAME 2

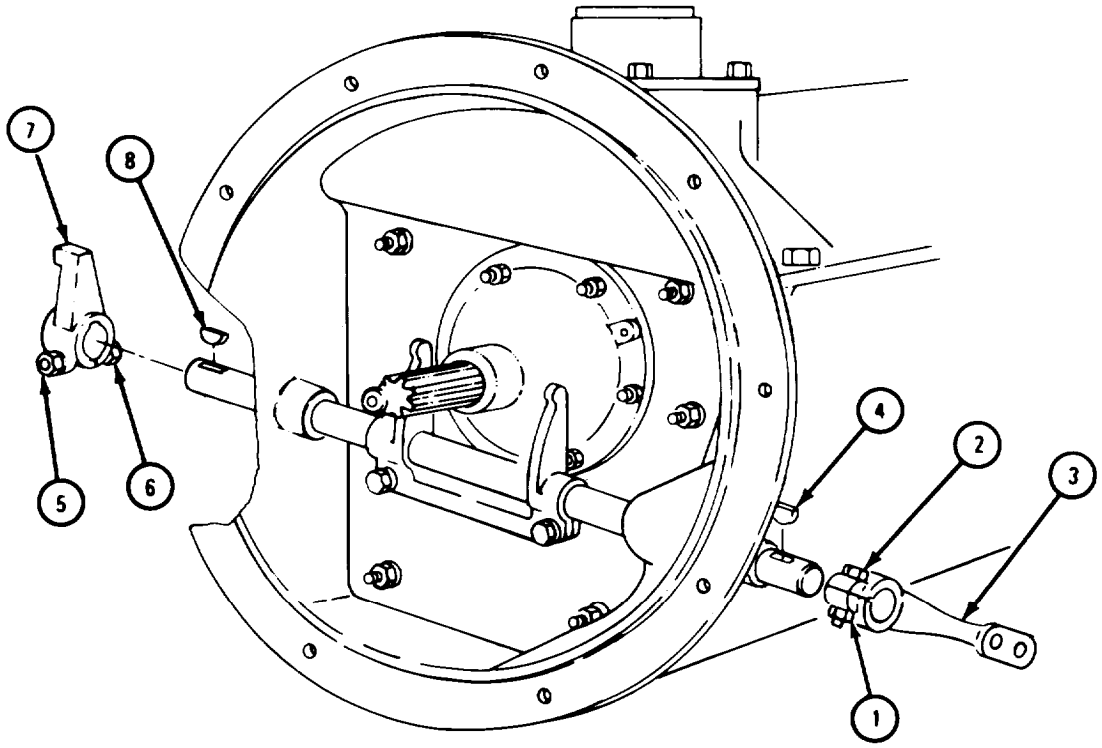
1. Take off locknut (1) while holding bolt (2). Take out bolt (2) and slide off clutch release lever (3).
2. Take out woodruff key (4).

NOTE

For truck M543A2, do steps 3 and 4. For all other trucks, go to frame 3.

3. Take off locknut (5) while holding bolt (6). Take out bolt (6) and slide off clutch release lever (7).
4. Take out woodruff key (8).

GO TO FRAME 3



TA 087139

FRAME 3

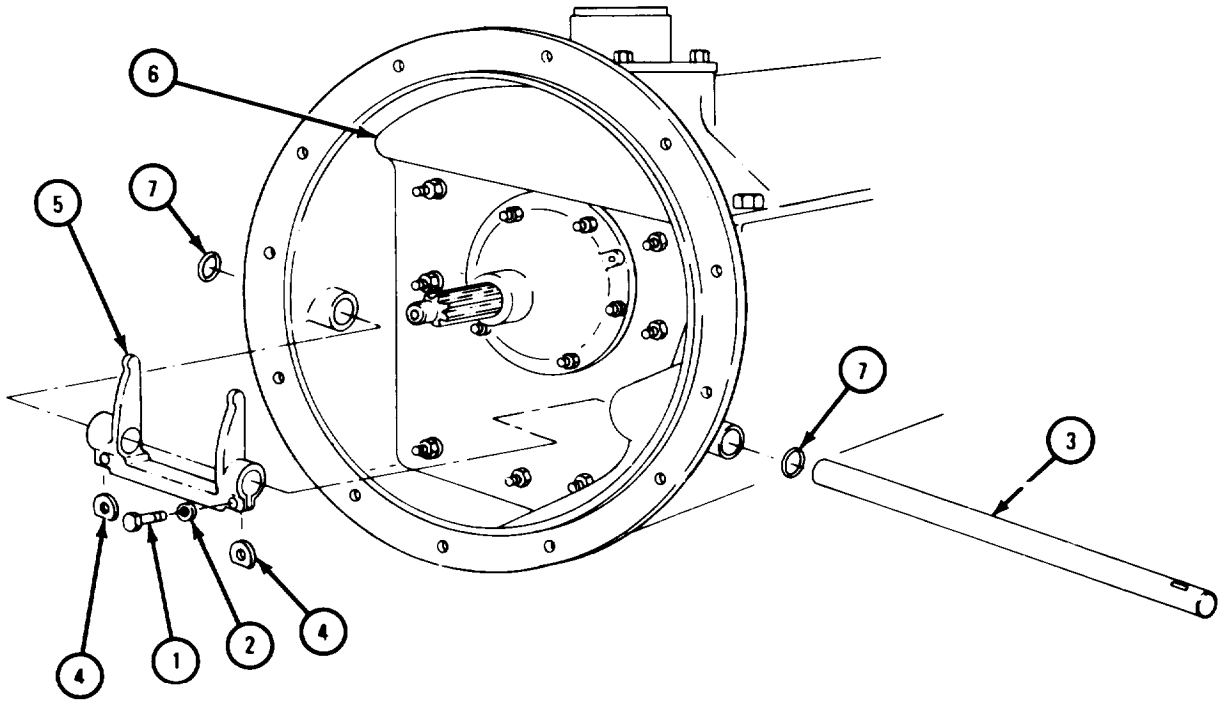
1. Take out two screws (1) and lockwashers (2).
2. Slide clutch release shaft (3) about two inches to the right and take out two keys (4).
3. Slide clutch release shaft (3) to the right far enough to slide off clutch release yoke (5).
4. Slide clutch release shaft (3) out of clutch housing (6).

NOTE

Transmission for truck M543A2 has two oil seals (7). Transmission for all other trucks has only one oil seal.

5. Take out and throw away oil seal (7).

GO TO FRAME 4

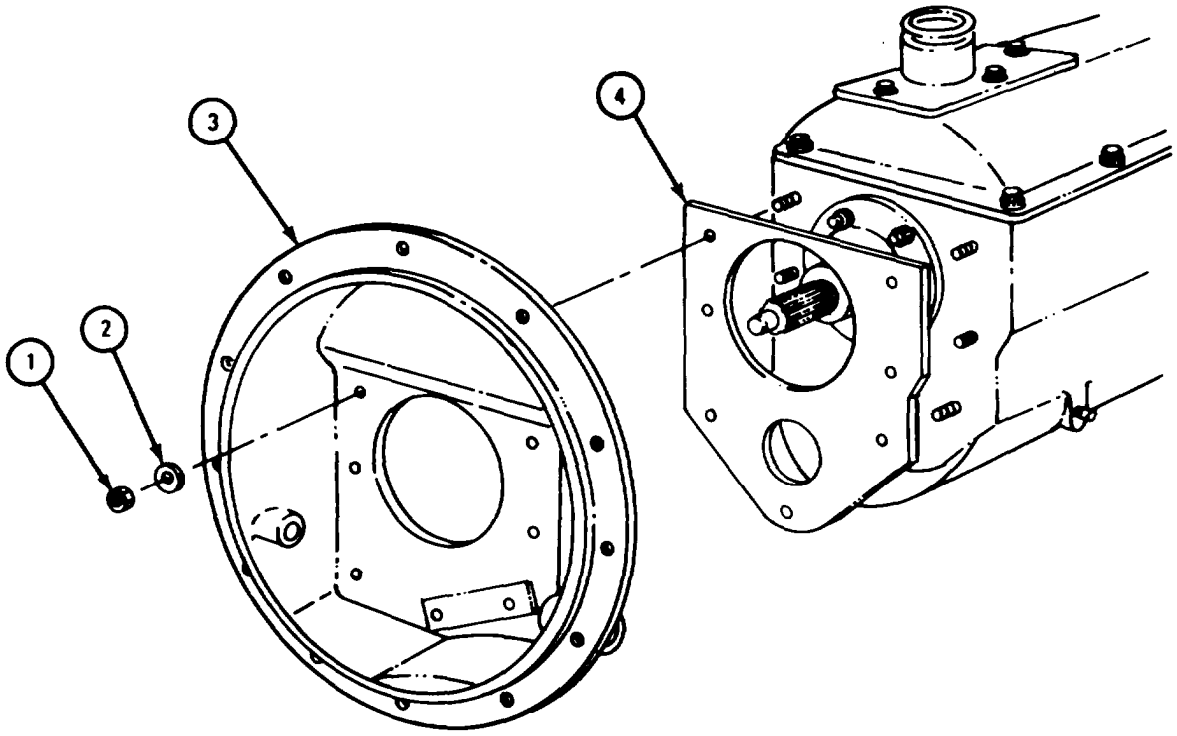


TA 087140

FRAME 4

1. Take off seven nuts (1) and lockwashers (2).
2. Take off clutch housing (3) and gasket (4). Throw away gasket.

GO TO FRAME 5



TA 087141

FRAME 5

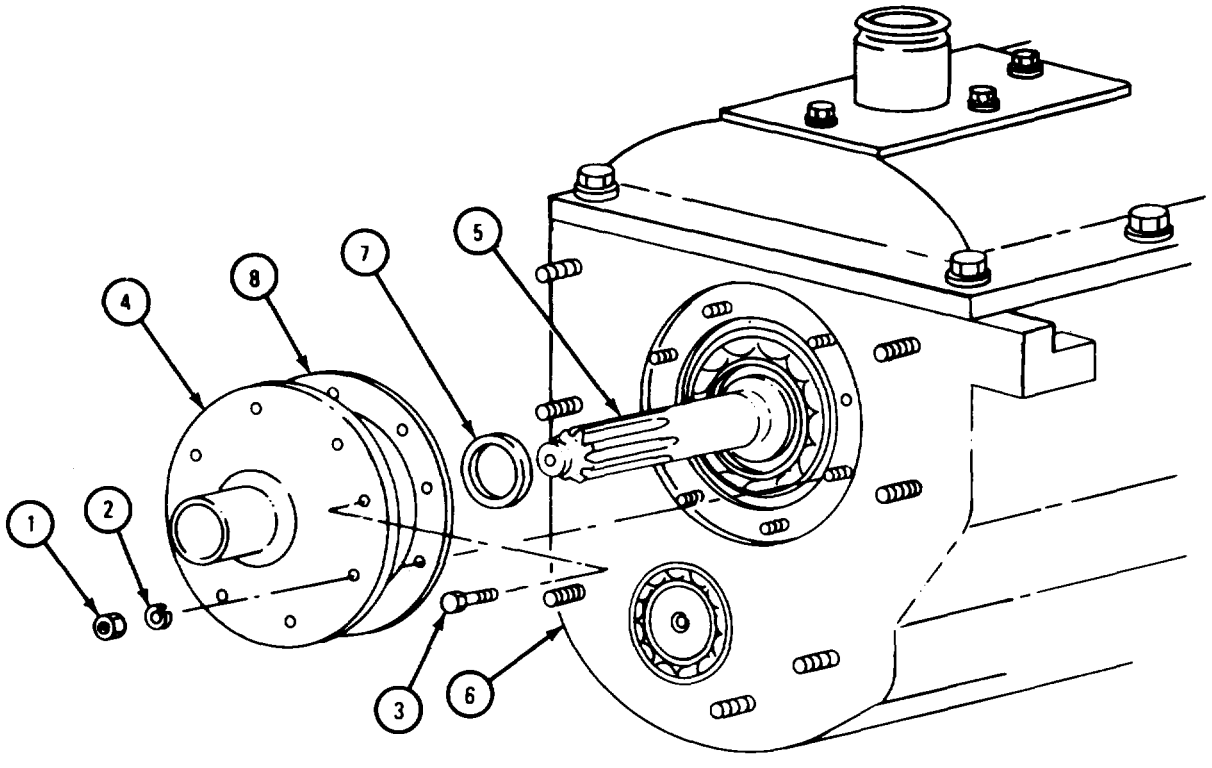
1. Take off six nuts (1) and lockwashers (2).
2. Put two 3/8-16-UNC screws (3) into threaded holes in input shaft cover (4). Do not tighten screws.

NOTE

When taking out input shaft cover (4), make sure input shaft (5) does not come out of transmission case (6) or bearings may fall into case.

3. Screw in screws (3) evenly until input shaft cover (4) is free.
4. Take off input shaft cover (4) with seal (7) and gasket (8). Throw away gasket.
5. Take out seal (7). Throw away seal.
6. Take out two screws (3).

END OF TASK

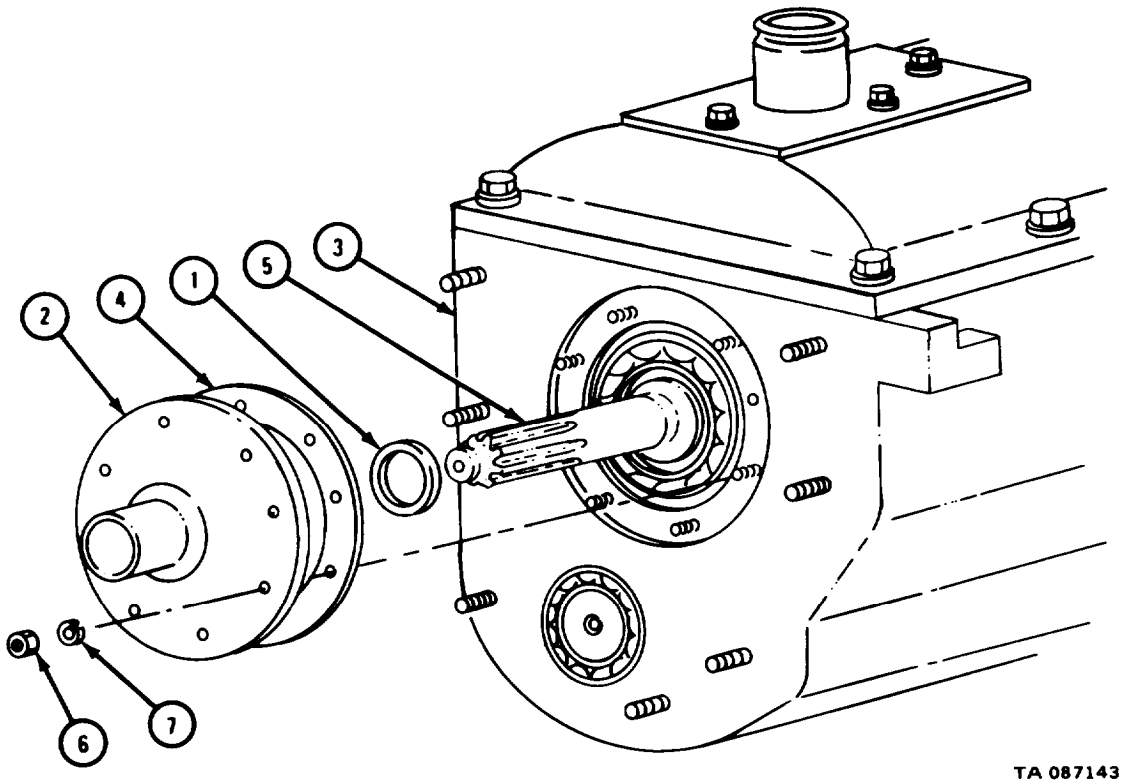


c. Replacement.

FRAME 1

1. Coat outside of oil seal (1) with hardening sealer. Pack inside of lip with a small amount of grease.
2. Put oil seal (1) in place in input shaft cover (2). Lip of oil seal must face towards transmission case (3).
3. Put input shaft cover gasket (4) in place.
4. Slide cover (2) with oil seal (1) onto input shaft (5).
5. Put on and tighten seven nuts (6) and lockwashers (7) to 25 to 30 pound-feet.

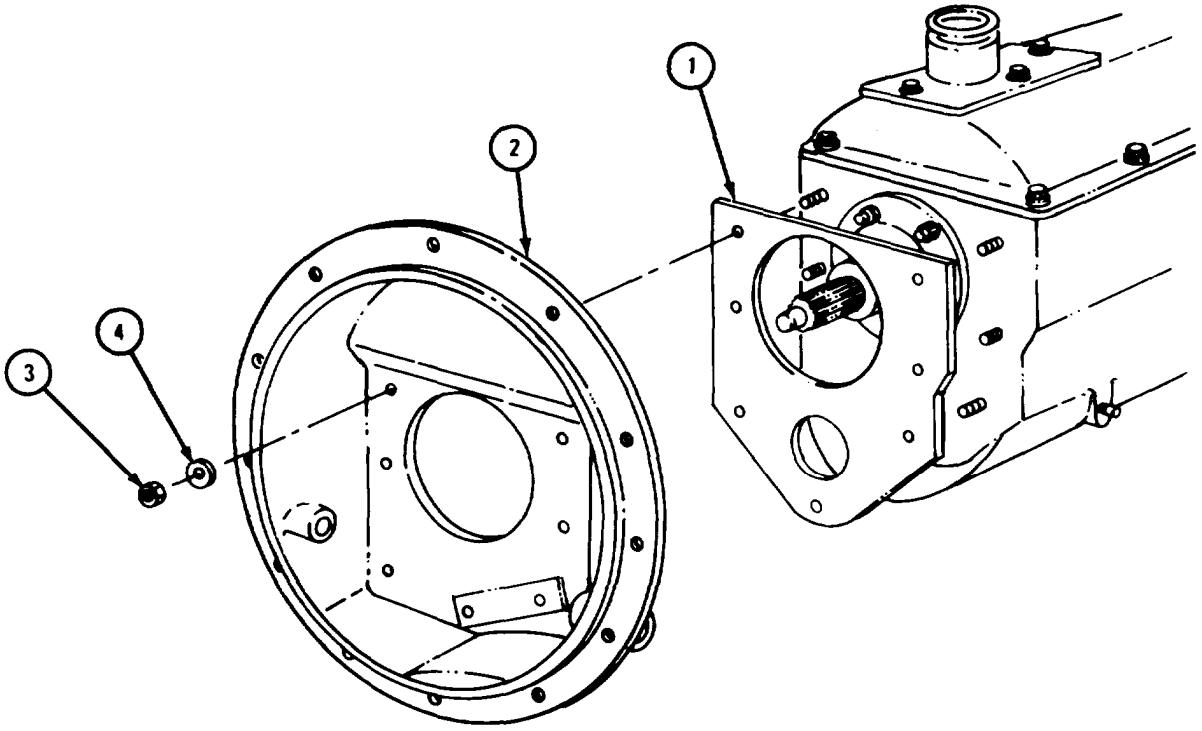
GO TO FRAME 2



FRAME 2

1. Put clutch housing gasket (1) and clutch housing (2) in place.
2. Put in seven nuts (3) and lockwashers (4).

GO TO FRAME 3



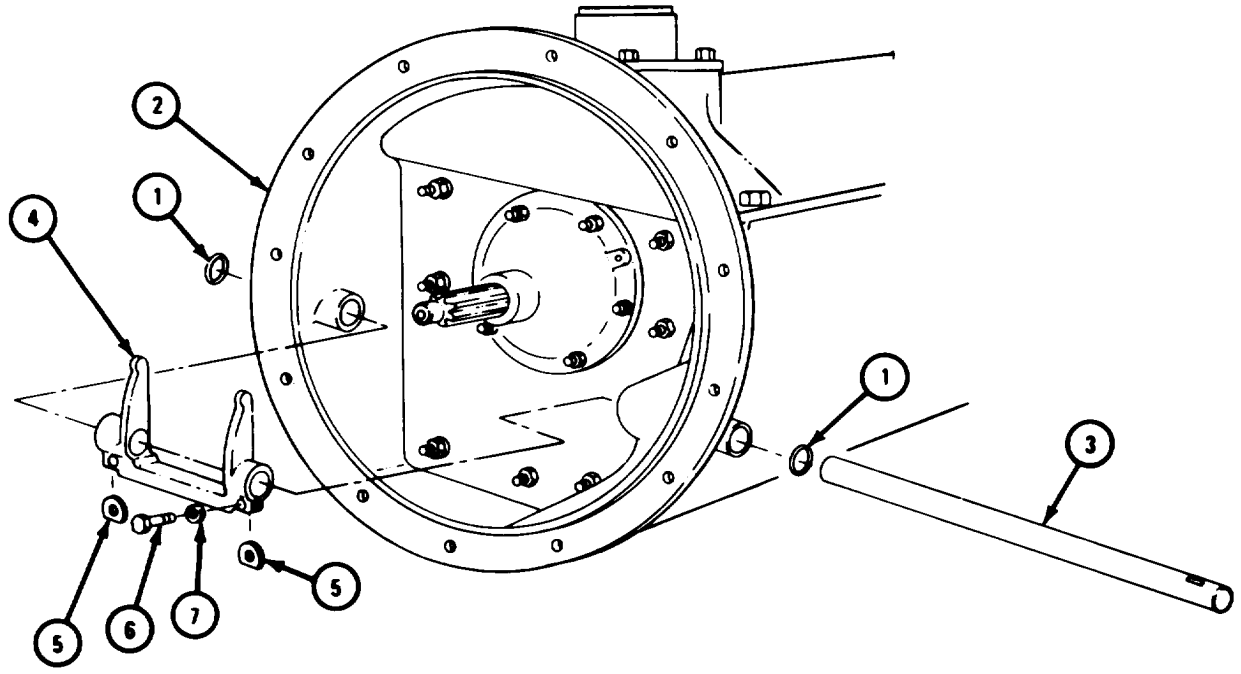
FRAME 3

NOTE

Transmission for M543A2 truck has two oil seals (1). Transmission on all other trucks has only one oil seal.

1. Put oil seal (1) in place in clutch housing (2).
2. Start clutch release shaft (3) from left side of clutch housing (2). Slide clutch release shaft about six inches into housing.
3. Hold clutch release yoke (4) in place. Slide clutch release shaft (3). through clutch release yoke.
4. Put two keys (5) into position in each bottom end of clutch release yoke (4) and slide shaft into right shaft bore in clutch housing (2).
5. Put in two screws (6) and lockwashers (7).

GO TO FRAME 4



TA 087145

FRAME 4

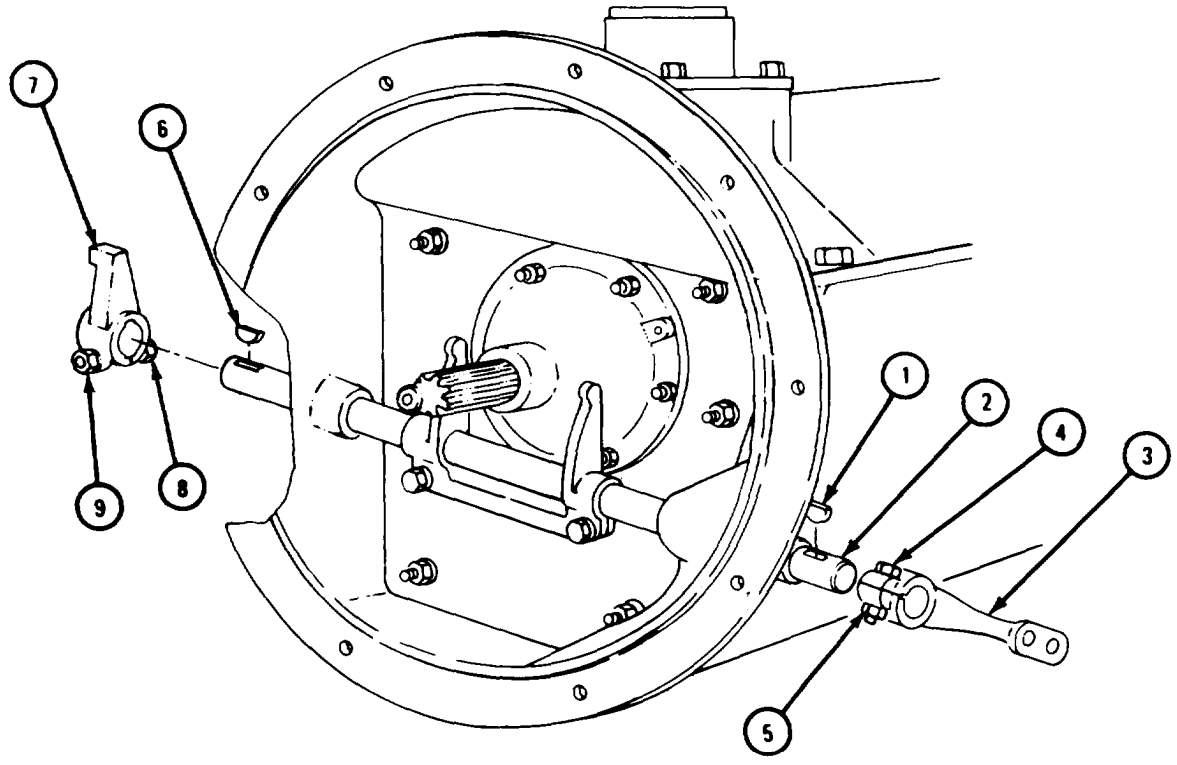
1. Put woodruff key (1) into keyway in clutch release shaft (2).
2. Slide clutch release lever (3) into place.

NOTE

For M543A2 truck transmission, do steps 4 through 6. For other truck transmission, go to frame 5.

3. Put bolt (4) into release lever (3). Put on and tighten locknut (5).
4. Put woodruff key (6) into keyway in clutch release shaft (2).
5. Slide clutch release lever (7) into place.
6. Put bolt (8) into release lever (7). Put in and tighten locknut (9).

GO TO FRAME 5



TA 087146

FRAME 5

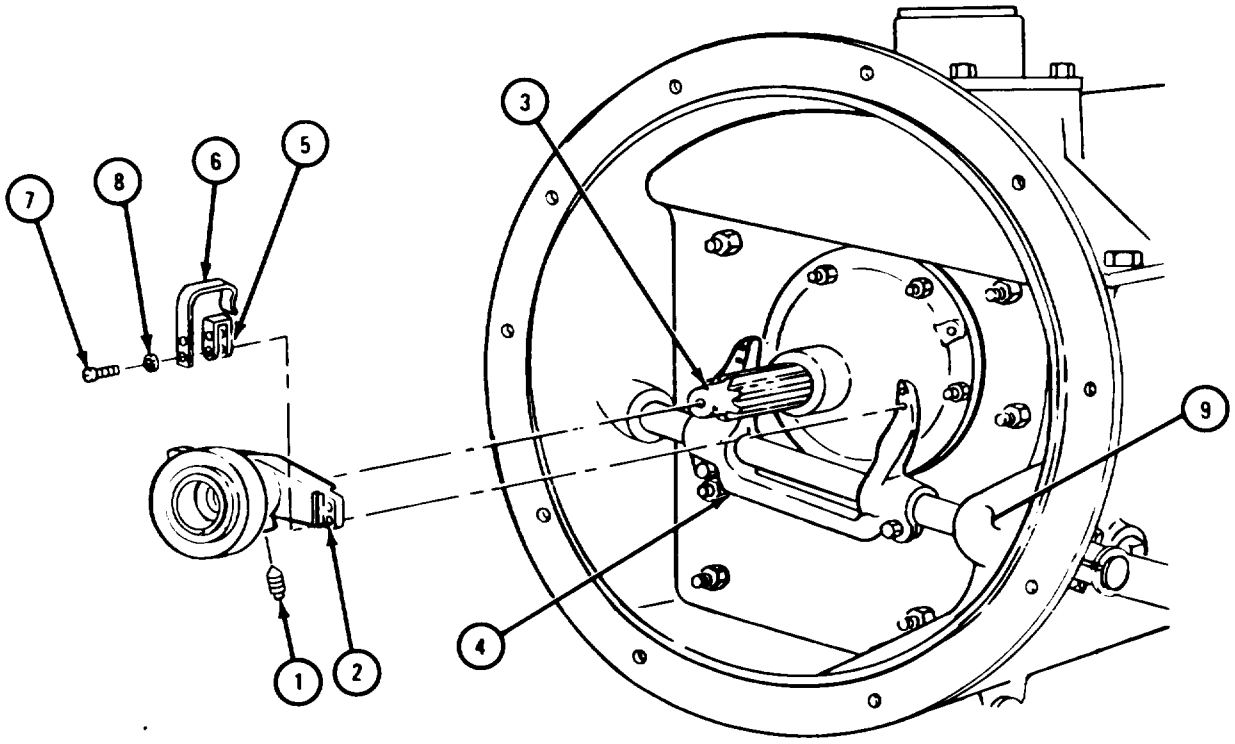
1. Put plug (1) into sleeve (2).
2. Put a small amount of grease into bore of sleeve (2).
3. Slide sleeve (2) onto input shaft (3) and aline it with clutch release yoke (4).
4. Put two pads (5) and spring clips (6) in place on sleeve (2) and clutch release yoke (4).
5. Put in four screws (7) and lockwashers (8).
6. With clean rag, wipe grease from clutch housing (9).

NOTE

Follow-on Maintenance Action Required:

1. Replace transmission. Refer to para 7-3.
2. Fill transmission. Refer to LO 9-2320-211-12.

END OF TASK



TA 087147

7-6. TRANSMISSION OUTPUT SHAFT SEAL REMOVAL AND REPLACEMENT.

TOOLS: Mechanical puller, pn 8708724
Companion flange replacer, pn 7950147

SUPPLIES: Hardening sealer, MIL-S-3927C
Artillery and automotive grease, type GAA, MIL-G-10924
Rear output shaft seal
Cotter pin
Rear output shaft cover gasket

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

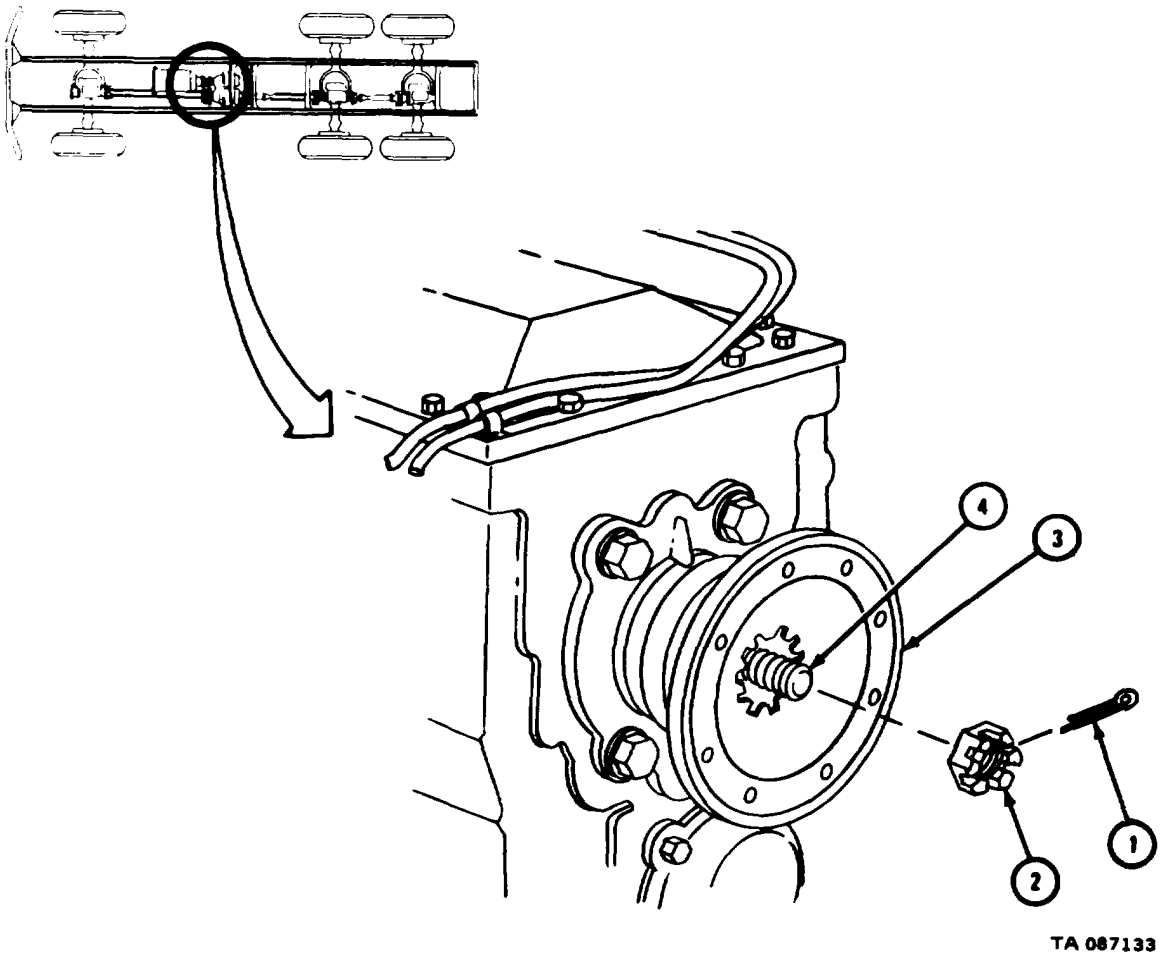
a. Preliminary Procedure. Remove transmission-to-transfer propeller shaft. Refe to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Take out and throw away cotter pin (1).
2. Takeoff slotted nut (2).
3. Using mechanical puller, take off companion flange (3) from main shaft (4).

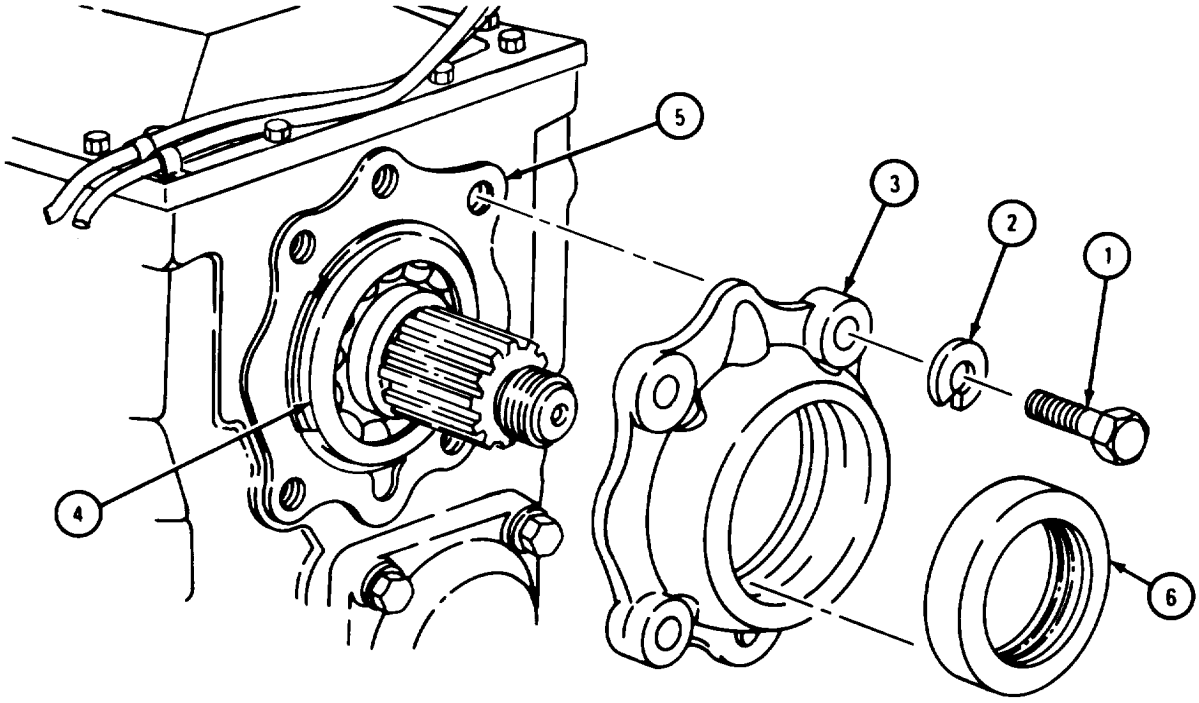
GO TO FRAME 2



FRAME 2

1. Take out four screws (1) and lockwashers (2).
2. Using lightweight hammer, tap rear output shaft cover (3) lightly to free it from main shaft rear bearing outer race (4).
3. Take off rear output shaft cover (3), cover gasket (5), and oil seal (6). Throw away gasket.
4. Using hammer and punch, drive oil seal (6) out of rear output shaft cover (3). Throw away oil seal.

END OF TASK



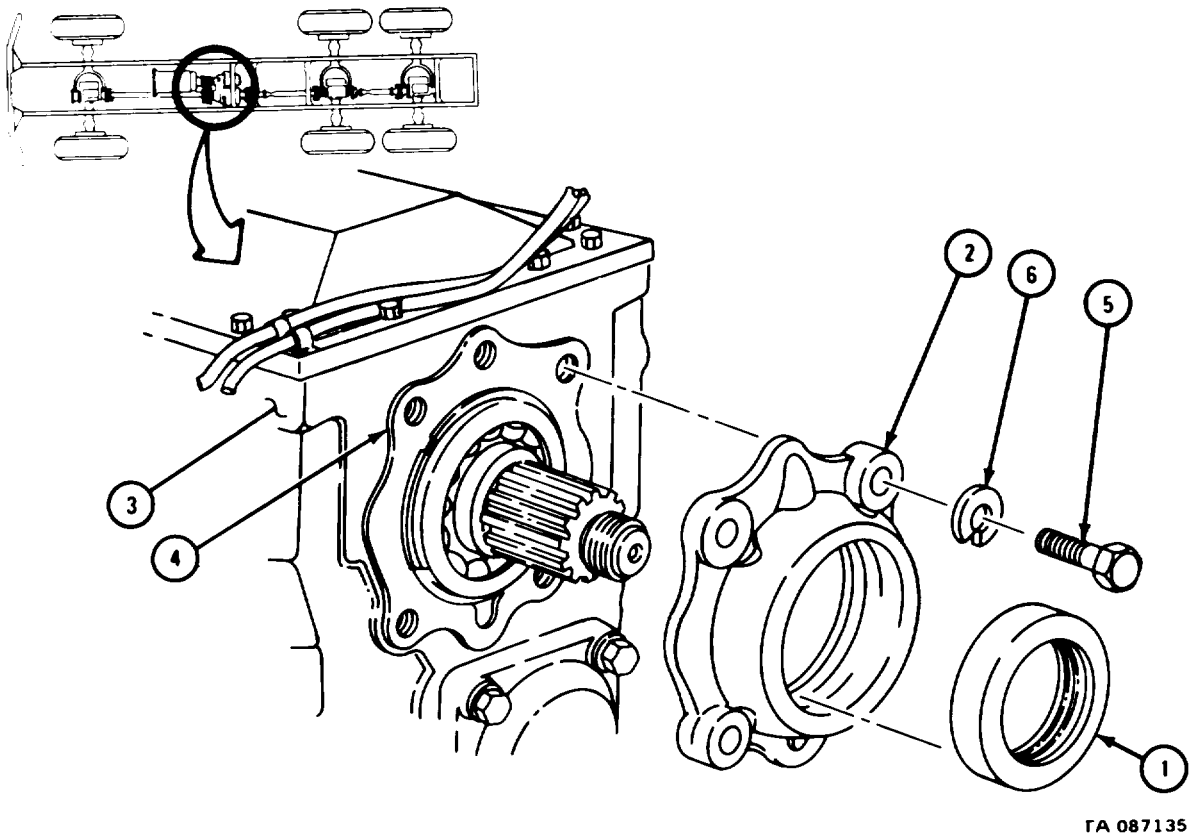
TA 087134

c. Replacement.

FRAME 1

1. Put hardening sealer on outside of oil seal (1). Pack inside lip of seal with small amount of grease.
2. Using hammer and block of wood, drive oil seal (1) into place in rear output shaft cover (2). Lip of oil seal must face transmission case (3).
3. Put rear output shaft cover gasket (4) and cover (2) with oil seal (1) in place on transmission case (3). Aline oil holes in transmission case, gasket, and cover.
4. Put in and tighten four screws (5) and lockwashers (6) to 65 to 75 pound-feet.

GO TO FRAME 2



FRAME 2

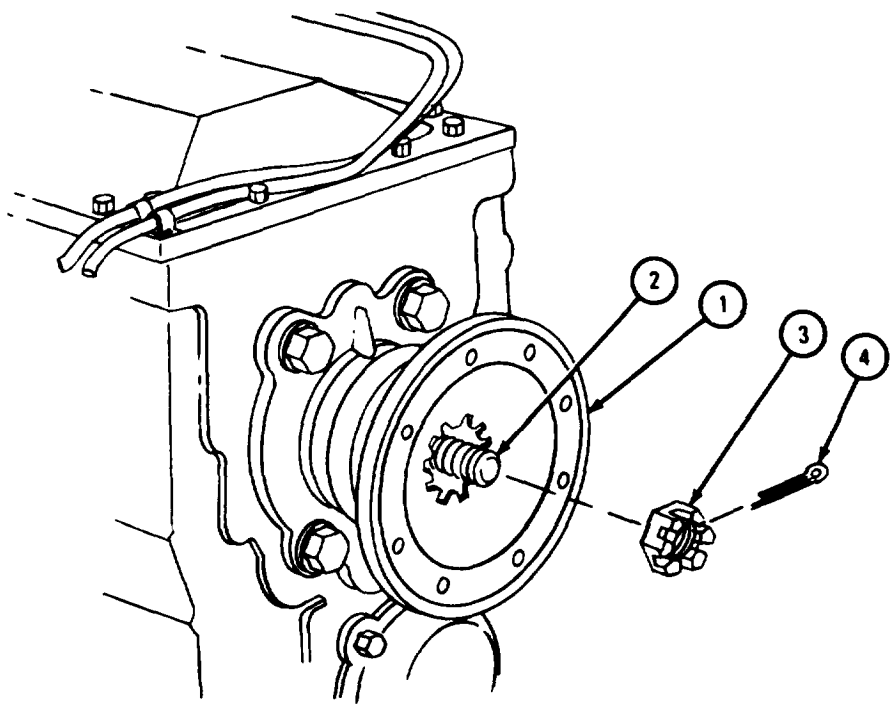
1. Using flange replacer, press companion flange (1) onto main shaft (2).
2. Put on and tighten slotted nut (3) to 500 to 550 pound-feet. If slot in nut does not aline with cotter pin hole in main shaft (2), tighten nut until it does.
3. Put in and bend open ends of cotter pin (4).

NOTE

Follow-on Maintenance Action Required:

1. Fill transmission. Refer to LO 9-2320-211-12.
2. Replace transmission-to-transfer propeller shaft. Refer to TM 9-2320-211-20.

END OF TASK



TA 087136

7-7. MAINTENANCE OF BEARINGS.

NOTE

Tasks are for general maintenance of bearings. Refer to TM 9-214 for more detailed information.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Anti-seize compound, white lead, TT-A-680-B-2
Drop light

PERSONNEL: One

a. Removal of Bearing from Shaft by Pressing.

FRAME 1

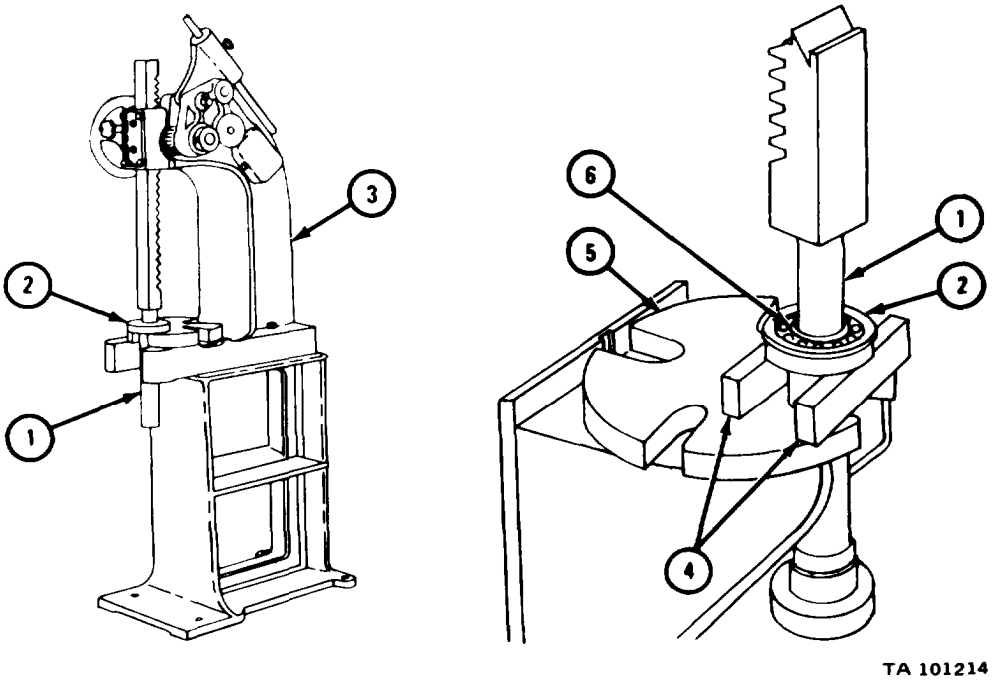
1. Hold shaft (1) with bearing (2) in arbor press (3).

CAUTION

Do not place steel bars (4) against shaft (1). Steel bars can scratch and score shaft.

2. Place two flat bars (4) between bearing (2) and base plate (5). Inner race (6) of bearing must rest firmly on steel bars.
3. Hold shaft (1) so it does not fall and press shaft from bearing (2).

END OF TASK



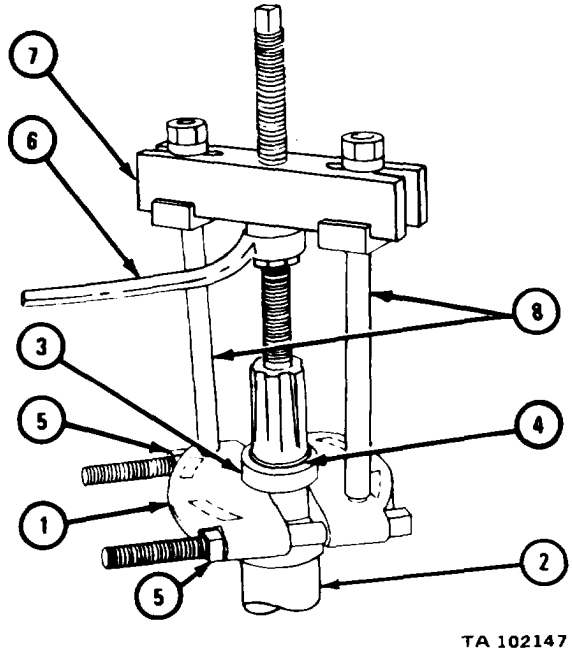
TA 101214

b. Removal of Bearing from Shaft by Pulling.

FRAME 1

1. Put puller plate (1) on shaft (2) with bearing (3) as shown. Close puller plate until inner race (4) of bearing (3) rests on puller plate but plate does not touch shaft (2).
2. Tighten two nuts (5) to keep puller plate (1) from opening.
3. Put puller wrench (6) on push-puller (7). Screw in and tighten two legs (8) into puller plate (1).
4. Pull bearing (3) off shaft (2).

END OF TASK



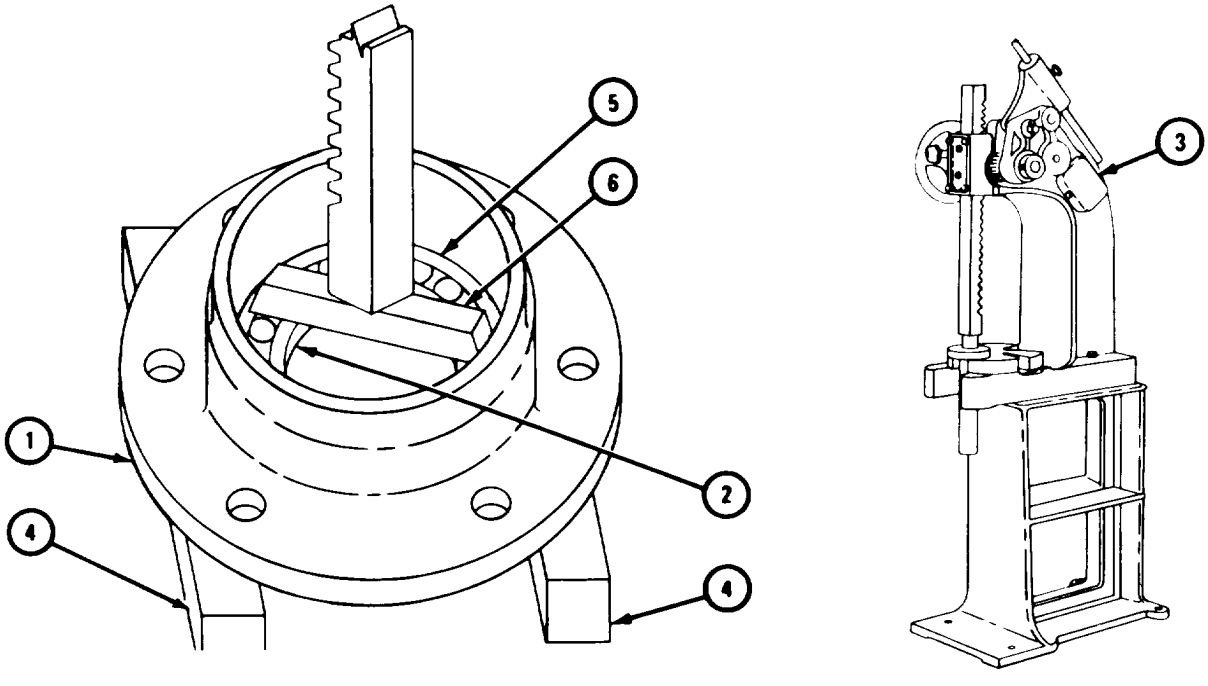
TA 102147

c. Removal of Bearing from Housing by Pressing.

FRAME 1

1. Hold housing (1) with bearing (2) in arbor press (3).
2. Place two steel bars (4) on rim of housing (1) but not touching outer race (5) of bearing (2).
3. Place steel bar (6) in notches in housing (1).
4. Press bearing (2) out of housing (1).

END OF TASK



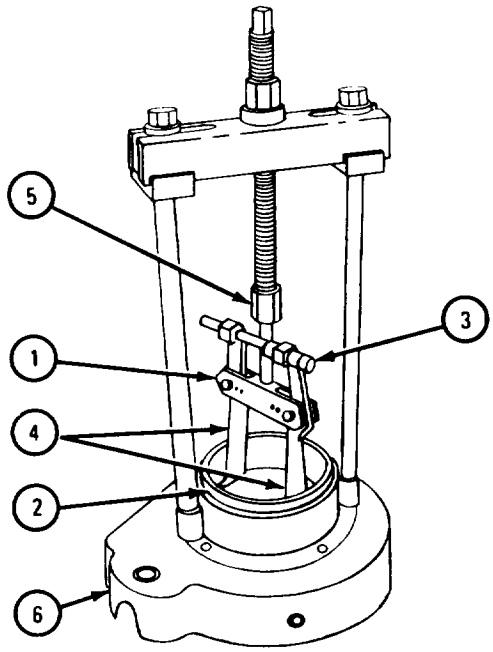
TA 101215

d. Removal of Bearing from Housing By Pulling.

FRAME 1

1. Hold pulling attachment (1) in bearing (2). Tighten nut (3) to spread two legs (4).
2. Join pulling attachment (1), reducing adapter (5).
3. Pull bearing (2) from housing (6).

END OF TASK



TA 102151

e. Cleaning of Bearings.

FRAME 1

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame.Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

NOTE

All old lubricant must be taken off bearing cones (1) during cleaning. Soak bearing cones as long as needed to take off all old lubricant.

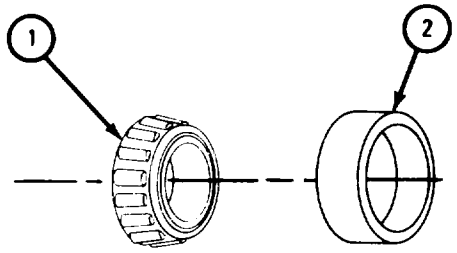
1. Soak bearing (1) in solvent.
2. Rinse bearing cone (1) in clean solvent.

WARNING

Do not dry bearing with compressed air. Spinning bearings may explode and cause serious injury to personnel.

3. Let bearing (1) dry.
4. Using clean rags, wipe all old grease from inside bearing cup (2).

END OF TASK



TA 053414

f. Inspection.

FRAME 1

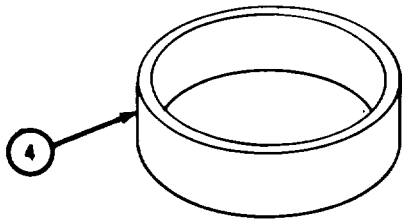
1. Place drop light behind bearing assembly.
2. Hold wheel bearing cone (1) and turn inner race (2) slowly.
3. Check that bearing rollers (3) and wheel bearing cone (1) have no cracks, flaking, pitting or long or deep scratches.
4. Check that wheel bearing cone (1) has not overheated. Wheel bearing cone will turn blue where it has overheated.
5. Check that bearing cups (4) have no dents or small depressions.

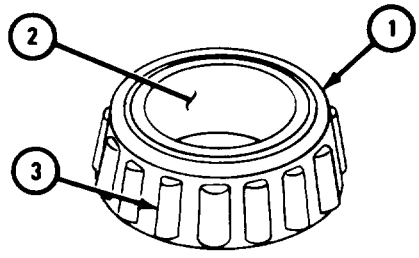
NOTE

If bearing rollers (3) are damaged, throw away bearing cone (1) and get a new one.

6. Check that bearing cups (4) and bearing rollers (3) are not splintered or chipped.
7. Throw away damaged parts and get new ones.

END OF TASK





TA 105175

g. Replacement of Bearing onto Shaft.

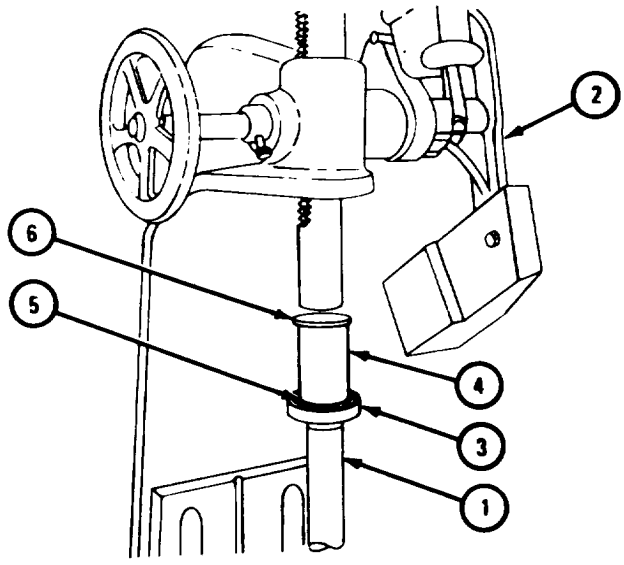
FRAME 1

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

1. Using solvent, clean bearing seat on shaft (1).
2. Coat bearing seat on shaft (1) with anti-seize compound.
3. Hold shaft (1) in place in arbor press (2).
4. Place bearing (3) squarely on top of shaft (1).
5. Place sleeve (4) on inner race (5). Put steel drive plate (6) on sleeve (4).
6. Press bearing (3) into place on shaft (1).

END OF TASK



TA 101216

h. Replacement of Bearing into Housing.

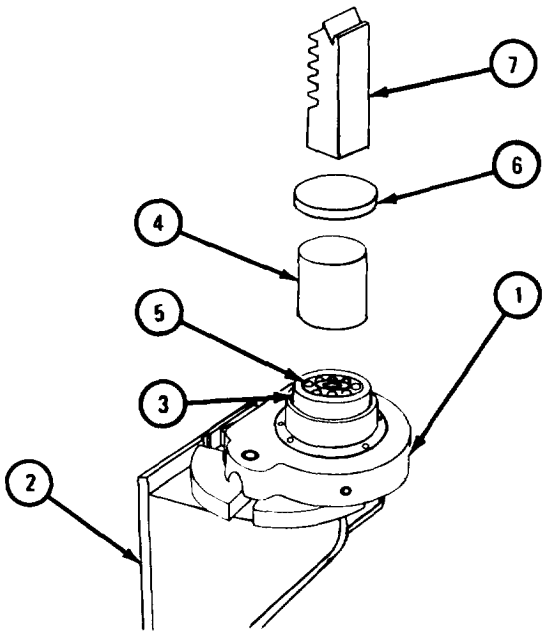
FRAME 1

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

1. Using solvent, clean bore of housing (1).
2. Coat bore of housing (1) with anti-seize compound.
3. Put housing (1) in place in arbor press (2).
4. Place bearing (3) squarely on bore of housing (1).
5. Put sleeve (4) on outer race (5) of bearing (3).
6. Put steel drive plate (6) on top of sleeve (4).
7. Using press arbor (7), push bearing (3) into housing (1).

END OF TASK



TA 101217

CHAPTER 8

TRANSMISSION TRANSFER SYSTEM GROUP MAINTENANCE

Section I. SCOPE

8-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for the transmission transfer assembly and the transmission transfer controls and linkages for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels.

8-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. TRANSMISSION TRANSFER ASSEMBLY

8-3. TRANSMISSION TRANSFER REMOVAL AND REPLACEMENT.

TOOLS: Transfer case fixture,

SUPPLIES: None

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove outer right forward-rear wheel. Refer to TM 9-2320-211-10.

(2) Remove inner right forward-rear wheel. Refer to TM 9-2320-211-10.

(3) Vent air system pressure. Refer to TM 9-2320-211-20.

(4) Remove transfer-to-forward-rear axle propeller shaft from transfer case. Refer to TM 9-2320-211-20.

(5) Remove transfer-to-transmission propeller shaft from transfer case. Refer to TM 9-2320-211-20.

(6) Remove transfer-to-front axle propeller shaft from transfer case. Refer to TM 9-2320-211-20.

(7) For truck M543A2, remove power takeoff-to-power divider propeller shaft from power takeoff unit on transfer case. Refer to TM 9-2320-211-20.

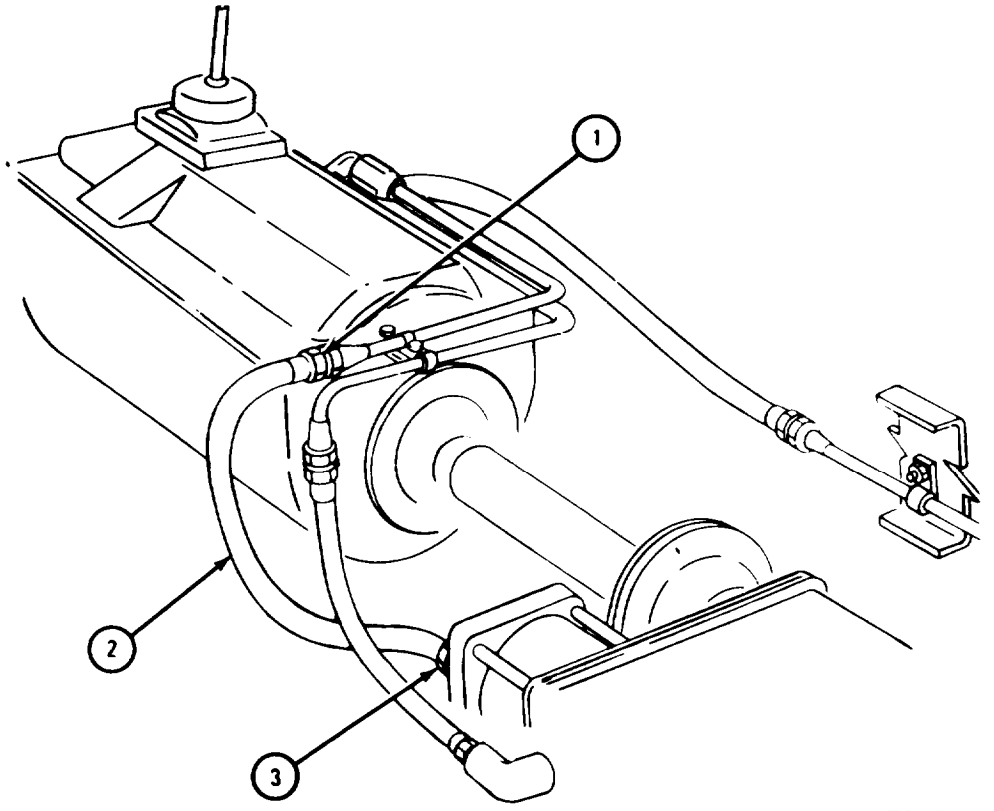
(8) Remove air hydraulic cylinder shield. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Unscrew coupling nut (1).
2. Unscrew and take off hose (2).
3. Unscrew coupling nut (3) and take off hose (2).

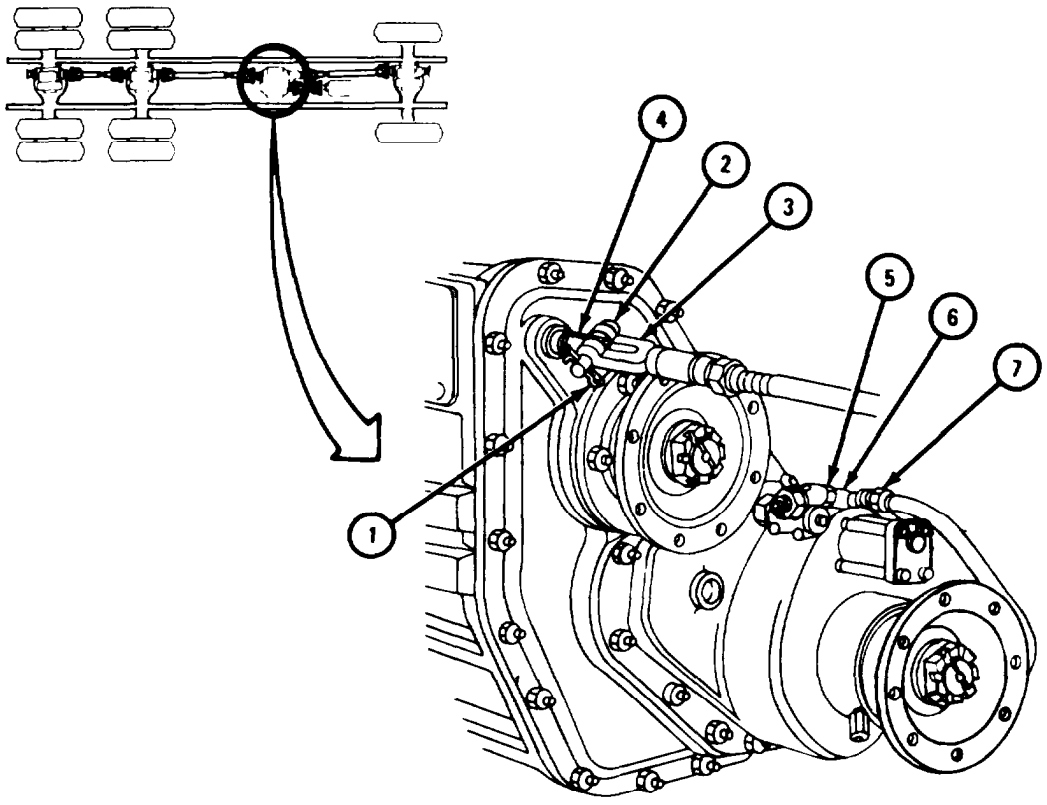
GO TO FRAME 2



FRAME 2

1. Take out cotter pin (1) and clevis pin (2).
2. Take control rod yoke (3) away from transfer shifting fork pin (4).
3. Unscrew coupling nut (5) and take off speedometer cable (6).
4. Unscrew and take off actuating hose (7).

GO TO FRAME 3

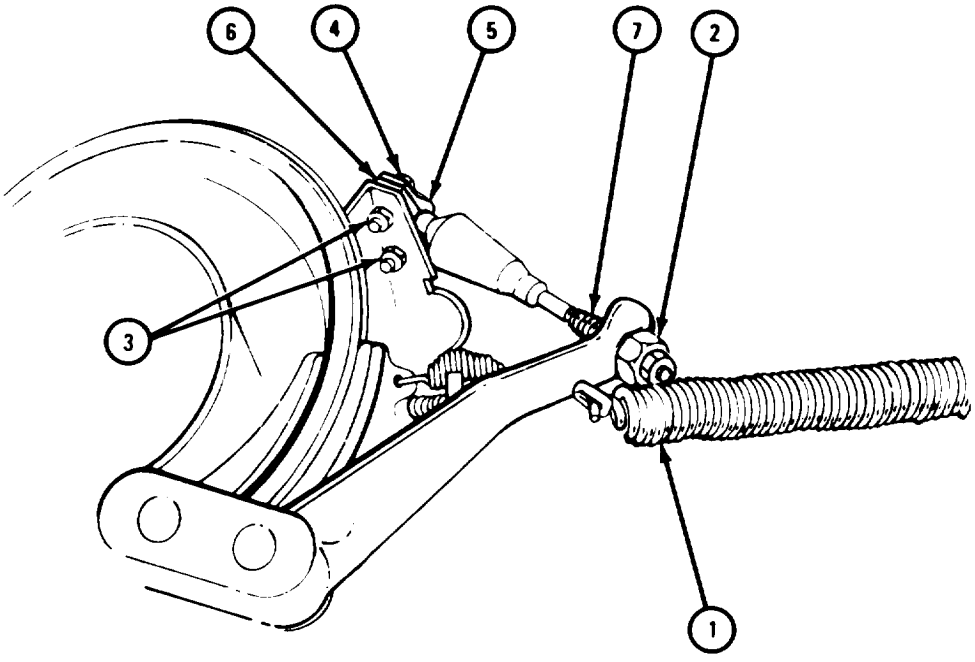


TA 084363

FRAME 3

1. Take off handbrake release spring (1).
2. Take off two nuts (2).
3. Take off two nuts (3) and take out two screws (4).
4. Take off clamp (5), spacer (6), and handbrake cable (7).

IF WORKING ON TRUCK M543A2, GO TO FRAME 4.
IF WORKING ON ALL OTHER TRUCKS, GO TO FRAME 5

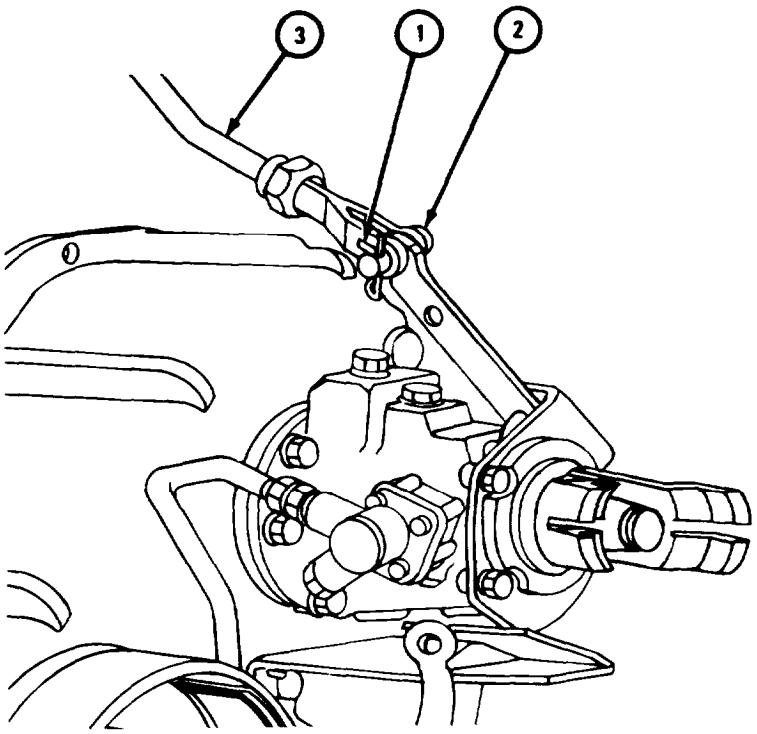


TA 084364

FRAME 4

1. Take out cotter pin (1) and take out clevis pin (2). Take off rod (3).

GO TO FRAME 5

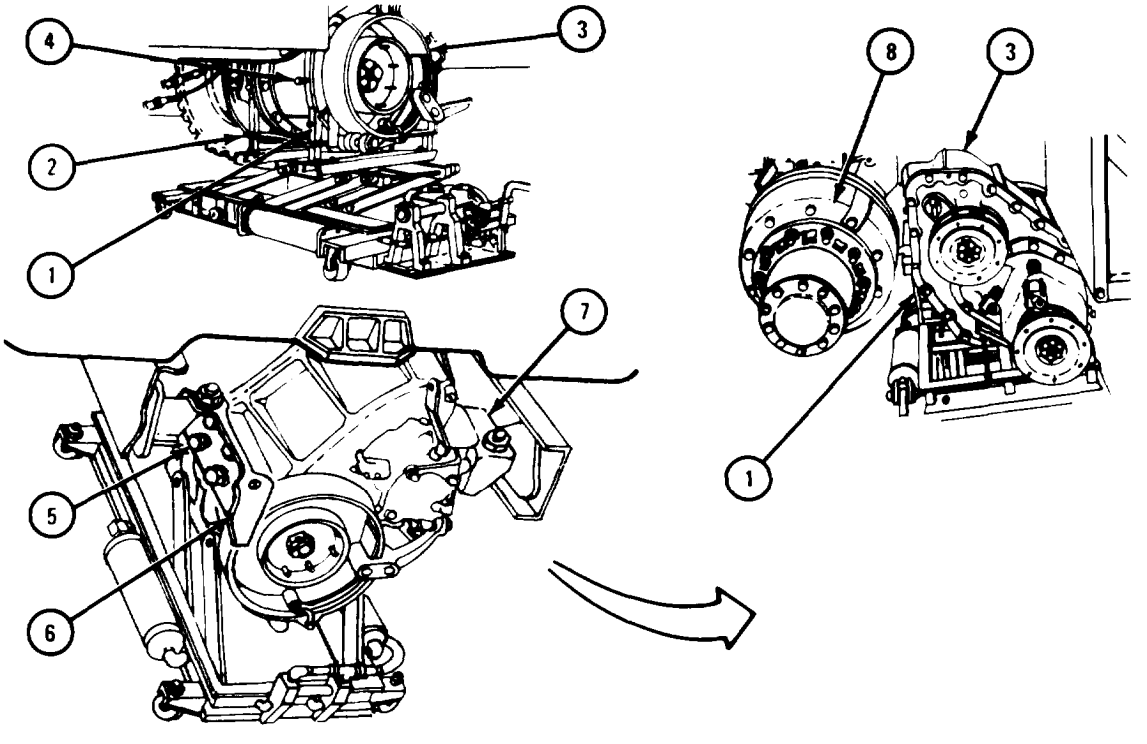


TA 084365

FRAME 5

1. Place transfer fixture (1) and lift (2), under transfer assembly (3).
2. Raise lift (2) until weight of transfer assembly (3) rests on transfer fixture (1).
3. Tighten six screws (4) in transfer fixture (1) until they touch transfer assembly (3).
4. Take out seven screws with washers (5), four from left mounting bracket (6) and three from right mounting bracket (7).
5. Slowly lower lift (2).
6. Turn lift (2) so that right side of transfer assembly (3) faces forward-rear axle (8).
7. Working on right side of truck, pull lift (2) with transfer fixture (1) and transfer assembly (3) out from under truck.

END OF TASK

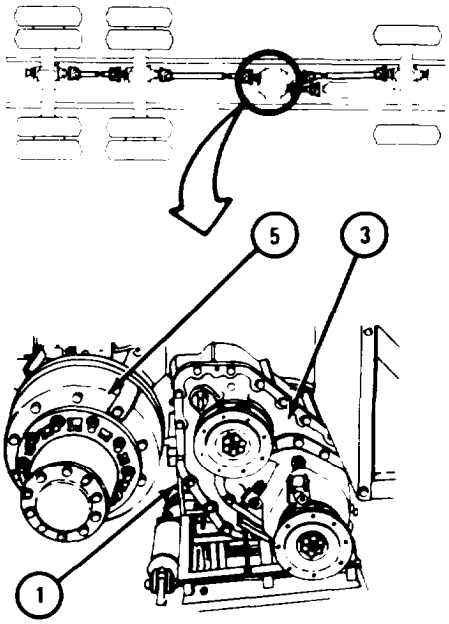


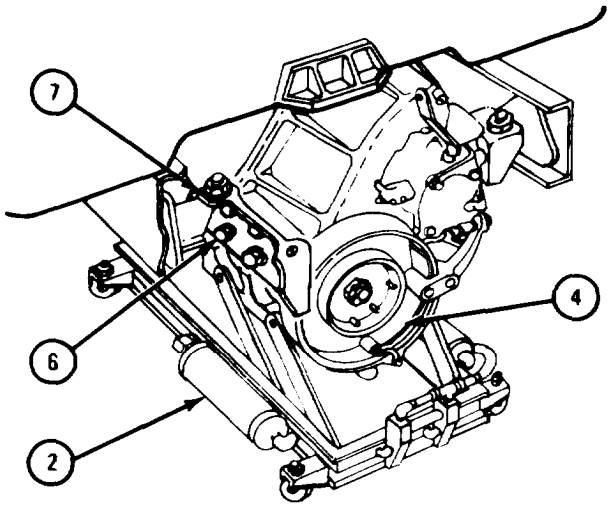
c. Replacement.

FRAME 1

1. Using transfer fixture (1) and lift (2), slide transfer assembly (3) under right side of truck as shown.
2. Turn transfer assembly (3) so that handbrake (4) faces forward-rear axle (5).
3. Lift transfer assembly (3) into place.
4. Put in seven screws and washers (6) and two mounting brackets (7), four into left mounting bracket and three into right mounting bracket.
5. Lower lift (2) and take away lift (2) and transfer fixture (1).

GO TO FRAME 2



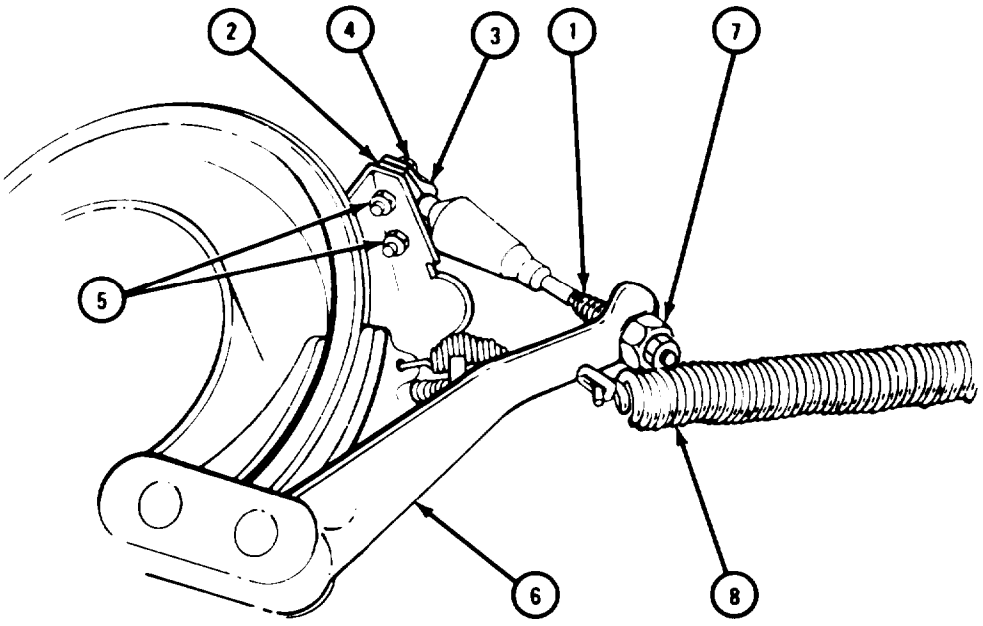


TA 084367

FRAME 2

1. Hold handbrake cable (1), spacer (2), and clamp (3) in place.
2. Put in and hold two screws (4).
3. Put on two nuts (5).
4. Slide cable (1) into handbrake lever (6).
5. Put on two nuts (7).
6. Hook handbrake release spring (8) on lever (6).

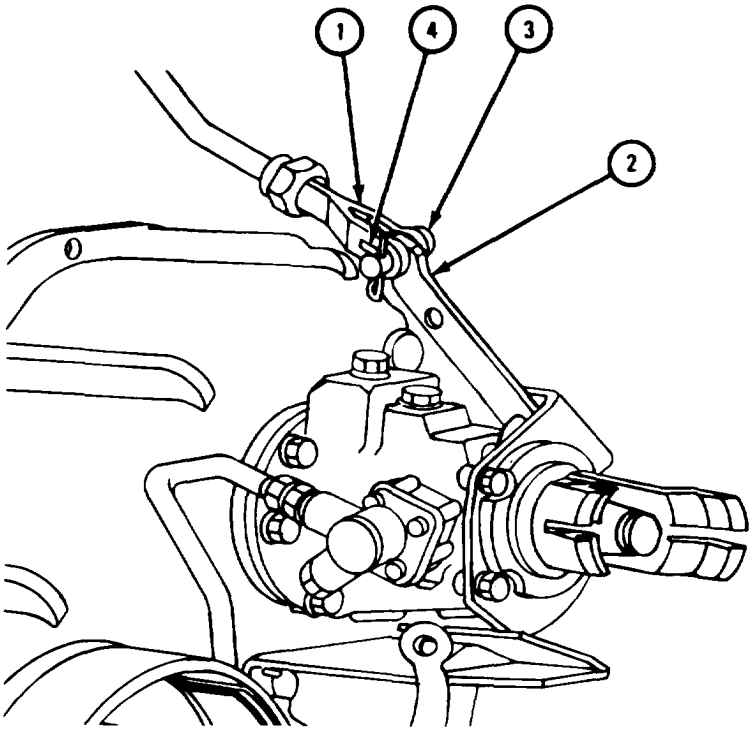
IF WORKING ON TRUCK M543A2, GO TO FRAME 3.
IF WORKING ON ALL OTHER TRUCKS, GO TO FRAME 4



TA 084368

FRAME 3

1. Hold yoke (1) in place on lever (2). Put in clevis pin (3). Put in cotter pin (4).
GO TO FRAME 4

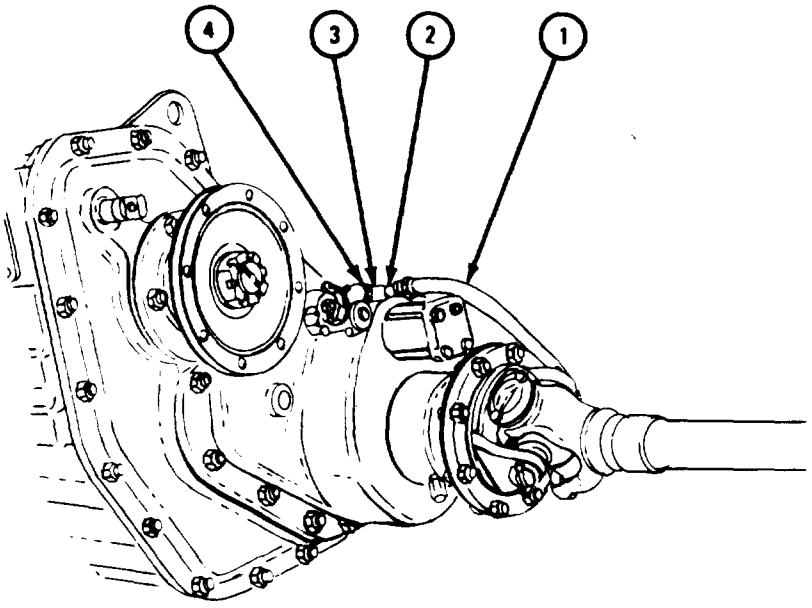


TA 084369

FRAME 4

1. Put on actuating hose (1) at elbow (2).
2. Hold speedometer cable (3) in pIace. Tighten coupling nut (4).

GO TO FRAME 5

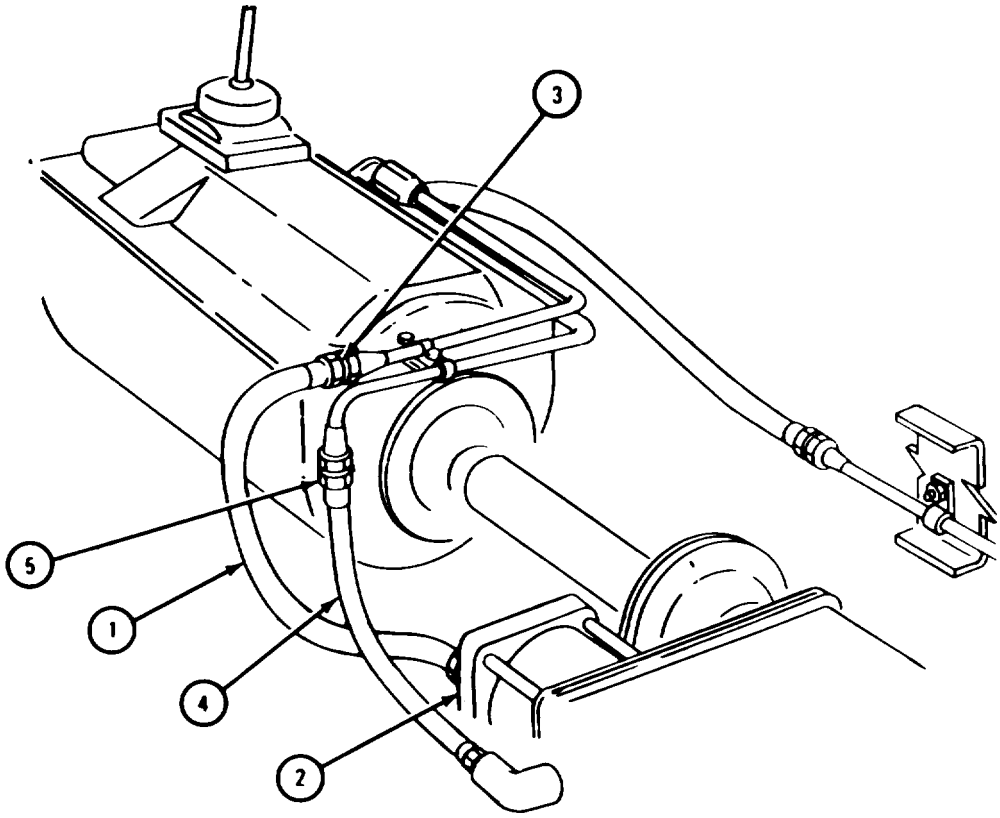


TA 084370

FRAME 5

1. Put on transfer-to-air cylinder hose (1) at air cylinder (2). Screw on coupling nut (3).
2. Put actuating hose (4) in place and screw on coupling nut (5).

GO TO FRAME 6



TA 087516

FRAME 6

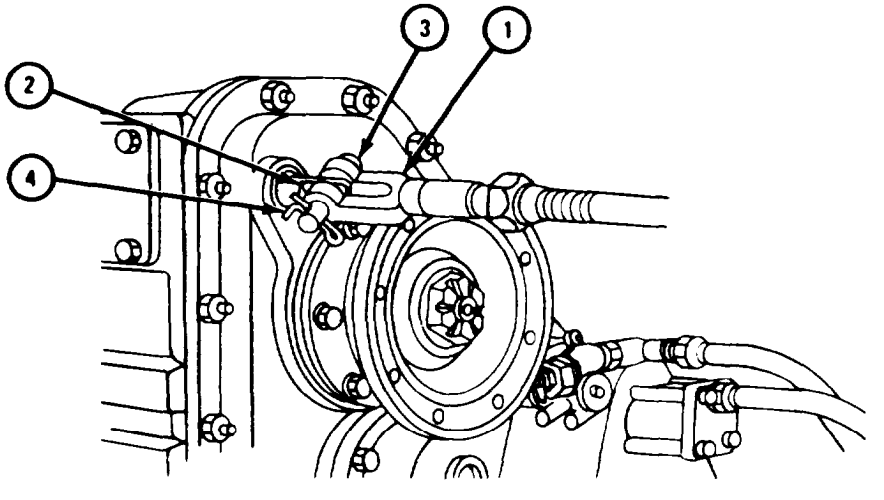
1. Hold control yoke (1) on shifter shaft (2) and put in clevis pin (3).
2. Put in cotter pin (4).

NOTE

Follow-on Maintenance Action Required:

1. Replace transfer-to-front axle propeller shaft on transfer case. Refer to TM 9-2320-211-20.
2. Replace transfer-to-transmission propeller shaft on transfer case. Refer to TM 9-2320-211-20.
3. Replace transfer-to-forward-rear axle propeller on transfer case. Refer to TM 9-2320-211-20.
4. Pressurize air system. Refer to TM 2320-211-10.
5. Replace inner right forward-rear wheel. Refer to TM 9-2320-211-10.
6. Replace outer right forward-rear wheel. Refer to TM 9-2320-211-10.
7. Adjust transfer shift linkage. Refer to TM 9-2320-211-20.
8. Adjust handbrake. Refer to TM 9-2320-211-10.
9. Check for proper operation of transfer. Refer to TM 9-2320-211-10.
10. For truck M543A2, replace power takeoff-to-hydraulic hoist pump propeller shaft on power takeoff unit on transfer case. Refer to TM 9-2320-211-20.
11. Replace air hydraulic cylinder shield. Refer to TM 9-2320-211-20.

END OF TASK



TA 084371

8-4. TRANSMISSION TRANSFER ASSEMBLY REPAIR.

TOOLS: Transfer case fixture, pn 8708898
Puller adapter, pn 7950090
Yoke replacer, pn 7950147
Mechanical puller kit, pn 8708724
Oil seal replacer, pn 7950152
Remover and replacer, pn 7950159
Right side adapter bracket, pn 7010363
Left side adapter bracket, pn 7010362
Intermediate shaft bearing adjusting fixture, fabricated locally
Rear output shaft bearing adjusting fixture, fabricated locally

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Multipurpose lubricant, GO 85/140, MIL-L-2105
Lubricating oil, ICE, OE/HDO 10, MIL-L-2104
Gear lubricating oil, GO 80/90, MIL-L-2105
Gear lubricating oil, GO 85/140, MIL-L-2105
Sealer compound, type II
Clear lacquer
White lead pigment
Wood block, 1 x 1 x 2 inches (2)
Safety wire
Transfer transmission gasket set
Rear output shaft cover and intermediate shaft bearing cover shim kit
Rear output shaft seal
Front input shaft seal
Front output shaft seal
Shift pin seal
Shifting fork pin seal

PERSONNEL: Two

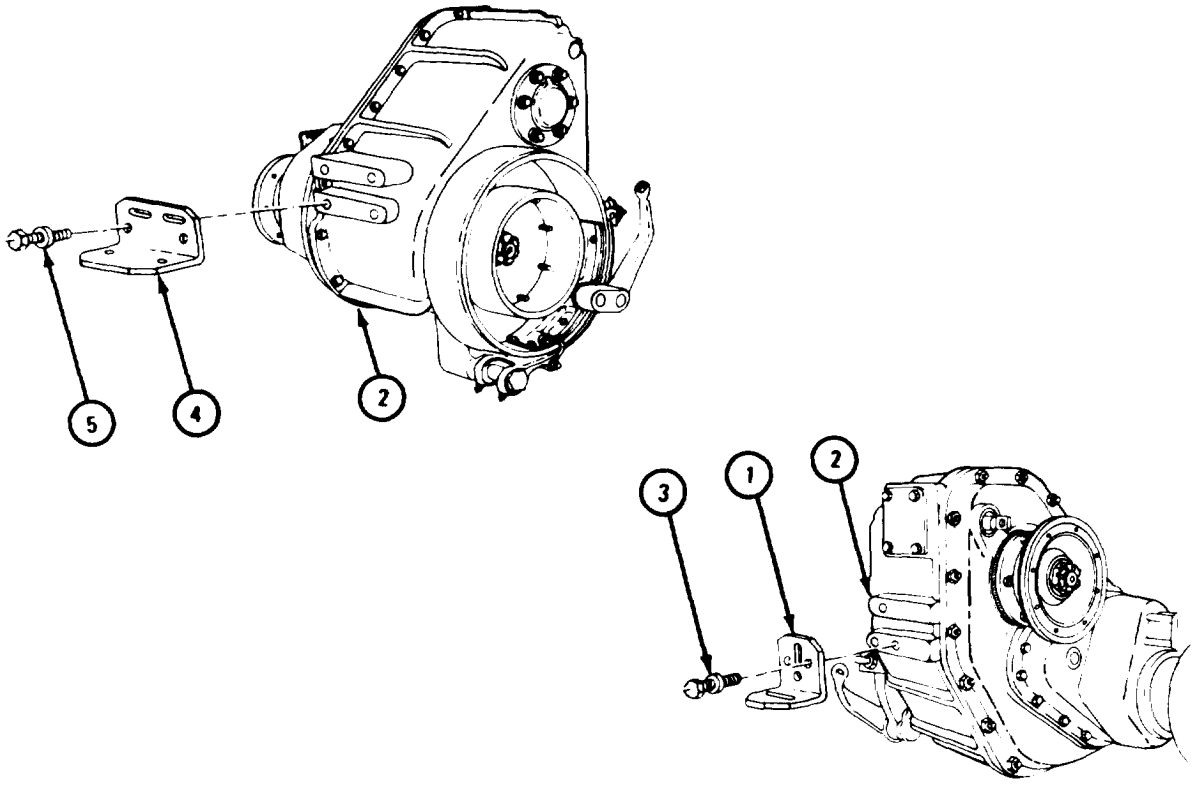
EQUIPMENT CONDITION: Transmission transfer assembly removed from truck.

a. Mounting Transmission Transfer Assembly in Stand.

FRAME 1

1. Hold right side adapter bracket (1) on right side of transfer assembly (2) and put in two screws with washers (3).
2. Hold left side adapter bracket (4) on left side of transfer assembly (2) and put in two screws with washer (5).

GO TO FRAME 2



FRAME 2

NOTE

Make sure that oil has been drained from transfer assembly (1).

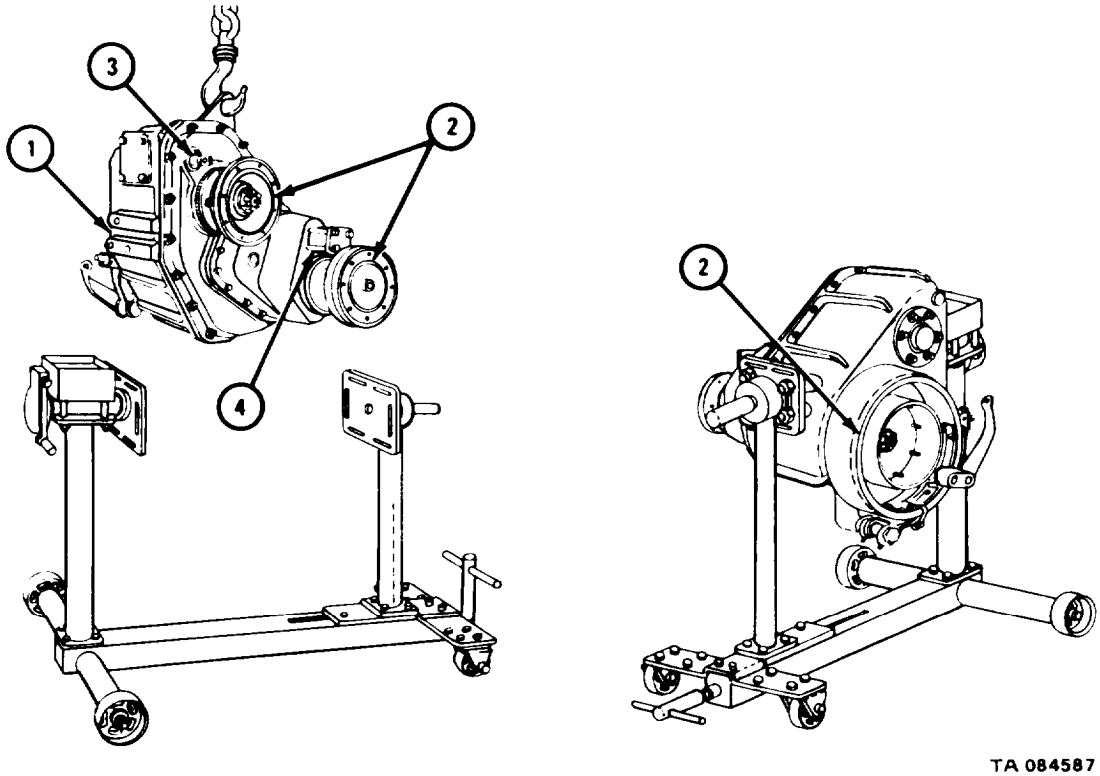
1. Using chain hoist, lift transfer assembly (1) to height for mounting in stand.
2. Mount transfer assembly (1) in stand.
3. Check that transfer (1) has no leaks around driveshafts (2), shifting fork pin (3), or sprag air cylinder (4).

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

4. Using solvent, clean outside of transfer assembly (1).
5. Remove handbrake. Refer to TM 9-2320-211-20.

END OF TASK



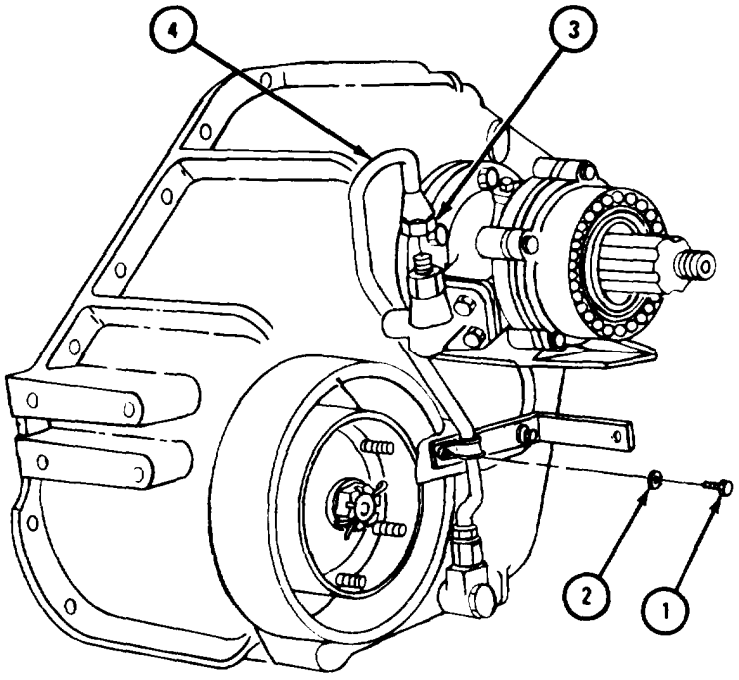
b. Disassembly into Subassemblies.

(1) Transmission transfer power takeoff (truck M543A2).

FRAME 1

1. Take out capscrew (1) and flat washer (2).
2. Loosen coupling nut (3) and take away driveshaft lube tube (4).

GO TO FRAME 2

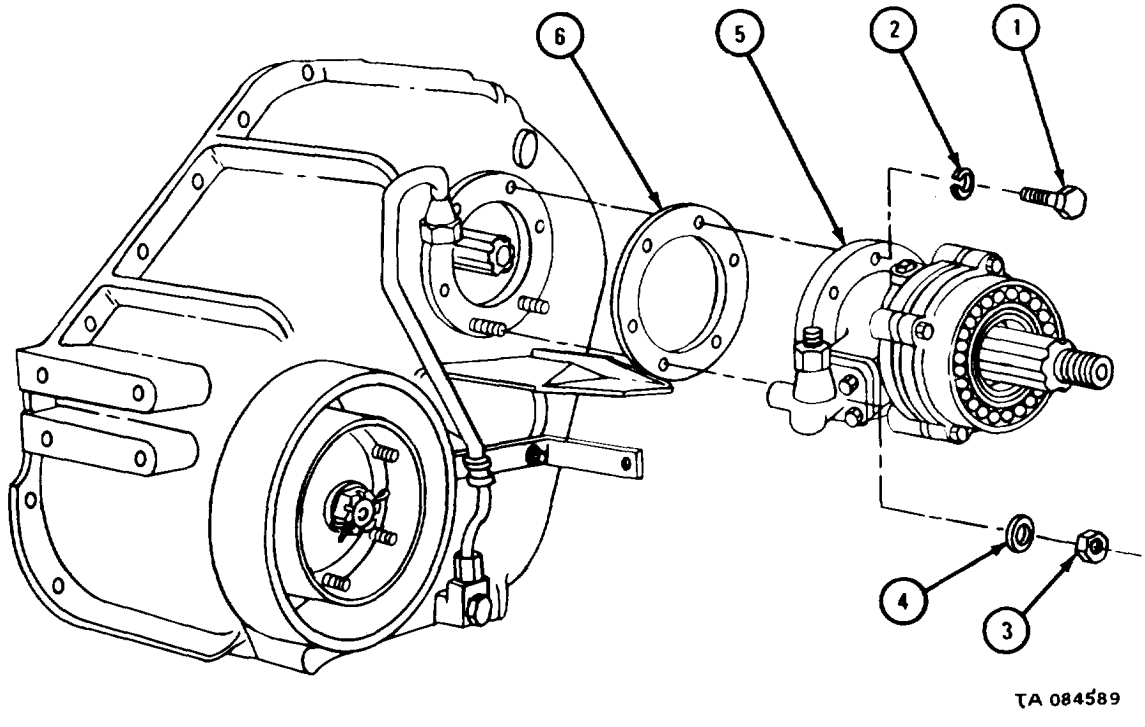


TA 084588

FRAME 2

1. Take out four capscrews (1) and lockwashers (2).
2. Take off two nuts (3) and flat washers (4).
3. Take off transmission transfer power takeoff (5) and gasket (6). Throw away gasket.

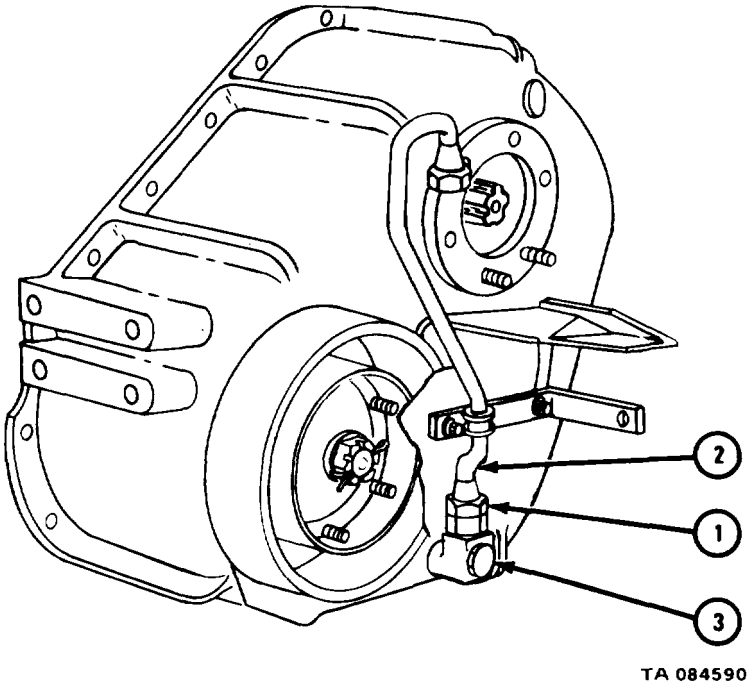
GO TO FRAME 3



FRAME 3

1. Loosen coupling nut (1) and takeoff drive shaft lube tube (2) and nut (1).
2. Takeout check valve assembly (3).

END OF TASK



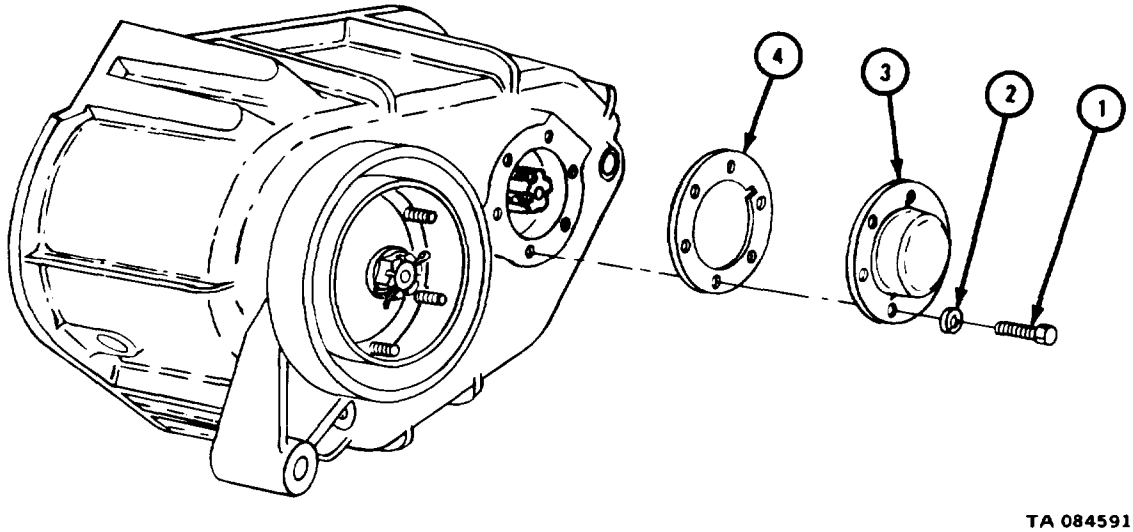
TA 084590

(2) Input shaft cover (all trucks except M543A2).

FRAME 1

1. Take out six screws (1) and washers (2).
2. Take off input shaft cover (3) and gasket (4). Throw away gasket.

END OF TASK



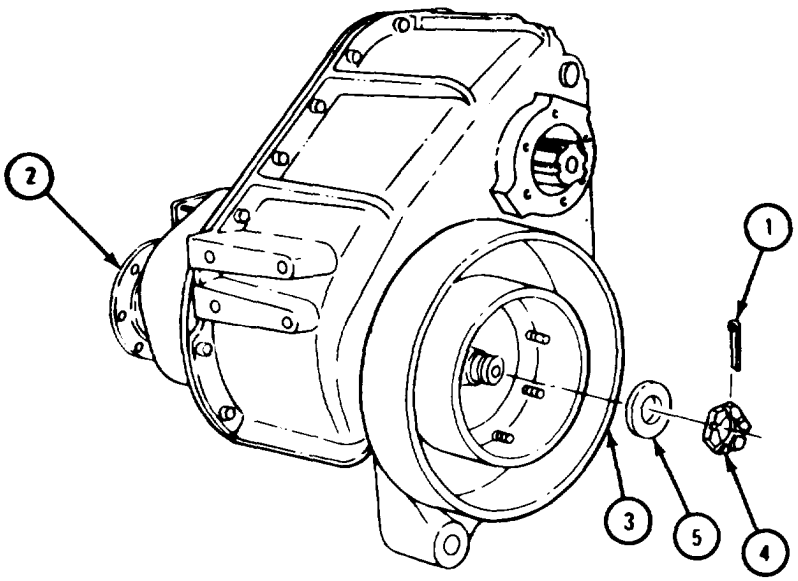
TA 084591

(3) Handbrake brake drum and flange assembly.

FRAME 1

1. Take out cotter pin (1).
2. Put prybar through screw hole in companion flange (2) to keep handbrake brake drum and flange assembly (3) from turning.
3. Take off nut (4) and washer (5).
4. Using puller kit, take off handbrake brake drum and flange assembly (3). Hold assembly to keep it from falling as it is taken off.
5. Take out prybar.

END OF TASK



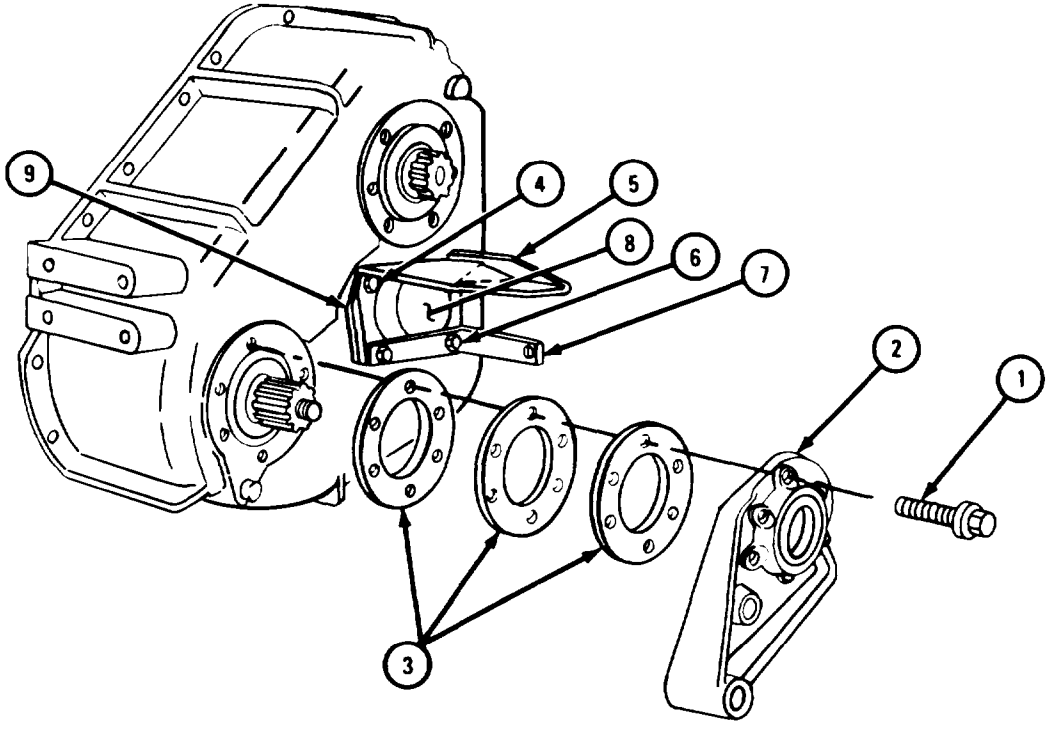
TA 084592

(4) Intermediate shaft bearing retainer cap and rear output shaft bearing retainer cap and seal.

FRAME 1

1. Take out six screws with washers (1). Tap off rear output shaft bearing retainer cap and seal assembly (2) and needed number of shims (3).
2. Take out two screws with washers (4). Take off bracket (5).
3. Take out two screws with washers (6). Take off bracket (7), intermediate shaft bearing retainer cap (8), and needed number of shims (9).

GO TO FRAME 2

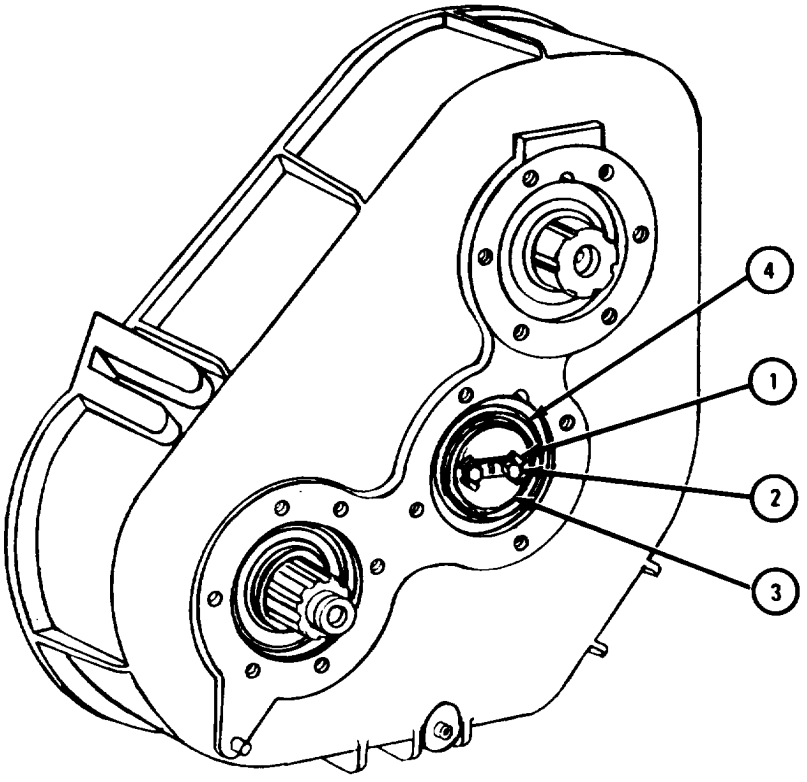


TA 084593

FRAME 2

1. Bend tabs of retaining plate (1) away from two screws (2).
2. Take out two screws (2).
3. Take off retaining plate (1) and thrust washer (3).
4. Take off collar (4).

END OF TASK



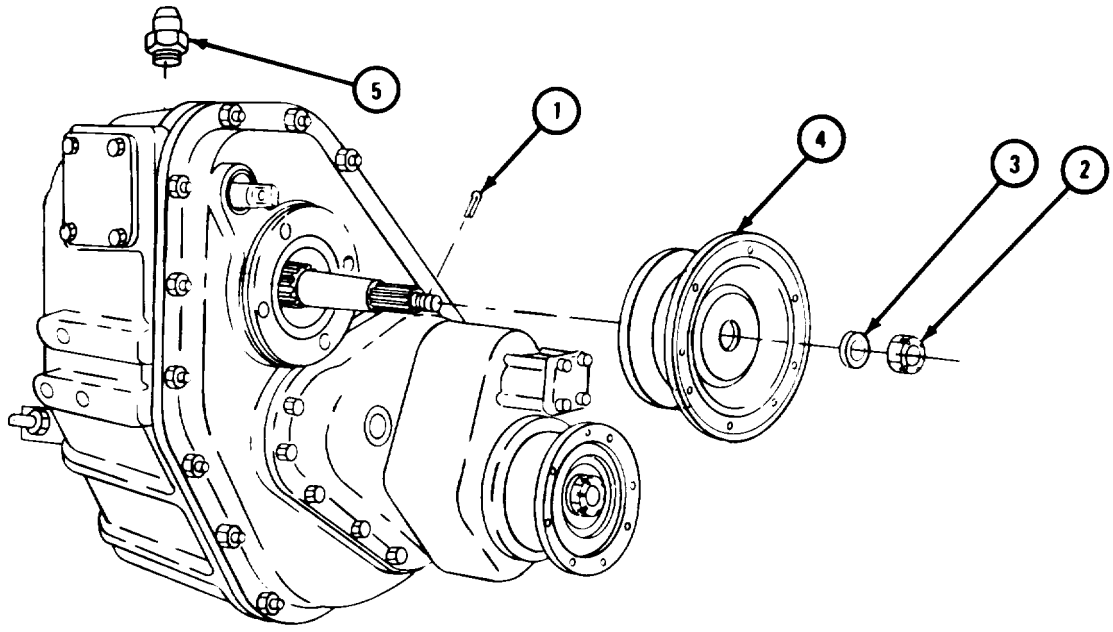
TA 084594

(5) Input shaft companion flange and transfer case breather assembly.

FRAME 1

1. Take out cotter pin (1).
2. Take off nut (2) and washer (3).
3. Using mechanical puller kit, take off companion flange (4).
4. Take out breather assembly (5).

END OF TASK



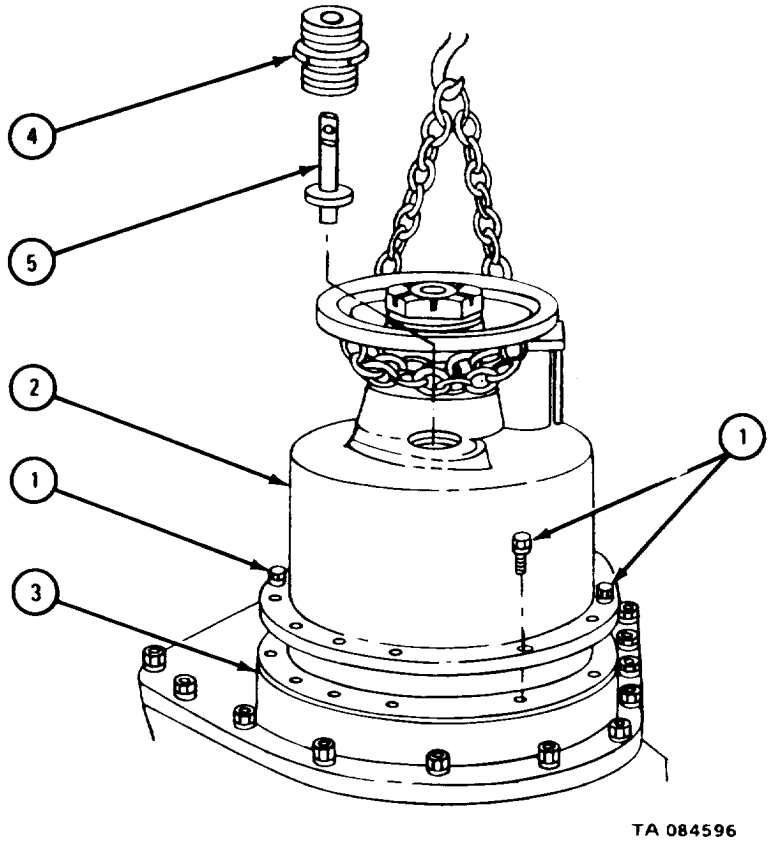
TA 084595

(6) Front output shaft cover assembly.

FRAME 1

1. Take out 10 screws and washers (1).
2. Screw two screws and washers (1) into two threaded puller mounting holes as shown. Tighten two screws until front output shaft cover (2) is raised.
3. Using chain and hoist, lift off and set down front output shaft cover (2). Take off chain and move hoist away.
4. Take off and throw away gasket (3).
5. Take out two screws and washers (1).
6. Take out speedometer union (4) and pin (5).

END OF TASK

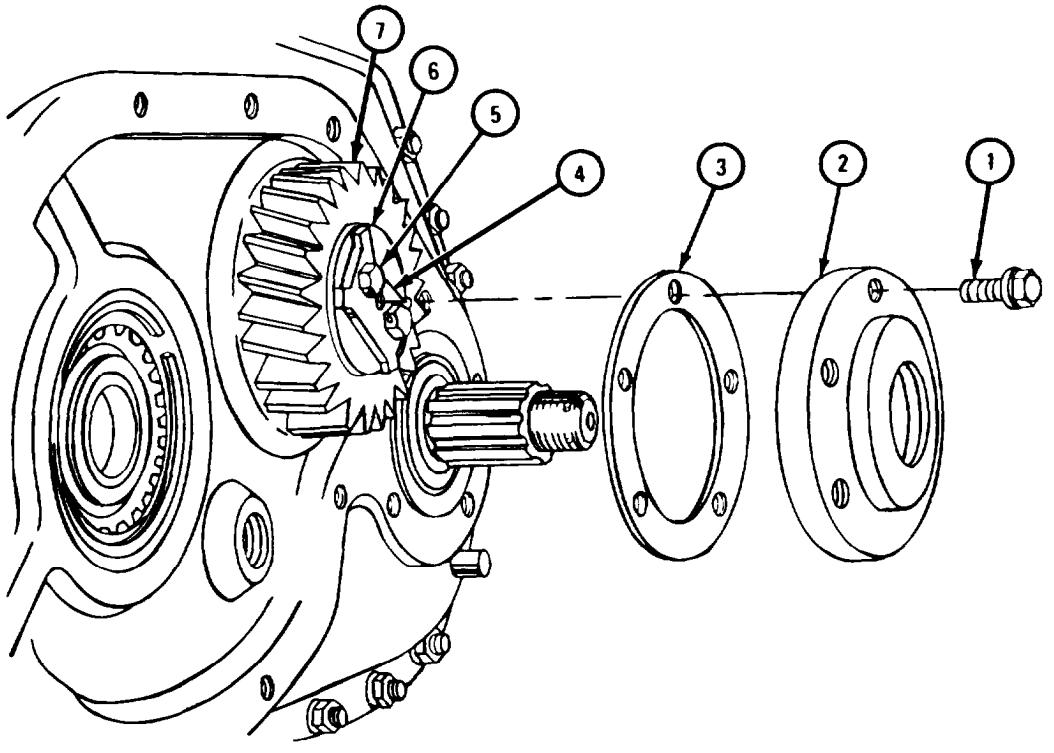


(7) Transfer housing front cover.

FRAME 1

1. Take out five screws with washers (1).
2. Take off input shaft bearing retainer cap (2) and gasket (3). Throw away gasket.
3. Bend tabs of retaining plate (4) away from two screws (5).
4. Take out two screws (5).
5. Take off retaining plate (4) and thrust washer (6).
6. Take off gear (7).

GO TO FRAME 2

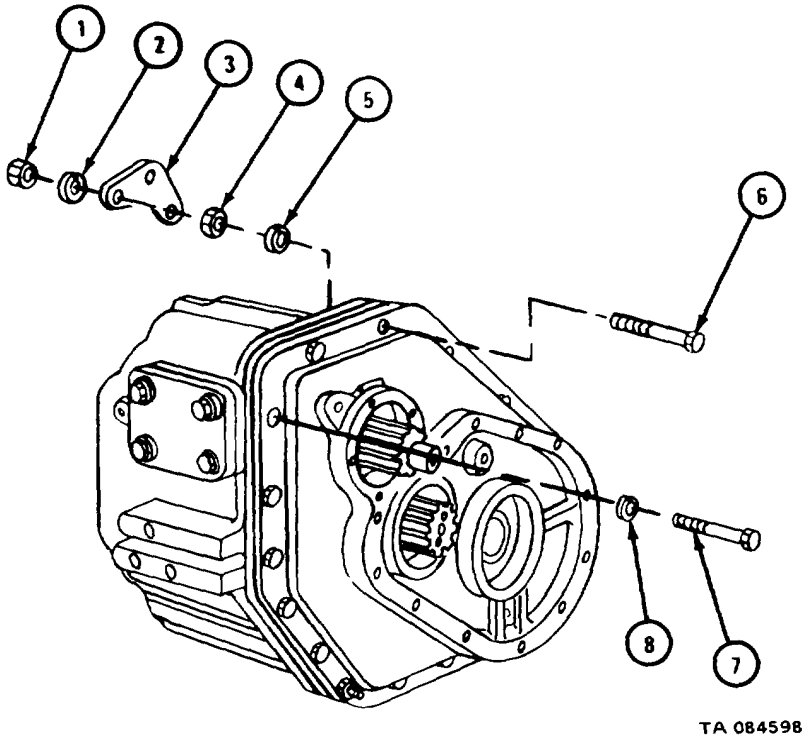


TA 084597

FRAME 2

1. Take off two nuts (1) and lockwashers (2).
2. Take off lifting plate (3).
3. Take off two nuts (4) and lockwashers (5). Take out two screws (6).
4. Takeout screw (7) and lockwasher (8).

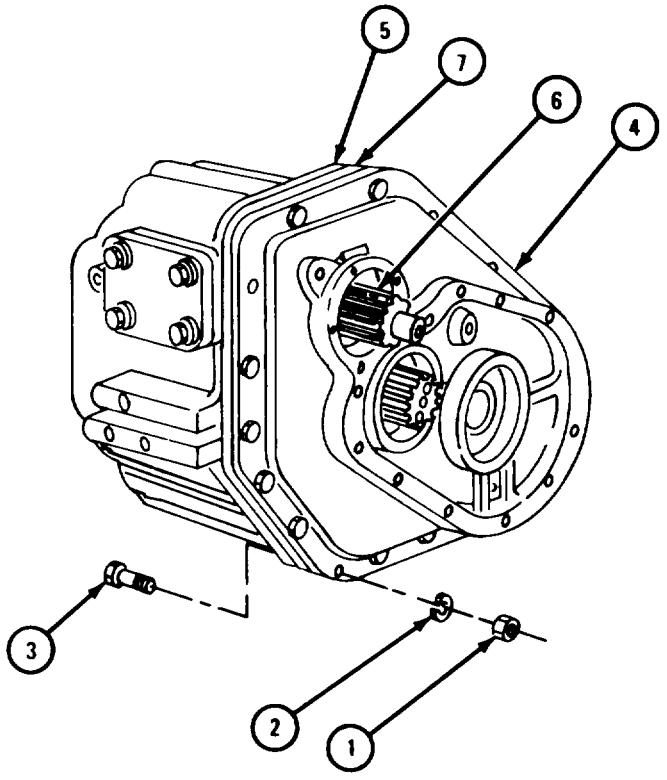
GO TO FRAME 3



FRAME 3

1. Take off 15 nuts (1) and lockwashers (2). Take out 15 screws (3).
2. Screw three screws (3) into threaded holes in transfer case cover (4) and tighten until cover is free from transfer housing (5).
3. Put chain hoist on cover (4).
4. Tap input shaft (6) free.
5. Using chain hoist and prybar, lift off transfer case cover (4) and put it on workbench. Take off and throw away gasket (7). Take off chain hoist.
6. Take out three screws (3).

END OF TASK



TA 084599

(8) Backlash check.

FRAME 1

NOTE

This frame tells how to check backlash for all gears. Do this frame when measuring backlash for each set of gears in frames 2 and 3.

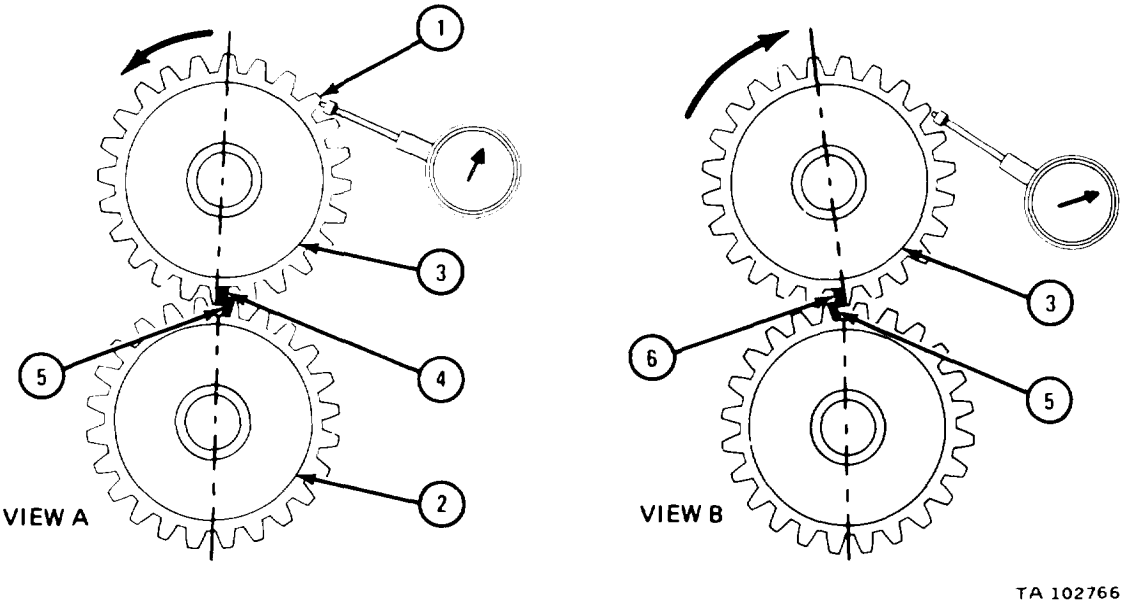
1. Mount dial indicator on housing and set stem against side of gear tooth (1) as shown.

NOTE

When measuring backlash, make sure that gear (2) does not turn. If gear turns, backlash readings will be wrong.

2. Turn gear (3) away from dial indicator until gear tooth (4) touches gear tooth (5) as shown in view A.
3. Set dial indicator to read 0.
4. Turn, gear (3) towards dial indicator until gear tooth (6) touches other side of gear tooth (5) as shown in view B.
5. Check that dial indicator readings are within wear limits given for each set of gears.

GO TO FRAME 2



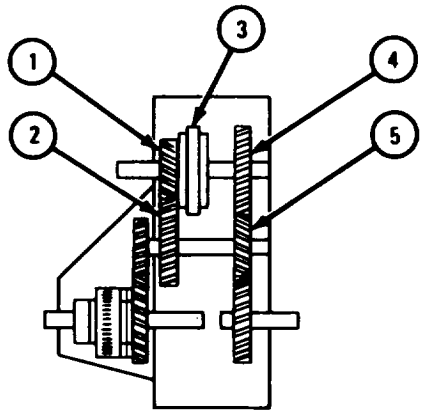
FRAME 2

NOTE

Readings must be within limits given in table 8-1. If readings are not within given limits, throw away both gears and get new ones.

1. Measure backlash between low speed gear (1) and low speed intermediate gear (2).
2. Measure backlash between low speed gear (1) and synchronizer (3).
3. Measure backlash between synchronizer (3) and high speed gear (4).
4. Measure backlash between high speed gear (4) and high speed intermediate gear (5).

GO TO FRAME 3



TA 102767

Table 8-1. Transmission Transfer Low Speed Gear Backlash Wear Limits

Index Number	Item/Point Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	Low speed gear to low speed intermediate gear	0.005 to 0.010	None
1 and 3	Low speed gear to synchronizer	0.004 to 0.010	None
3 and 4	Synchronizer to high speed gear	0.004 to 0.010	None
4 and 5	High speed gear to high speed intermediate gear	0.005 to 0.010	None

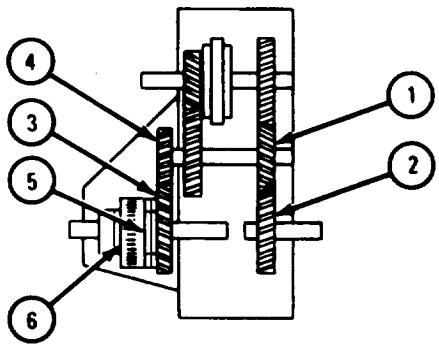
FRAME 3

NOTE

Readings must be within limits given in table 8-2. If readings are not within given limits, throw away both gears and get new ones.

1. Measure backlash between high speed intermediate gear (1) and rear driven gear (2).
2. Measure backlash between front output driven gear (3) and front intermediate drive gear (4).
3. Measure backlash between front output driven gear (3) and sprag clutch shifter collar (5).
4. Measure backlash between sprag clutch shifter collar (5) and sprag clutch outer race (6).

END OF TASK



TA 102768

Table 8-2. Transmission Transfer High Speed Gear Backlash Wear Limits

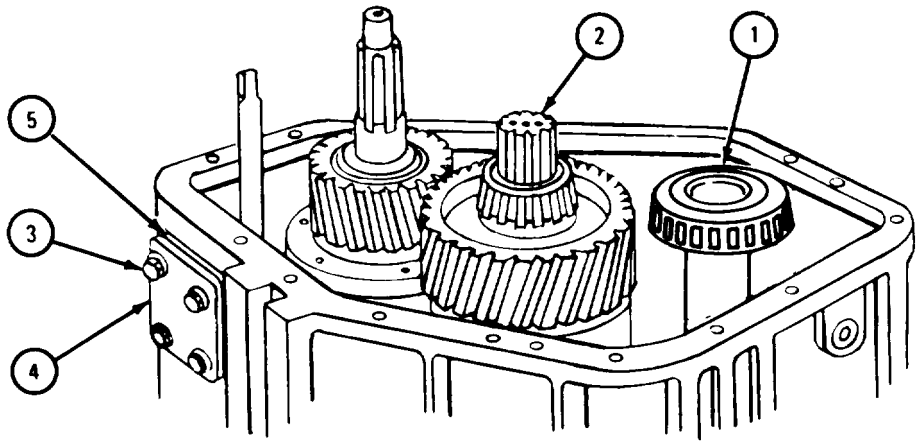
Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	High speed intermediate gear to rear driven gear	0.005 to 0.010	None
3 and 4	Front output driven gear to front intermediate drive gear	0.005 to 0.010	None
3 and 5	Front output driven gear to sprag clutch shifter collar	0.017	None
5 and 6	Sprag clutch shifter collar to sprag clutch outer race	0.017	None

(9) Shaft assemblies.

FRAME 1

1. Carefully lift out rear output shaft assembly (1).
2. Carefully lift out intermediate shaft assembly (2).
3. Take out four screws and washers (3).
4. Take off cover plate (4) and gasket (5). Throw away gasket.

GO TO FRAME 2

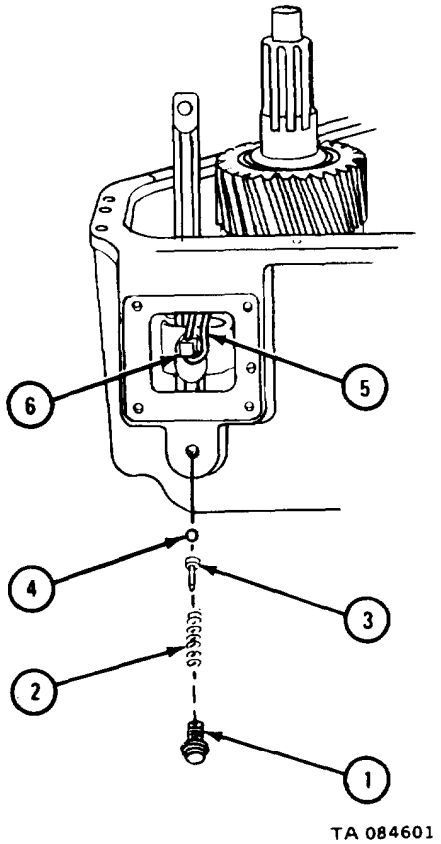


TA 084600

FRAME 2

1. Take out spring retaining screw and washer (1).
2. Take out spring (2).
3. Using small magnet, take out plunger (3) and poppet ball (4).
4. Take off safety wire (5).
5. Take out setscrew (6).

GO TO FRAME 3



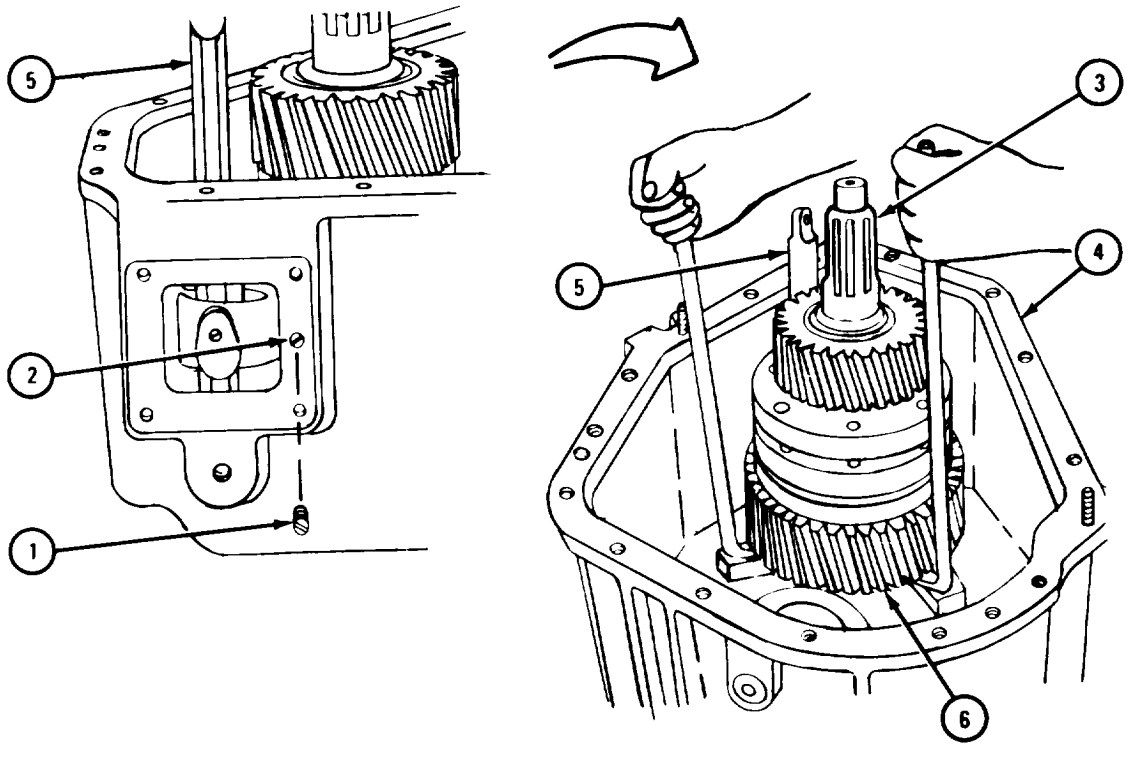
FRAME 3

WARNING

Input shaft assembly (3) is heavy. Be careful to avoid injury.

1. Take out screw (1).
2. Loosen screw (2).
3. Using two prybars and wood blocks as shown, lift input shaft assembly (3) free of transfer housing (4).
4. Holding gear shifter shaft (5) and input shaft high speed gear (6), lift input shaft assembly (3) out of transfer housing (4). Set down shaft assembly.

END OF TASK



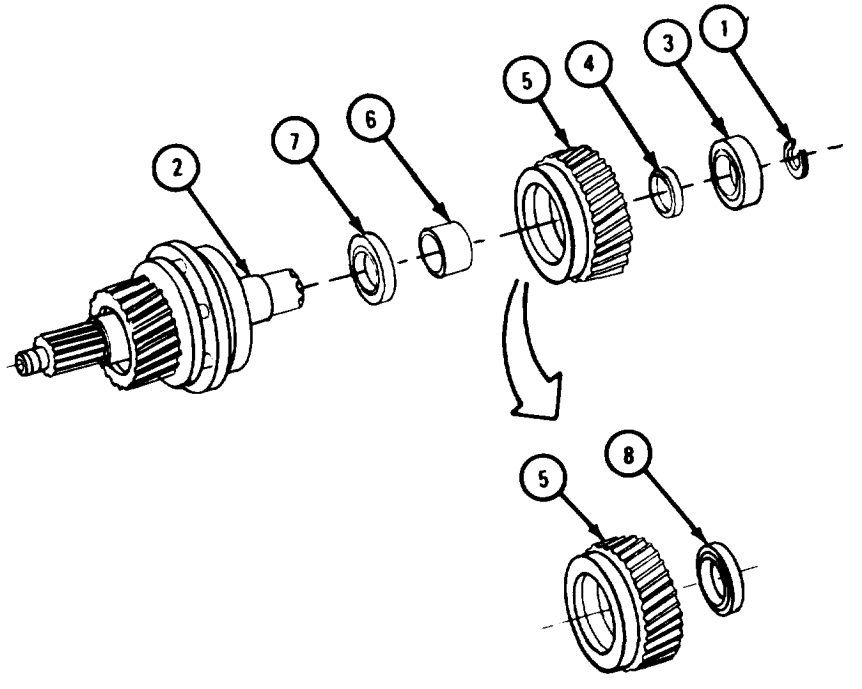
c. Disassembly of Subassemblies.

(1) Input shaft assembly.

FRAME 1

1. Take retaining ring (1) off input shaft (2).
2. Using hammer and brass punch, take off bearing (3) and thrust washer (4). Refer to para 7-7.
3. Press off low speed gear assembly (5). Take off bearing spacer (6).
4. Using hammer and brass punch, take out bearing (7).
5. Using hammer and brass punch, take bearing (8) out of gear (5).

GO TO FRAME 2

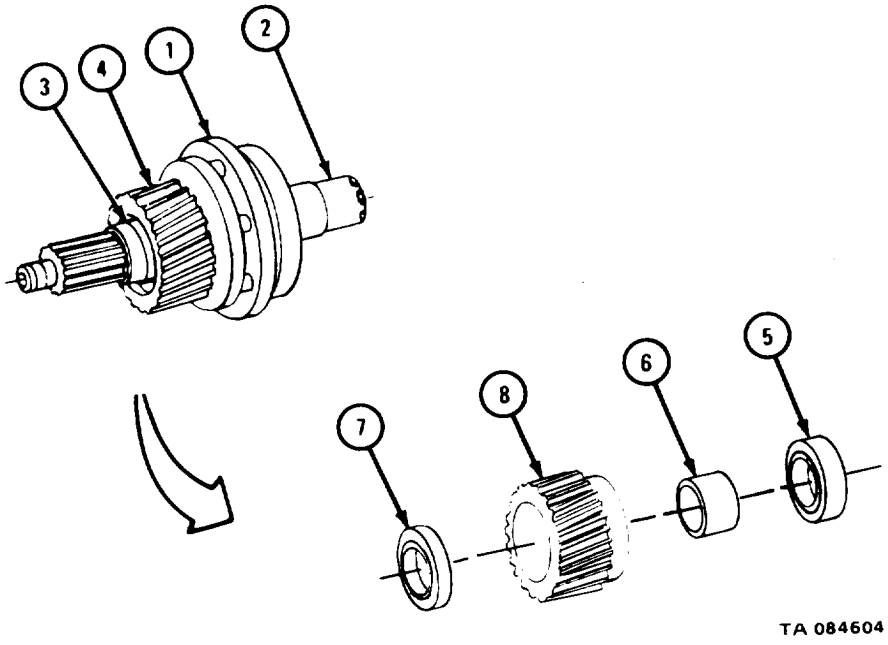


TA 084603

FRAME 2

1. Take synchromesh clutch (1) off input shaft (2).
2. Take off spacing collar (3). Press off high speed gear assembly (4).
3. Using hammer and brass punch, take off bearing (5) and spacer (6).
4. Using hammer and brass punch, take bearing (7) out of gear (8).

END OF TASK

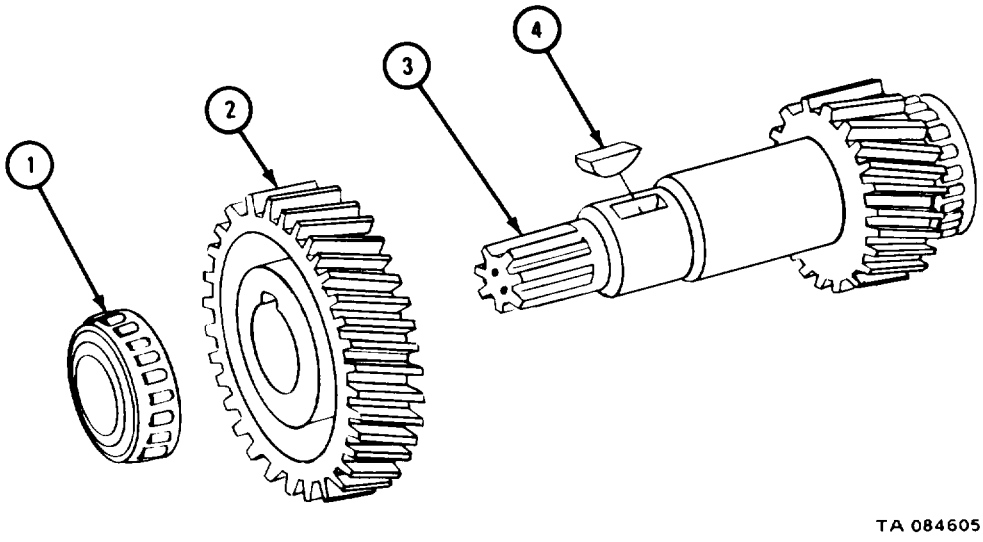


(2) Intermediate shaft assembly.

FRAME 1

1. Press bearing cone (1) and high speed gear (2) off intermediate shaft (3). Refer to para 7-7.
2. Take out woodruff key (4).

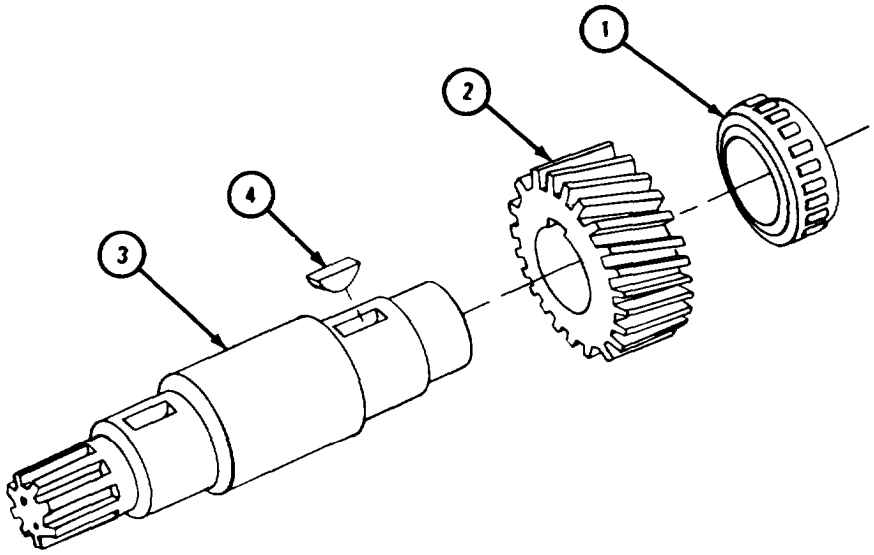
GO TO FRAME 2



FRAME 2

1. Press bearing cone (1) and low speed gear (2) off intermediate shaft (3). Refer to para 7-7.
2. Take out woodruff key (4).

END OF TASK



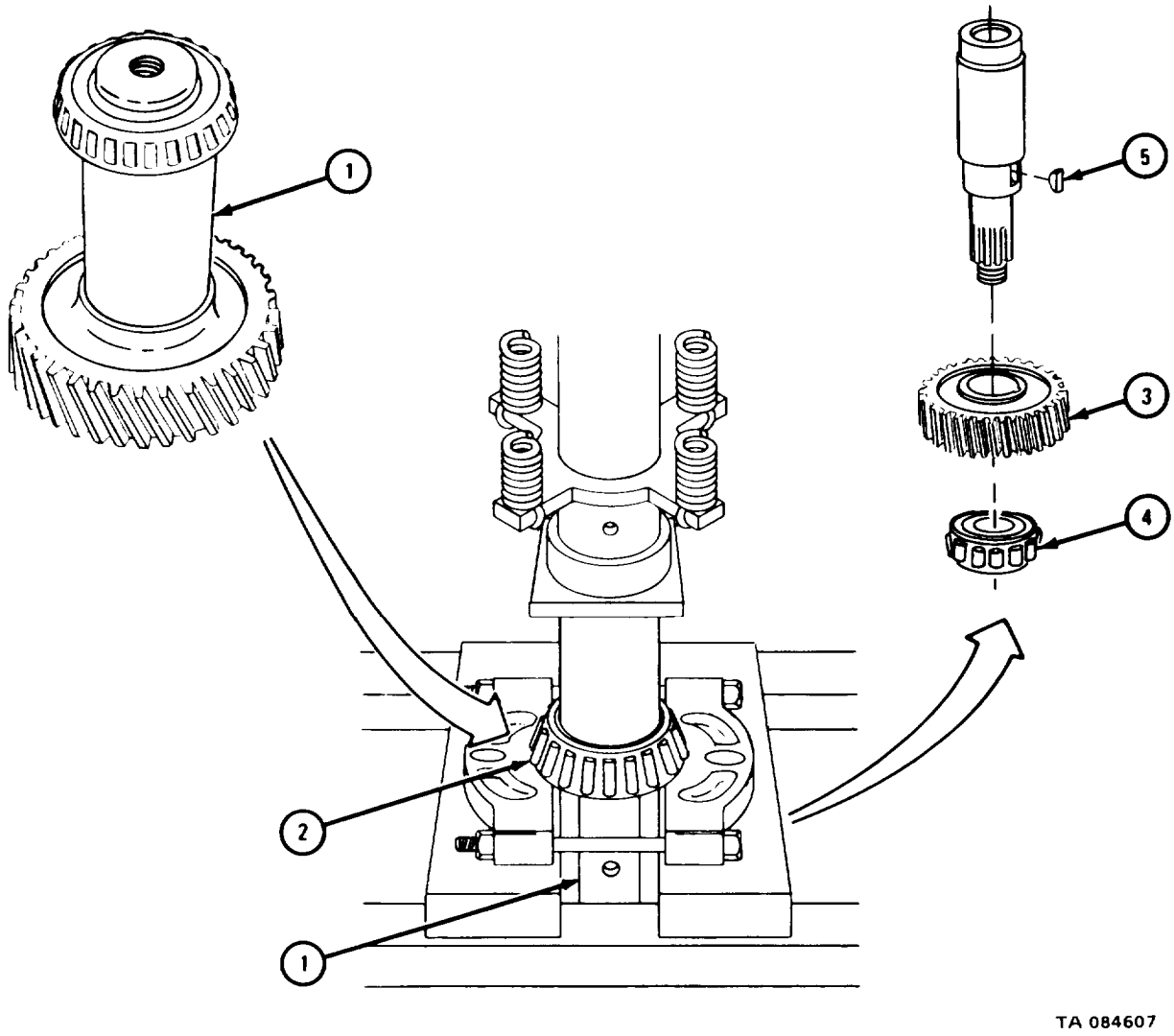
TA 084606

(3) Rear output shaft.

FRAME 1

1. Set rear output shaft (1) in hydraulic press as shown.
2. Press off inner bearing cone (2). Take shaft out of press.
3. Turn shaft over and put it back in press. Press off reverse shift gear (3) and outer bearing cone (4).
4. Take shaft out of press. Take out woodruff key (5).

END OF TASK

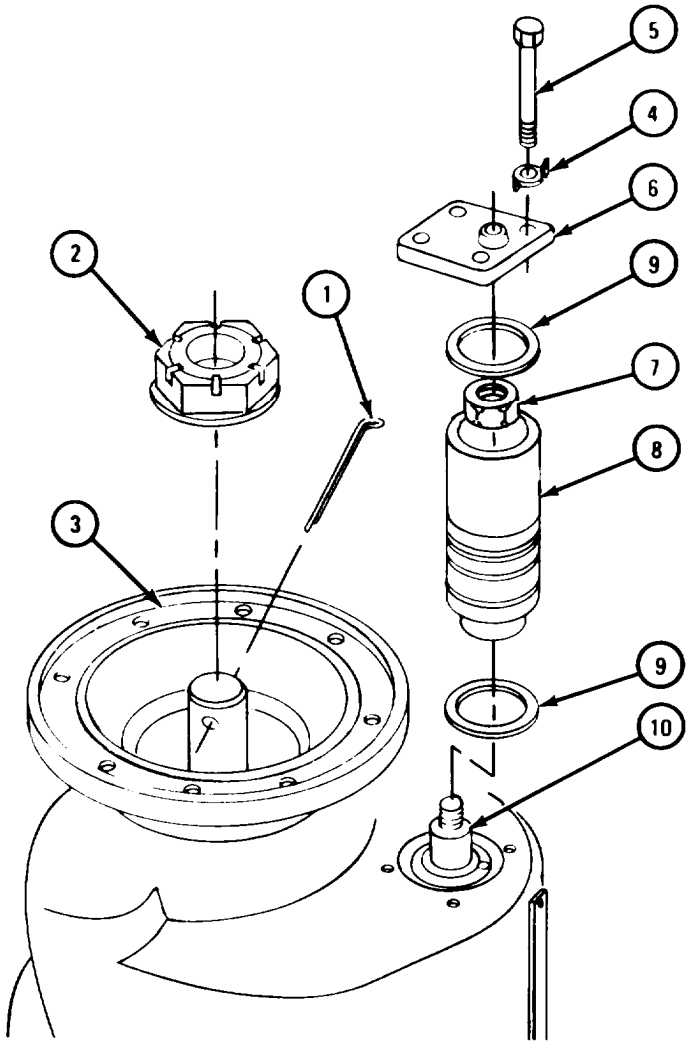


(4) Front output shaft cover assembly.

FRAME 1

1. Take out cotter pin (1).
2. Take off nut and washer (2).
3. Using puller, take off companion flange (3).
4. Bend tabs of four lockwashers (4) away from screws (5).
5. Take out four screws (5). Take off cylinder cover (6) and nut (7).
6. Take off cylinder (8) and two gaskets (9), one from cover (6) and one from shifter shaft (10).

GO TO FRAME 2

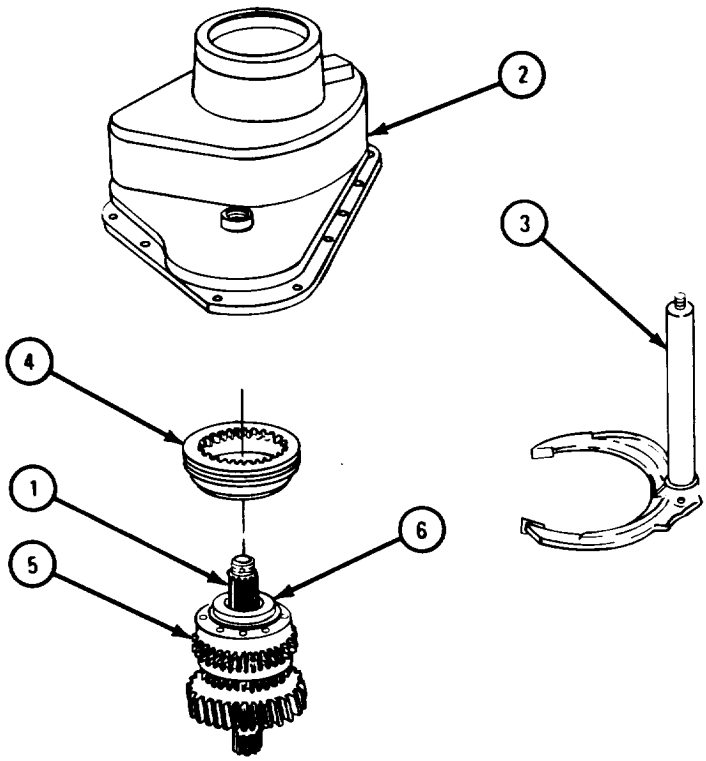


TA 084608

FRAME 2

1. Using hammer and brass punch, take front output shaft (1) out of front output cover (2).
2. Take shifting fork pin (3) off reverse shift gear (4).
3. Aline teeth of reverse shift gear (4) and sprag clutch (5) and take off reverse shift gear.
4. Take off collar (6).

GO TO FRAME 3

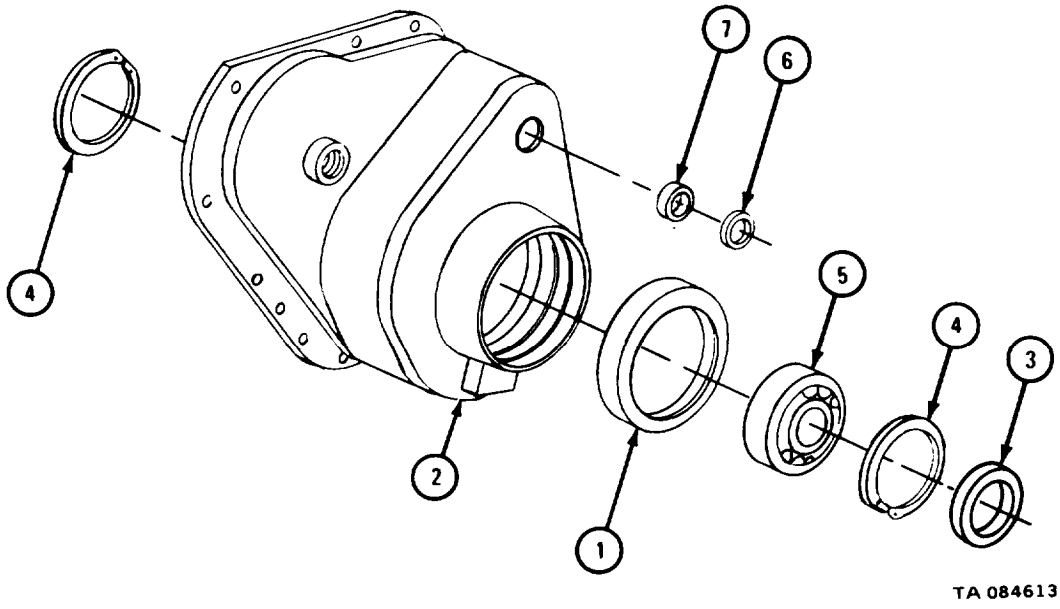


TA 084609

FRAME 3

1. Take front output shaft seal (1) out of front output shaft cover (2).
2. Take out collar (3).
3. Take out two retaining rings (4).
4. Press out bearing (5). Refer to para 7-7.
5. Take out air cylinder shifter shaft washer (6) and seal (7).

END OF TASK



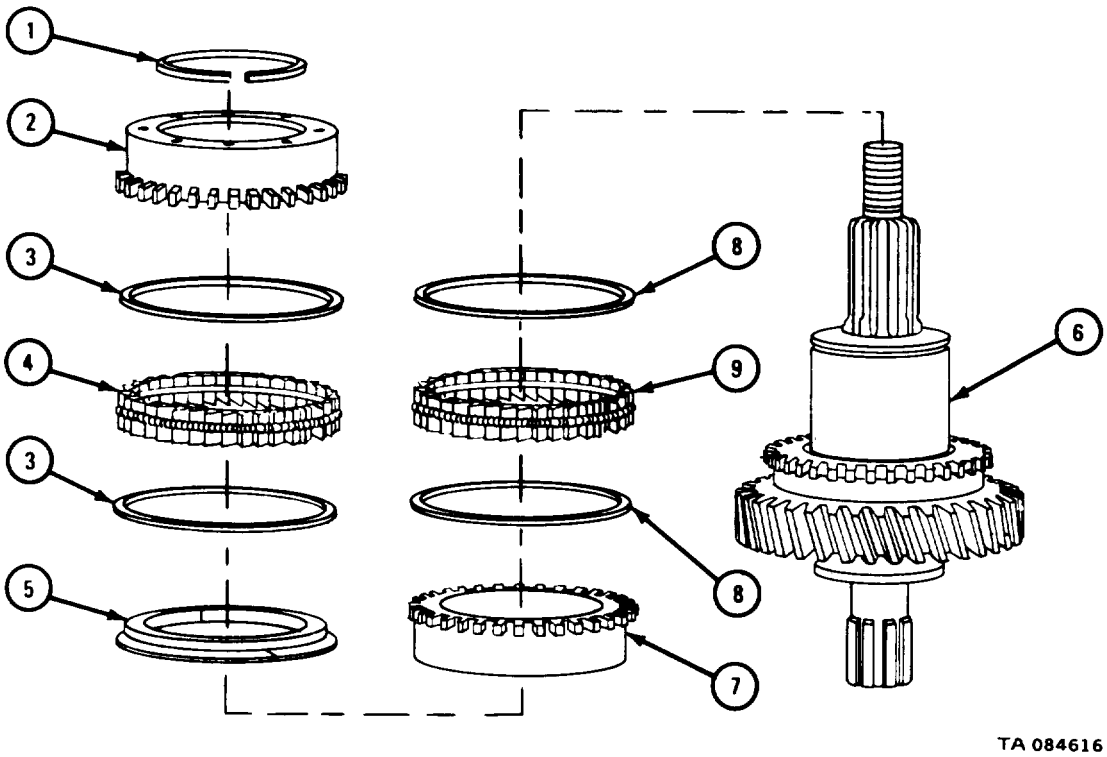
TA 084613

(5) Front output shaft assembly.

FRAME 1

1. Take off retaining ring (1).
2. Lift race (2), two springs (3), front sprag assembly (4), and transfer case washer (5) off drive sprag race (6).
3. Take off transfer case washer (5) and take out two springs (3) and front sprag assembly (4) from race (2).
4. Lift race (7) with two springs (8) and rear sprag assembly (9) off drive sprag race (6).
5. Take out two springs (8) and rear sprag assembly (9) from race (7).

GO TO FRAME 2



FRAME 2

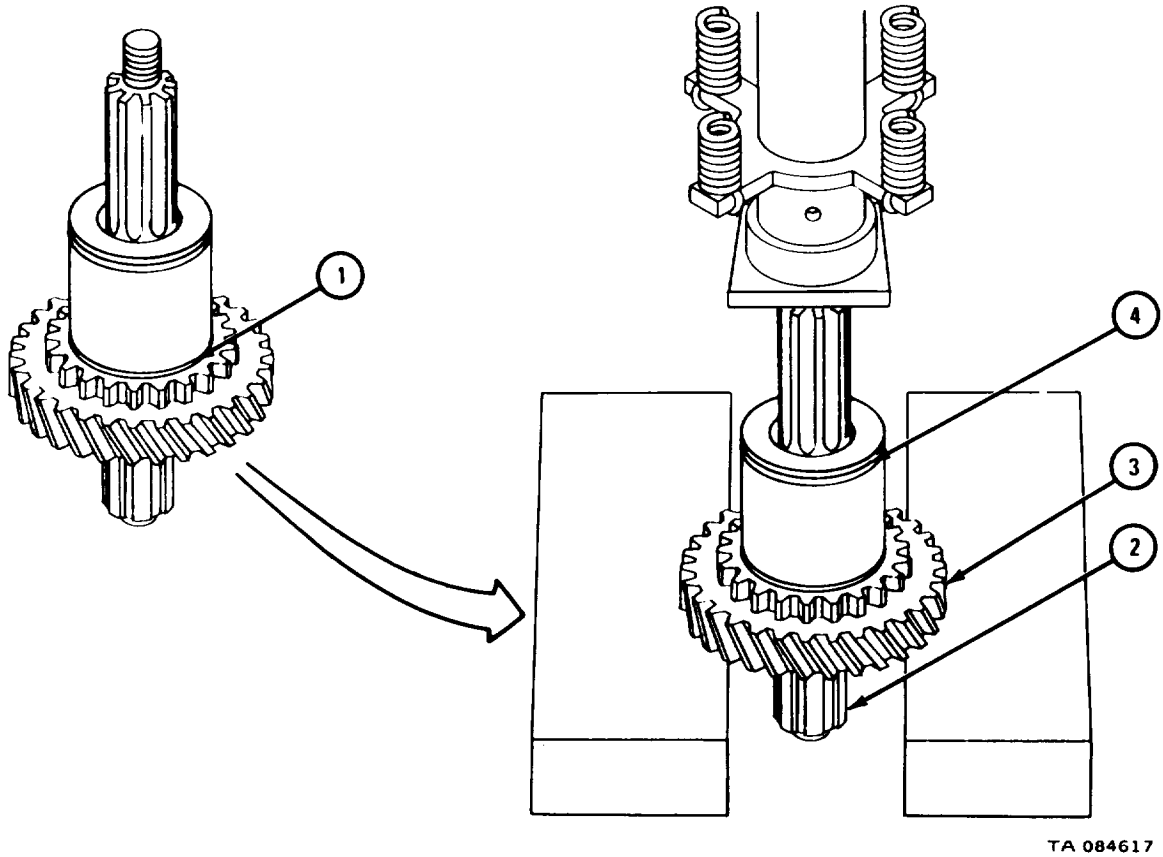
1. Take off retaining ring (1).

Soldier A 2. Set up front output shaft (2) in hydraulic press as shown.

Soldier B 3. Working under hydraulic press, hold end of front output shaft (2) to keep it from falling when front output shaft is pressed out of transmission gear (3) and inner race (4). Tell soldier A when ready.

Soldier A 4. Press out front output shaft (2).

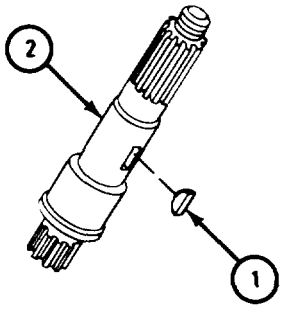
GO TO FRAME 3



FRAME 3

1. Take out woodruff key (1) from front output shaft (2).

END OF TASK



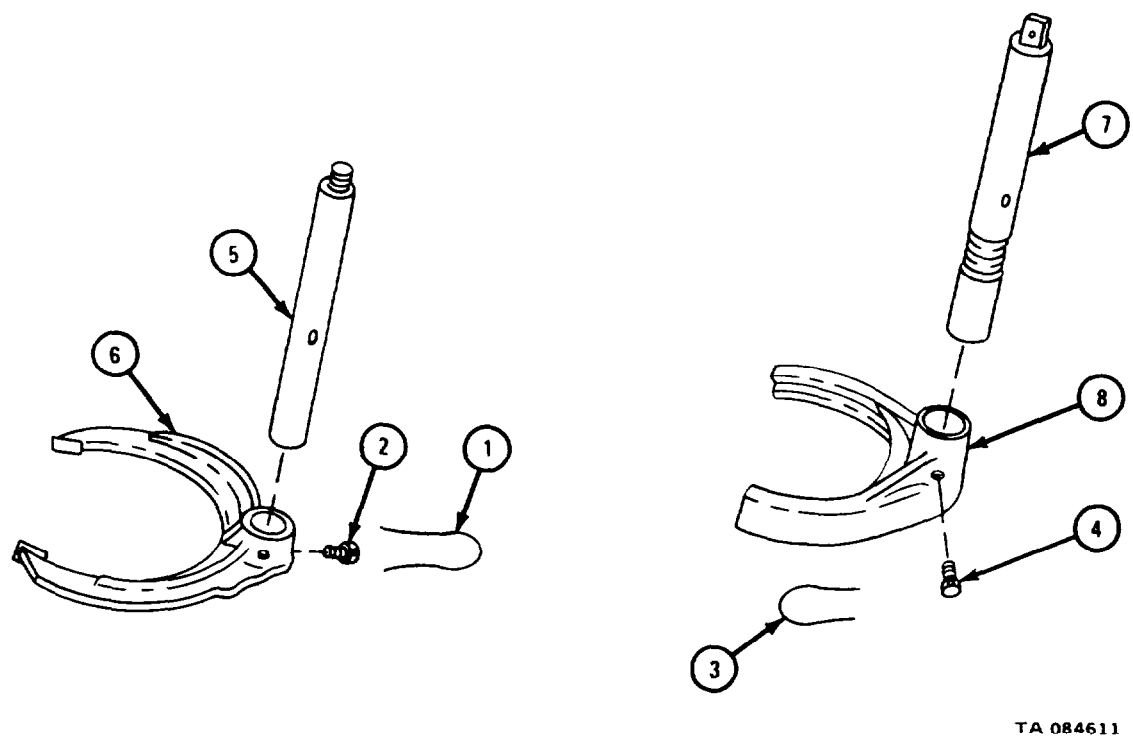
TA 102769

(6) High and low range output shifter forks.

FRAME 1

1. Take off safety wire (1).
2. Take out setscrew (2).
3. Take off safety wire (3).
4. Take out setscrew (4).
5. Take shifter output shaft (5) out of fork (6).
6. Take shifter high and low range shaft (7) out of fork (8).

END OF TASK

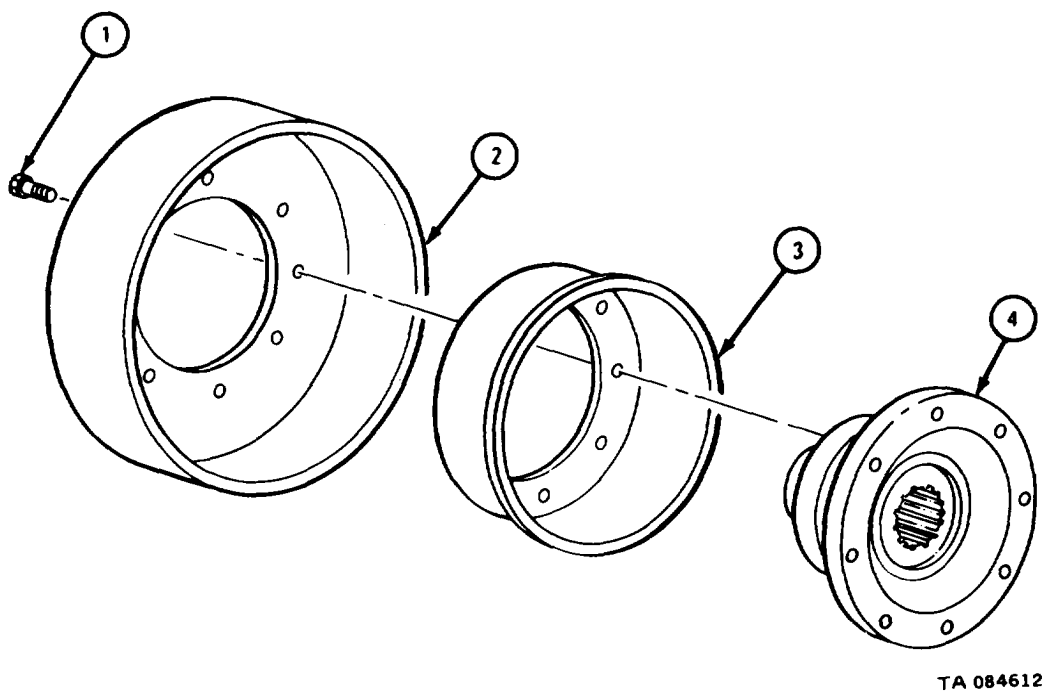


(7) Handbrake brake drum.

FRAME 1

1. Take out eight screws (1). Take apart brake drum (2), shield (3), and flange (4).

END OF TASK

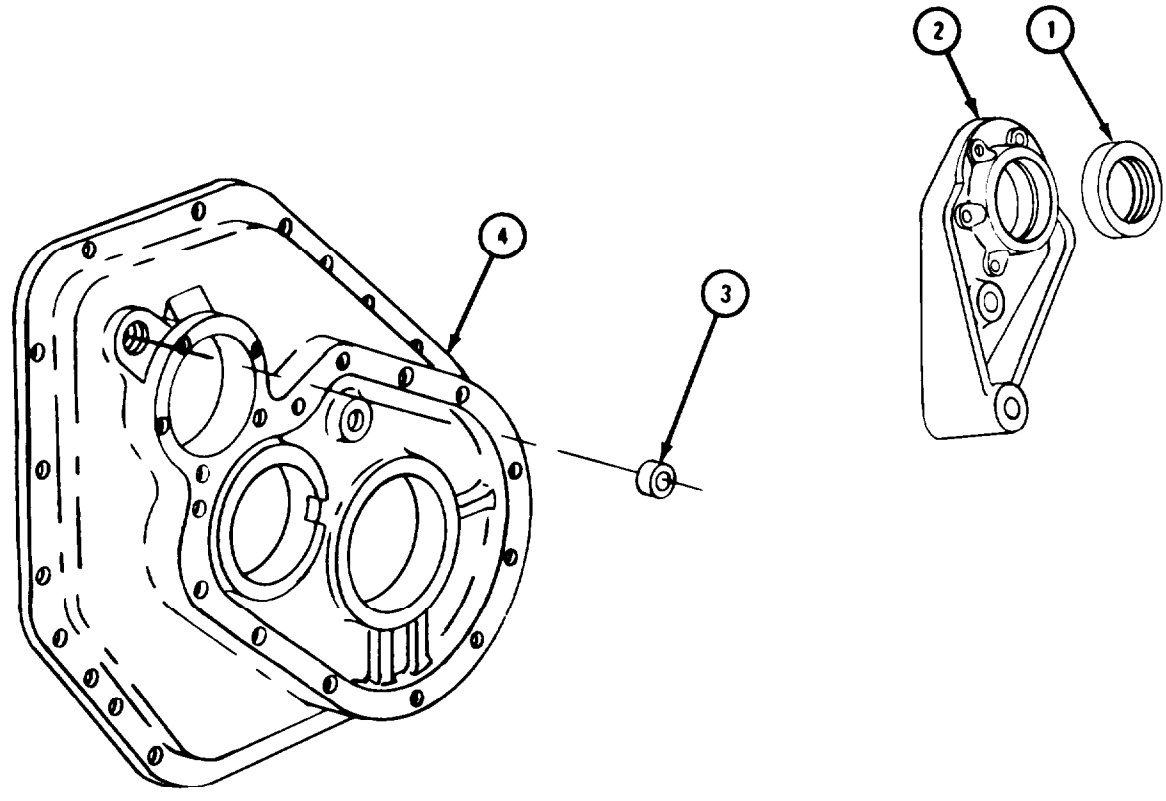


(8) Rear output bearing retainer cap and front cover.

FRAME 1

1. Press rear output shaft seal (1) out of rear output bearing retainer cap (2).
2. Take shifter shaft seal (3) out of front cover (4).

END OF TASK



d. Cleaning. There are no special cleaning procedures required. Refer to cleaning procedures given in para 1-3.

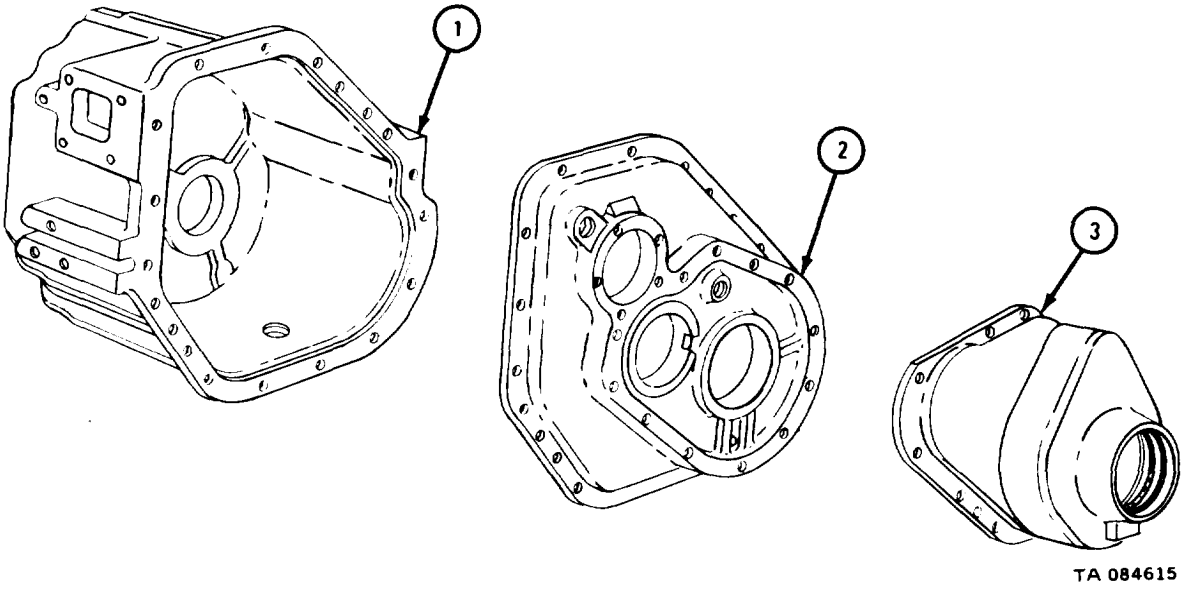
e. Inspection.

(1) Transfer case, front cover, and front output shaft cover.

FRAME 1

1. Check that transfer case housing (1), front cover (2), and front output shaft cover (3) are not cracked. Check that machined surfaces of housing, front cover, and front output shaft cover are not scratched or scored.
2. Check that all bearing cups and seals in transfer case housing (1), front cover (2), and front output shaft cover (3) are not damaged.

GO TO FRAME 2



TA 084615

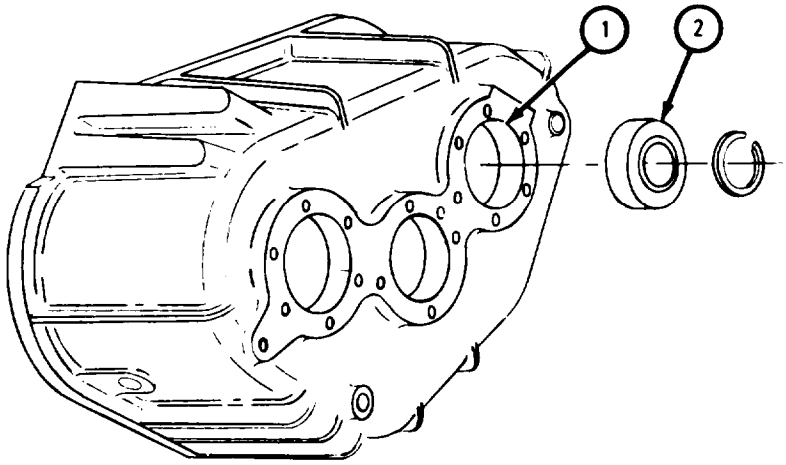
FRAME 2

NOTE

Readings must be within limits given in table 8-3. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure diameter of transfer case bearing bore (1).
2. Measure fit of bearing (2) in transfer case (1).

GO TO FRAME 3



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 084622

Table 8-3. Transfer Case Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Diameter of transfer case bearing bore	4.3305 to 4.3315	4.3315
1 and 2	Fit of bearing case in transfer case	0.0009T to 0.0006L	0.0006L

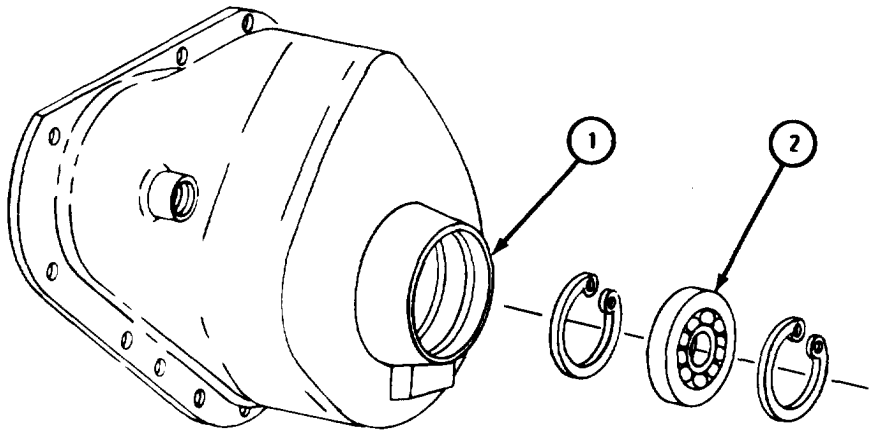
FRAME 3

NOTE

Readings must be within limits given in table 8-4. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure diameter of front cover bore (1).
2. Measure fit of bearing (2) in front cover bore (1).

GO TO FRAME 4



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 084618

Table 8-4. Front Cover Wear Limits

Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limi (inches)
1	Diameter of front cover bore	4.7242 to 4.7252	4.7252
1 and 2	Fit of bearing in front cover bore	0.0002T to 0.0014L	0.0014L

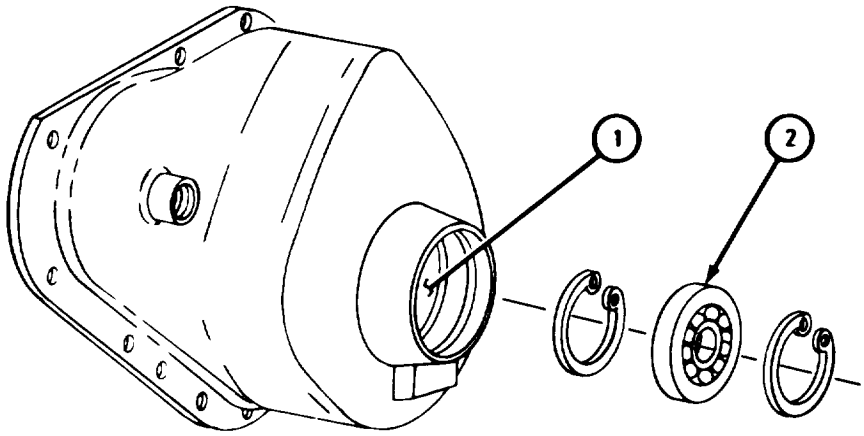
FRAME 4

NOTE

Readings must be within limits given in table 8-5. The letter L shows a loose fit and the letter T shows a tight fit. If reading is not within given limits, throw away part and get a new one.

1. Measure inside diameter of front output shaft cover bore (1).
2. Measure fit of bearing (2) in front output shaft cover bore (1).

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 084623

Table 8-5. Front Output Shaft Cover Wear Limits

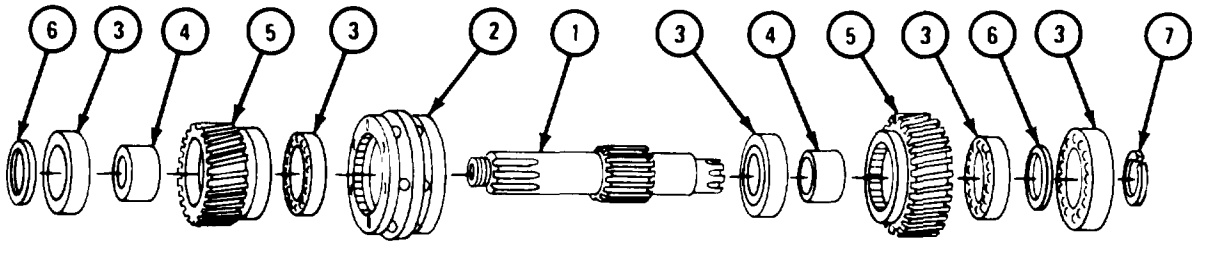
Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Front output shaft cover bore diameter	3.9368 to 3.9376	3.9376
1 and 2	Fit of bearing in front output shaft cover bore	0.0002T to 0.0012L	0.0012L

(2) Input shaft.

FRAME 1

1. Check that machined surface on shaft (1) is not scratched, scored or pitted If shaft is damaged, get a new one.
2. Check that splines on shaft (1) are not bent or chipped. If splines are damaged, get a new shaft.
3. Check that synchronizer (2) slides smoothly on shaft (1). Check that teeth on synchronizer are not cracked or broken. If synchronizer is damaged, get a new one.
4. Check that five bearings (3) are not damaged. Refer to TM 9-214.
5. Check that two bushings (4) are not worn, scored or burred. If bushings are damaged, get new ones.
6. Check that teeth on two gears (5) are not cracked, chipped or broken. If teeth are damaged, get new gears.
7. Check that two collars (6) and lockring (7) are not worn, cracked or bent. If parts are damaged, get new ones.

GO TO FRAME 2



TA 084619

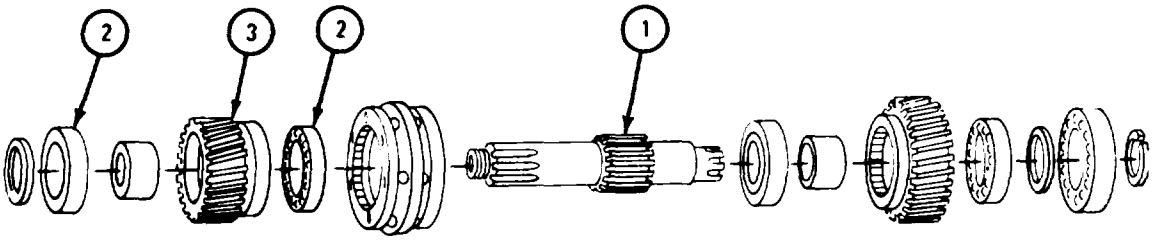
FRAME 2

NOTE

Readings must be within limits given in table 8-6. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure outside diameter of input shaft (1).
2. Measure fit of bearing (2) on input shaft (1).
3. Measure inside diameter of gear bore (3).
4. Measure fit of bearing (2) in gear bore (3).

GO TO FRAME 3



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR
REFERENCE PURPOSES.

TA 084620

Table 8-6. Input Shaft High Speed Gear Assembly Wear Limits

Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Input shaft outside diameter	2.1651 to 2.1656	2.1651
1 and 2	Fit of bearing on shaft	0.0008T to 0.0003L	0.0003L
2 and 3	Fit of bearing in gear	0.0009T to 0.0007L	0.00007L
3	Inside diameter of gear	3.9361 to 3.9371	3.9371

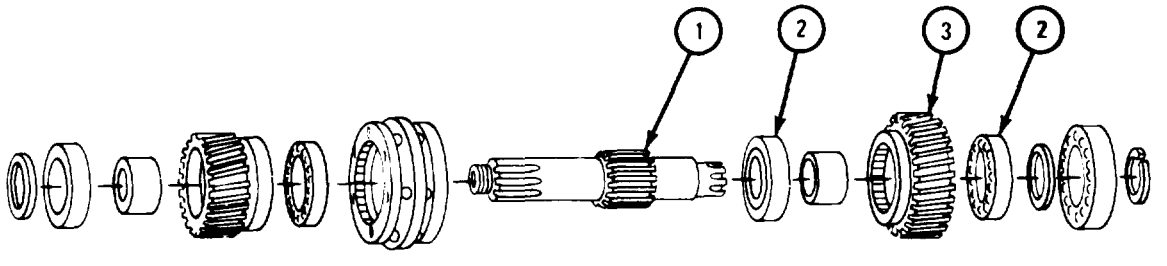
FRAME 3

NOTE

Readings must be within limits given in table 8-7. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure outside diameter of shaft (1).
2. Measure fit of two bearings (2) on shaft (1).
3. Measure inside diameter of gear bore (3).
4. Measure fit of bearings (2) in gear bore (3).

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 084621

Table 8-7. Input Shaft Low Speed Gear Assembly Wear Limits

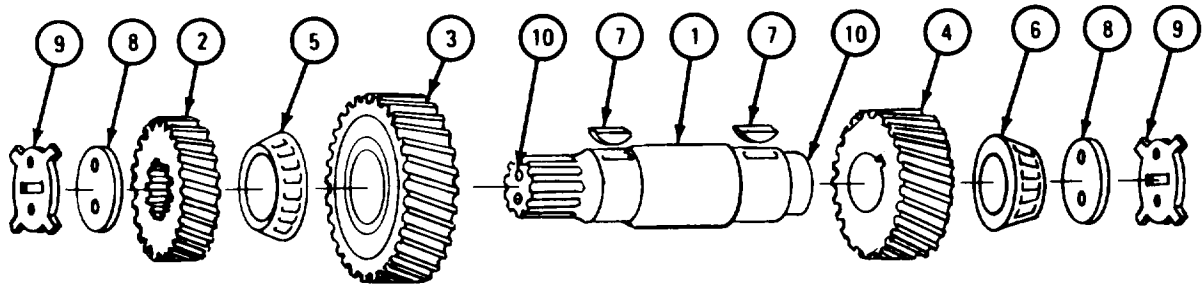
Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Input shaft outer diameter	1.9684 to 1.9689	None
1 and 2	Fit of bearing on shaft	0.0008T to 0.0003L	None
3	Inside diameter of gear bore	3.9361 to 3.9371	None
2 and 3	Fit of bearing in gear bore	0.0009T to 0.0007L	None

(3) Intermediate shaft.

FRAME 1

1. Check that machined surface on shaft (1) is not scratched, pitted or scored. If shaft is damaged, get a new one.
2. Check that splines on shaft (1) are not bent or chipped. If splines are damaged, get a new shaft.
3. Check that teeth in gears (2, 3, and 4) are not cracked or broken. If teeth are damaged, get new gears.
4. Check that bearings (5 and 6) are not damaged. Refer to TM 9-214.
5. Check that keys (7) are not bent or cracked.
6. Check that keyways in shaft (1) are not worn.
7. Check that two plates (8) and washers (9) are not worn, cracked or bent.
8. Check that tapped holes (10) have no damaged threads.

GO TO FRAME 2



TA 084624

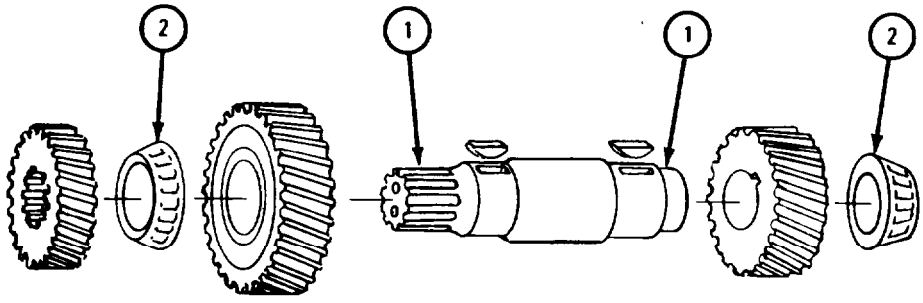
FRAME 2

NOTE

Readings must be within limits given in table 8-8. The letter L shows a loose fit and the letter T shows a tight fit. If readings are not within given limits, throw away part and get a new one.

1. Measure outside diameter of shaft (1).
2. Measure fit of bearing (2) on shaft (1).

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102739

Table 8-8. Intermediate Shaft Wear Limits

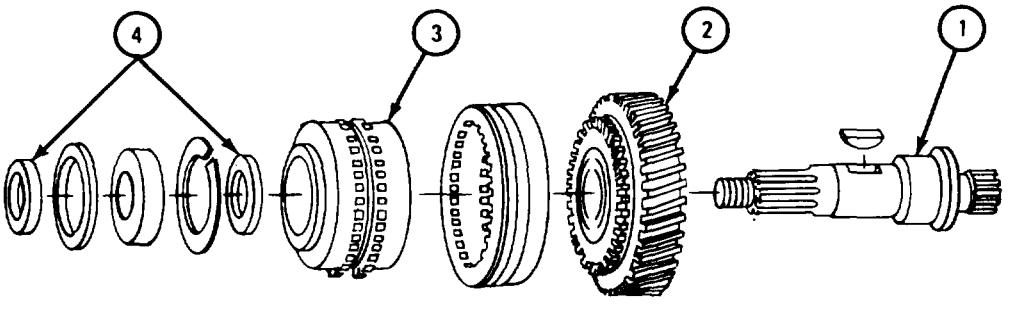
Index Number	Item/Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Outside diameter of shaft	2.2510 to 2.2515	2.2509
1 and 2	Fit of bearings on shaft	0.0008T to 0.0003L	2.2509

(4) Front output shaft.

FRAME 1

1. Check that splines on shaft (1) are not broken, chipped or cracked. If splines are damaged, get a new shaft.
2. Check that threads on end of shaft (1) are not burred or damaged. Re-tap damaged threads. If more repair is needed, get a new shaft.
3. Check that keyway in shaft (1) is not worn or damaged.
4. Check that teeth on gear (2) are not broken, chipped or cracked. If teeth are damaged, get a new gear.
5. Check that teeth or spur gear (3) are not broken, chipped or cracked. If teeth are damaged, get a new spur gear.
6. Check that two collars (4) are not bent, worn or cracked.

GO TO FRAME 2



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CAL LOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 102740

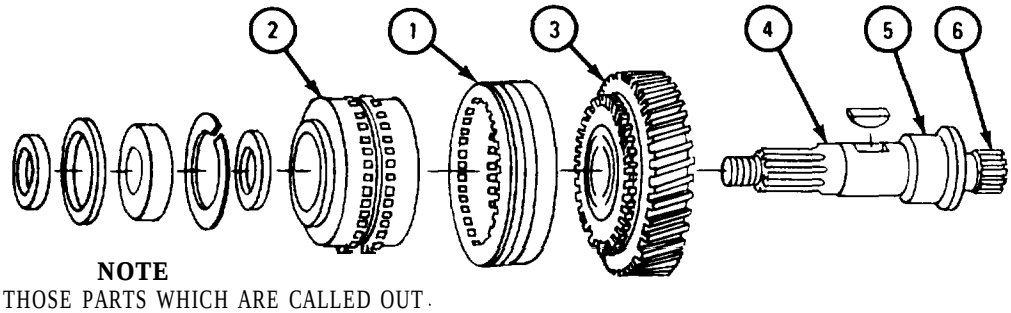
FRAME 2

NOTE

Readings must be within limits given in table 8-9. If readings are not within given limits, throw away part and get a new one.

1. Measure width of grooves inside gear (1).
2. Measure outside diameter of spur gear assembly (2).
3. Measure inside diameter of bore in gear (3).
4. Measure front output shaft diameter (4).
5. Measure front output shaft diameter (5).
6. Measure front output shaft diameter (6).

END OF TASK



NOTE

CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102741

Table 8-9. Front Output Shaft Wear Limits

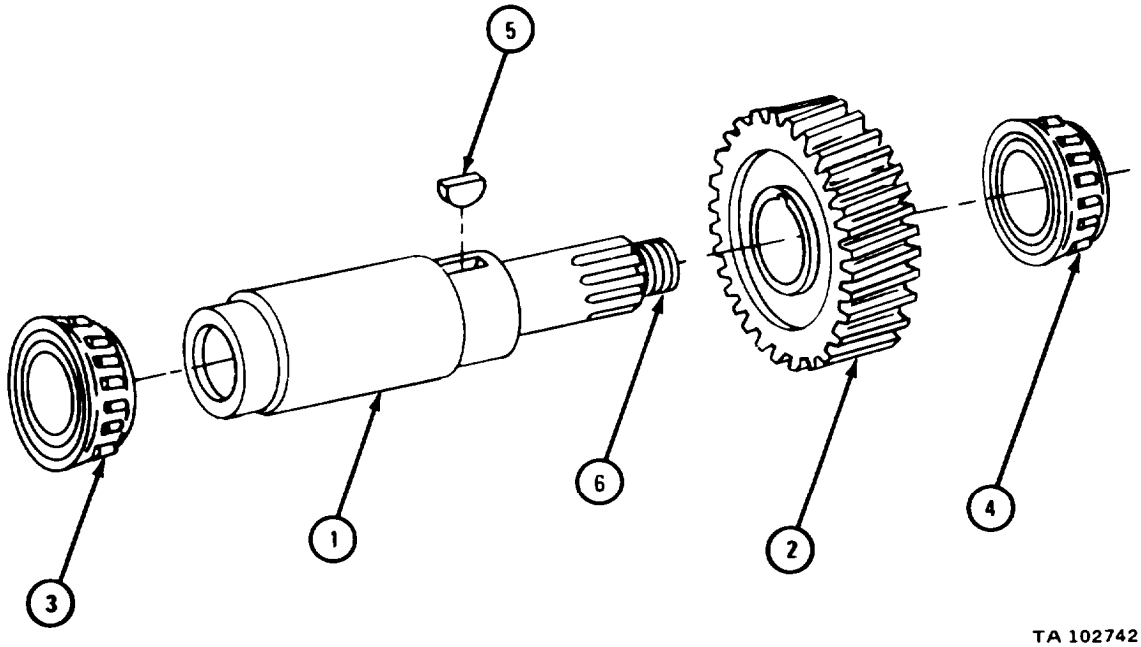
Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches
1	Groove width	0.607 to 0.612	0.618
2	Spur gear assembly outside diameter	6.6974 to 6.7034	6.6910
3	Gear bore inside diameter	3.001 to 3.002	3.001
4	Diameter of shaft	2.9985 to 2.9990	2.9980
5	Diameter of shaft	1.8103 to 1.8108	1.8100
6	Diameter of shaft	2.1652 to 2.1657	2.1652

(5) Rear output shaft.

FRAME 1

1. Check that machined surface on shaft (1) is not scratched, pitted or scored. If shaft is damaged, get a new one.
2. Check that splines on shaft (1) are not bent or chipped. If splines are damaged, get a new shaft.
3. Check that teeth on gear (2) are not chipped, cracked or broken. If teeth are damaged, get a new gear.
4. Check that bearings (3 and 4) are not damaged. Refer to TM 9-214.
5. Check that key (5) is not cracked or bent.
6. Check that keyway in shaft (1) has a tight fit with key (5).
7. Check that threads (6) are not damaged. Retap damaged threads. If more repair is needed, get a new shaft (1).

GO TO FRAME 2



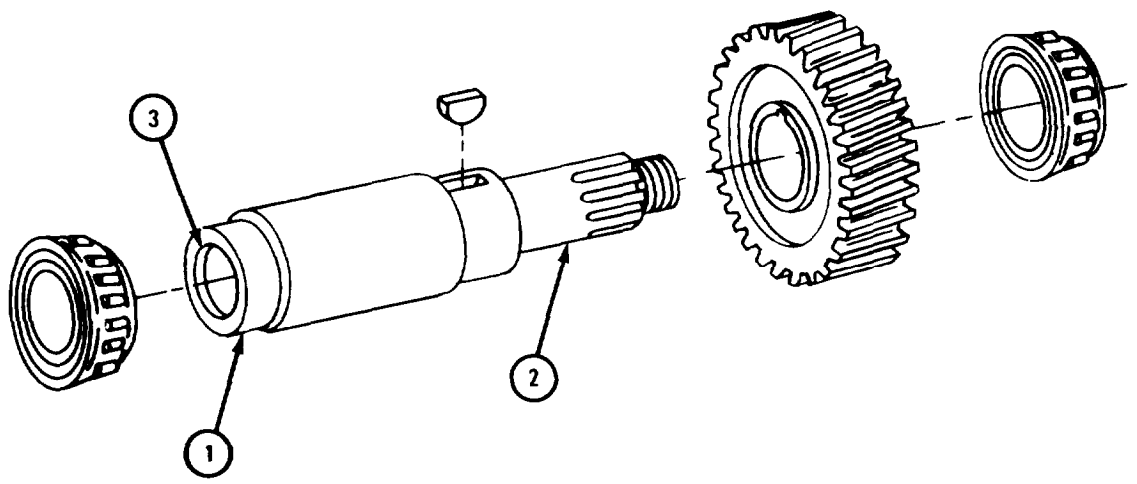
FRAME 2

NOTE

Readings must be within limits given in table 8-10. If readings are not within given limits, throw away part and get a new one.

1. Measure shaft front out side diameter (1).
2. Measure shaft rear outside diameter (2).
3. Measure inside diameter bore (3).

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102743

Table 8-10. Rear Output Shaft Wear Limits

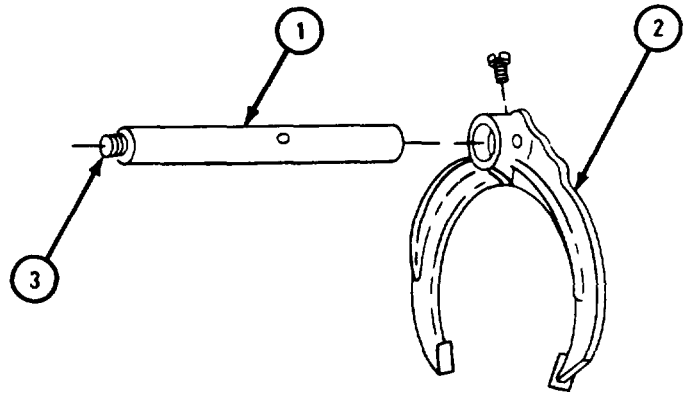
Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Shaft front outside diameter	2.8765 to 2.8770	2.8765
2	Shaft rear outside diameter	2.0010 to 2.0015	2.0010
3	Bore inside diameter	1.8125 to 1.8130	1.8133

(6) Output shifter shaft.

FRAME 1

1. Check that shaft (1) is not cracked, scored, pitted or scratched.
2. Check that fork (2) is not cracked, scored or bent.
3. Check that threads (3) are not damaged.

GO TO FRAME 2



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 102744

FRAME 2

NOTE

Readings must be within limits given in table 8-11. If readings are not within given limits, throw away parts and get new ones.

1. Measure outside diameter of shaft (1).
2. Measure shift pad thickness (2).
3. Measure shift pad distance (3).

END OF TASK

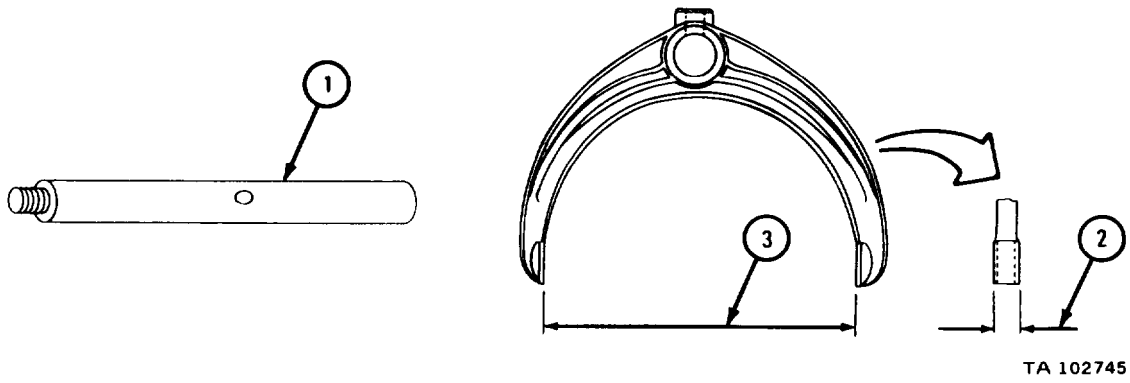


Table 8-11. Outer Shifter Shaft Wear Limits

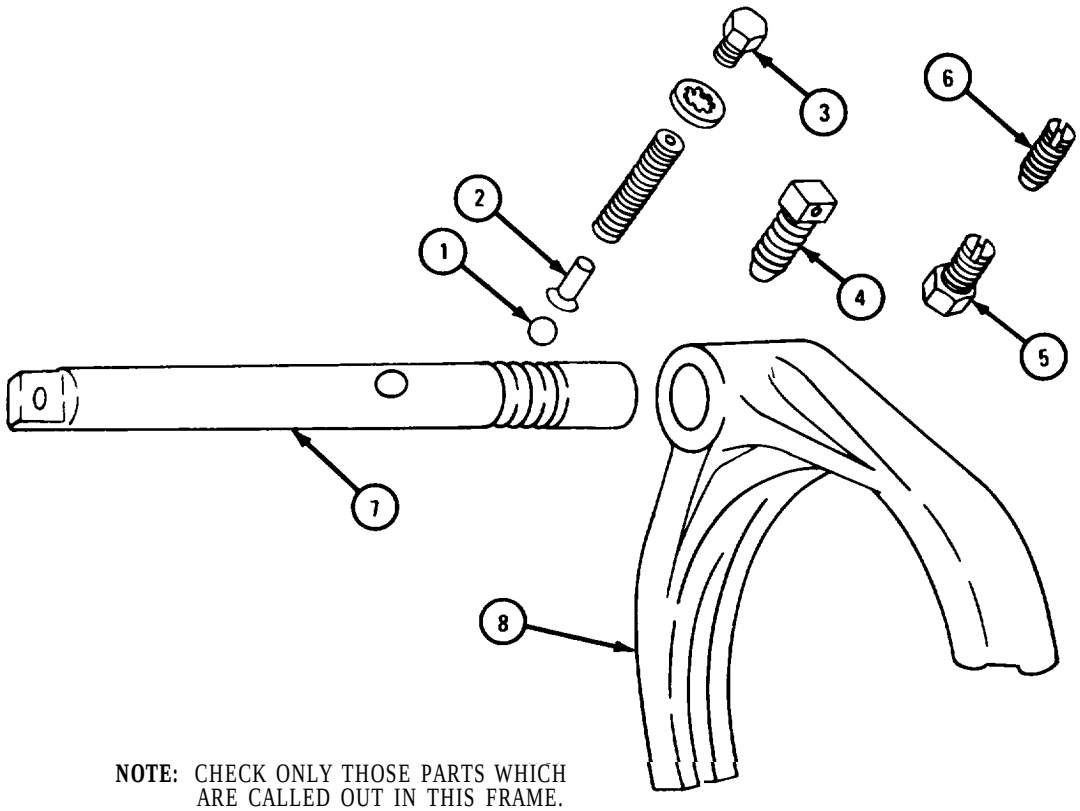
Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limits (inches)
1	Shaft outside diameter	0.8715 to 0.8745	0.8710
2	Shift pad thickness	0.562 to 0.572	0.562
3	Pad-to-pad distance	7.344 to 7.375	7.385

(7) High and low range shifter fork.

FRAME 1

1. Check that ball (1) and plunger (2) have no scoring, uneven wear, pitting, or cracks. If ball or plunger is damaged, get a new one.
2. Check that threads on screws (3 through 6) are not damaged.
3. Check that shaft (7) is not cracked, scored, pitted or worn unevenly. If shaft is damaged, get a new one.
4. Check that fork (8) has no cracks, scoring or uneven wear. If fork is damaged, get a new one.

GO TO FRAME 2



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 102746

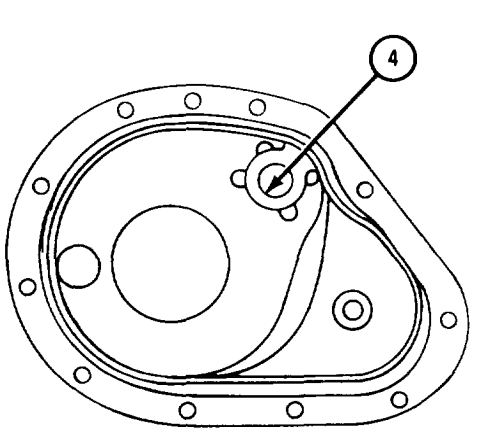
FRAME 2

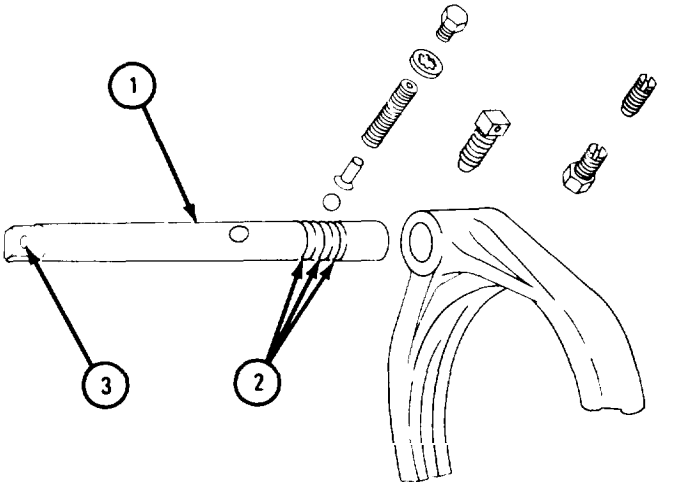
NOTE

Readings must be within limits given in table 8-12. The letter L shows a loose fit. If readings are not within given limits, throw away parts and get new ones.

1. Measure outside diameter of shaft (1).
2. Measure width of three grooves (2).
3. Measure outside diameter of hole (3).
4. Measure inside diameter of shifter bore in housing (4).
5. Measure fit of shifter shaft (1) in shifter bore (4).

GO TO FRAME 3





NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102747

Table 8-12. High and Low Range Shifter Fork Shaft Wear Limits

Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Outside diameter of shaft	2.9945 to 0.9955	0.9945
2	Groove width (under 0.4375-inch diameter ball)	0.0005 to 0.015	0.002
3	Hole diameter	0.495 to 0.500	0.503
4	Shifter bore in housing	0.9995 to 1.0015	1.0025
1 and 4	Shifter shaft in shifter bore	0.0045 to 0.00070L	0.010L

FRAME 3

NOTE

Readings must be within limits given in table 8-13. If readings are not within given limits, throw away parts and get new ones.

1. Measure width of two slots (1).
2. Measure width of fork (2) at slots (1).

END OF TASK

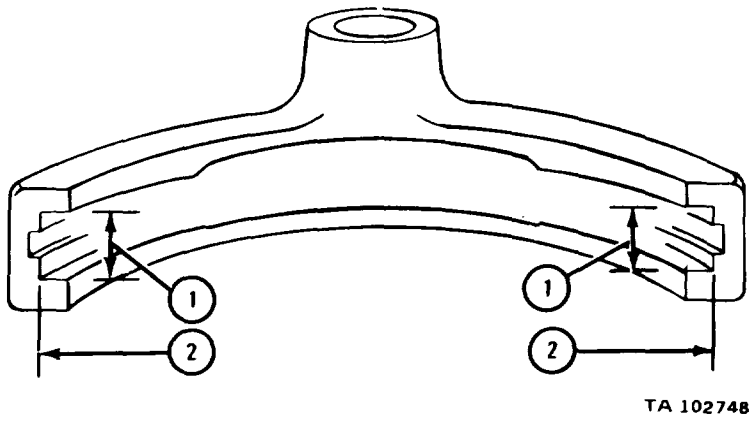


Table 8-13. High and Low Range Shifter Fork Wear Limits

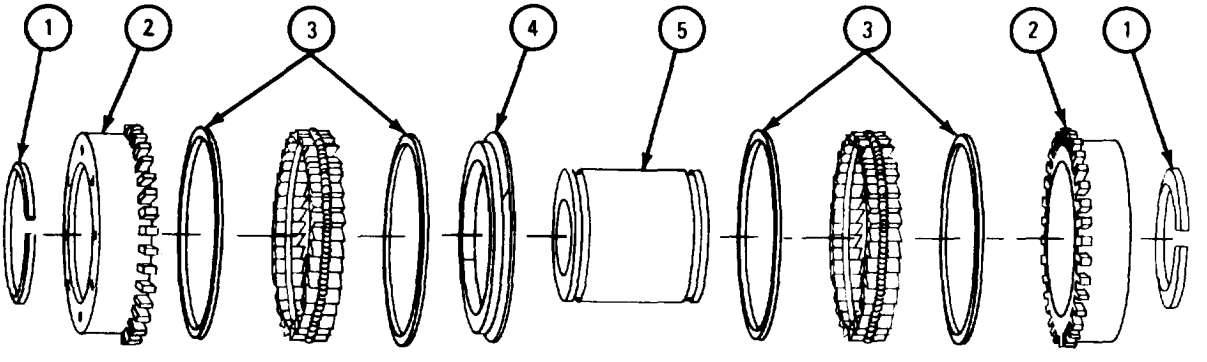
Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Slot width	0.712 to 0.720	0.725
1 and 2	Fork width at slots	7.910 to 7.936	7.945

(8) Sprag assembly.

FRAME 1

1. Check that two retaining rings (1) are not cracked, nicked or scored. If retaining rings are damaged, get new ones.
2. Check that teeth on two races (2) are not nicked, broken, cracked or worn. If teeth are damaged, get new races.
3. Check that four springs (3) have no kinks, bends or twists. If spring is damaged, get a new one.
4. Check that transfer case washer (4) is not scored, chipped or cracked. If washer is damaged, get a new one.
5. Check that sprag drive race (5) has no chipped retaining ring grooves, scoring or burrs. Take off burrs using a file. If more repair is needed, get a new sprag drive race.

GO TO FRAME 2



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102749

FRAME 2

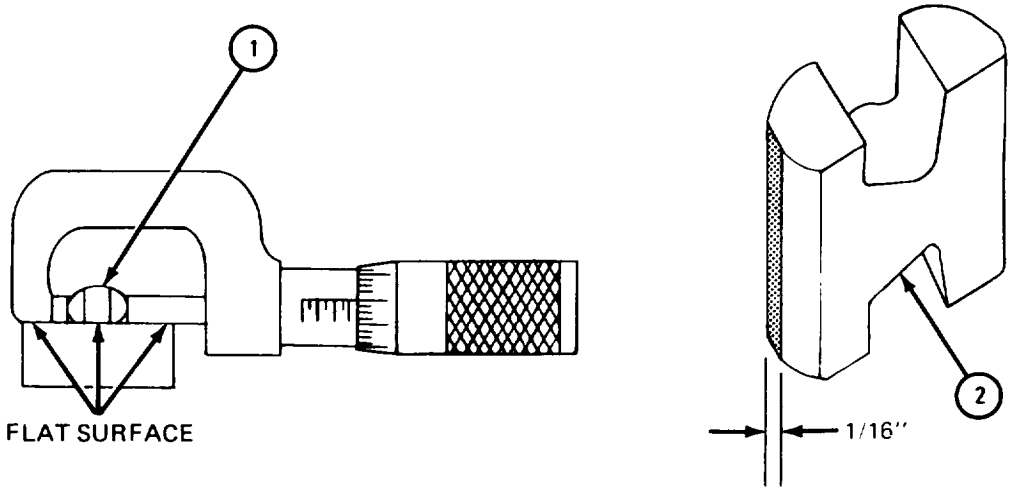
NOTE

When checking sprags, anvil and spindle ends of micrometer and flat back of sprag must all rest on a flat surface as shown in view A.

Since wear on all sprags in any one sprag unit will be the same, it is only necessary to check five sprags in each assembly.

1. Measure five sprags (1) as shown in view A. If three or more sprags are worn to 0.375 inch or smaller, put new sprags in sprag unit.
2. Measure five sprags (2) as shown in view B. If three or more sprags are worn more than 1/16 inch on the polished edge, put new sprags in sprag unit.

END OF TASK



VIEW A VIEW B

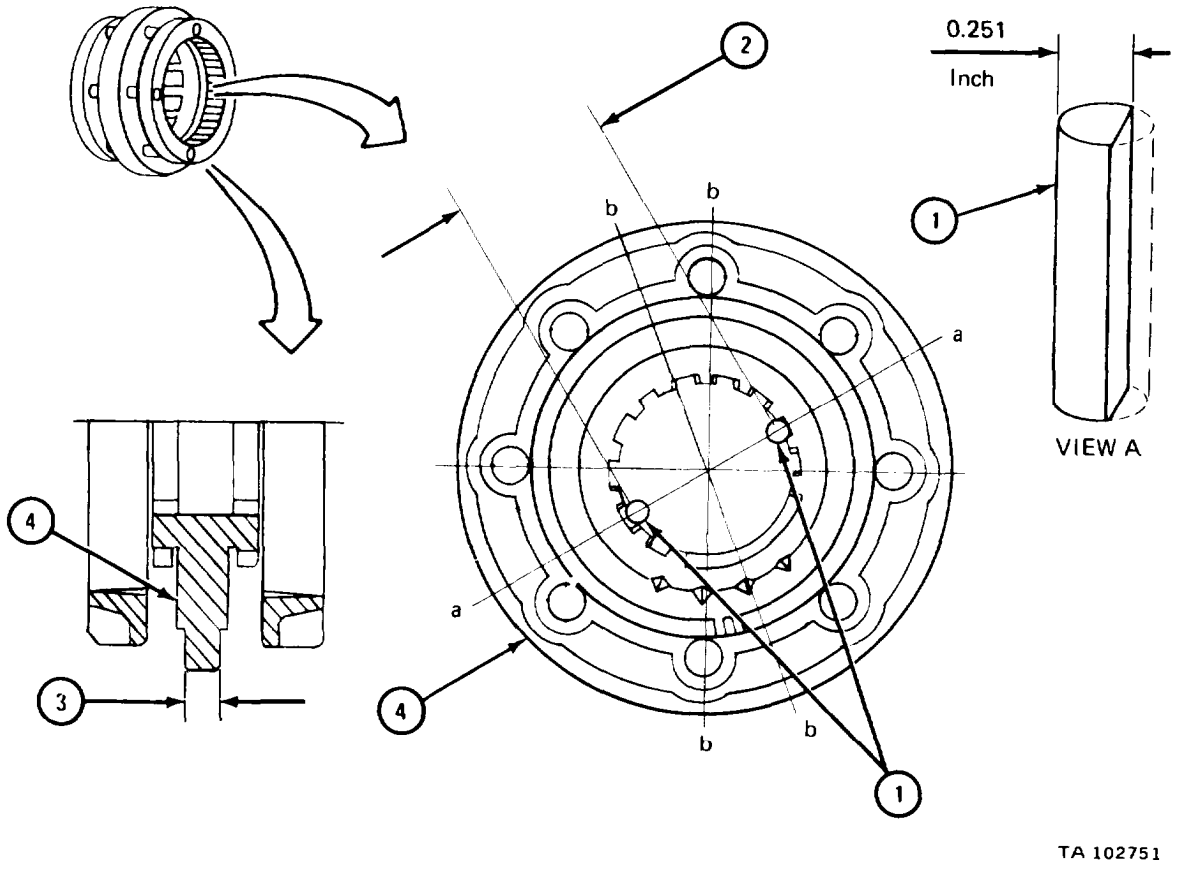
TA 102750

(9) Shifter clutch collar.

FRAME 1

1. Grind two flats on 0.2727-inch diameter pins (1) so that there is 0.251 inch along flat area as shown in view A.
2. Put pins (1) into gear segment as shown along line a-a.
3. Measure distance (2) between pins (1). If measurement is more than 2.4757 inches, get a new collar.
4. Move pins (1) into gear segment along line b-b.
5. Do step 3 again for line b-b.
6. Measure thickness (3) of collar (4). If measurement is less than 0.677 inch, get a new collar.

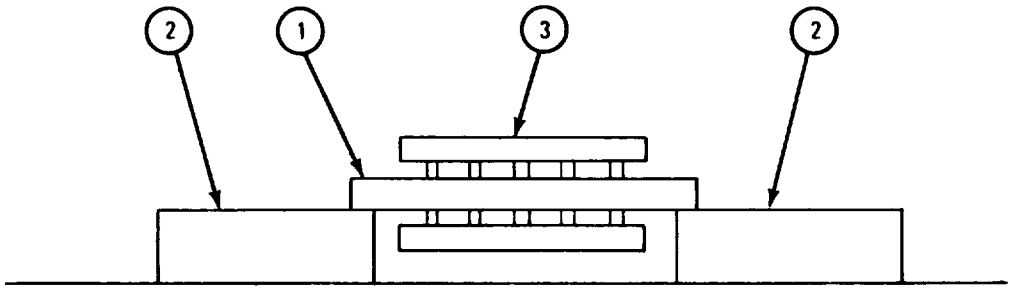
GO TO FRAME 2



FRAME 2

1. Put shifter clutch collar (1) on two blocks (2) as shown. Lower side of collar must not touch surface.
2. Add weights (3) to collar until collar (1) is free. Get a new collar if weight needed is below 145 pounds or above 175 pounds.

END OF TASK



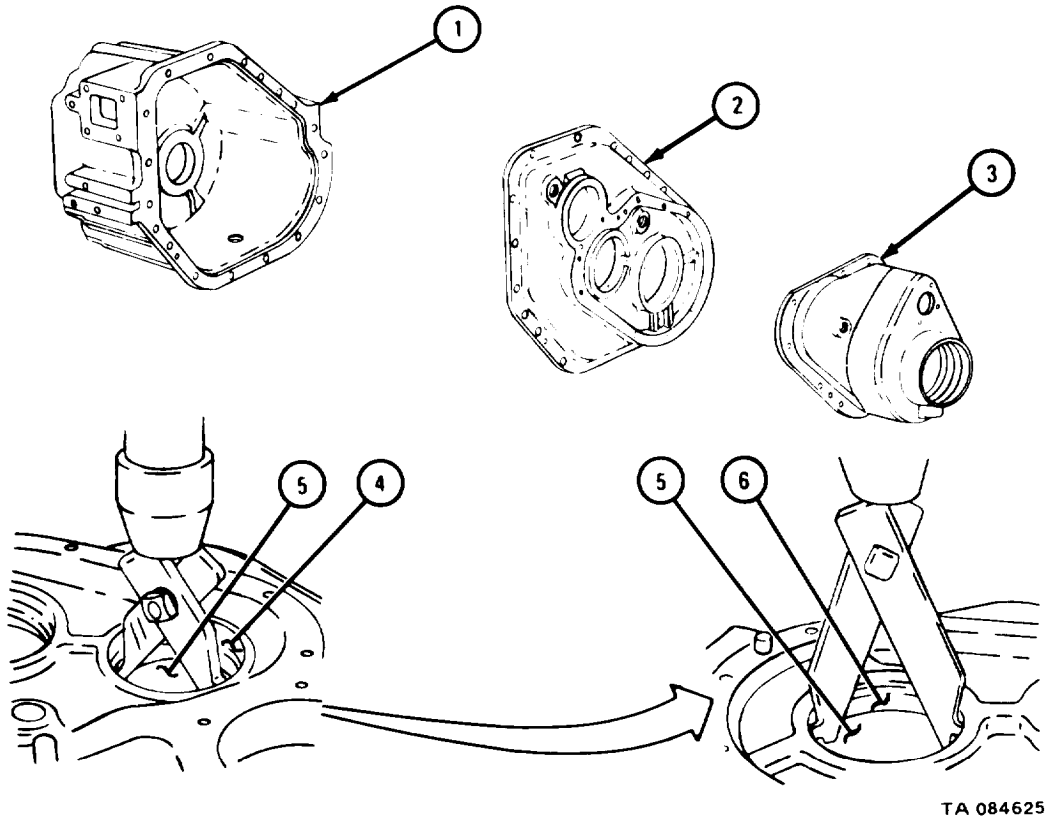
TA 102752

f. Repair.

FRAME 1

1. Take off small scratches or nicks from transfer case housing (1), front cover (2), and front output shaft cover (3) as needed.
2. Weld racks and small holes in housing and covers. Refer to TM 9-237,
3. Drill out any broken bolts or studs in tapped holes.
4. Drill out stripped or out-of-round holes. Retap to next larger size. Use bolt or stud of new size in assembly.
5. If bearing cup (4) is damaged, take it out of bore (5). Refer to para 7-7. Get a new bearing cup and mating bearing cone.
6. Put new bearing cup (6) into bore (5). Refer to para 7-7.

GO TO FRAME 2

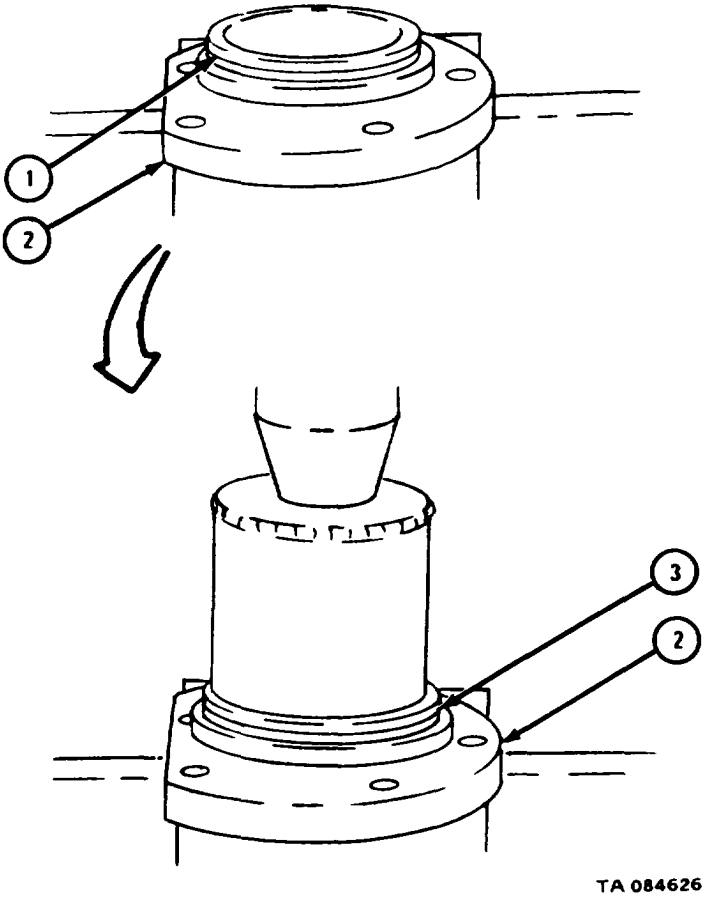


TA 084625

FRAME 2

1. If front input shaft oil seal (1) is damaged, take it out of input shaft bearing retainer cap (2). Throw away damaged oil seal.
2. Coat new front drive gear oil seal (3) with multipurpose lubricant.
3. Put new front input shaft oil seal (3) into input shaft bearing retainer cap (2).

END OF TASK



g. Assembly of Subassemblies.

NOTE

Keep all parts clean and protected from dust and dirt. Coat all bearings and oil seals with multipurpose lubricant when putting them in.

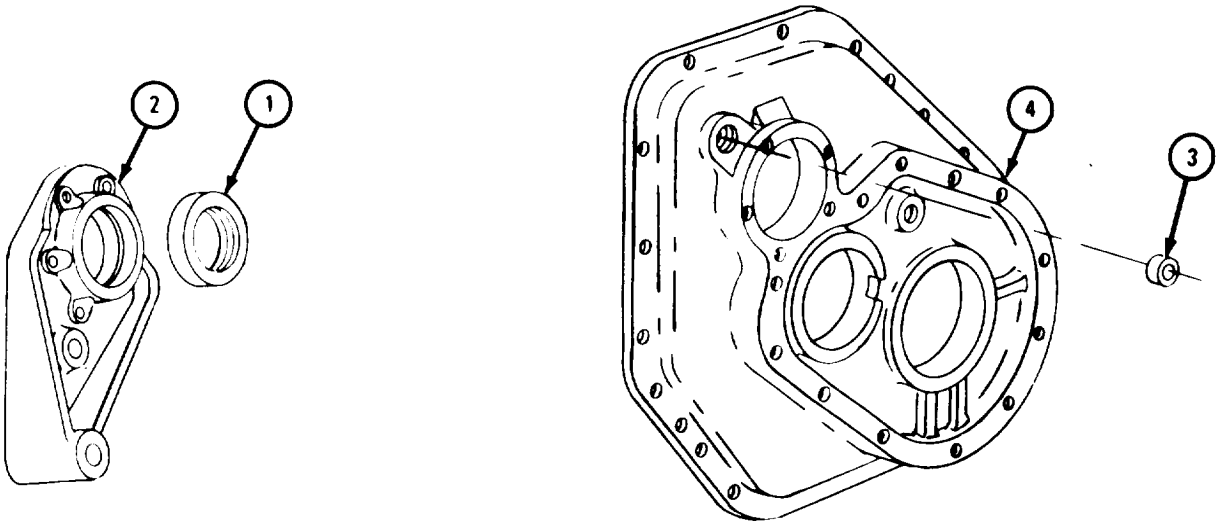
Coat all gears and shafts with engine lubricating oil. Coat shafts and bores of gears with white lead pigment.

(1) Rear output bearing retainer cap and front cover.

FRAME 1

1. Press rear output shaft seal (1) into rear output shaft bearing retainer cap (2).
2. Put shaft pin seal (3) in transfer case front cover (4).

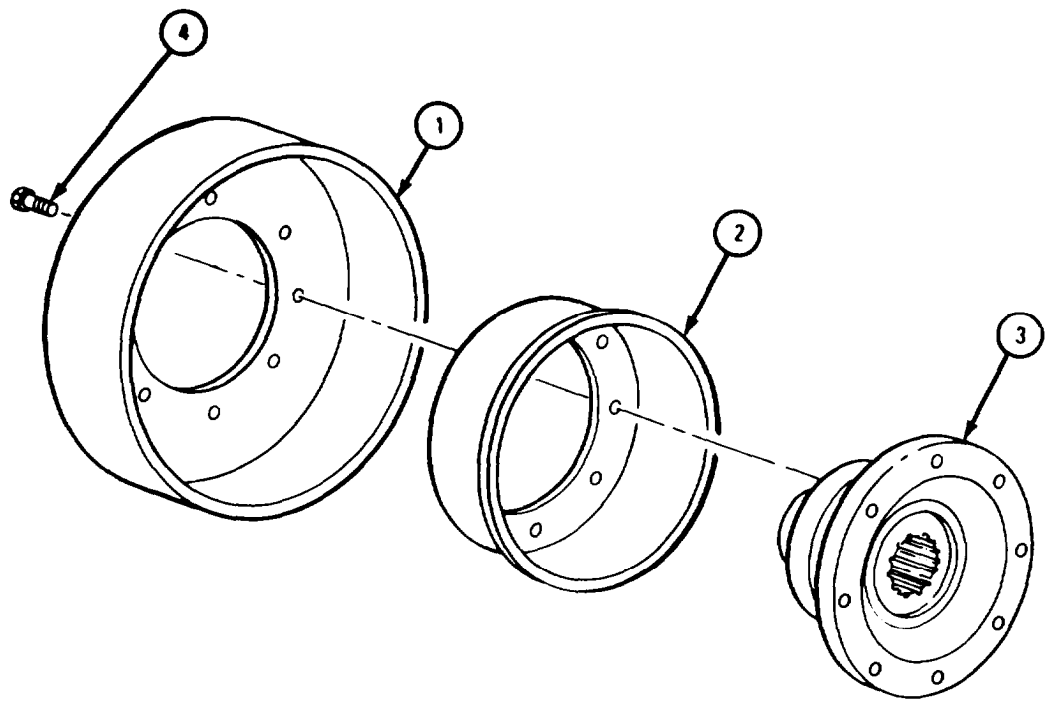
END OF TASK



FRAME 1

1. Aline holes in brake drum (1), shield (2), and companion flange (3).
2. Push eight screws (4) through holes.

END OF TASK



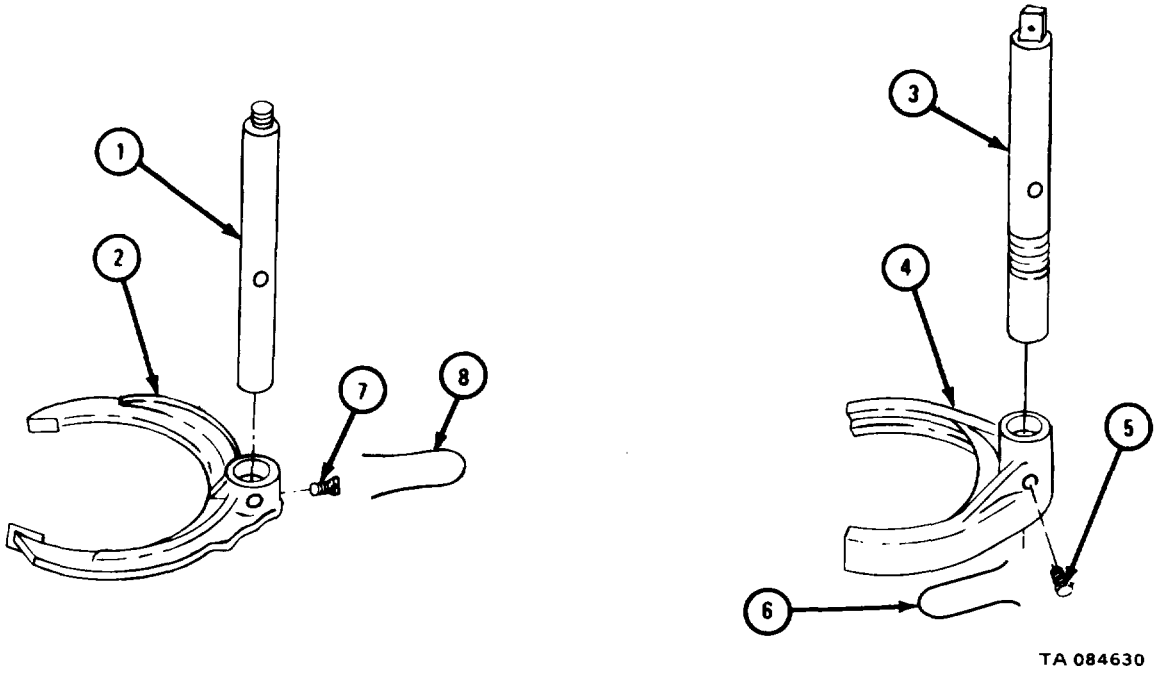
TA 084629

(3) High and low range and output shifter forks.

FRAME 1

1. Put shifter shaft (1) in shifter shaft fork (2).
2. Put shifter shaft (3) in shifter shaft fork (4).
3. Screw in, but do not tighten, setscrew (5) . put on safety wire (6).
4. Put in setscrew (7). Tighten setscrew to 45 to 57 pound-feet.
5. Put on safety wire (8).

END OF TASK

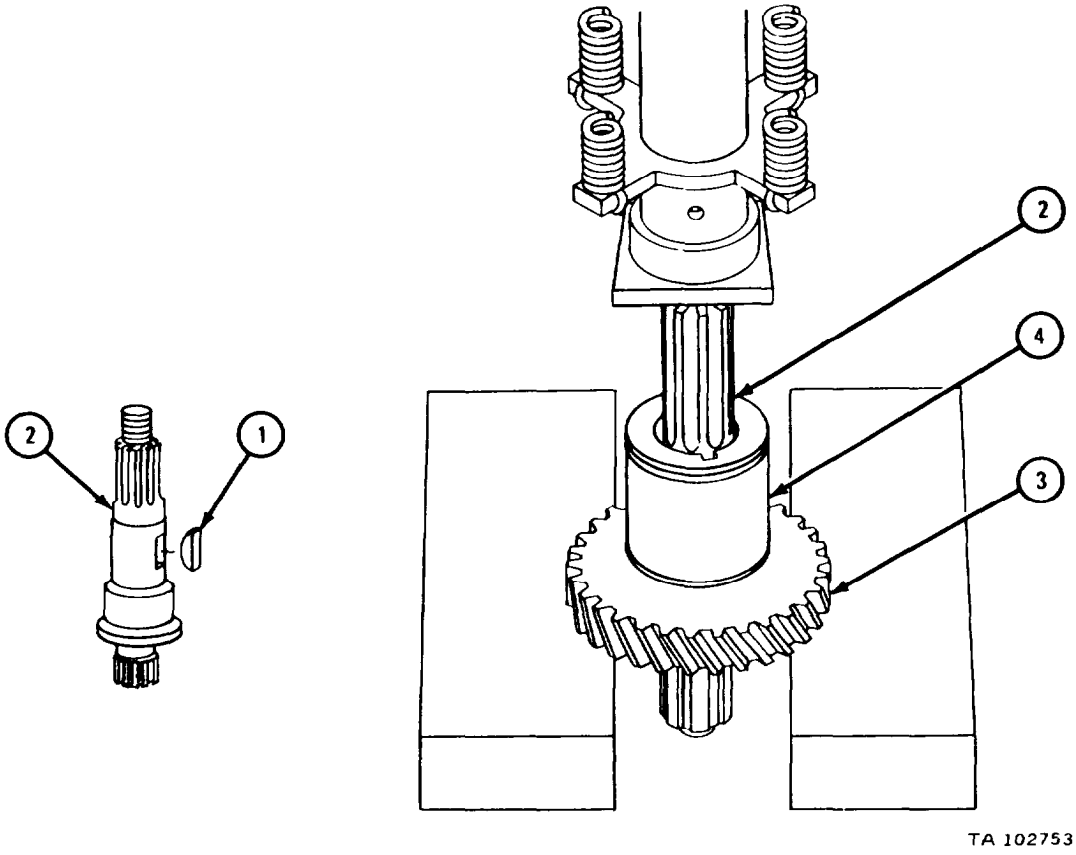


(4) Front output shaft assembly.

FRAME 1

1. Put woodruff key (1) into shaft (2).
2. Set gear (3) on shaft (2).
3. Put shaft (2) and gear (3) on hydraulic press. Aline keyway in race (4) with key (1).
4. Press race (4) against back of gear (3).

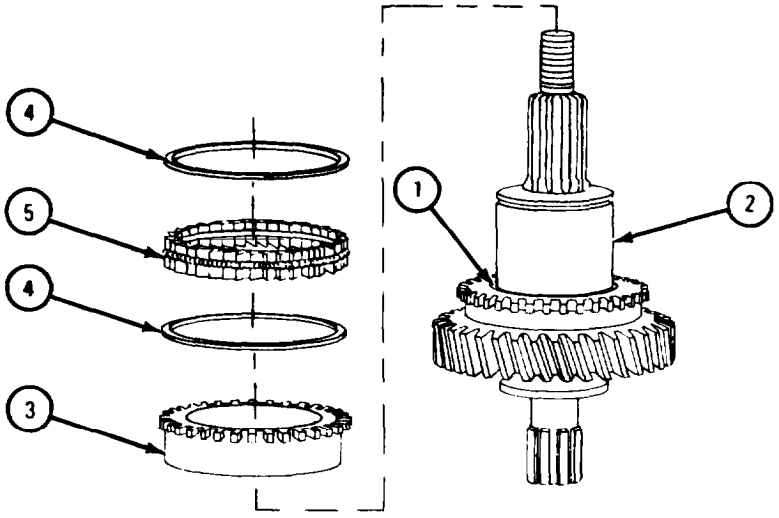
GO TO FRAME 2



FRAME 2

1. Put retaining ring (1) on back of race (2).
2. Put race (3) over race (2) .
3. Put two springs (4) and 41 sprags (5) into race (3).

GO TO FRAME 3

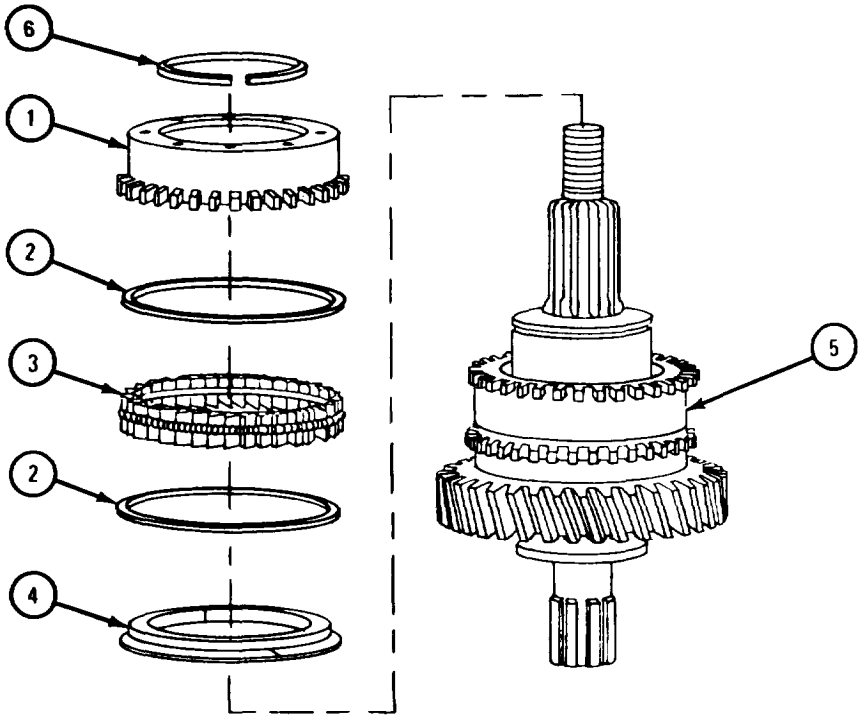


TA 102754

FRAME 3

1. Put race (1) face up on workbench.
2. Put two springs (2) and 41 sprags (3) into race (1).
3. Put transfer case washer (4) on top of race (1).
4. Lift race (1) off workbench and place it on top of race (5) as shown.
5. Put on retaining ring (6).

END OF TASK



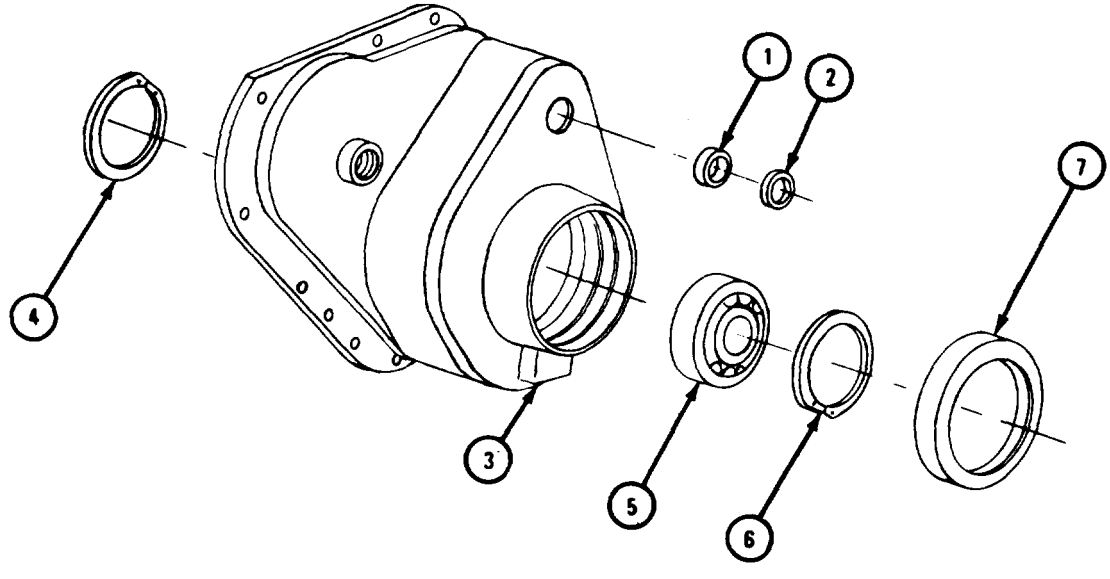
TA 102755

(5) Front output shaft cover assembly.

FRAME 1

1. Put shifting fork pin seal (1) and washer (2) in front output shaft cover (3).
2. Put in inner snapring (4).
3. Press in bearing (5). Refer to para 7-7.
4. Put in outer snapring (6).
5. Press in front output shaft seal (7).

GO TO FRAME 2

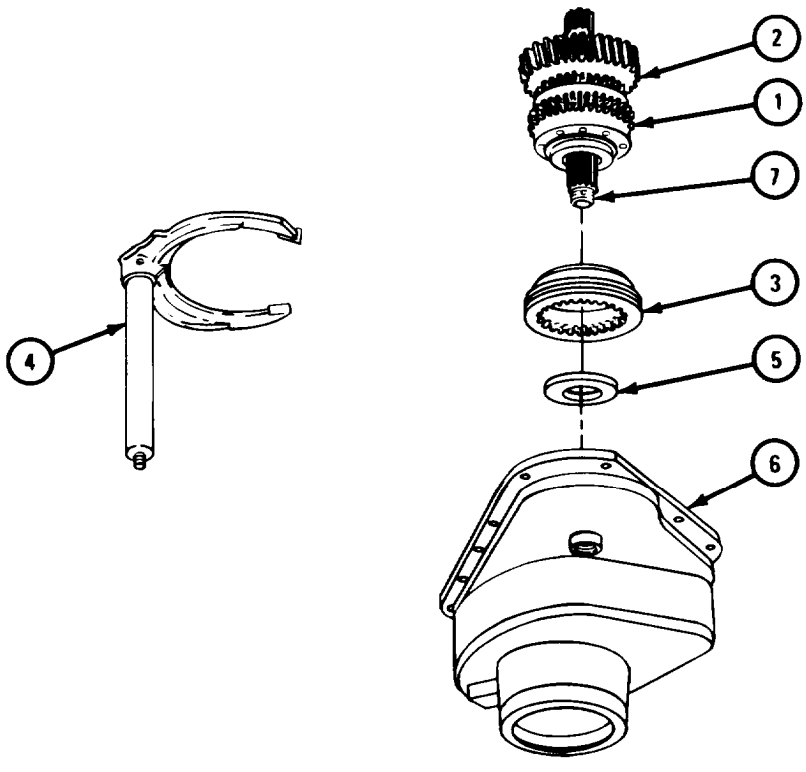


TA 084628

FRAME 2

1. Aline teeth of sprag clutch (1) and drive gear (2) and put on reverse shift gear (3).
2. Slide shifting fork pin (4) on reverse shift gear (3).
3. Put collar spacer (5) in front output shaft cover (6) .
4. Press shaft assembly (7) into front output shaft cover (6) .

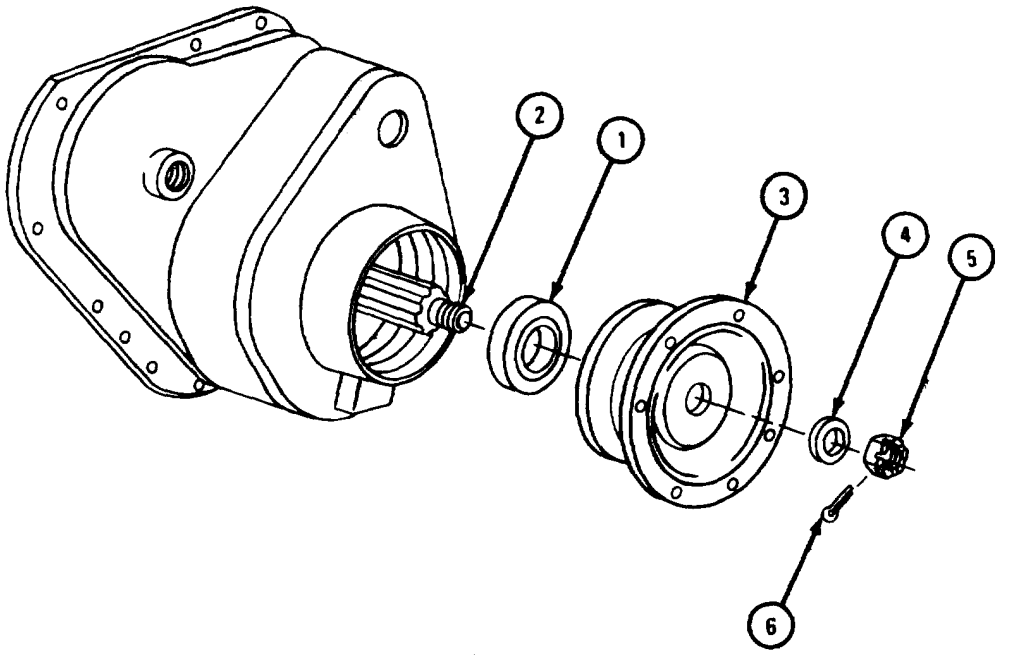
GO TO FRAME 3



FRAME 3

1. Put collar (1) on front output shaft (2).
2. Put companion flange (3) on front output shaft (2).
3. Put on washer (4) and nut (5). Tighten nut to 300 to 400 pound-feet. Aline slots in nut with hole in shaft (2).
4. Put in cotter pin (6).

GO TO FRAME 4

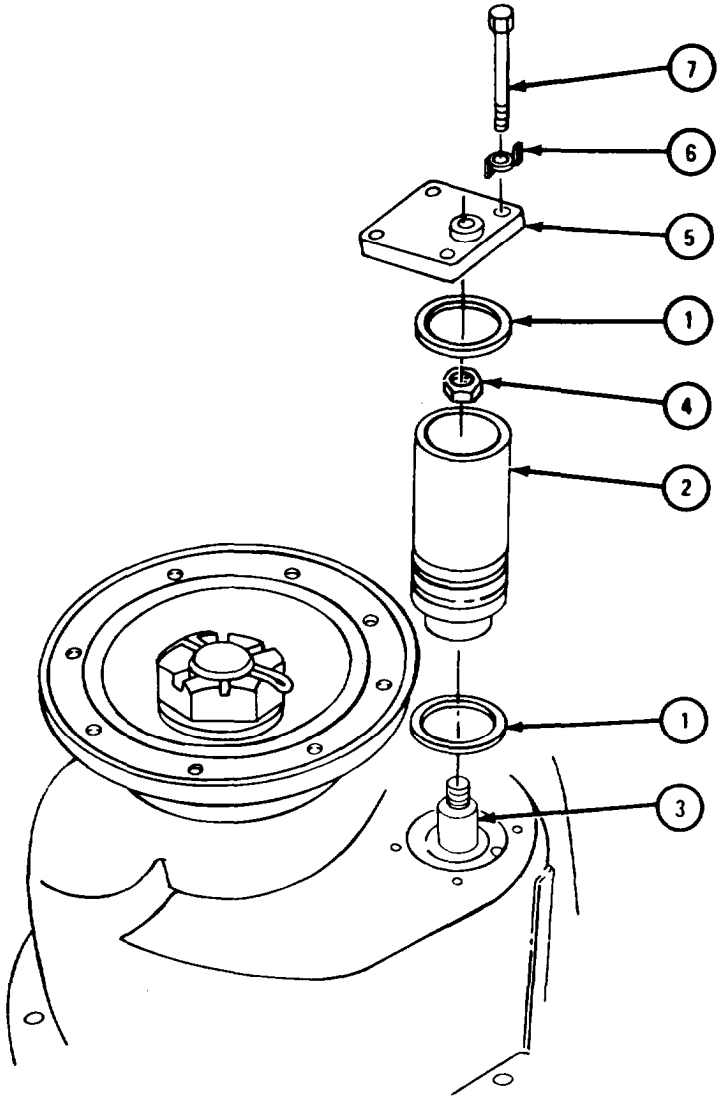


TA 084633

FRAME 4

1. Put two gaskets (1) and air shift cylinder (2) on shifter shaft (3) .
2. Put on nut (4).
3. Hold air cylinder cover (5) in place and put on four washers (6) and screws (7). Tighten screws to 5 to 8.5 pound-feet.
4. Bend tabs of washers (6) up against screws (7).

END OF TASK



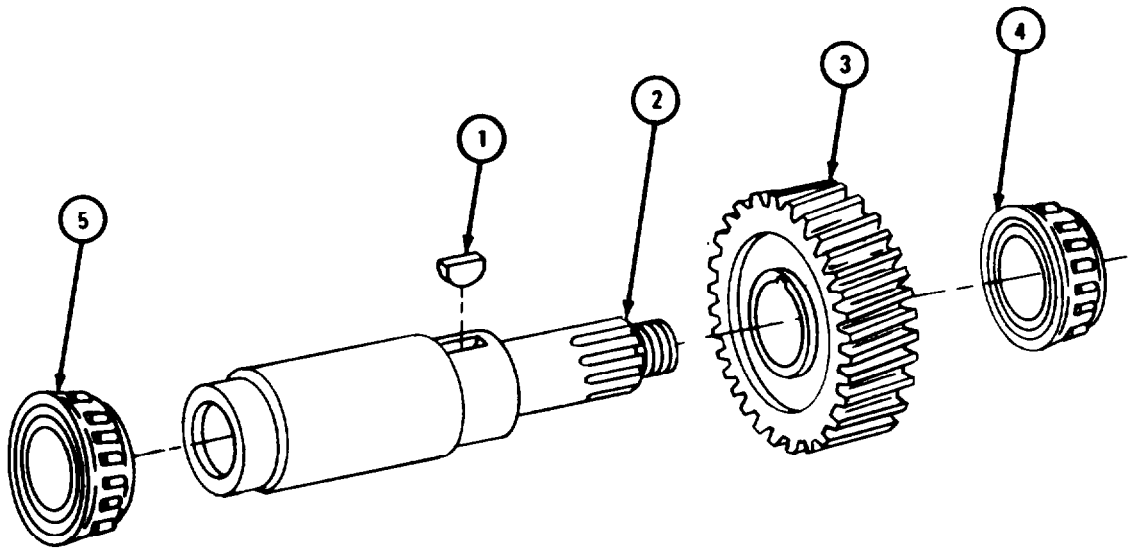
TA 085648

(6) Rear output shaft.

FRAME 1

1. Put woodruff key (1) into rear output shaft (2).
2. Press on gear (3).
3. Press on bearing cone (4). Refer to para 7-7.
4. Press on bearing cone (5). Refer to para 7-7.

END OF TASK

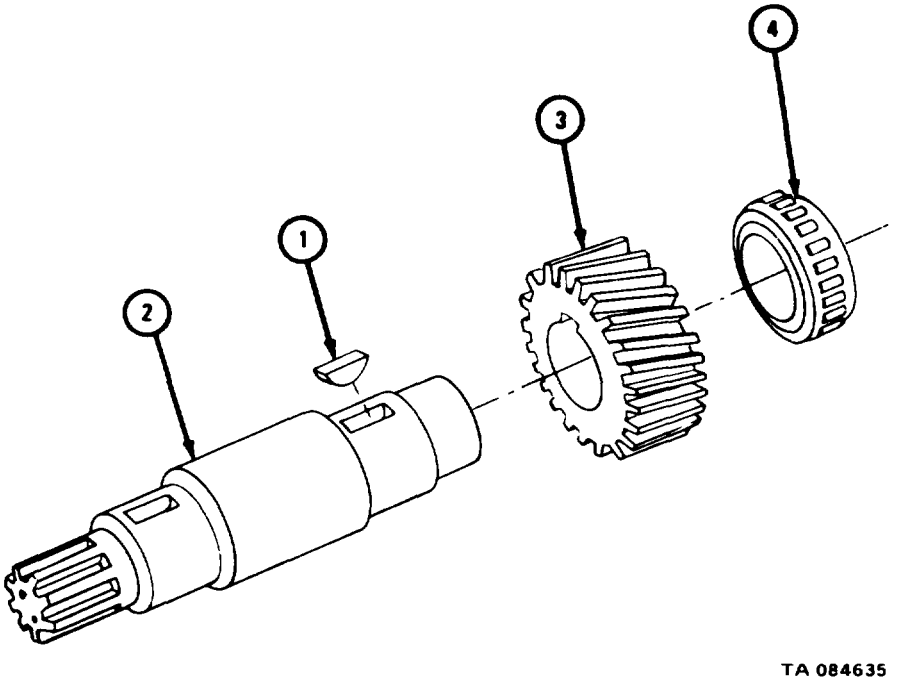


(7) Intermediate shaft.

FRAME 1

1. Put woodruff key (1) into intermediate shaft (2).
2. Press on gear (3).
3. Press on bearing (4). Refer to para 7-7.

GO TO FRAME 2

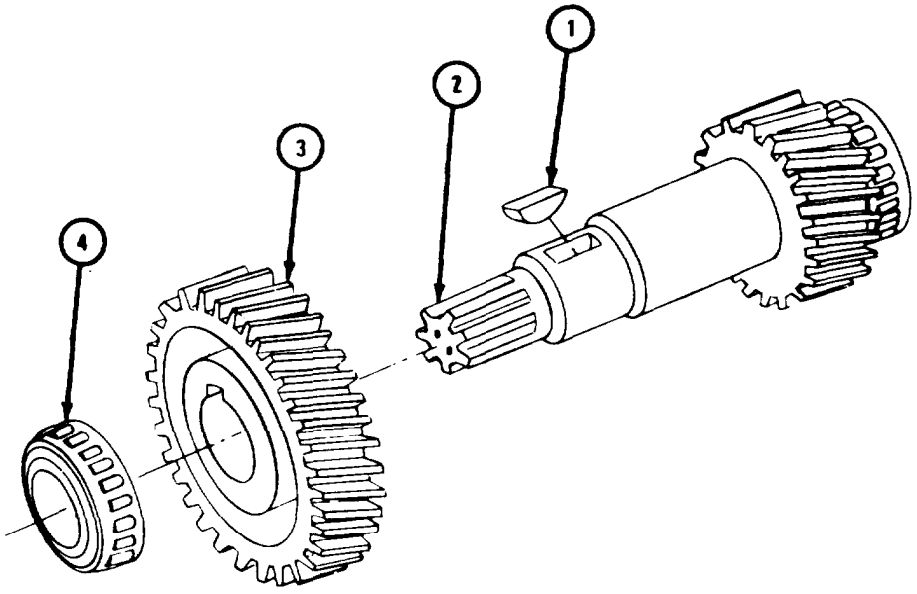


TA 084635

FRAME 2

1. Put woodruff key (1) into intermediate shaft (2).
2. Press on gear (3).
3. Press on bearing (4). Refer to para 7-7.

END OF TASK



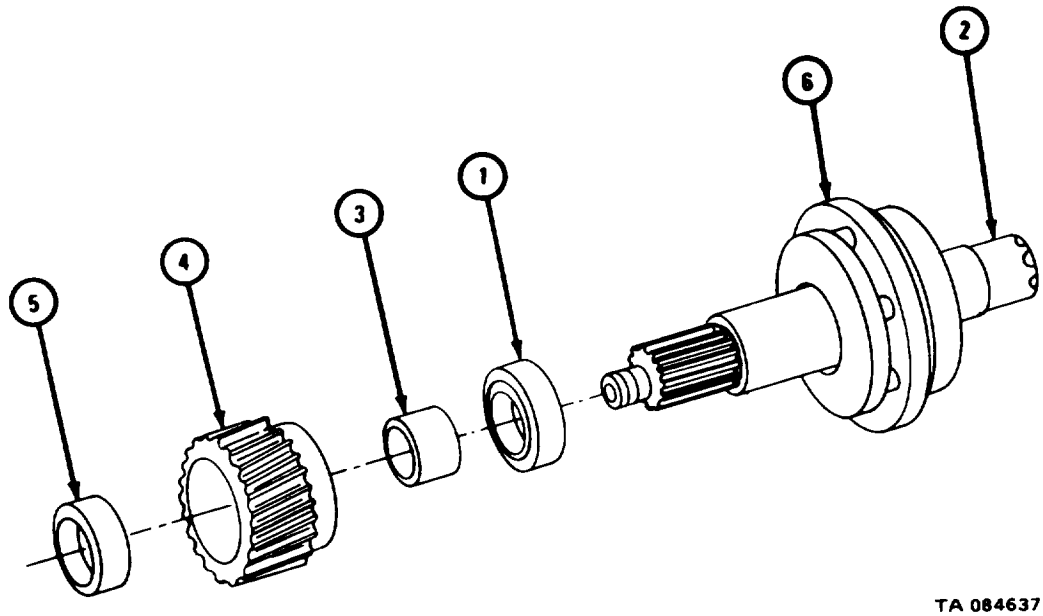
TA 084636

(8) Input shaft.

F R A M E 1

1. Press gear bearing (1) on input shaft (2). Put on sleeve spacer (3).
2. Press gear (4) on bearing (1).
3. Press gear bearing (5) into gear (4).
4. Slide on synchromesh clutch (6).

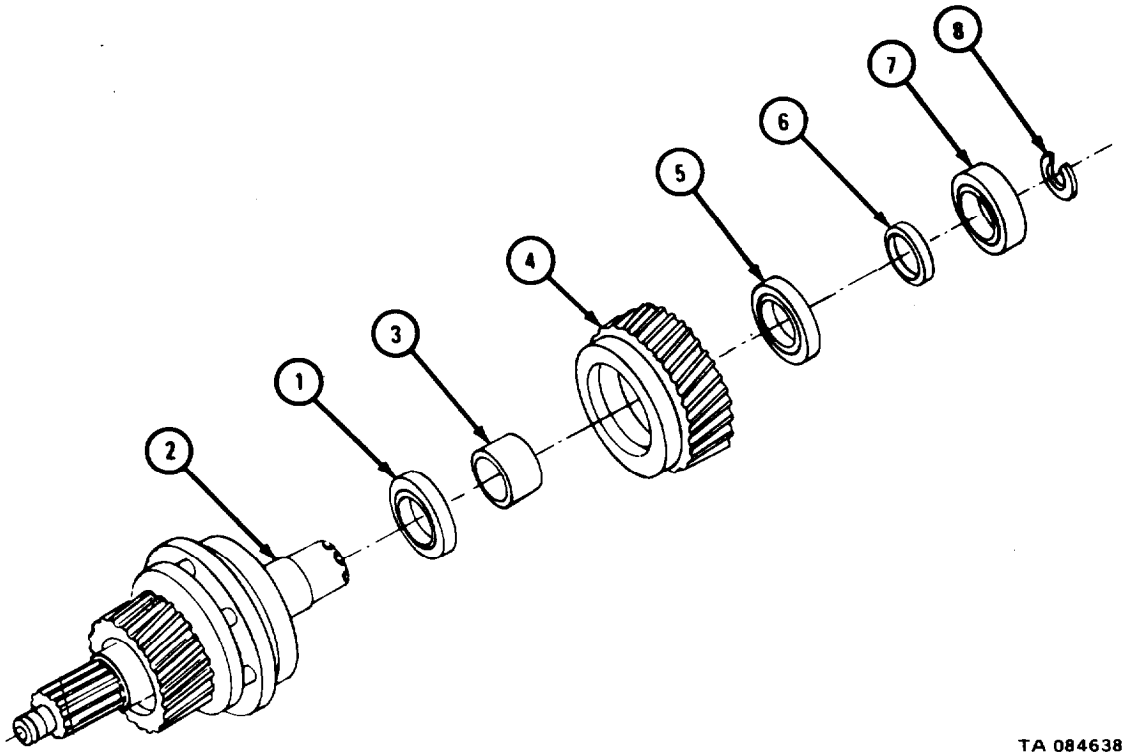
GO TO FRAME 2



FRAME 2

1. Press gear bearing (1) onto input shaft assembly (2) . Put on sleeve spacer (3).
2. Press gear (4) onto gear bearing (1).
3. Press gear bearing (5) into gear (4).
4. Put on spacing collar (6).
5. Press on bearing (7). Refer to para 7-7.
6. Put on snapring (8).

END OF TASK



TA 084638

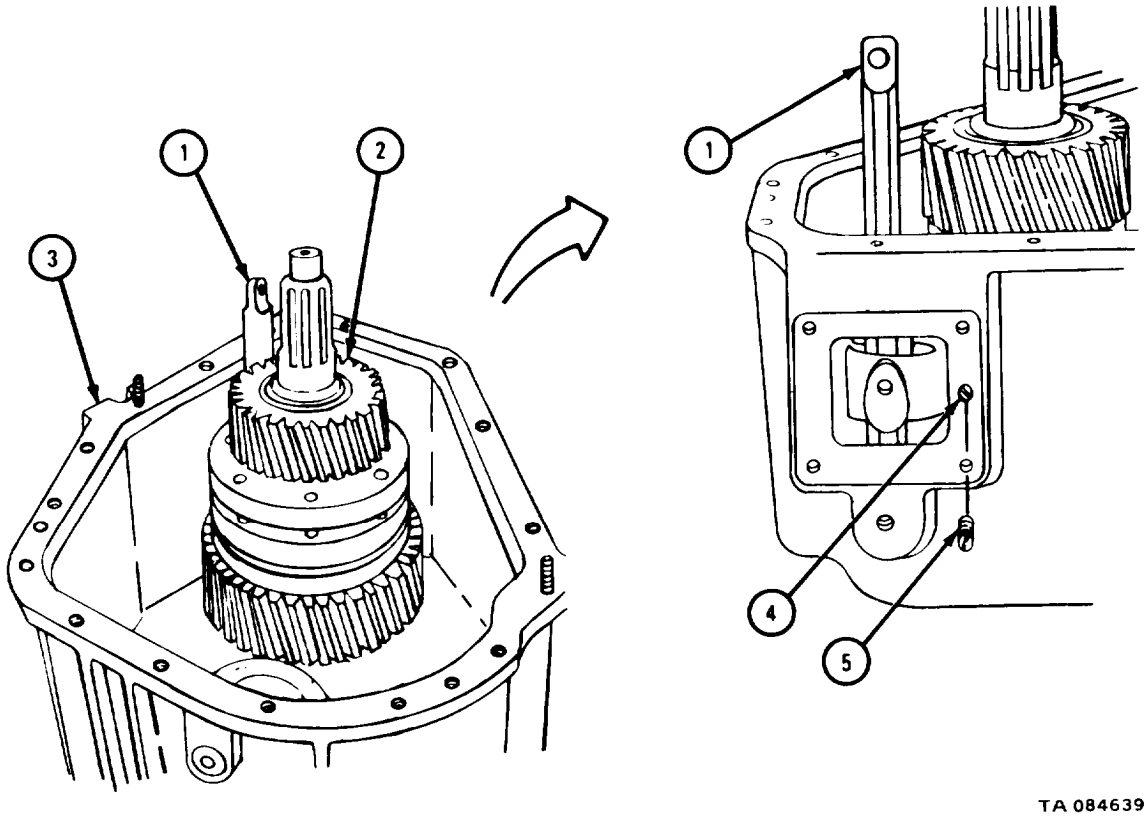
h. Replacement of Subassemblies.

(1) Shaft assemblies.

FRAME 1

1. Place shifter shaft fork (1) on synchromesh clutch of input shaft assembly (2).
2. Put shaft assembly (2) in place in transfer case housing (3).
3. Press shaft assembly (2) into transfer housing (3).
4. Tighten stop screw (4) to 5 to 15 pound-feet.
5. Put in screw (5).

GO TO FRAME 2

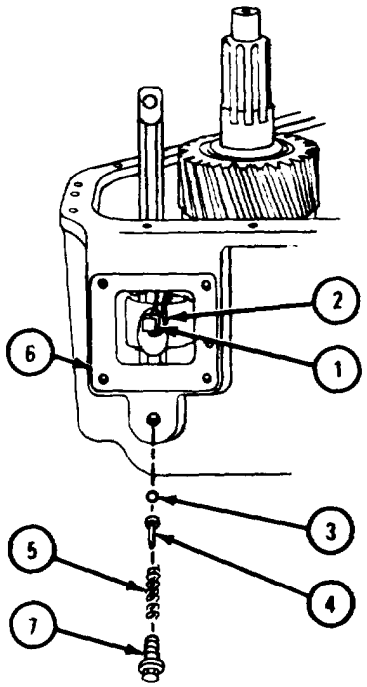


TA 084639

FRAME 2

1. Put in screw (1). Tighten screw to 115 to 120 pound-feet.
2. Put on safety wire (2).
3. Put poppet ball (3), plunger (4), and spring (5) in transfer case housing (6).
4. Put in screw and washer (7). Tighten screw to 60 to 70 pound-feet.

GO TO FRAME 3

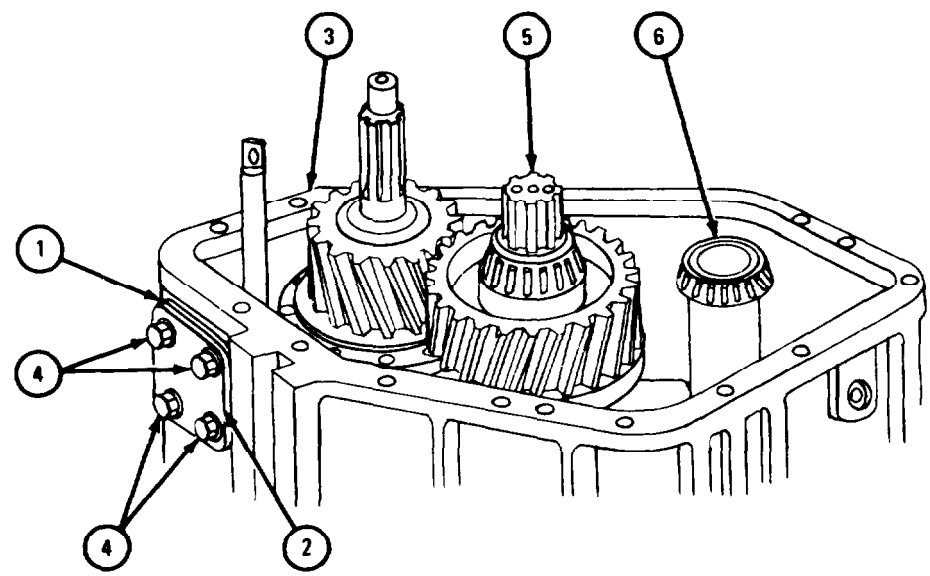


TA 084640

FRAME 3

1. Hold cover plate gasket (1) and cover plate (2) in place on transfer case housing (3).
2. Put in four screws and washers (4). Tighten screws to 38 to 49 pound-feet.
3. Put rear output shaft (5) and intermediate shaft (6) in place.
4. Do backlash check. Refer to para 8-4b (8).
5. If backlash check is not within given limits, disassemble transmission transfer and do wear limit inspection. Refer to para 8-4e.

END OF TASK



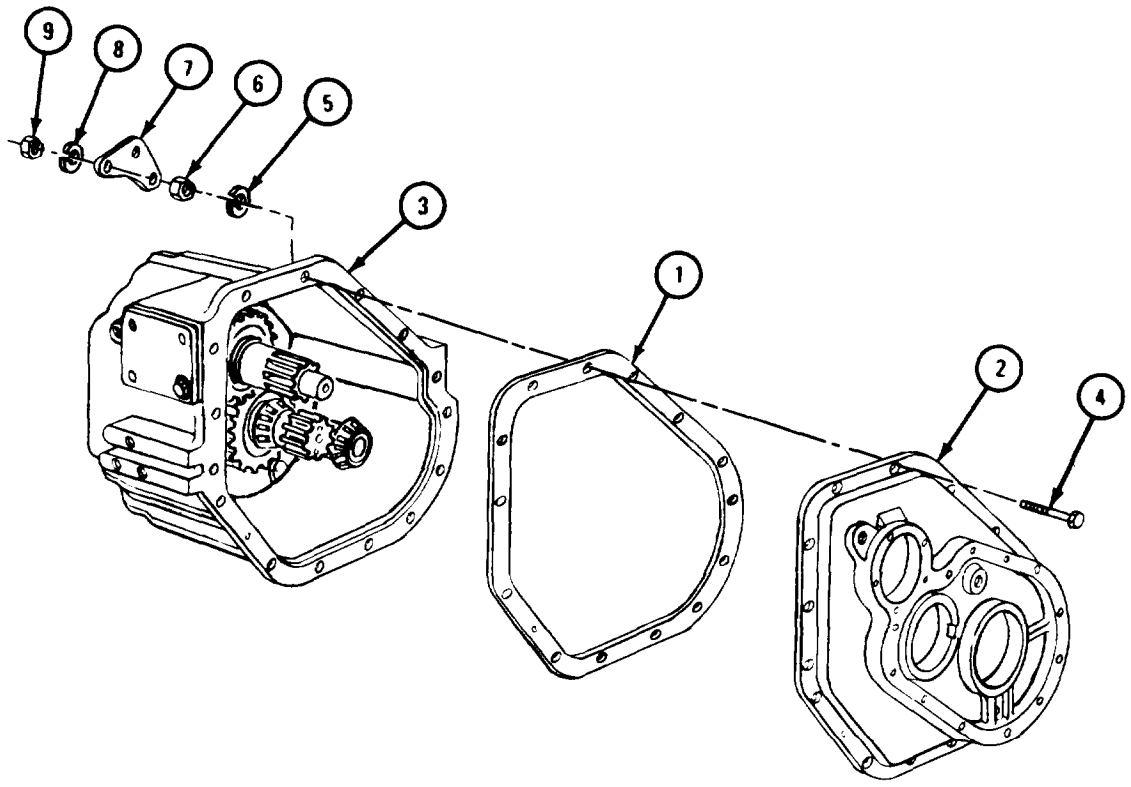
TA 084641

(2) Transfer housing front cover.

FRAME 1

1. Put on front cover gasket (1).
2. Put transfer case front cover (2) in place on housing (3). Aline holes.
3. Put in and hold two screws (4).
4. Put on two lockwashers (5) and nuts (6). Tighten nuts to 48 to 61 pound-feet.
5. Put on lifting bracket (7).
6. Put on two lockwashers (8) and nuts (9). Tighten nuts to 48 to 61 pound-feet.

GO TO FRAME 2

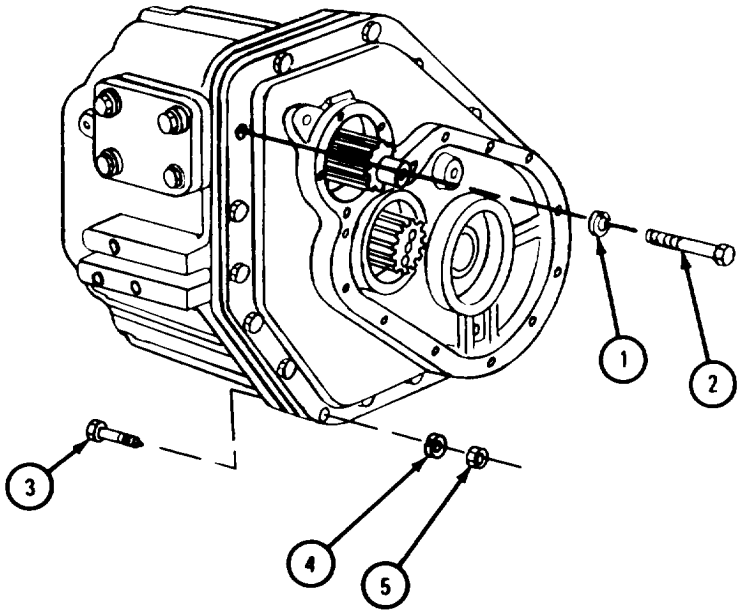


TA 084642

FRAME 2

1. Put in lockwashers (1) on screw (2). Tighten screw to 60 to 77 pound-feet.
2. Put in 15 screws (3). Put on 15 lockwashers (4) and nuts (5). Tighten nuts alternately and evenly to 40 to 61 pound-feet.

GO TO FRAME 3

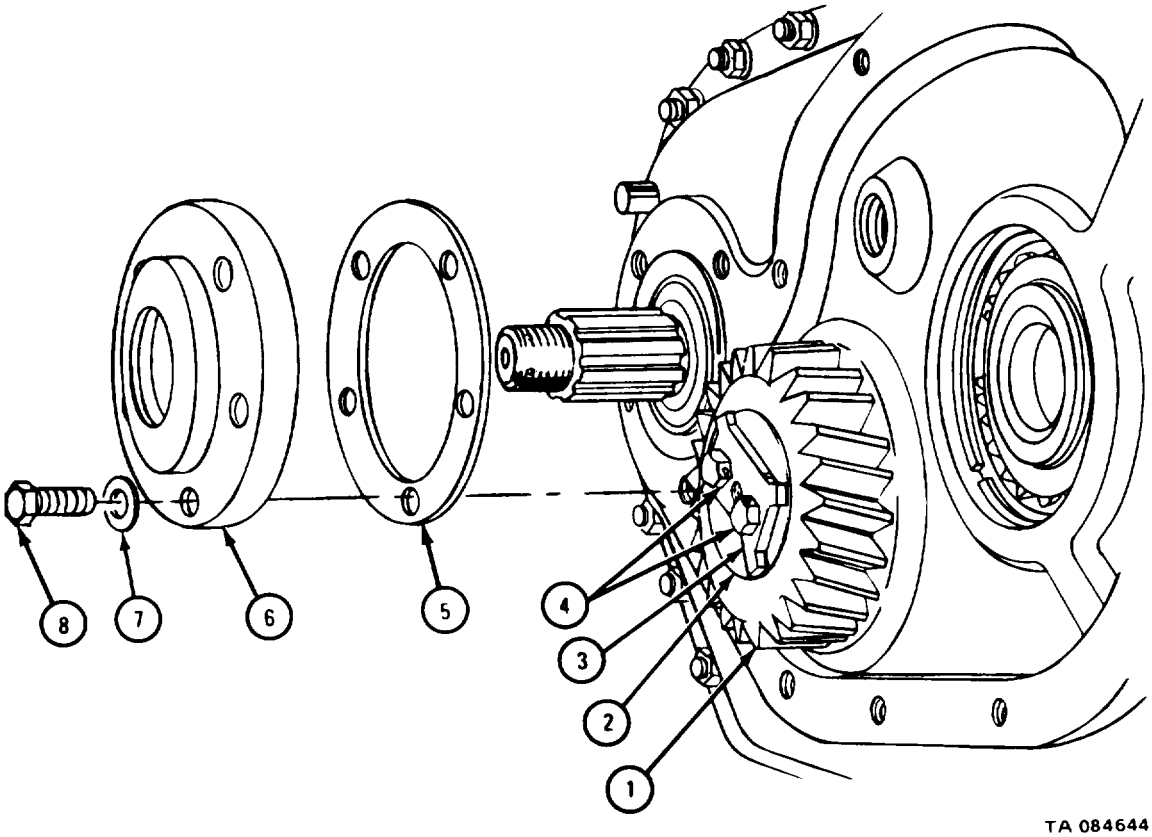


TA 084643

FRAME 3

1. Put intermediate front drive gear (1) in place.
2. Hold thrust washer (2) and intermediate shaft bearing retainer plate (3) in place and put in two screws (4). Tighten screws to 60 to 77 pound-feet.
3. Bend tabs of retainer plate (3) up against screws (4).
4. Hold front input shaft gasket (5) and bearing retainer (6) and put in five washers (7) and screws (8). Tighten screws to 60 to 77 pound-feet.

END OF TASK

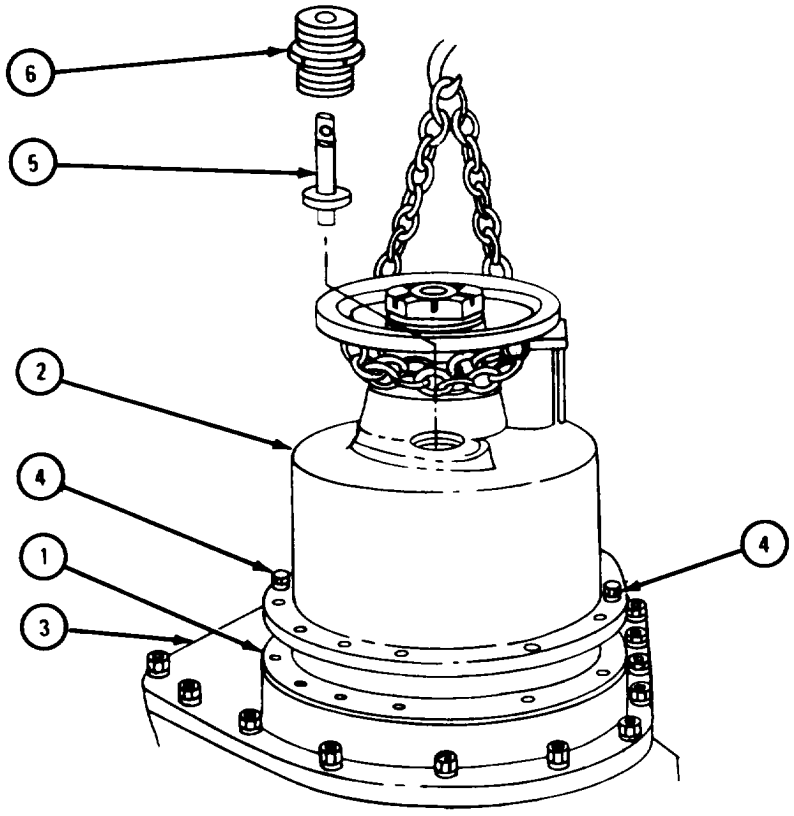


(3) Front output shaft cover assembly.

FRAME 1

1. Put front output shaft cover gasket (1) and front output shaft cover assembly (2) in place on transfer case front cover (3).
2. Put in 10 screws and washers (4). Tighten screws to 60 to 77 pound-feet.
3. Put in speedometer pin (5). Put in union (6).

END OF TASK



8-5. TRANSMISSION TRANSFER ASSEMBLY REAR SEAL REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, transmission in gear, handbrake set, wheels chocked.

a. Preliminary Procedures.

(1) Drain transfer. Refer to LO 9-2320-211-12.

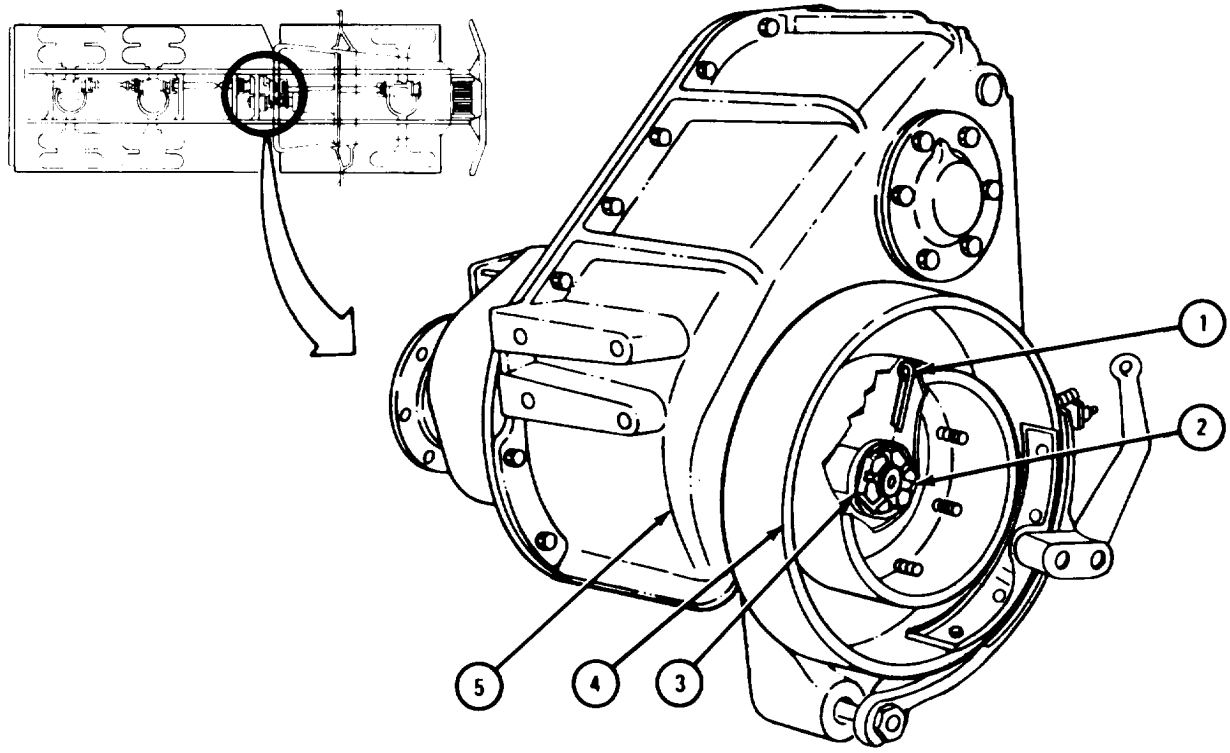
(2) Take off transfer-to-rear axle propeller shaft from transfer assembly. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Take out cotter pin (1).
2. Take off nut (2) and washer (3).
3. Pull brake drum (4) off transfer (5).

GO TO FRAME 2



TA 102100

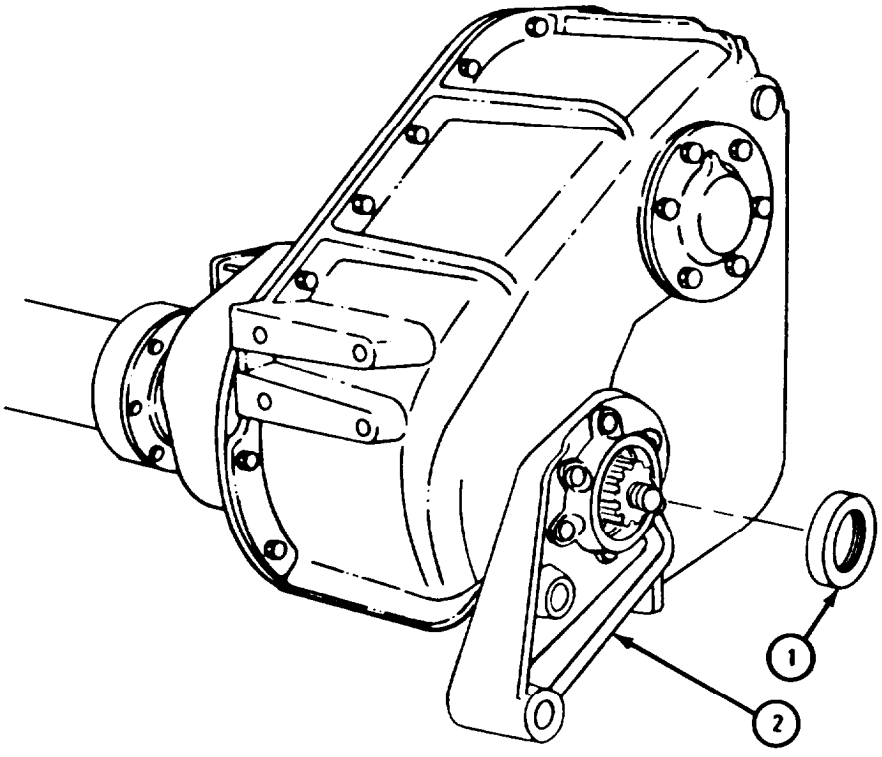
FRAME 2

CAUTION

Be careful not to damage shaft or housing when driving out seal (1).

1. Using punch, drive oil seal (1) out of transfer housing (2).

END OF TASK



TA 102101

c. Replacement.

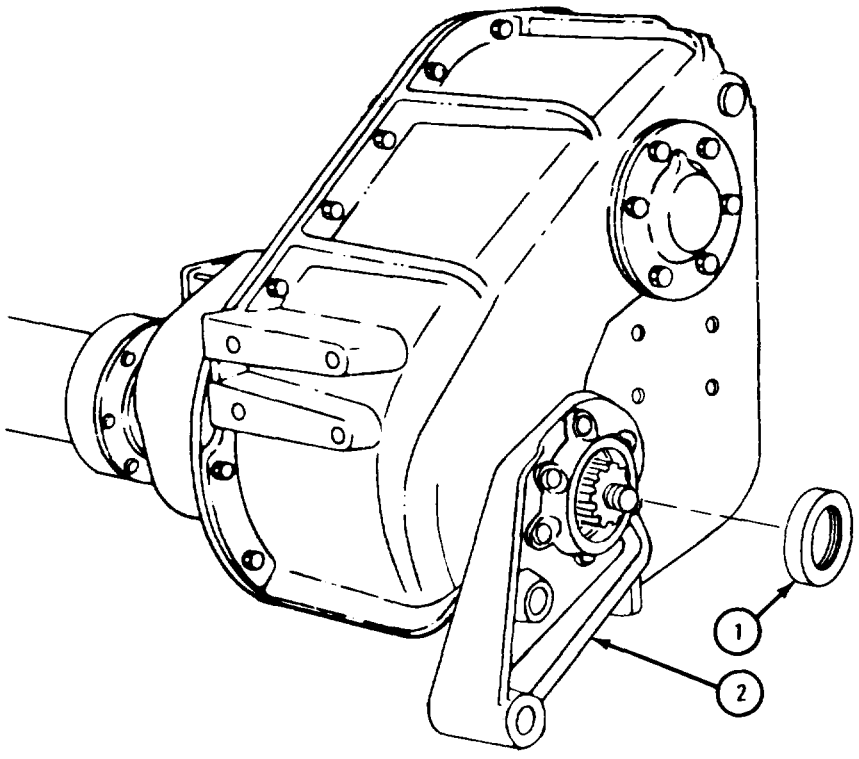
FRAME 1

CAUTION

Be careful not to damage shaft or housing when putting in seal (1).

1. Using hammer and brass bar, drive oil seal (1) into transfer housing (2).

GO TO FRAME 2



TA 105176

FRAME 2

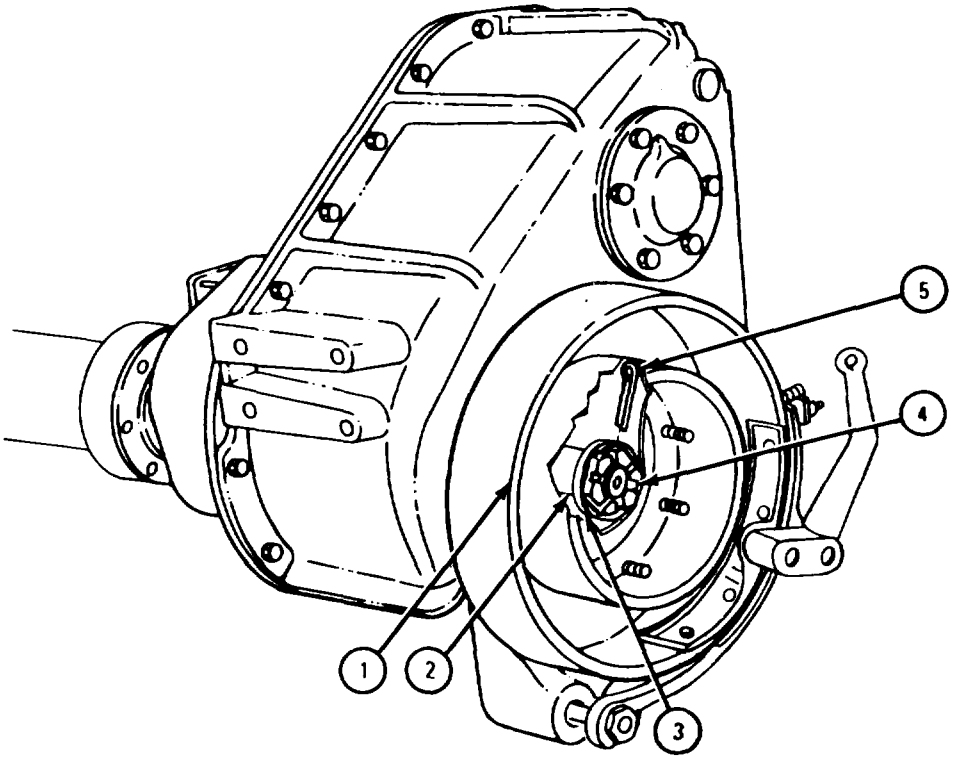
1. Press brake drum (1) over shaft (2).
2. Put on washer (3) and nut (4). Tighten nut to 300 to 400 pound-feet.
3. Put in cotter pin (5) .

NOTE

Follow-on Maintenance Action Required:

1. Replace transfer-to-rear axle propeller shaft on transfer assembly. Refer to TM 9-2320-211-20.
2. Fill transfer. Refer to LO 9-2320-211-12.

END OF TASK



TA 102105

8-6. TRANSMISSION TRANSFER CASE MOUNTING BRACKETS REMOVAL AND REPLACEMENT .

TOOLS: No special tools required

SUPPLIES: 5/8-inch x 1 1/2-inch NC screws (9)
5/8-inch NC nuts (9)
5/8-inch lockwashers (9)
Solvent, dry cleaning, type 11 (SD-2) , Fed. Spec P-D-680

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, wheels blocked.

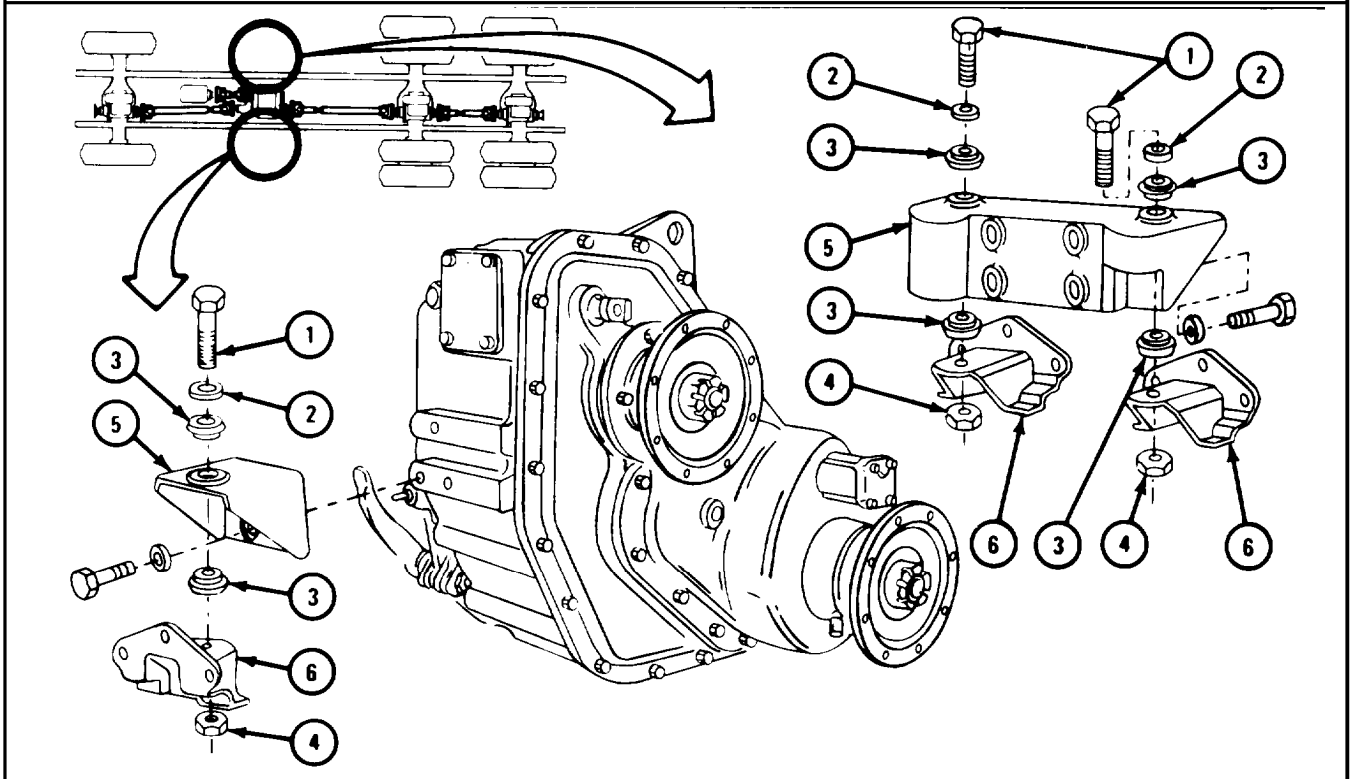
a. Preliminary Procedure. Remove transfer transmission from truck. Refer to para 8-3.

b. Removal.

FRAME 1

1. Take out three screws (1) , three washers (2) , six insulators (3) , and three nuts (4) from mounting brackets (5) and supports (6) .

GO TO FRAME 2



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT.
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR
REFERENCE PURPOSES.

TA 103007

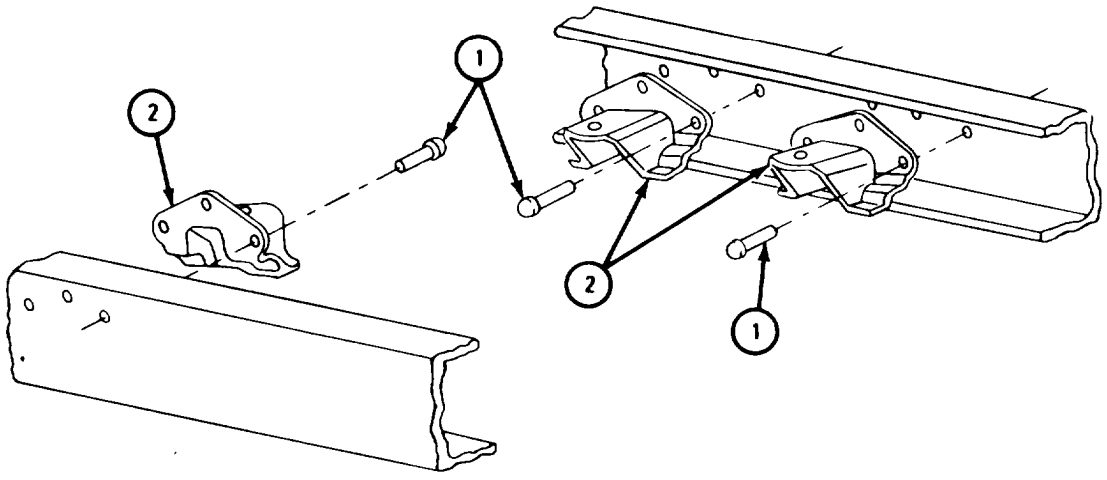
FRAME 2

1. Take out rivets (1) holding support brackets (2) to frame. Take off support brackets (2).

NOTE

If support brackets (2) have been taken off before, take out screws, nuts and washers holding support brackets.

END OF TASK



TA 105756

c. Cleaning and Inspection.

WARNING

Dry cleaning sol vent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

NOTE

Clean all parts before inspection, after repair, and before assembly.

(1) Clean inner and outer surfaces of metallic parts and all areas subject to oil or grease with dry cleaning solvent.

(2) Remove sludge and gum deposits with a stiff brush.

(3) Steam cleaning may be used to remove accumulated grease and dirt after dry cleaning solvent has been applied.

(4) Dry with clean rags.

(5) Rust must be taken off using a wire brush.

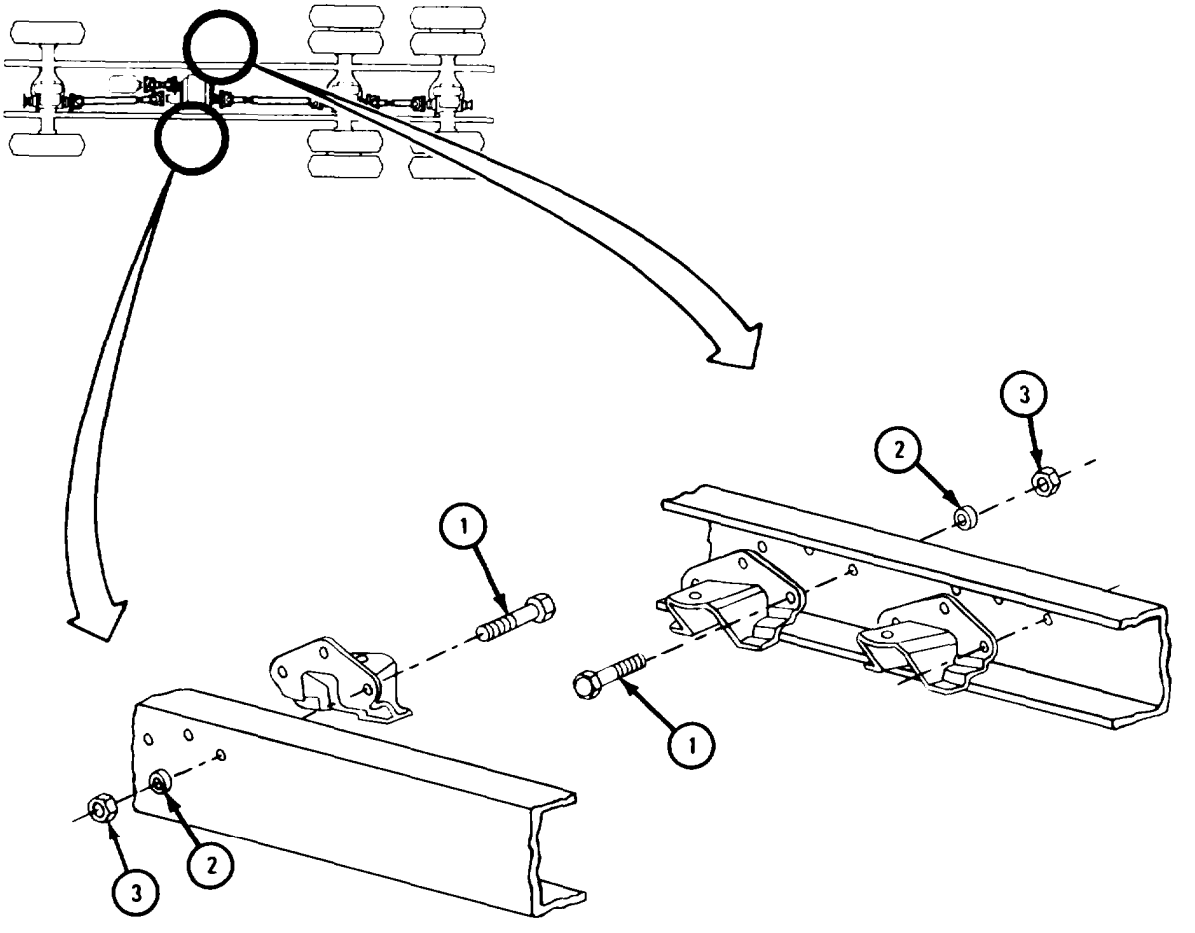
(6) Refer to para 1-3 for additional cleaning steps.

d. Replacement.

FRAME 1

1. Put in and tighten nine screws (1) , washers (2) , and nuts (3) joining support brackets to frame.

GO TO FRAME 2



FRAME 2

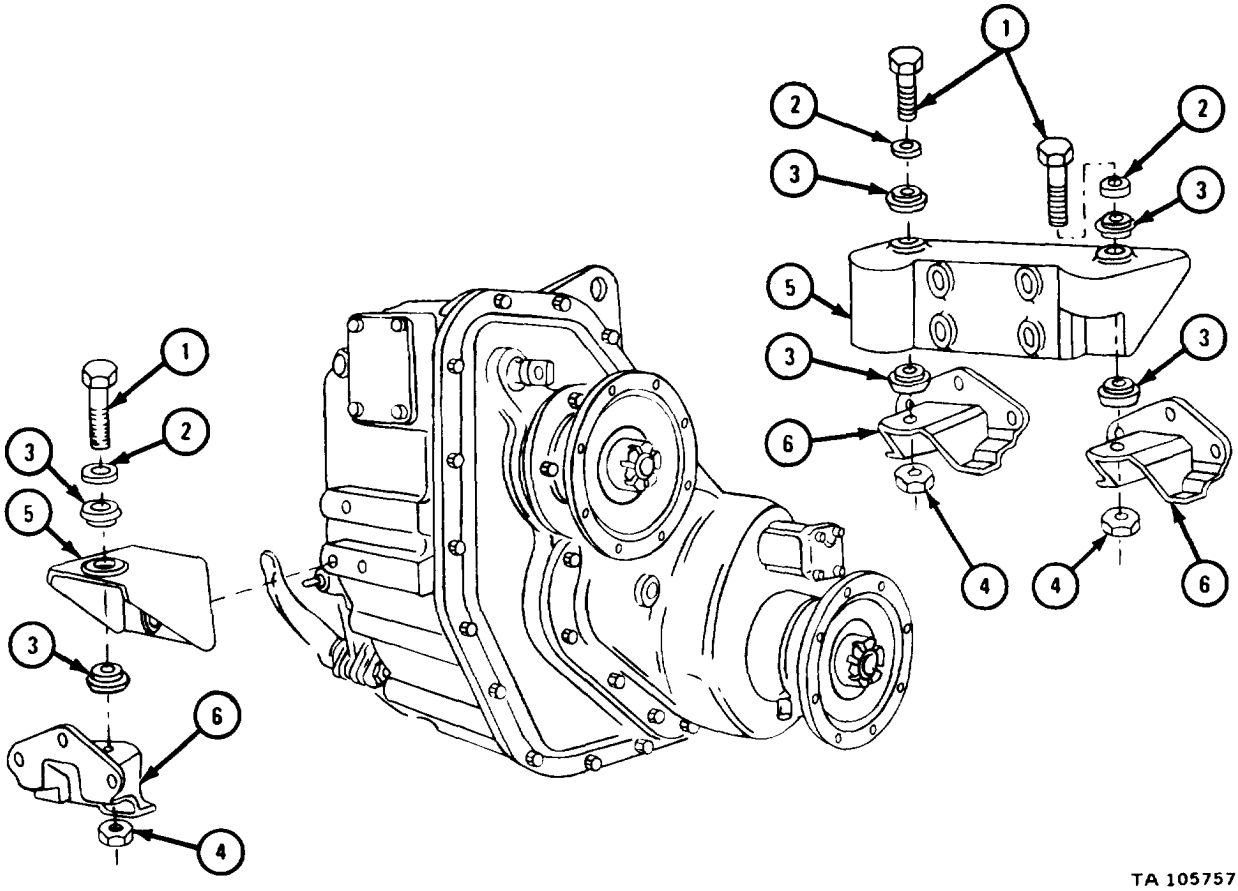
1. Put in three screws (1), three washers (2), six insulators (3), and three nuts (4) joining mounting brackets (5) and support brackets (6).

NOTE

Follow-on Maintenance Action Required:

Install transfer transmission into truck. Refer to para 8-3.

END OF TASK



Section III. TRANSMISSION TRANSFER CONTROLS AND LINKAGES

8-7. TRANSMISSION CONTROLS AND LINKAGE REMOVAL, REPAIR, AND REPLACEMENT (TRUCKS WITHOUT FRONT WINCH).

TOOLS: No special tools required

SUPPLIES: Cotter pin (5)

PERSONNEL: One

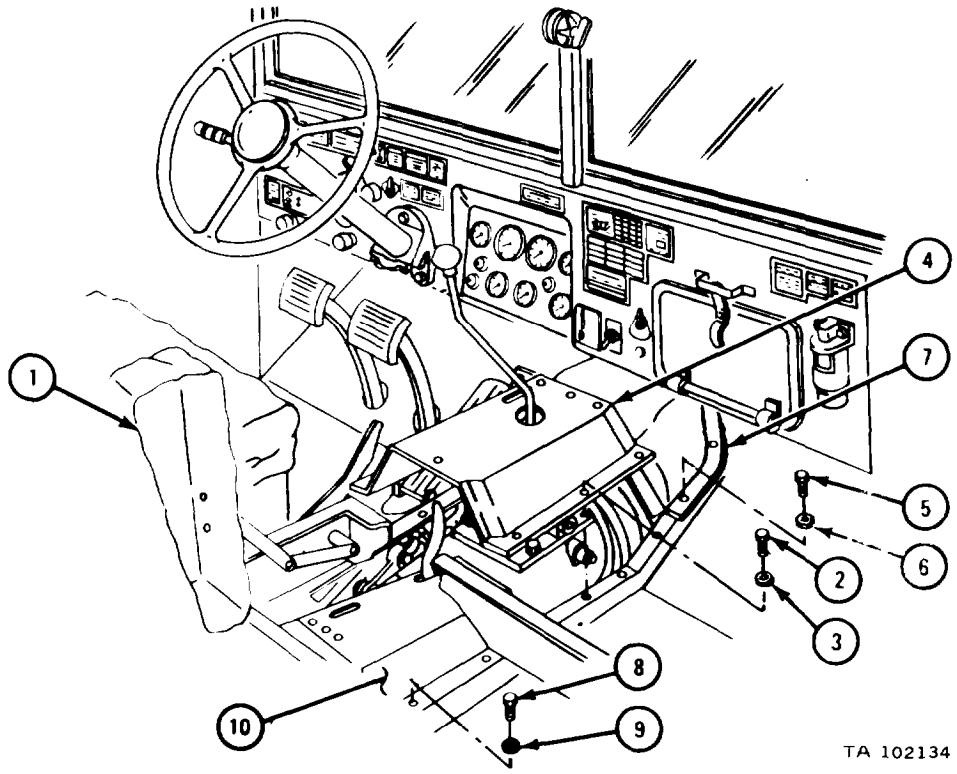
EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

Removal.

FRAME 1

1. Lift up companion seat (1).
2. Take out 12 screws (2) and lockwashers (3) from front tunnel (4).
3. Lift up and slide off front tunnel (4).
4. Take out eight screws (5) and lockwashers (6) from toeboard (7). Take off toeboard.
5. Take out six screws (8) and lockwashers (9). Lift up and slide off rear tunnel (10).

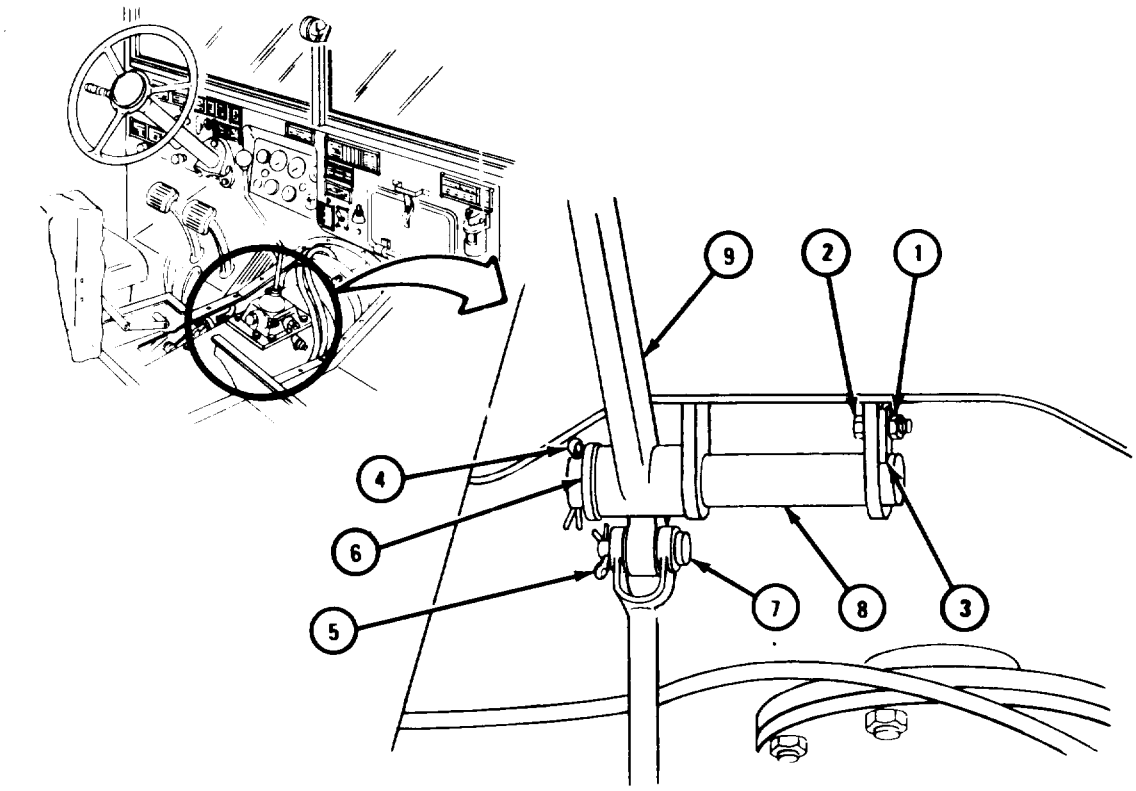
GO TO FRAME 2



FRAME 2

1. Take off nut (1).
2. Take out screw (2) and retainer (3).
3. Take out two cotter pins (4 and 5).
4. Take off washer (6).
5. Take out clevis pin (7).
6. Slide shaft (8) to the right and take off hand lever (9).

GO TO FRAME 3

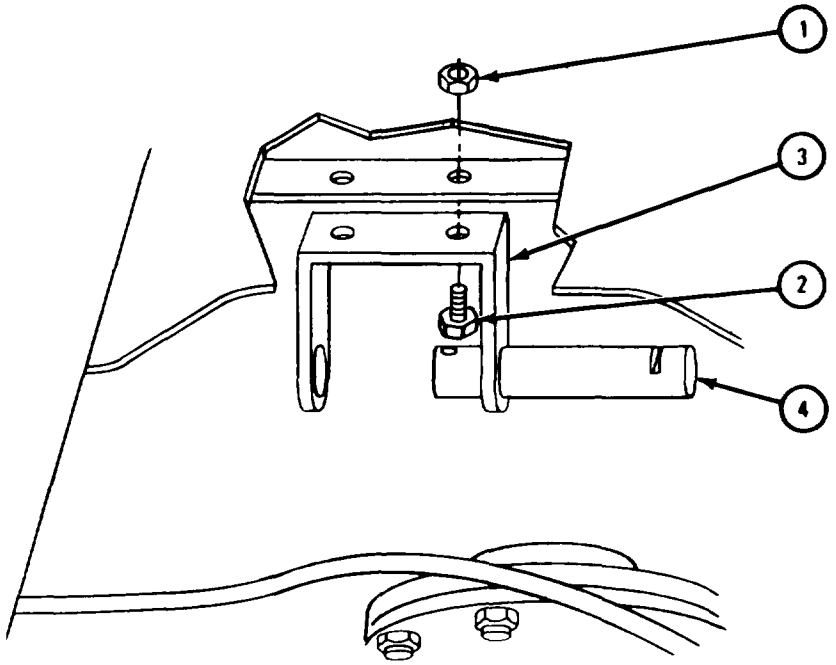


TA 084350

FRAME 3

1. Take off two nuts (1) and two screws (2).
2. Take off bracket (3) and slide out shaft (4).

GO TO FRAME 4

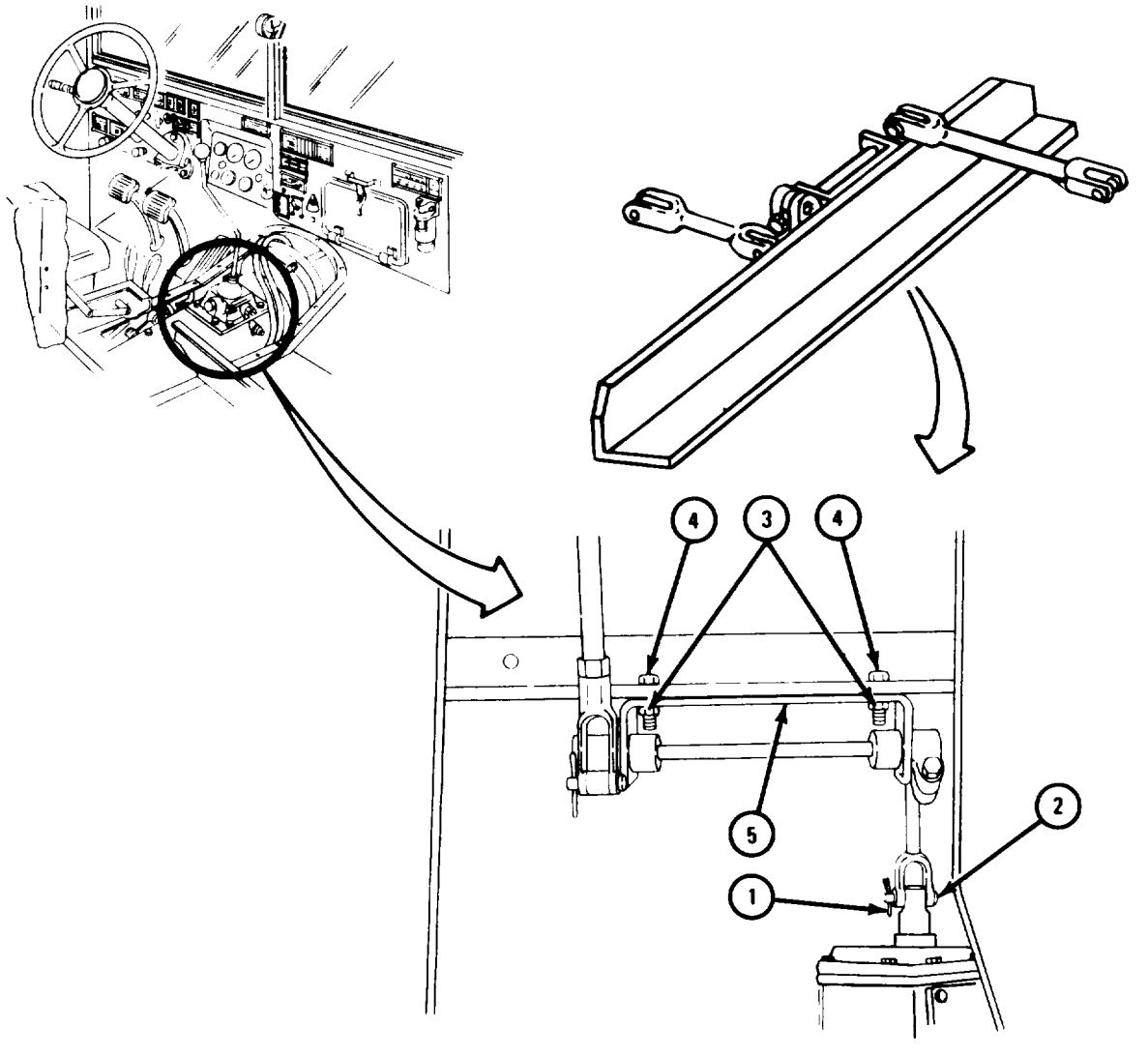


TA 084351

FRAME 4

1. Take out cotter pin (1).
2. Take out clevis pin (2).
3. Take off two nuts (3) and two screws (4).
4. Take off bracket and linkage assembly (5).

END OF TASK

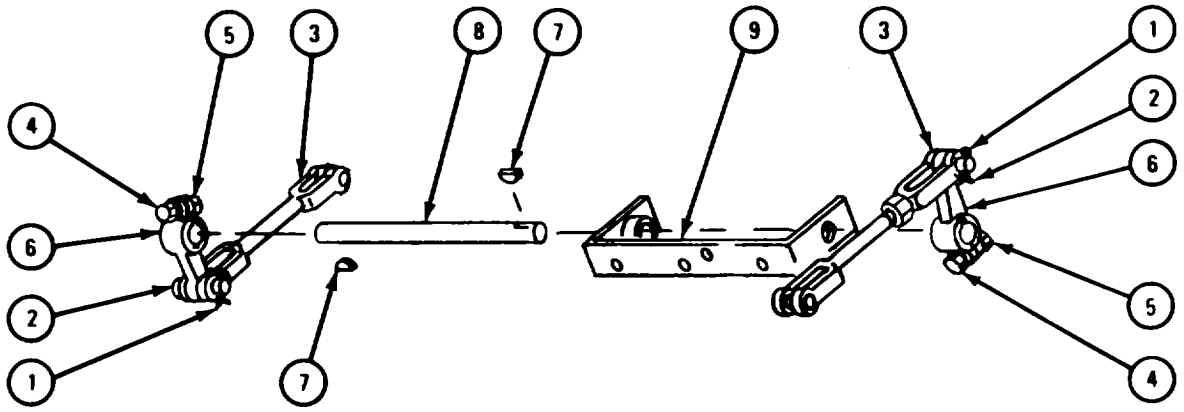


b. Disassembly.

FRAME 1

1. Take out two cotter pins (1).
2. Take out two clevis pins (2) and control rods (3).
3. Take out two bolts (4) and nuts (5).
4. Take off two levers (6).
5. Take out two keys (7).
6. Take shaft (8) out of bracket (9).

END OF TASK



TA 084356

c. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in para 1-3.

d. Inspection and Repair.

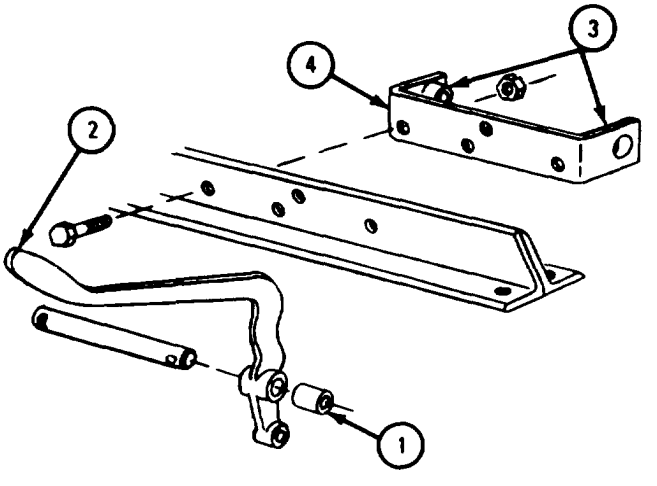
FRAME 1

NOTE

Do not remove bushings unless they are damaged.

1. Check that bushing (1) in hand lever (2) is not scored, chipped or damaged in any other way. If bushing is damaged, press it out and press in a new one.
2. Check that two bushings (3) in mounting bracket (4) are not scored, chipped or damaged in any other way. If bushings are damaged, press them out and press in new ones.
3. Check that all parts are not bent or cracked. Straighten bent parts. Refer to FM 43-2. Get new parts in place of cracked or damaged parts.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

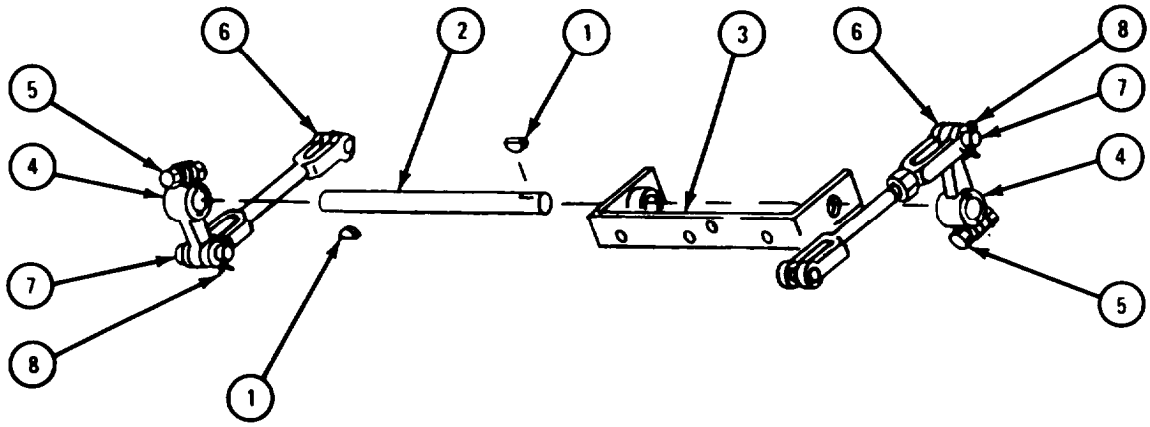
TA 084357

e. Assembly.

FRAME 1

1. Put two keys (1) in shaft (2) and put shaft in bracket (3).
2. Put on two levers (4) and tighten two screws (5) .
3. Put on two control rods (6).
4. Put in two clevis pins (7) and cotter pins (8).

END OF TASK



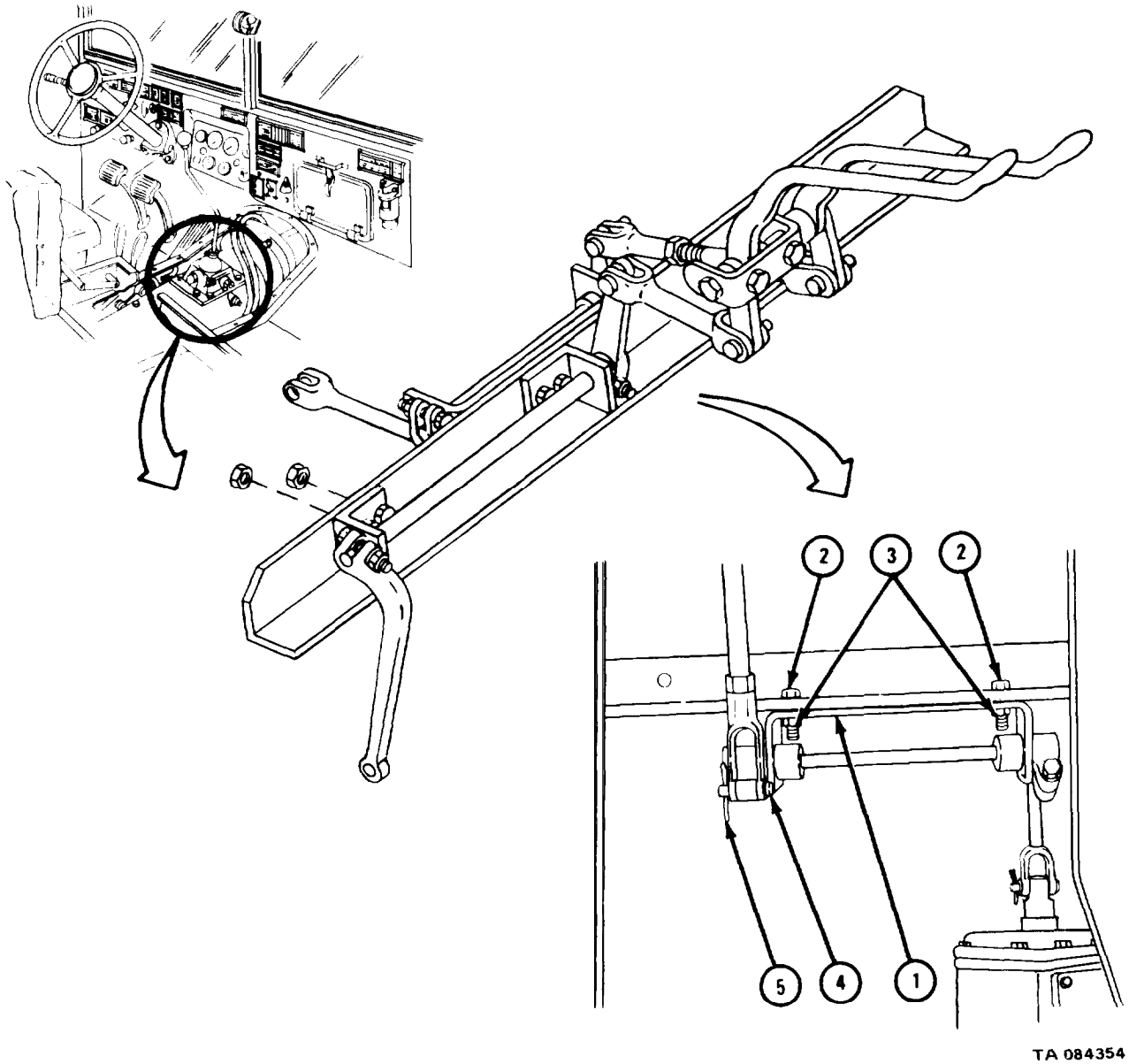
TA 084353

f. Replacement.

FRAME 1

1. Put in bracket and linkage assembly (1).
2. Put on two screws (2) and nuts (3).
3. Put in clevis pin (4).
4. Put in cotter pin (5).

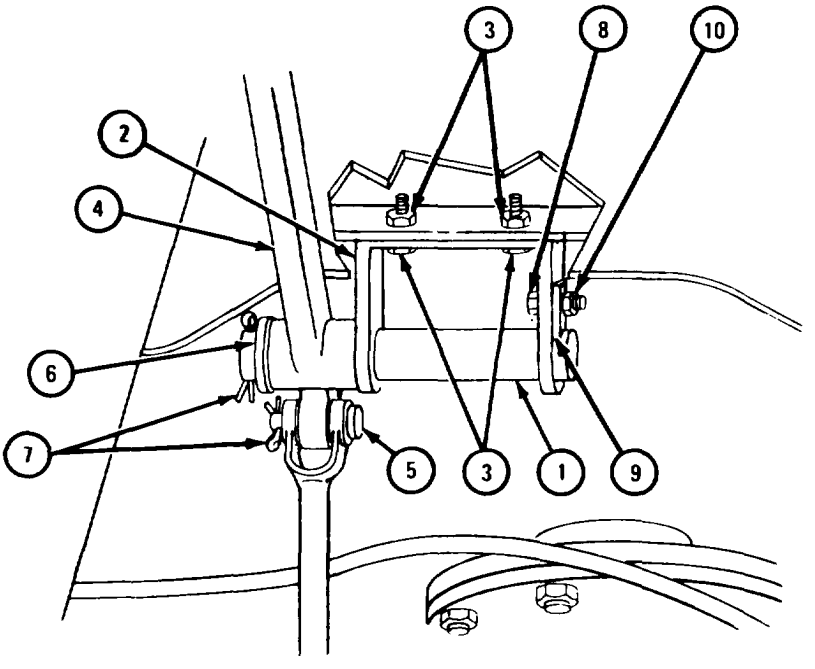
GO TO FRAME 2



FRAME 2

1. Put shaft (1) in bracket (2).
2. Put in two screws and nuts (3).
3. Put on hand lever (4).
4. Put in clevis pin (5).
5. Put on washer (6).
6. Put in two cotter pins (7).
7. Put in screw (8) and retainer (9).
8. Put on nut (10).

GO TO FRAME 3

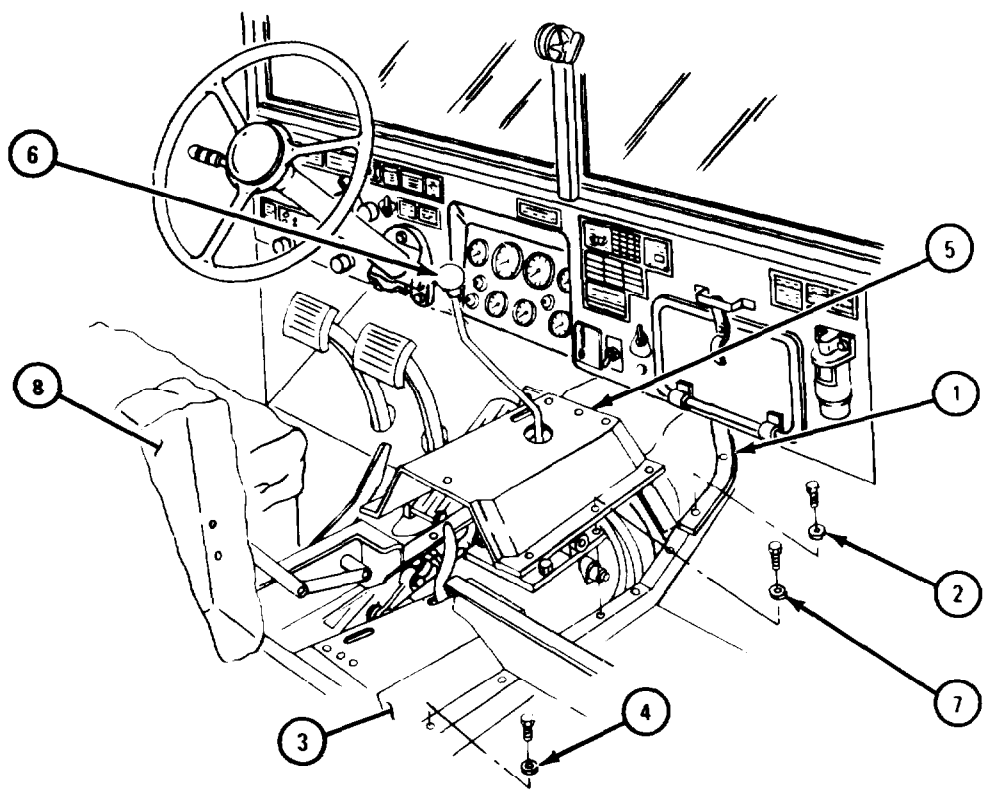


TA 084355

FRAME 3

1. Put toeboard (1) in place and aline holes. Put in 11 screws and lockwashers (2).
2. Slide rear tunnel (3) down into place and aline holes.
3. Put in six screws and lockwashers (4).
4. Slide front tunnel (5) down over shift lever (6).
5. Aline holes in front tunnel (5) with holes in cab floor, toeboard (1), and rear tunnel (3).
6. Put in 12 screws and lockwashers (7).
7. Put down companion seat (8).

END OF TASK



TA 102135

8-8. TRANSMISSION TRANSFER CONTROLS AND LINKAGE REMOVAL, REPAIR, AND REPLACEMENT (TRUCKS WITH FRONT WINCH).

TOOLS: No special tools required

SUPPLIES: Cotter pin (2)

PERSONNEL: One

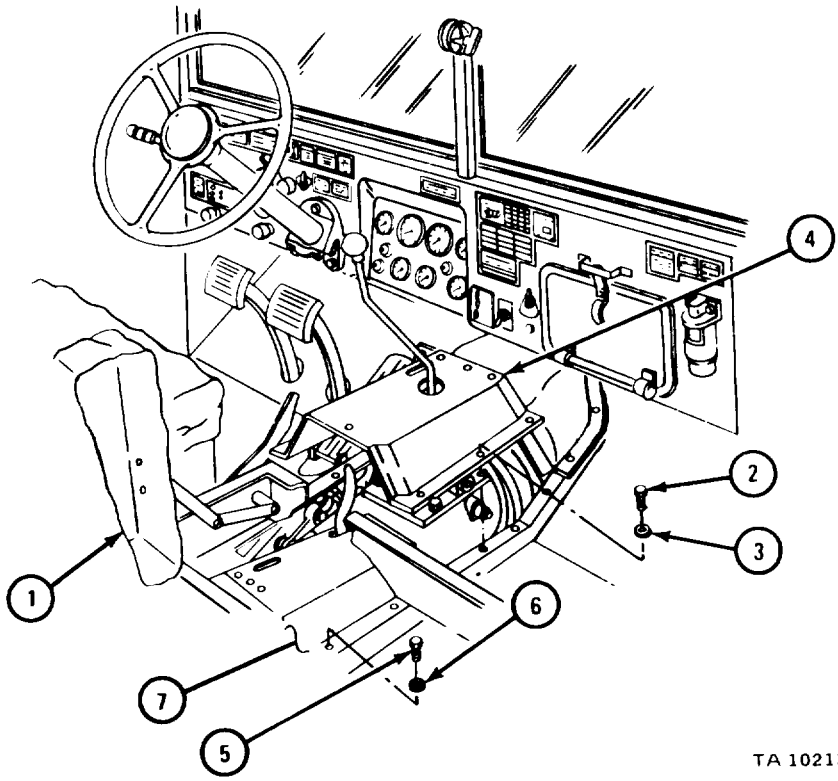
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Lift up companion seat (1).
2. Take out 13 screws (2) and lockwashers (3) from front tunnel (4).
3. Lift up and slide off front tunnel (4).
4. Take out eight screws (5) and lockwashers (6). Lift up and slide off rear tunnel (7).

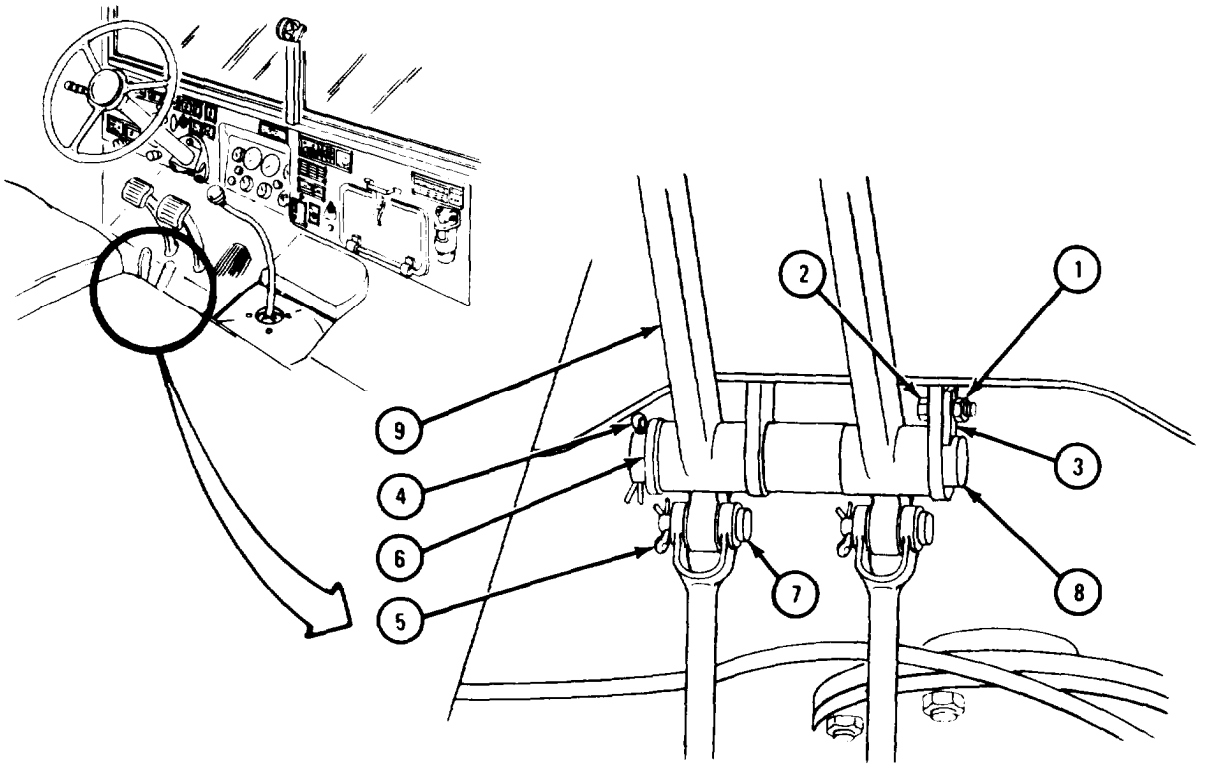
GO TO FRAME 2



FRAME 2

1. Take off nut (1).
2. Take out screw (2) and retainer (3).
3. Take out two cotter pins (4 and 5).
4. Take off washer (6).
5. Take out clevis pin (7).
6. Slide shaft (8) to the right and take off hand lever (9).

GO TO FRAME 3

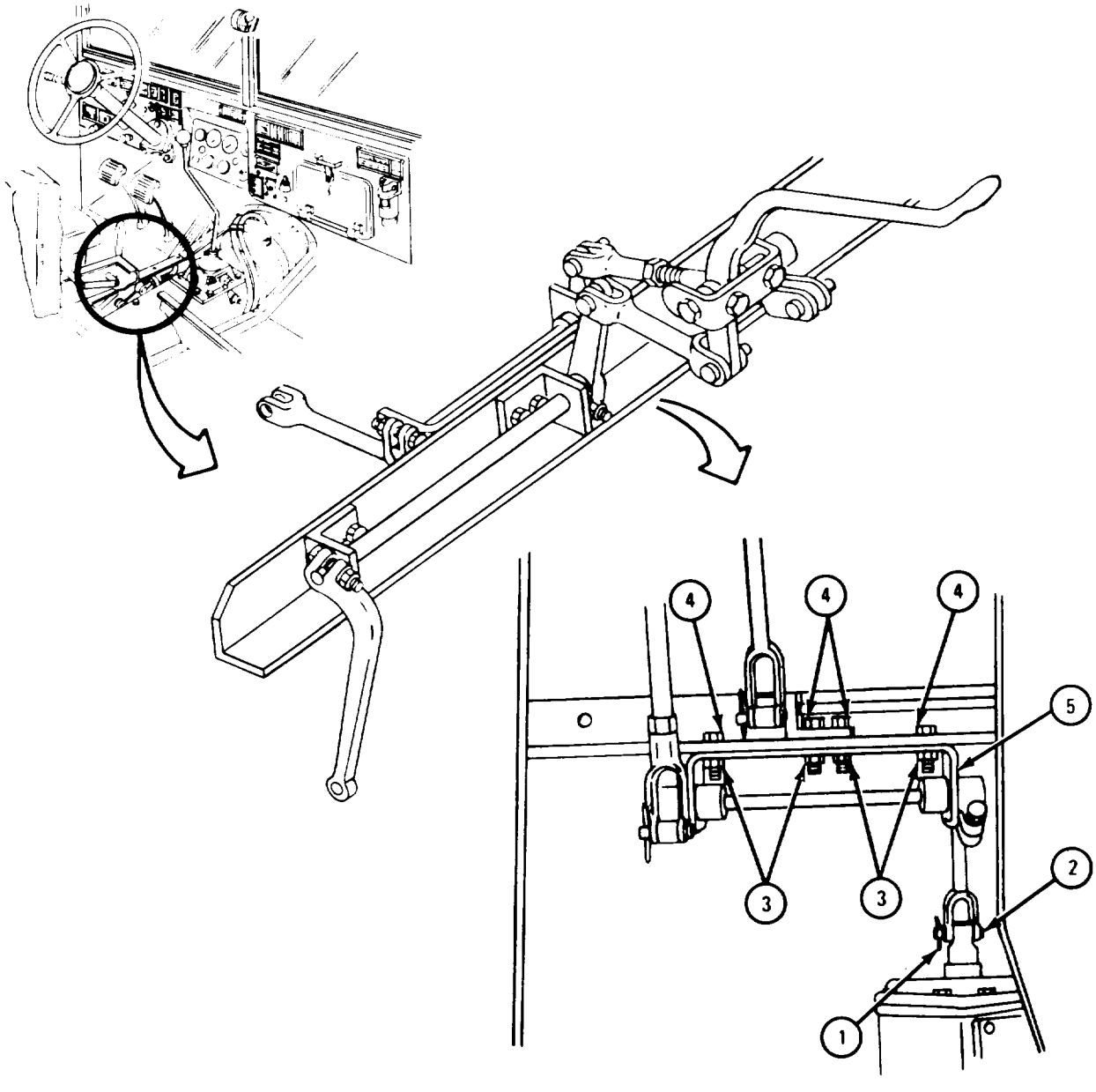


TA 102137

FRAME 3

1. Take out cotter pin (1).
2. Take out clevis pin (2).
3. Take off four nuts (3) from screws (4). Take out two outside screws (4).
4. Take off bracket and linkage assembly (5).

END OF TASK

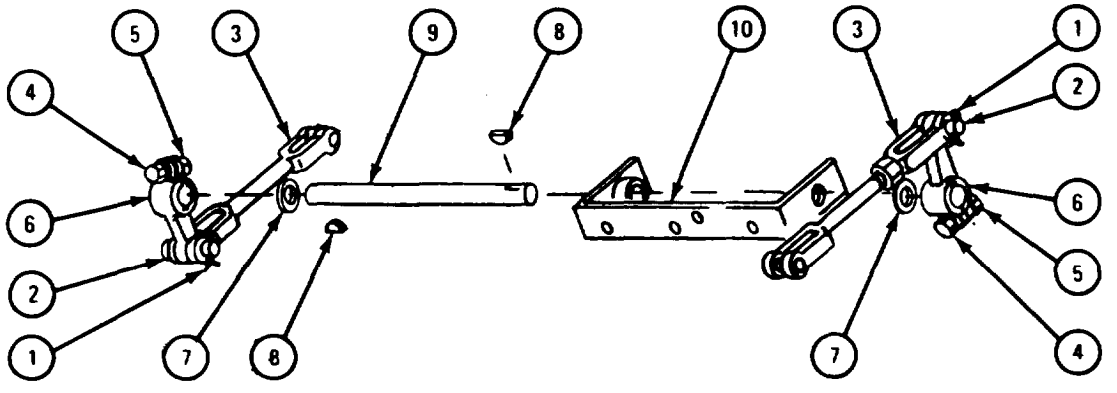


b. Disassembly.

FRAME 1

1. Take out two cotter pins (1).
2. Take out two clevis pins (2) and control rods (3).
3. Take out two bolts (4) and nuts (5).
4. Take off two levers (6) and spacers (7).
5. Take out two keys (8).
6. Take shaft (9) out of bracket (10).

END OF TASK



TA 102139

c. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in para 1–3.

d. Inspection and Repair.

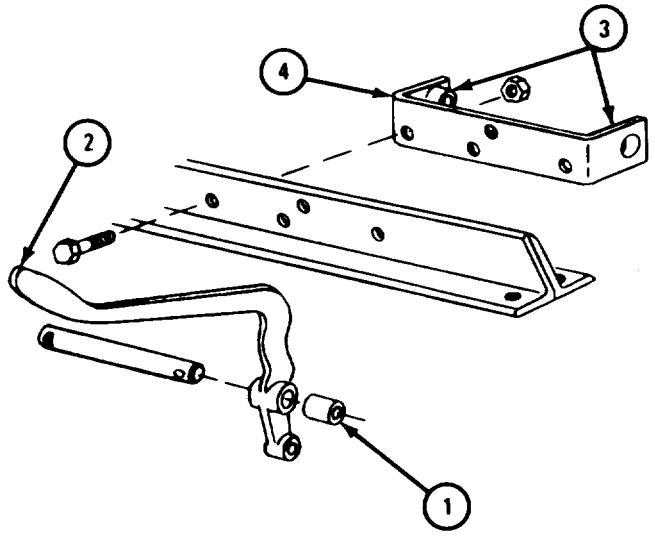
FRAME 1

NOTE

Do not remove bushings unless they are damaged.

1. Check that bushing (1) in hand lever (2) is not scored, chipped or damaged in any way. If bushing is damaged, press it out and press in a new one.
2. Check that two bushings (3) in mounting bracket (4) are not scored, chipped or damaged in any way. If bushings are damaged, press them out and press in new ones.
3. Check that all parts are not bent or cracked. Straighten bent parts. Refer to FM 43-2. Get new parts in place of cracked or damaged parts.

END OF TASK



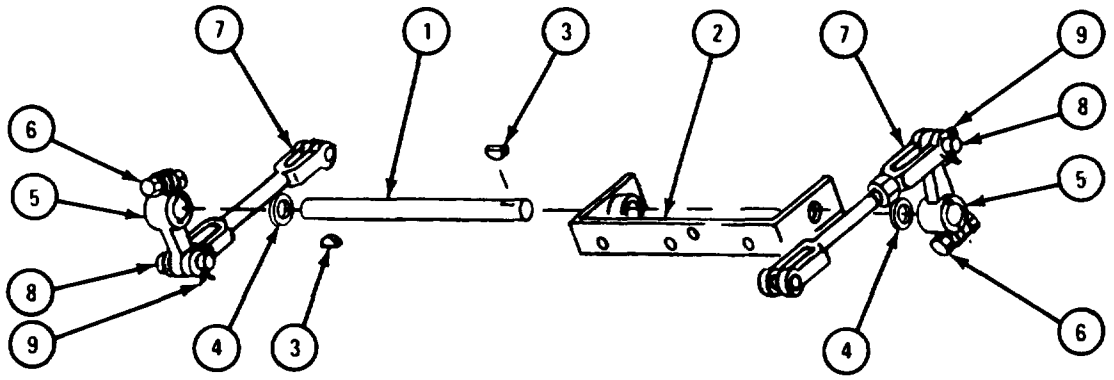
TA 102140

e. Assembly.

FRAME 1

1. Put shaft (1) in bracket (2).
2. Put two keys (3) in shaft (1).
3. Put on two spacers (4).
4. Put on two levers (5) and tighten two screws (6).
5. Put on two control rods (7).
6. Put in two clevis pins (8) and cotter pins (9).

END OF TASK



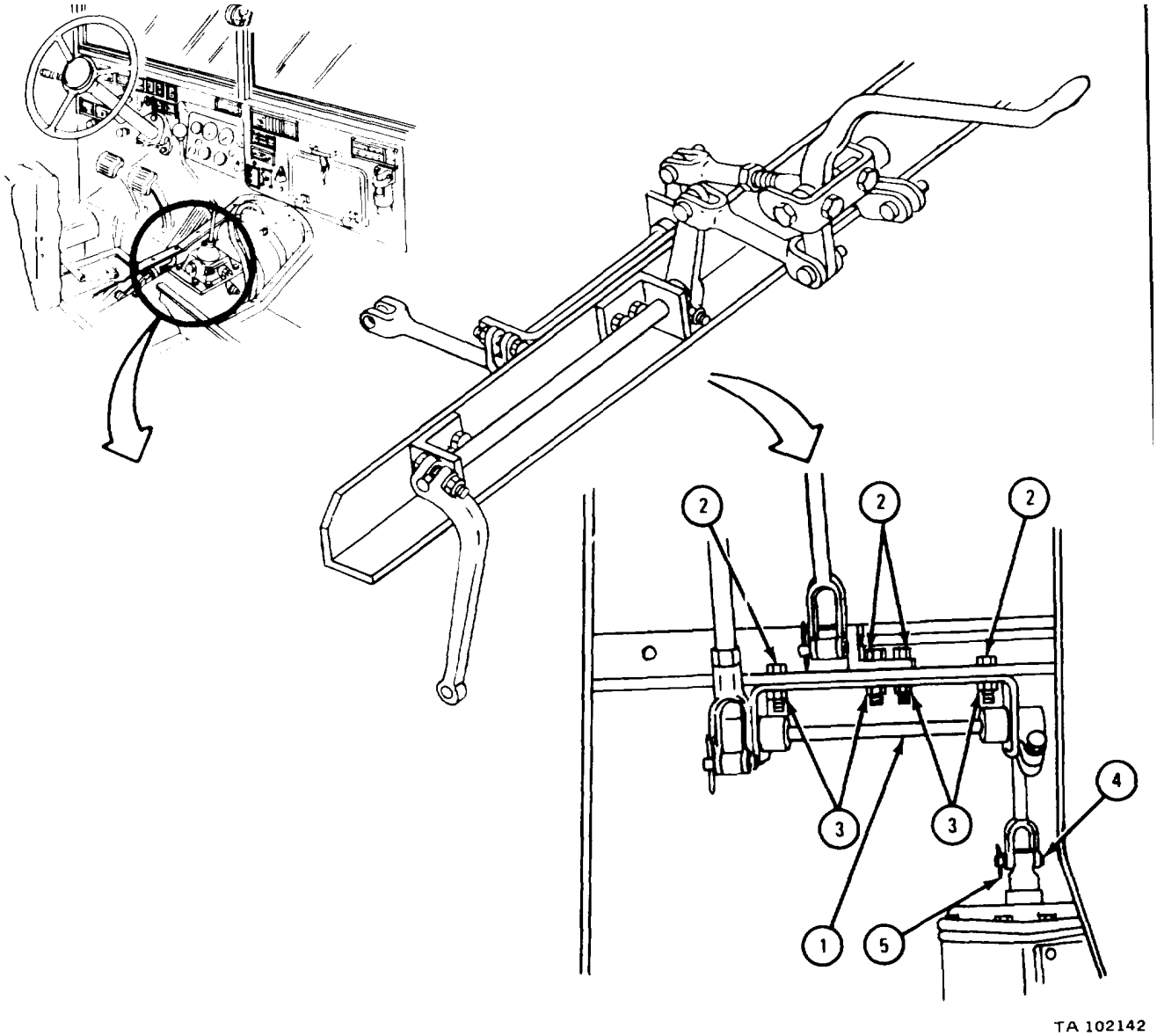
TA 102141

f. Replacement.

FRAME 1

1. Put in bracket and linkage assembly (1).
2. Put on four screws (2) and four nuts (3).
3. Put in clevis pin (4).
4. Put in cotter pin (5).

GO TO FRAME 2

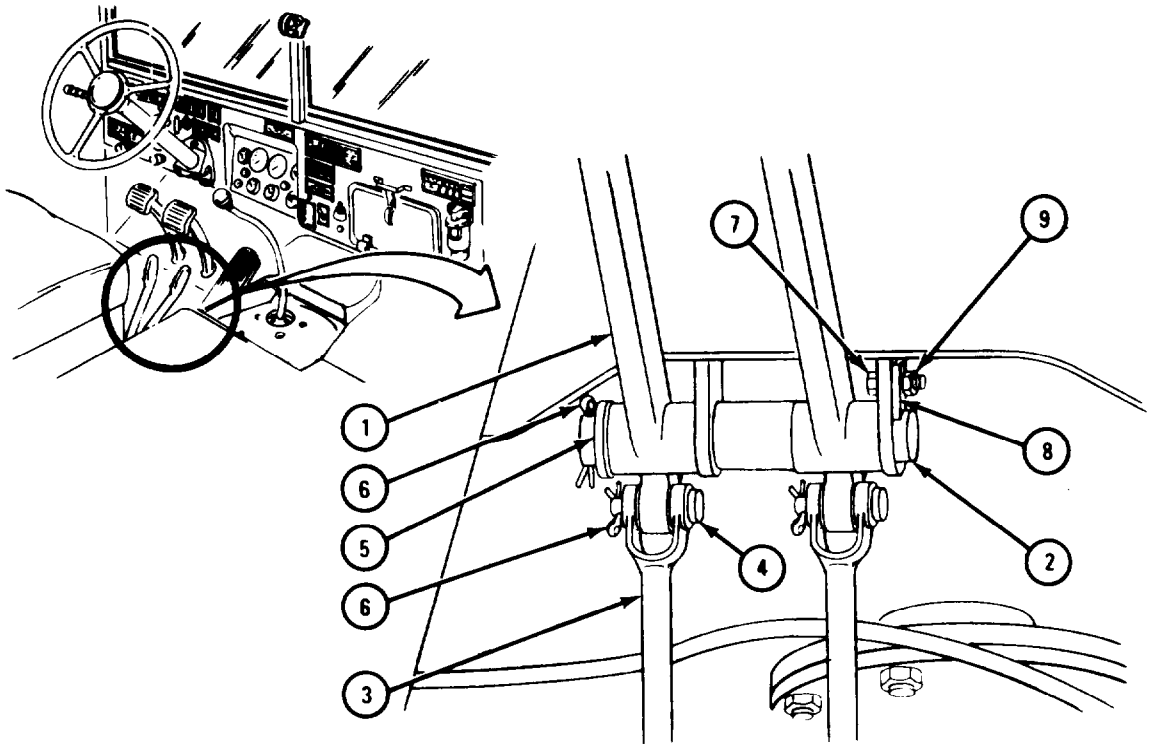


TA 102142

FRAME 2

1. Hold hand lever (1) in place as shown.
2. Push shaft (2) into hand lever (1).
3. Put on linkage (3).
4. Put in clevis pin (4).
5. Put on washer (5).
6. Put in two cotter pins (6).
7. Put in screw (7) and retainer (8).
8. Put on nut (9).

GO TO FRAME 3

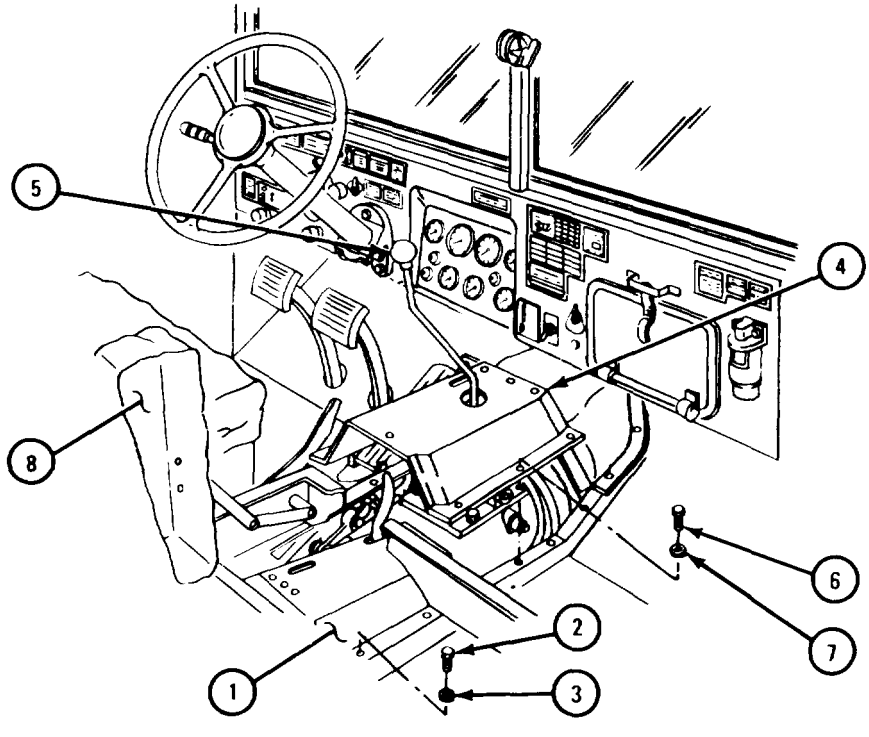


TA 102143

FRAME 3

1. Slide rear tunnel (1) down into place and aline holes.
2. Put in eight screws (2) and lockwashers (3).
3. Slide front tunnel (4) down over shift lever (5).
4. Aline holes in front tunnel (4) with holes in cab floor, and rear tunnel (1).
5. Put in 13 screws (6) and lockwashers (7).
6. Put down companion seat (8).

END OF TASK



TA 102144

CHAPTER 9

FRONT AXLE GROUP MAINTENANCE

Section 1. SCOPE

9-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for the front axle and differential carrier assemblies and the steering mechanism for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels.

9-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. FRONT AXLE ASSEMBLY

9-3. FRONT AXLE ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS : No special tools required

SUPPLIES : Filler plug gasket (2)

PERSONNEL : Two

EQUIPMENT CONDITION : Truck parked on level surface, engine off, handbrake set, rear wheels chocked.

WARNING

Weight of vehicle must be supported by floor jacks or motor vehicle trestles at all times. Do not attempt to support weight of truck on hydraulic jack.

a. Preliminary Procedures.

(1) Jack up truck and support chassis. Refer to TM 9-2320-211-20.

(2) Remove front wheels and tires. Refer to TM 9-2320-211-10.

(3) Put trestle under left and right front brake hub. Remove hydraulic jack from under differential housing. Refer to TM 9-2320-211-20.

(4) Take off lower drag link from steering arm. Refer to TM 9-2320-211-20.

(5) Drain lubrication from front axle. Refer to LO 9-2320-211-12.

(6) Remove hydraulic lines on front axle. Refer to Hydraulic Lines Removal and Replacement, TM 9-2320-211-20.

(7) Remove nut from lower end of front shock absorbers, and pull that end off only. Refer to TM 9-2320-211-20.

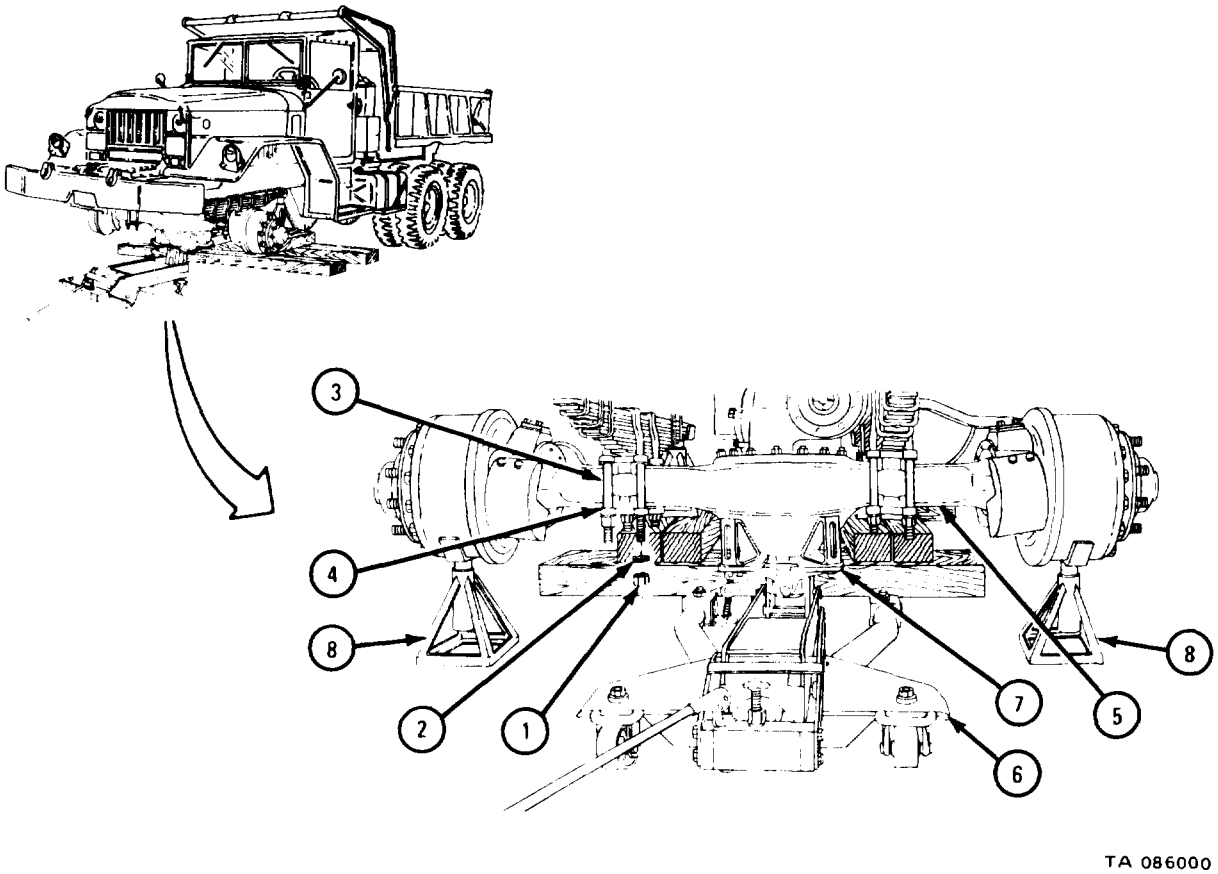
(8) Remove transfer-to-front axle propeller shaft. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Take off four nuts (1) and washers (2) from two U-bolts (3).
2. Take off clamp plate (4).
3. Do steps 1 and 2 again for other side of axle housing (5).
4. Put hydraulic jack (6) with axle fixture (7) under differential housing of axle (5).
5. Raise jack (6) to clear two trestles (8) under wheel hubs. Take out trestles.

GO TO FRAME 2

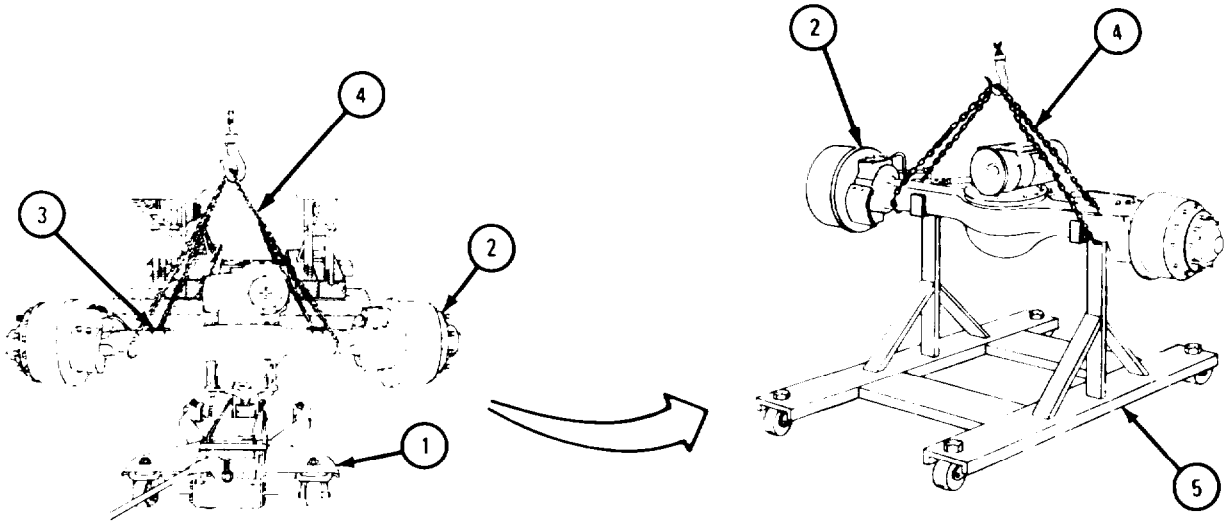


TA 086000

FRAME 1

	1.	Lower hydraulic jack (1) with axle assembly (2).
Soldiers A and B	2.	Pull hydraulic jack (1) with axle assembly (2) forward and out from under truck.
	3.	Take off two spring seats (3).
	4.	Put chain sling (4) around axle assembly (2).
	5.	Hook chain sling (4) onto hoist.
	6.	Lift axle assembly (2) off hydraulic jack (1) and onto axle stand (5).
	7.	Take off chain sling (4) and hoist.

END OF TASK



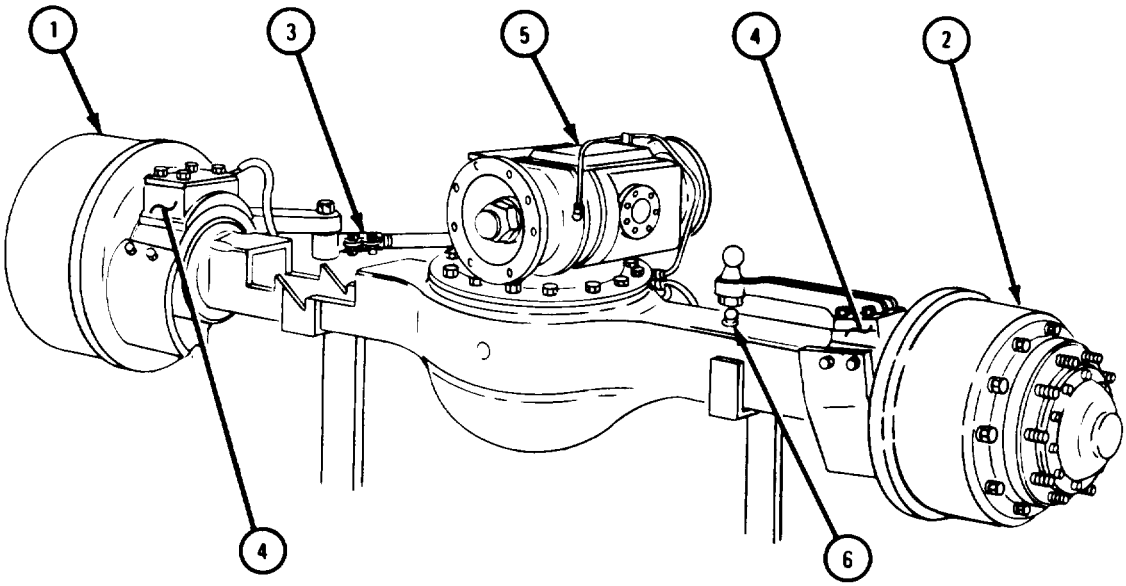
TA 087125

c. Disassembly.

FRAME 1

1. Take off left and right front hub and drum assembly (1 and 2). Refer to TM 9-2320-211-20.
2. Take off tie rod assembly (3). Refer to TM 9-2320-211-20.
3. Takeoff front axle steering knuckle (4). Refer to para 9-5.
4. Take off front differential (5). Refer to para 9-4.
5. Take out air pressure valve (6).

GO TO FRAME 2



FRAME 2

NOTE

Do not take out alinement pins (1) unless they are damaged. Refer to para 9-3e, for inspection procedures.

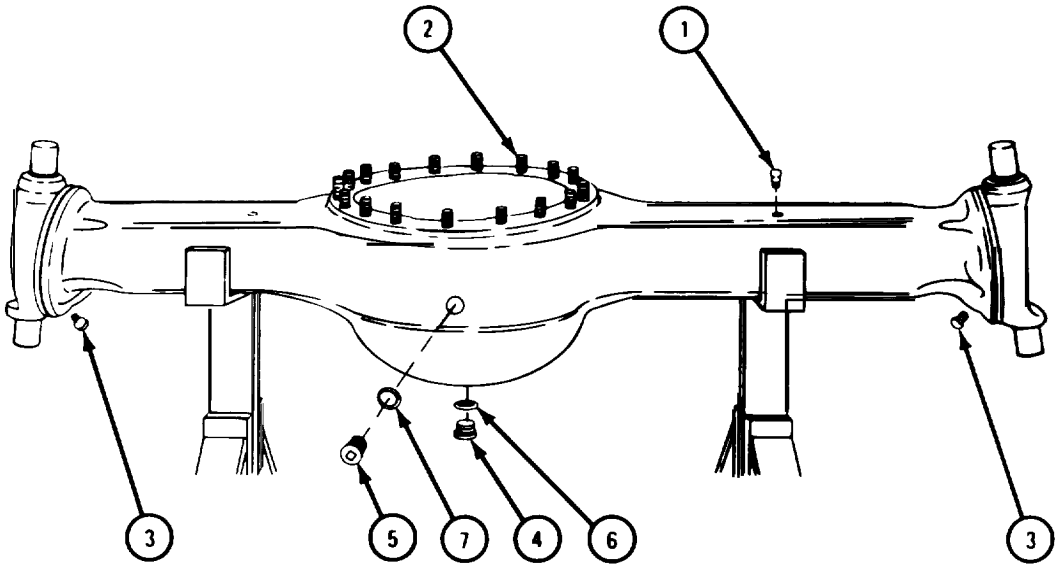
1. Drill out two alinement pins (1).

NOTE

Do not take out studs (2) unless they are damaged. Refer to para 9-3e, for inspection procedures.

2. Take out studs (2).
3. Take out two pipe plugs (3).
4. Take out plugs (4 and 5) with gaskets (6 and 7). Throw away gaskets.

END OF TASK



d. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean all parts with dry cleaning solvent.

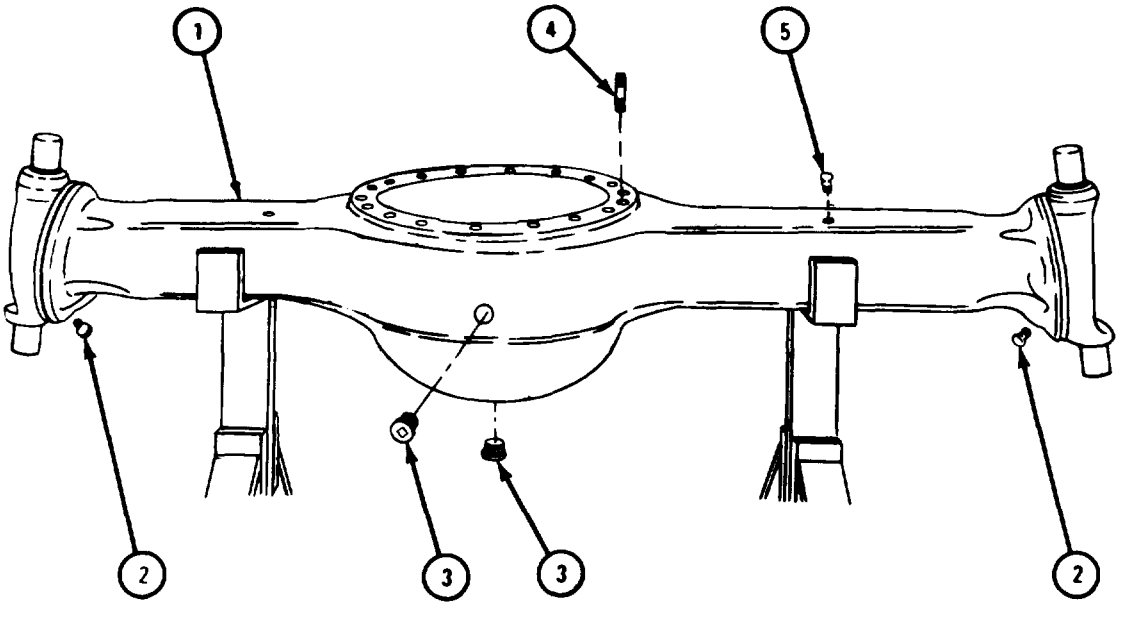
(2) Let parts dry.

e. Inspection and Repair.

FRAME 1

1. Check that axle housing (1) has no scratches or burrs on machined surfaces. If there are burrs or scratches, file them off with fine mill file.
2. Check that threads on plugs (2 and 3) are not damaged. If plug has damaged threads, get a new one.
3. Check that threads on 18 studs (4) are not damaged. If stud has damaged threads, get a new one.
4. Check that two alinement pins (5) have no cracks or wear, If pins are damaged, get new ones.

GO TO FRAME 2



FRAME 2

NOTE

Readings must be within limits given in table 9-1. If readings are not within given limits, throw away part and get a new one.

1. Measure inside diameter of steering knuckle bushing (1).
2. Measure outside diameter of steering knuckle pin (2).

END OF TASK

NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CAL LOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

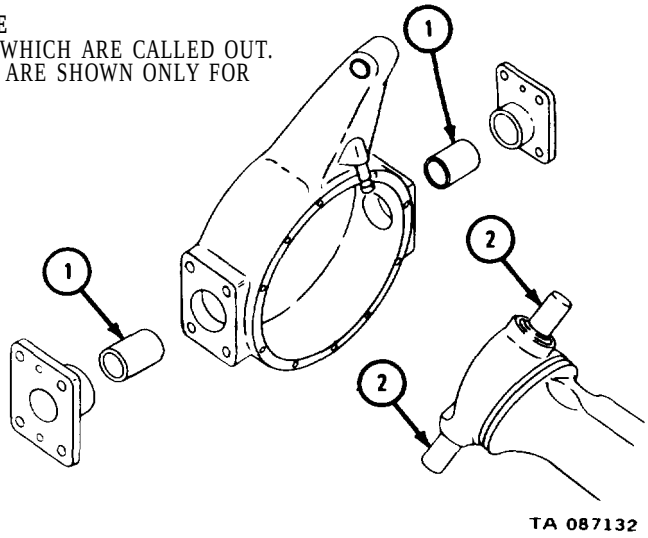


Table 9-1. Front Axle Steering Knuckle Pin Wear Limits

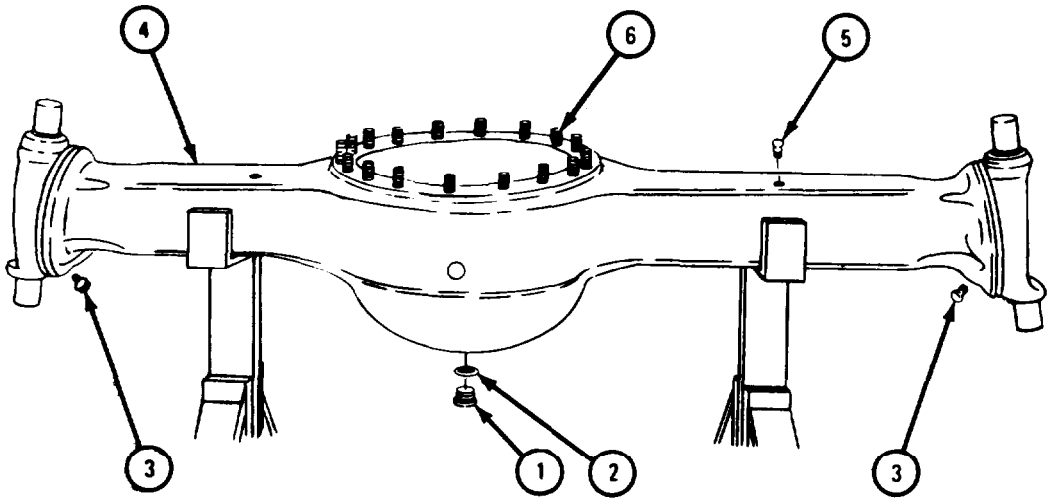
Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Inside diameter of steering knuckle bushing	1.500 to 1.501	None
2	Steering knuckle pin	1.498 to 1.4990	None
1 and 2	Fit of steering knuckle pin bushing	0.001 to 0.0025	None

f. Assembly.

FRAME 1

1. Put in drain plug (1) with gasket (2).
2. Put two pipe plugs (3) in axle housing (4).
3. Put in alinement pins (5), if removed.
4. Put in studs (6), if removed.

GO TO FRAME 2

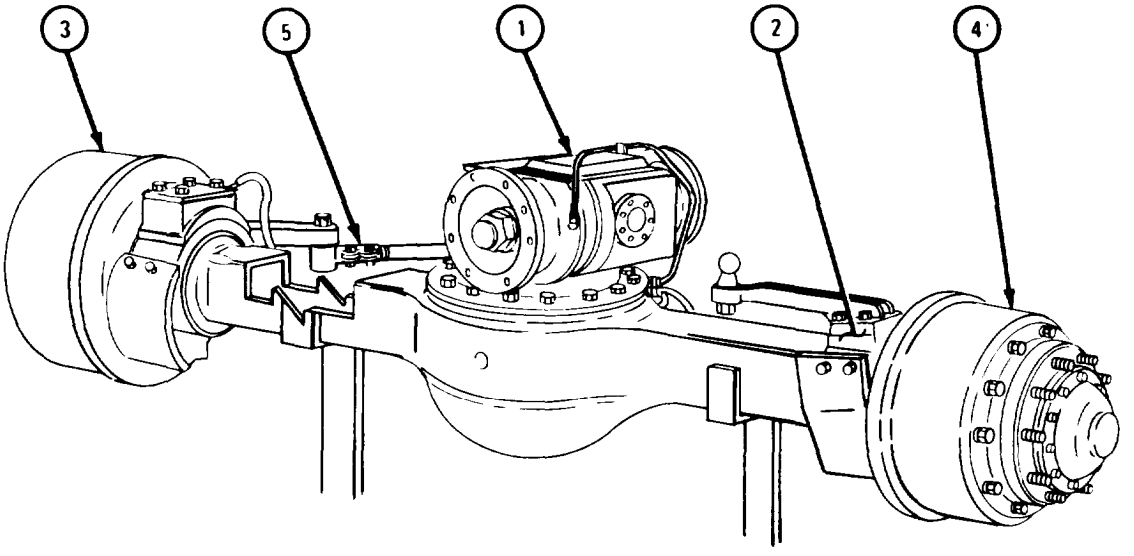


TA 087128

FRAME 2

1. Put on front differential (1). Refer to para 9-4.
2. Put on front axle steering knuckle (2). Refer to para 9-5.
3. Put on left and right front hub and drum assemblies (3 and 4). Refer to TM 9-2320-211-20.
4. Put on tie rod assembly (5). Refer to TM 9-2320-211-20.

END OF TASK



TA 087149

g. Tests and Adjustments.

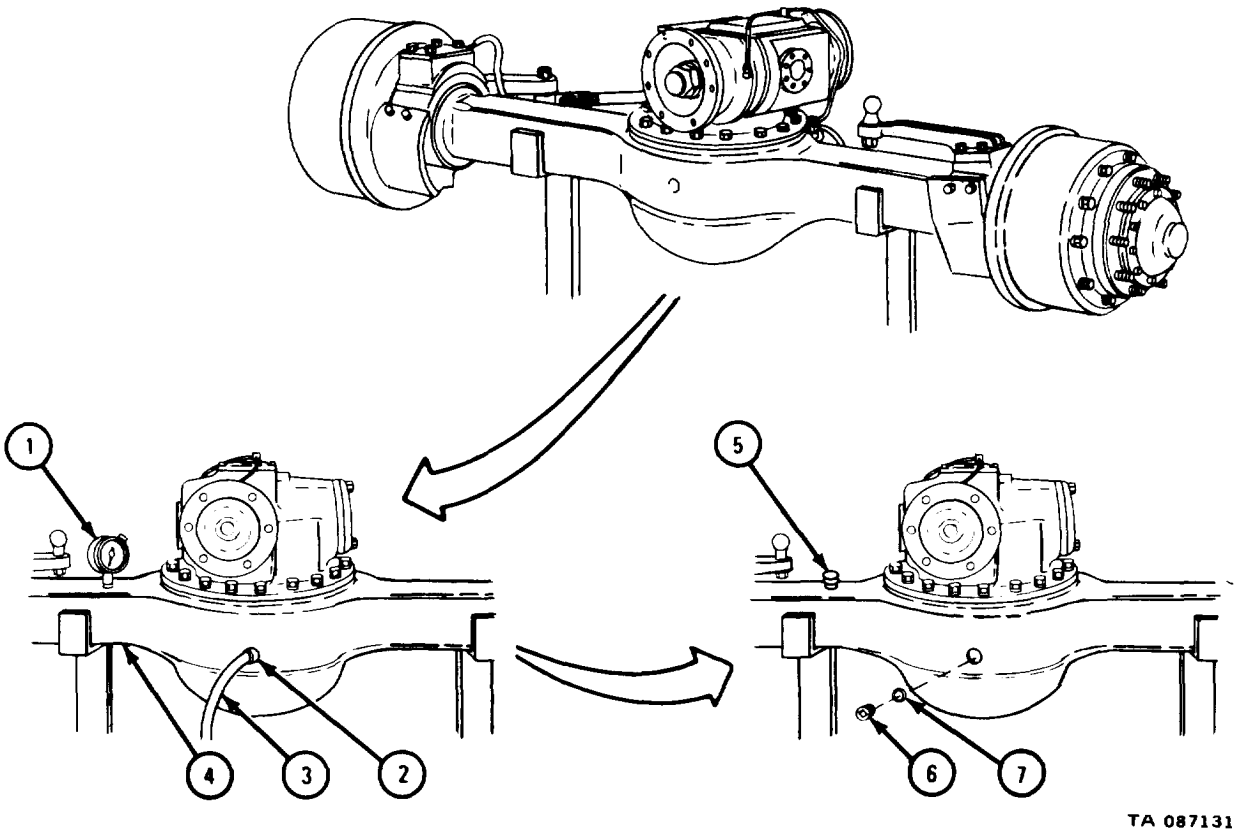
FRAME 1

CAUTION

Do not use more than 15 psi of air pressure.

1. Put air pressure gage (1) in air pressure valve hole.
2. Using adapter (2) and air line (3), hook up air supply to front axle (4).
3. Using air pressure gage (1) and stop watch, check that no more than 5 psi of air leaks in 45 seconds.
4. If more than 5 psi of air leaks out, tighten all screws and nuts again.
5. Do steps 3 and 4 again until less than 5 psi of air leaks in 45 seconds.
6. Take out air pressure gage (1) and put in air pressure valve (5).
7. Take off air line (3) with adapter (2) and put in fill plug (6) with gasket (7).

END OF TASK



TA 087131

h. Replacement.

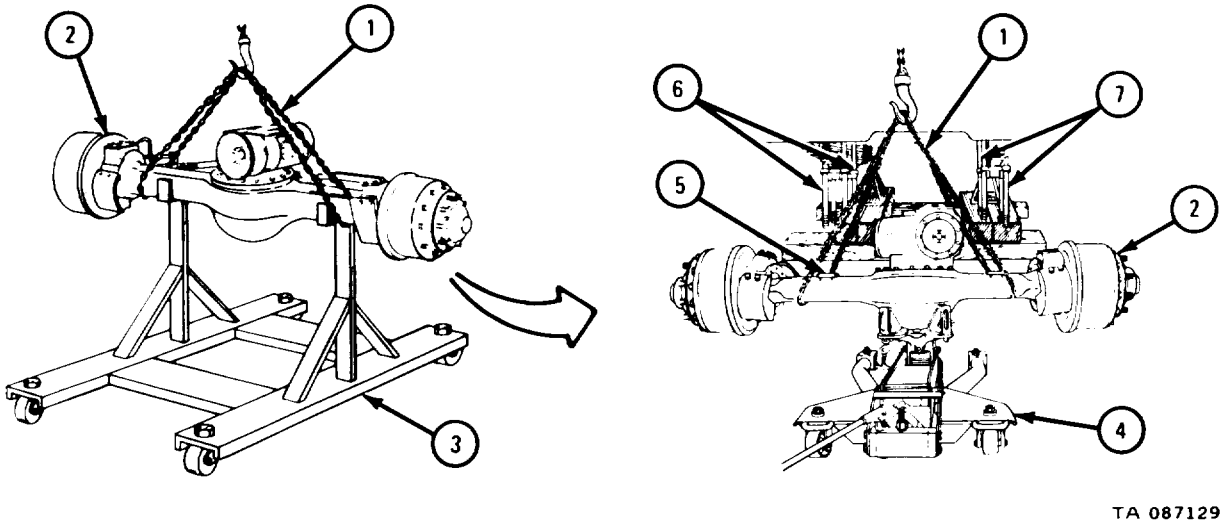
FRAME 1

1. Put chain sling (1) around axle assembly (2).
2. Hook chain sling (1) to hoist.
3. Lift axle assembly (2) off axle stand (3) and onto hydraulic jack (4).
4. Take off chain sling (1) and hoist.
5. Put on two spring seats (5).

Soldiers A and B

6. Push hydraulic jack (4) with axle assembly (2) under truck. Put axle assembly under U-bolts (6 and 7).

GO TO FRAME 2

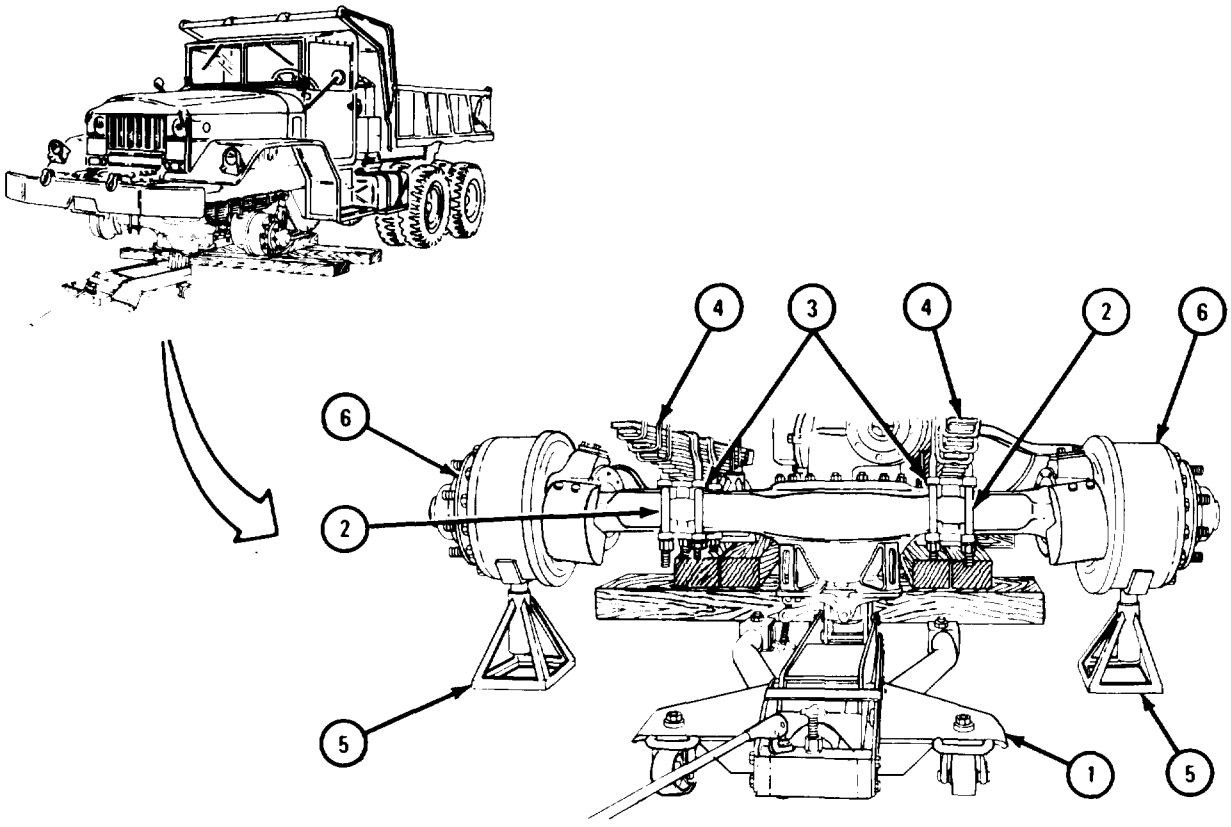


TA 087129

FRAME 2

1. Raise hydraulic jack (1) until U-bolts (2) almost touch spring seats (3).
2. Move hydraulic jack (1) so that leaf spring center bolt goes into alinement hole in spring seats (3). Raise jack until spring seats touch left springs (4).
3. Place motor vehicle trestle (5) under each brake hub (6).
4. Lower hydraulic jack (1) and pull it out from under truck.

GO TO FRAME 3



TA 087130

FRAME 1

NOTE

Follow-on Maintenance Action Required:

1. Replace transfer-to-front axle propeller shaft. Refer to TM 9-2320-211-20.
2. Pull lever end of front shock absorbers forward and replace nut. Refer to TM 9-2320-211-20.
3. Replace hydraulic lines on front axle. Refer to Hydraulic Lines and Fittings Removal and Replacement, TM 9-2320-211-20.
4. Replace lower drag link on steering arm. Refer to TM 9-2320-211-20.
5. Place hydraulic jack under differential. Raise front axle assembly and take out trestles from under left and right front brake hub. Refer to TM 9-2320-211-20.
6. Replace front wheels and tires. Refer to TM 9-2320-211-10.
7. Remove supports from truck chassis. Refer to TM 9-2320-211-20.
8. Bleed brakes. Refer to TM 9-2320-211-20.
9. Lubricate front axle and propeller shaft. Refer to Lubrication Order LO 9-2320-211-12.
10. Do front wheels alinement. Refer to TM 9-2320-211-20.

END OF TASK

Section III. DIFFERENTIAL CARRIER ASSEMBLY

9-4. DIFFERENTIAL CARRIER ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: Bearing preload tester, pn 1597-200
Mechanical puller kit, pn 8708724
Dial indicating scale, pn 8950157
Dial indicator, pn 7950104
Bearing remover and replacer, pn 7950159
Honing stone, NSN 5345-00-260-0759

SUPPLIES:
- Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
- Crocus cloth
- White load pigment, Fed. Spec TT-W-262C
- Prussian blue, MIL-P-30501
- String
- Safety wire
- Gasket and shim set
- Pinion bevel spacers
- Sleeve spacers
- Pinion bearing spacer
- Pinion drive spacer

PERSONNEL: TWO

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) For front axle differential, do the following:

(a) Drain differential. Refer to LO 9-2320-211-12.

(b) Remove axle shafts. Refer to para 9-5.

(c) Remove propeller shaft. Refer to TM 9-2320-211-20.

(d) Jack up truck and put safety jacks under frame rails behind front axle housing. Refer to TM 9-2320-211-20.

(e) Remove wheels and tires. Refer to TM 9-2320-211-10.

(f) Remove drag link. Refer to TM 9-2320-211-20.

(g) Remove power steering cylinder assembly. Refer to Part 2, para 13-5.

(h) Remove brake hydraulic lines. Refer to Hydraulic Lines and Fittings Removal and Replacement, TM 9-2320-211-20.

(i) Remove front axle assembly. Refer to para 9-3.

(2) For forward-rear axle or rear-rear axle differential, do the following:

(a) Drain differential. Refer to LO 9-2320-211-12.

(b) Remove axle shafts. Refer to TM 9-2320-211-20.

(c) Remove propeller shafts. Refer to TM 9-2320-211-20.

(d) Jack up truck and put safety jacks under rear spring seats. Refer to TM 9-2320-211-20.

(e) Remove wheels and tires. Refer to TM 9-2320-211-10.

(f) Remove torque rods. Refer to Part 2, para 15-7.

(g) Remove brake hydraulic lines. Refer to Hydraulic Lines and Fittings Removal and Replacement, TM 9-2320-211-20.

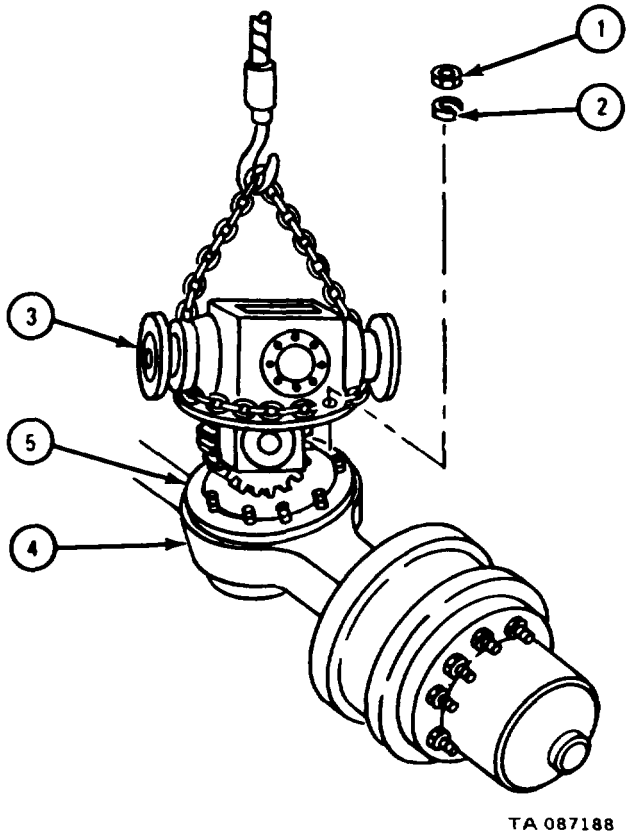
(h) Remove axle housing. Refer to para 10-3.

b. Removal.

FRAME 1

1. Takeout 18 nuts (1) and flat washers (2).
2. Using hoist and chain sling, lift differential carrier assembly (3) out of axle housing (4).
3. Take off and throw away gasket (5).

END OF TASK

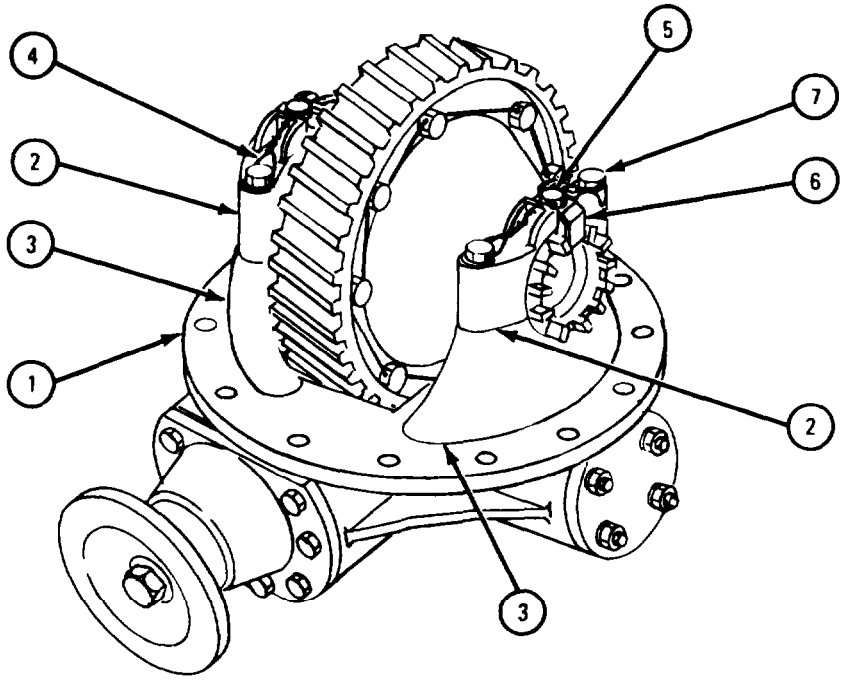


c. Disassembly.

FRAME 1

1. Mount differential carrier assembly (1) in holding device.
2. Using center punch and hammer, mark positions of two caps (2) to bearing saddles (3). Caps must be put back in same positions.
3. Take out two safety wires (4). Throw away safety wires.
4. Take out two screws (5). Take off two adjusting nut locks (6).
5. Take out four screws and flat washers (7).
6. Tap on sides of two caps (2) to loosen them. Take off caps.

GO TO FRAME 2

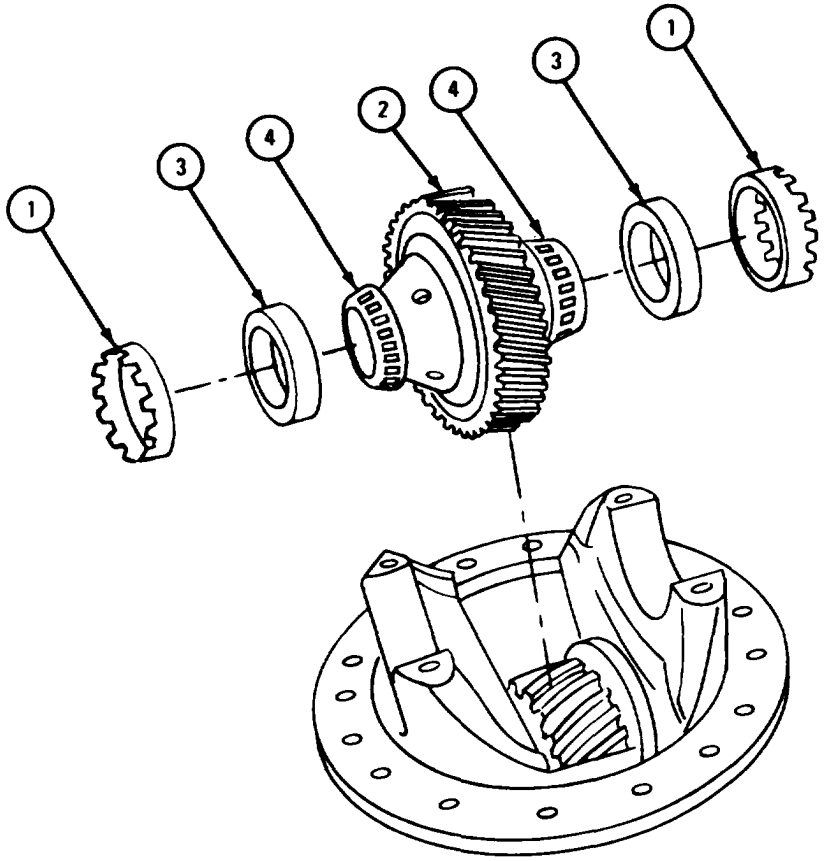


TA 087189

FRAME 2

1. Lift off two adjusting nuts (1).
2. Lift each side of differential case assembly (2) enough to pull out two bearing cups (3).
3. Lift out differential case assembly (2).
4. Take off two bearing cones (4). Refer to para 7-7.

GO TO FRAME 3

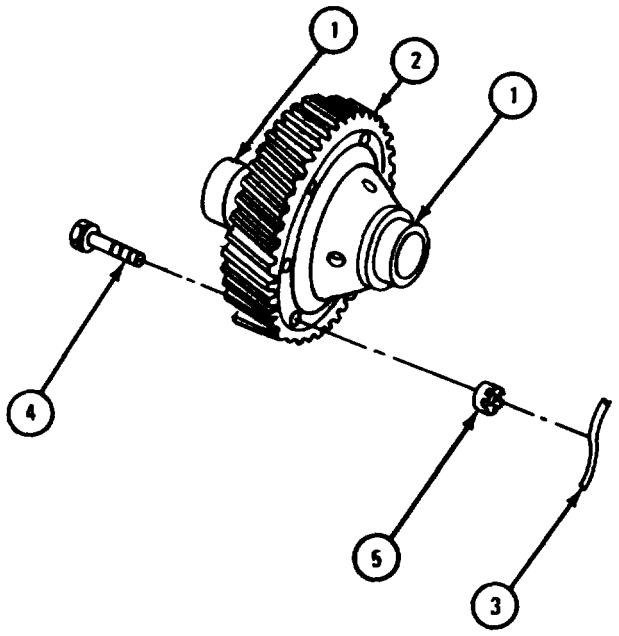


TA 087190

FRAME 3

1. Using center punch and hammer, mark positions of two differential case halves (1) to helical drive gear (2). These parts must be put back in the same positions.
2. Take out safety wire (3). Throw away safety wire.
3. Take out eight screws (4) and nuts (5).

GO TO FRAME 4

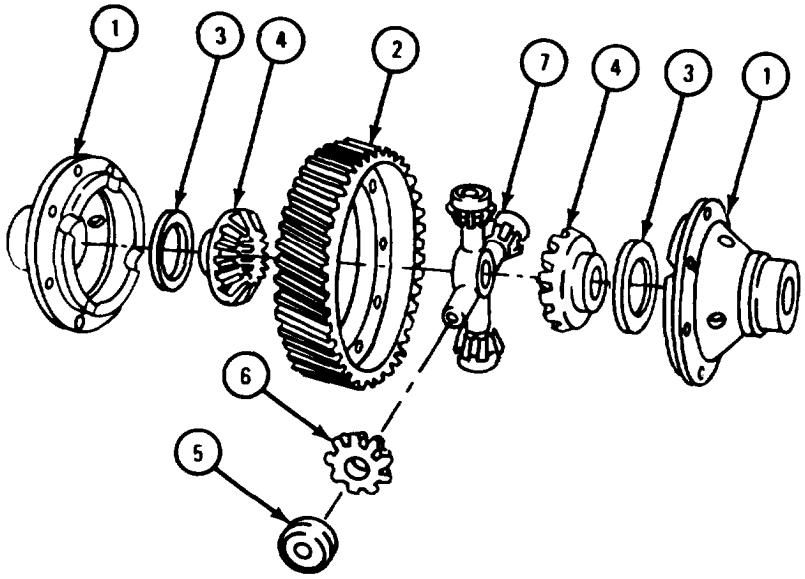


TA 087191

FRAME 4

1. Pull two differential case halves (1) off helical drive gear (2).
2. Take off two thrust washers (3) and two side gears (4).
3. Take off four thrust washers (5) and four spider gears (6) from spider (7).

GO TO FRAME 5



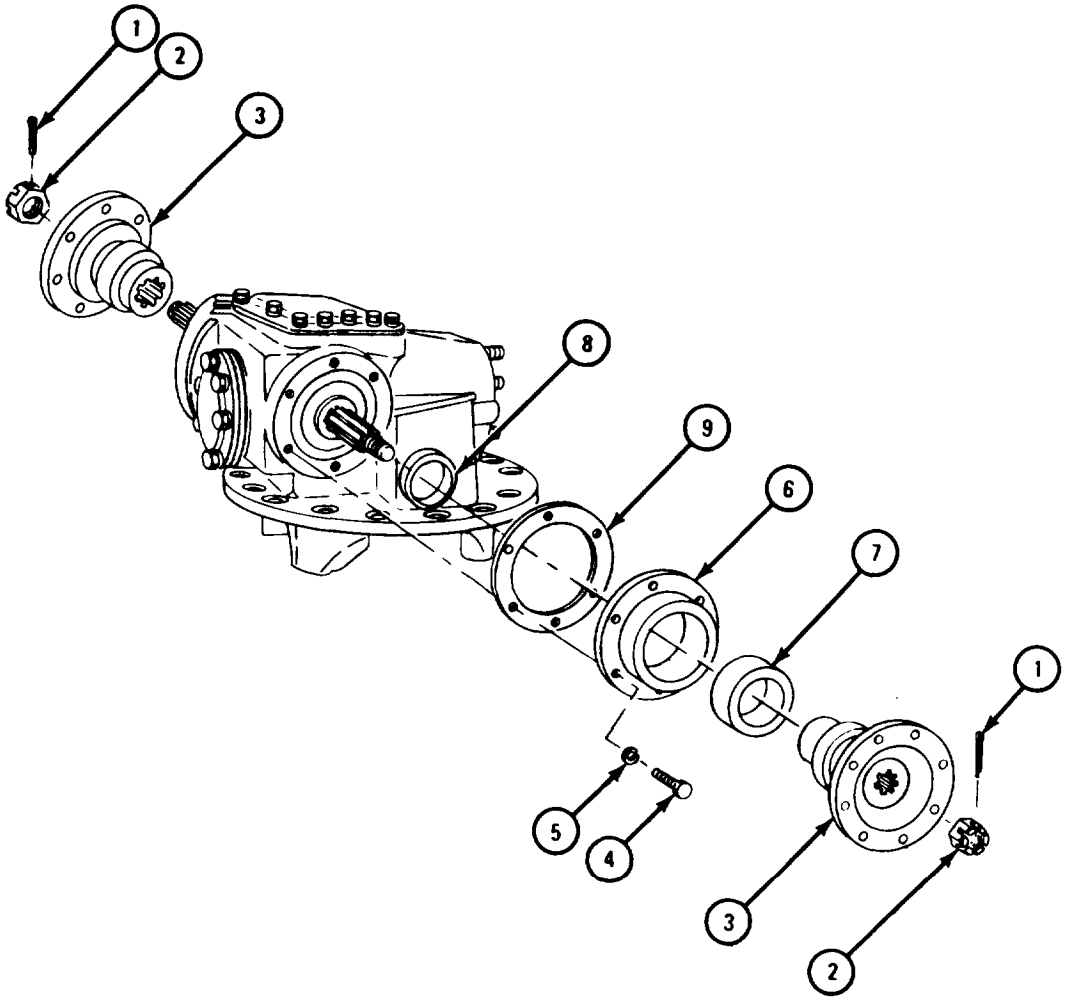
TA 087192

FRAME 5

Soldiers A and B

1. Takeout and throw away two cotter pins (1).
2. Take off two nuts (2).
3. Using puller, take off two companion flanges (3).
4. Take out six screws (4) and lockwashers (5).
5. Take off rear bearing cover (6) with seal (7) and thrust washer (8). Take out and throw away gasket (9).
6. Take out and throw away seal (7) from rear bearing cover (6).

GO TO FRAME 6

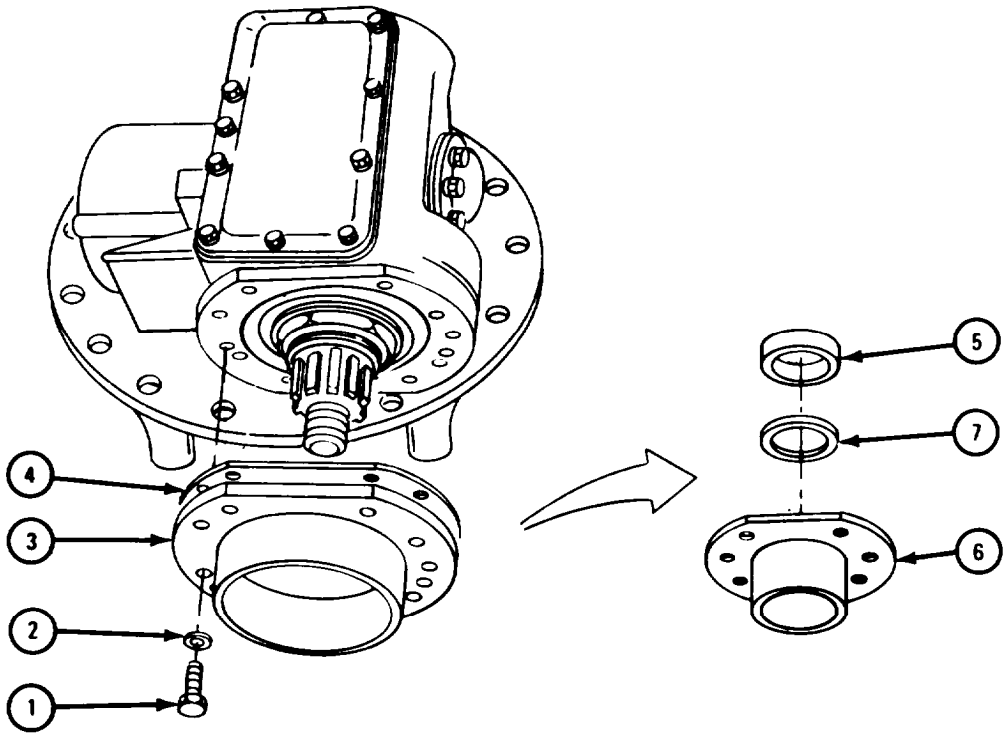


TA 087193

FRAME 6

1. Take out eight screws (1) and flat washers (2).
2. Take off front bearing cover assembly (3) and gasket (4). Throw away gasket.
3. Take out and throw away seal (5) from front bearing cover (6).
4. Take out and throw away gasket (7).

GO TO FRAME 7

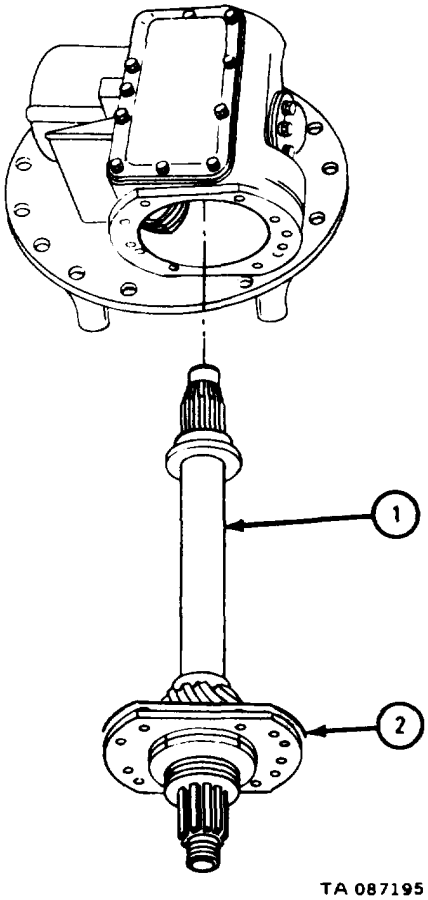


TA 087194

FRAME 7

1. Tap on rear end of drive shaft assembly (1) to loosen it. Slide out drive shaft assembly with needed number of shims (2).
2. Take shims (2) off drive shaft assembly (1) and tie them to front bearing cover (taken off in frame 6).
3. Using bearing remover and replacer and hammer, take out bearing (3). Refer to para 7-7.

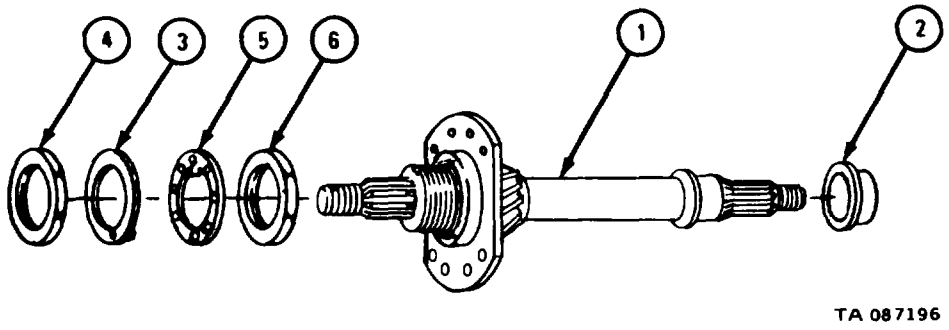
GO TO FRAME 8



FRAME 8

1. Clamp drive shaft (1) in vise.
2. Take off bearing inner race (2). Refer to para 7-7.
3. Bend open locktab on lockwasher (3).
4. Take off outer nut (4).
5. Take off lockwasher (3) and key washer (5).
6. Take off inner nut (6).

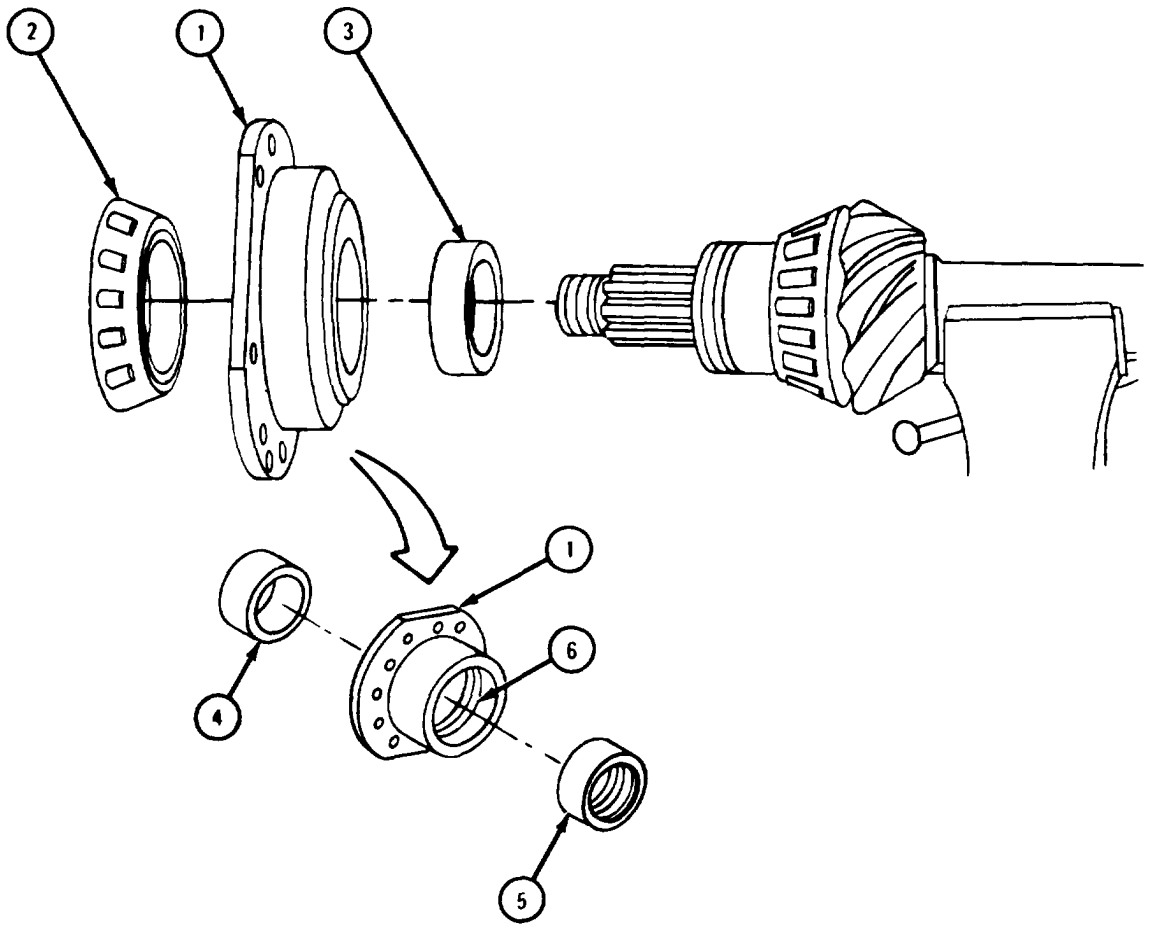
GO TO FRAME 9



FRAME 9

1. Tap lightly on retainer assembly (1) to loosen outer bearing cone (2).
2. Slide off outer bearing cone (2), retainer assembly (1), and collar (3).
3. Place retainer assembly (1), flange side down, on two wooden blocks.
4. Using bearing remover and replacer, and hammer, drive out outer bearing cup (4).
5. Tap inner bearing cup (5) away from shoulder (6) of retainer (1).
6. Using bearing remover and replacer and hammer, drive out inner bearing cup (5) .

GO TO FRAME 10

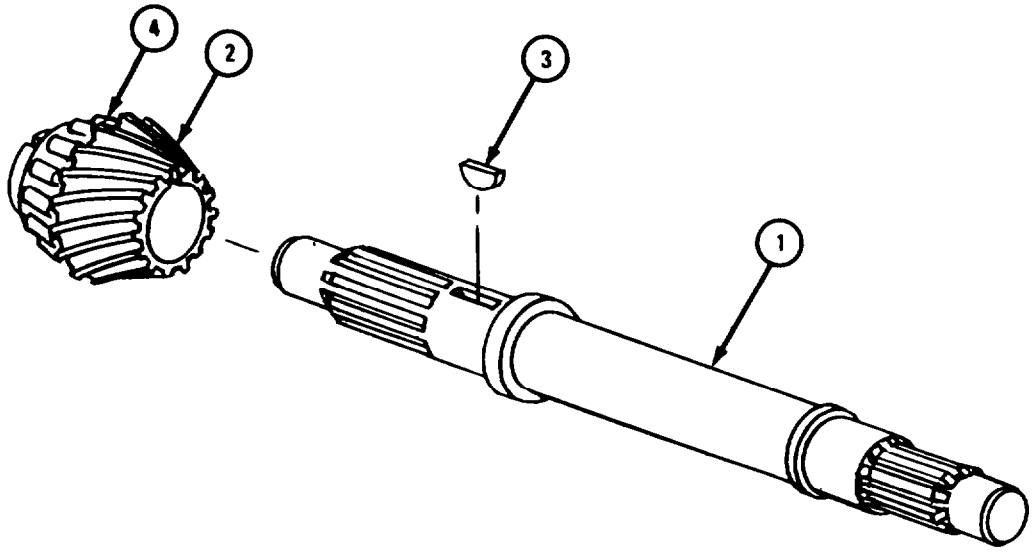


TA 087197

FRAME 10

1. Take drive shaft (1) out of vise.
2. Press drive shaft (1) out of bevel pinion gear (2).
3. Drive out key (3).
4. Take inner bearing cone (4) off bevel pinion gear (2).

GO TO FRAME 11

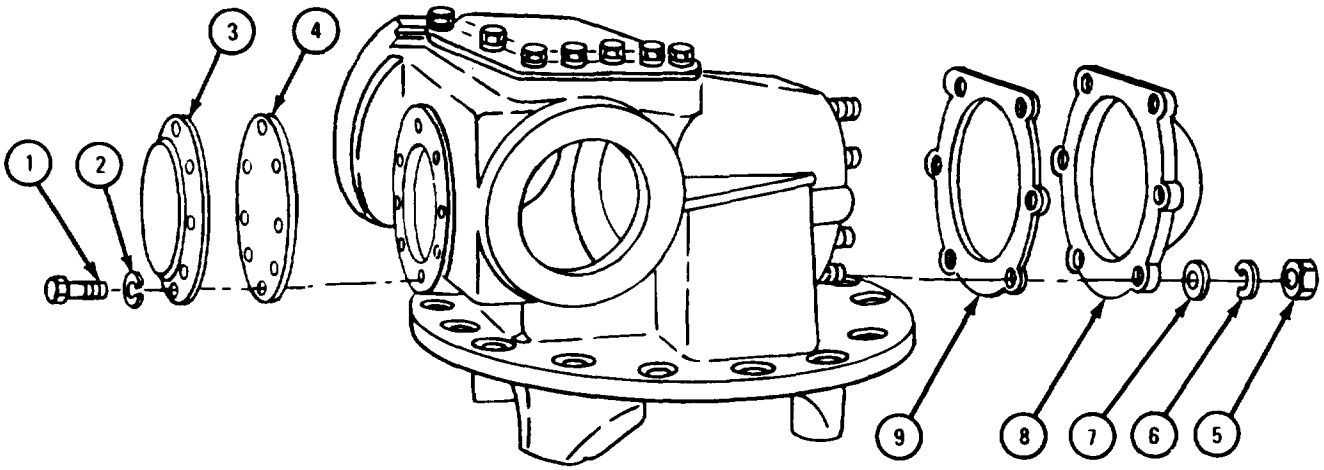


TA 087198

FRAME 11

1. Takeout eight screws (1) and flat washers (2).
2. Takeoff side cover (3) and gasket (4). Throw away gasket.
3. Take off six nuts (5), lockwashers (6), and flat washers (7).
4. Take off outer bearing cover (8) and needed number of shims (9). Tie shims to outer bearing cover.

GO TO FRAME 12

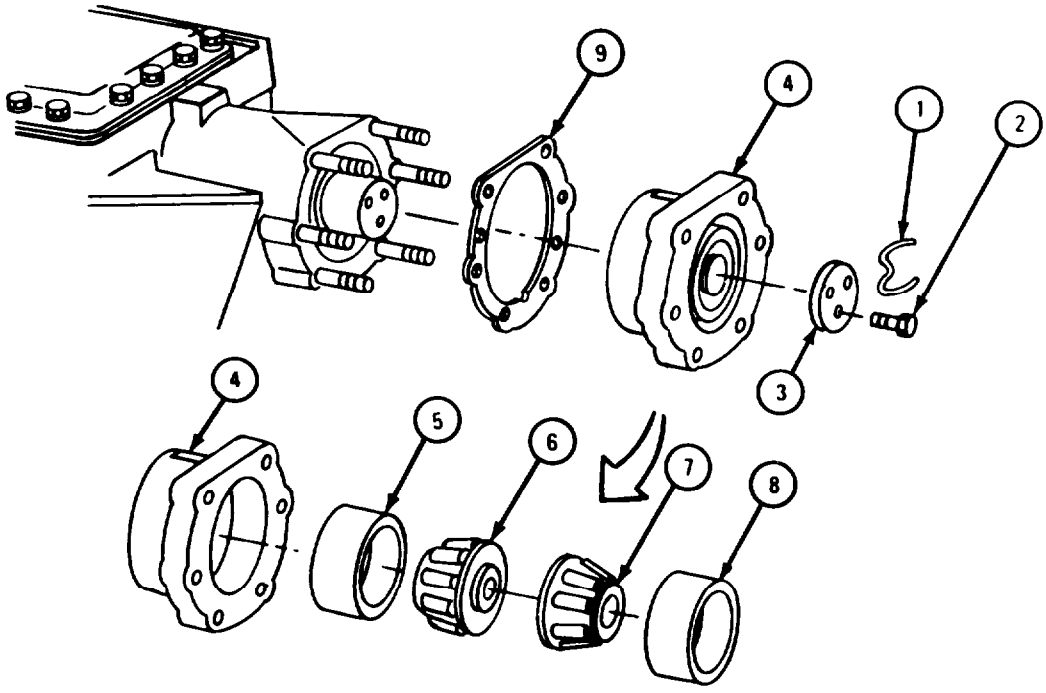


TA 087199

FRAME 12

1. Take out safety wire (1). Throw away safety wire.
2. Take out three screws (2).
3. Take off retaining plate (3).
4. Put two puller screws into jacking holes in cap assembly (4) and evenly tighten screws until cap assembly is free. Take off cap assembly.
5. Take out puller screws.
6. Place cap (4) on arbor press table with flange down. Press out inner bearing cup (5) and inner bearing cone (6). Press out outer bearing cone (7) and outer bearing cup (8).
7. Take off needed number of shims (9) and tie them to cap (4).

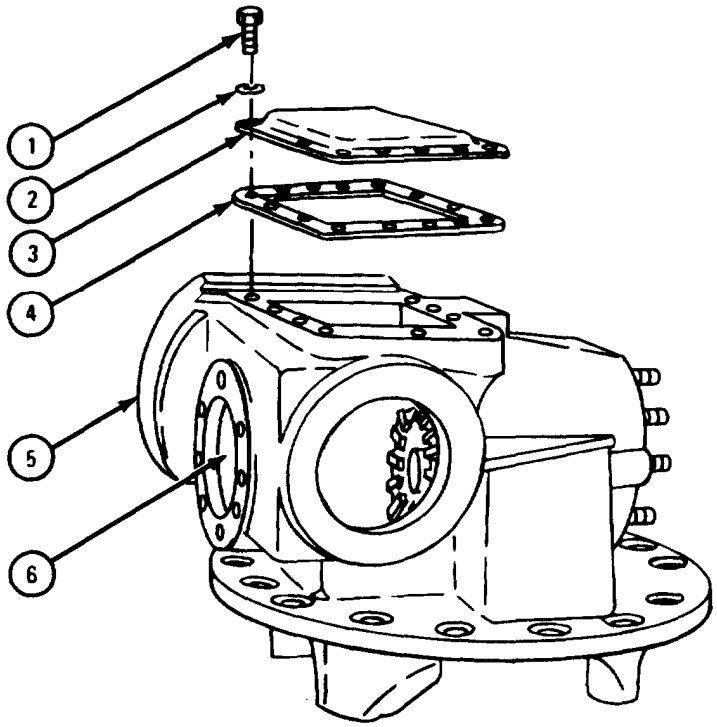
GO TO FRAME 13



FRAME 13

1. Take out 10 screws (1) and flat washers (2).
2. Take off top cover (3) and gasket (4). Throw away gasket.
3. Put differential carrier assembly (5) on arbor press with side cover hole (6) facing up.

GO TO FRAME 14

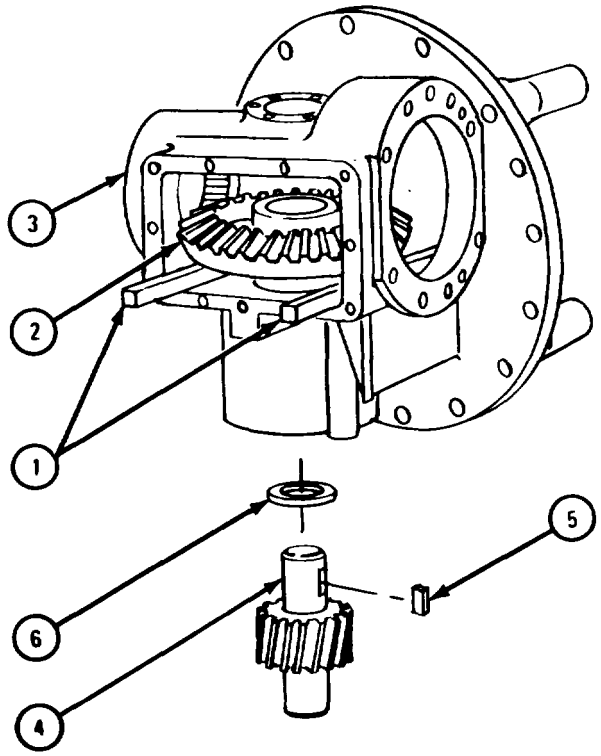


TA 087201

FRAME 14

1. Put two soft iron spacers (1) between hypoid drive gear (2) and housing (3) as shown.
2. Using arbor press, press spur gear pinion (4) with key (5) out of hypoid drive gear (2).
3. Take out key (5).
4. Slide off spacing washer (6).
5. Take out two soft iron spacers (1).

GO TO FRAME 15



TA 087202

FRAME 15

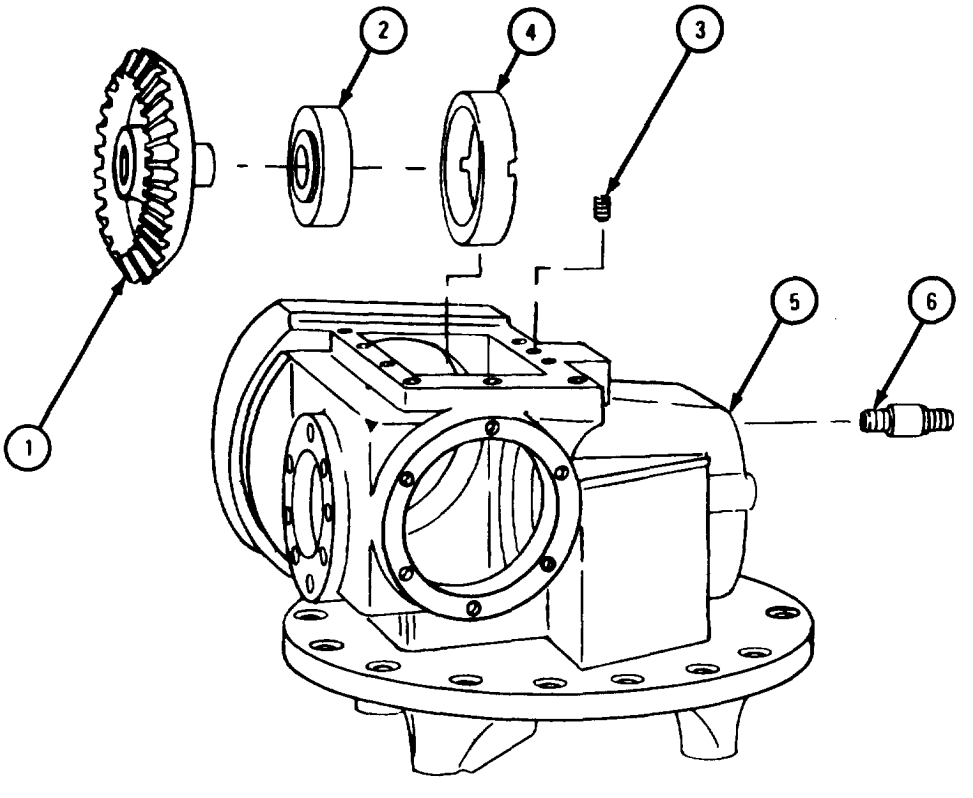
1. Pry off hypoid drive gear (1).
2. Takeout bearing (2).
3. Take out screw (3).

CAUTION

Do not let sleeve (4) cock to one side when driving it out or housing (5) will be damaged. Avoid damage by driving sleeve a little at one notch and then at the other.

4. Drive sleeve (4) away from shoulder of housing (5).
5. Using bearing remover and replacer, take out sleeve (4).
6. Using stud remover, unscrew and take out six studs (6).

END OF TASK



TA 087203

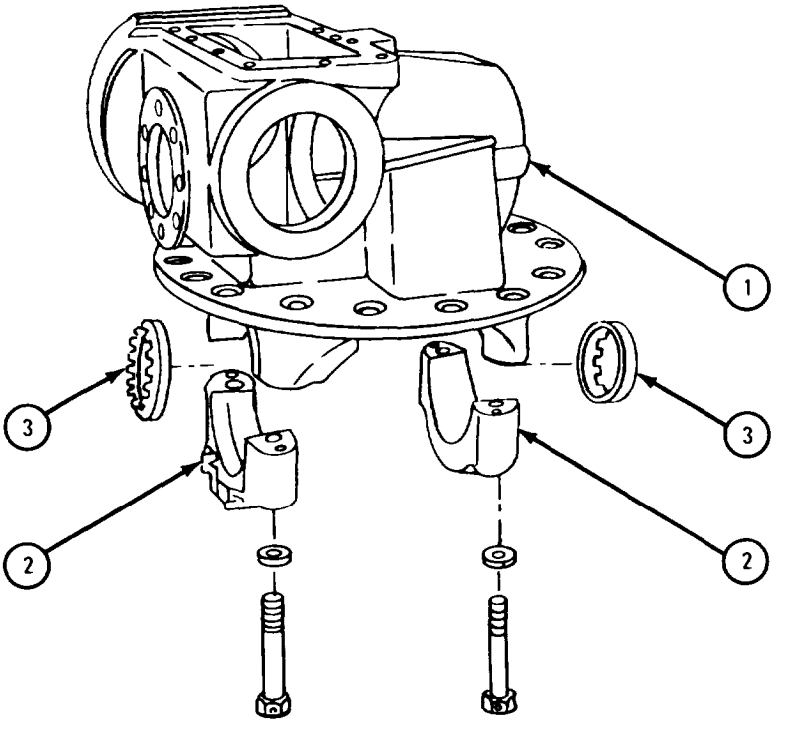
d. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in para 1-3.

e. Inspection and Repair.

FRAME 1

1. Check that differential carrier housing (1) and two cap assemblies (2) are not cracked or distorted. If housing or cap assemblies are damaged, get a new differential carrier housing and two new cap assemblies.
2. Check that adjusting nut threads on differential carrier housing (1), cap assemblies (2), and two adjusting nuts (3) are not stripped *or* crossthreaded. If adjusting nuts are damaged, get new one.
3. Check that tapped holes in differential carrier housing (1) are not stripped or crossthreaded. Fix with correct size tap.

GO TO FRAME 2



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

FRAME 2

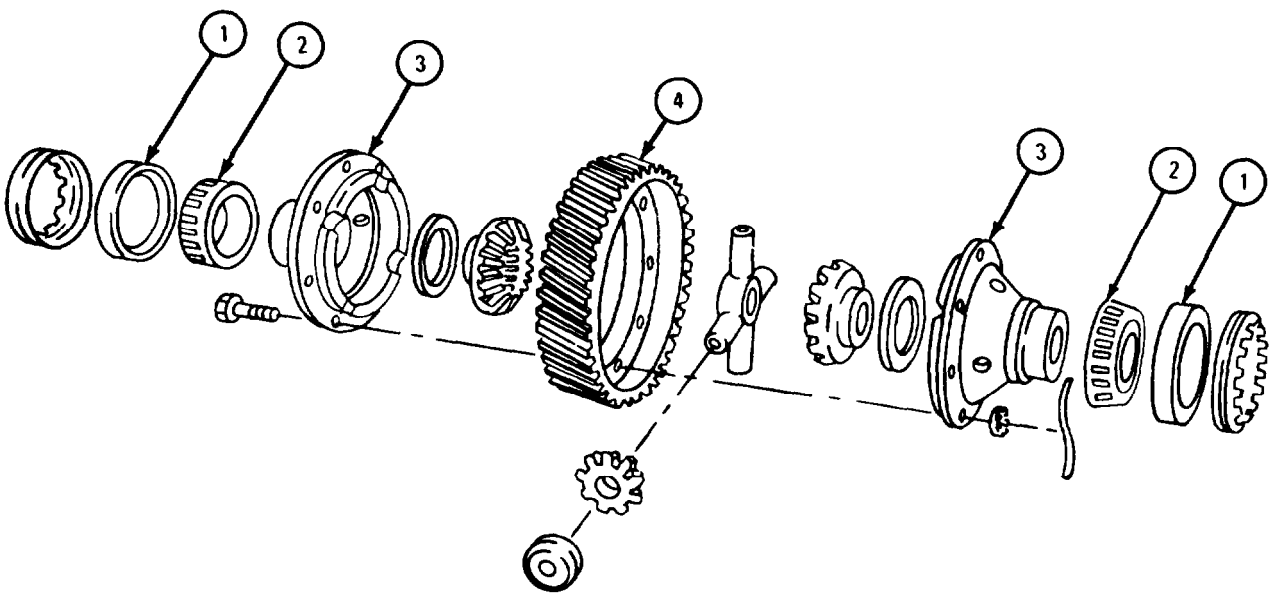
1. Check that two bearing cups (1) and two bearing cones (2) are not damaged. Refer to para 7-7. Replace if damaged.
2. Mount each differential case half (3) in a lathe. Place dial indicator against flange that mounts to helical drive gear (4). Check that runout at flange of differential case half is not more than 0.002 inch.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

3. If differential case half (3) runout is more than 0.002 inch, use lathe to cut away only enough metal to bring runout within limits. Rem-eve burrs with a honing stone. Clean with solvent.

GO TO FRAME 3



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

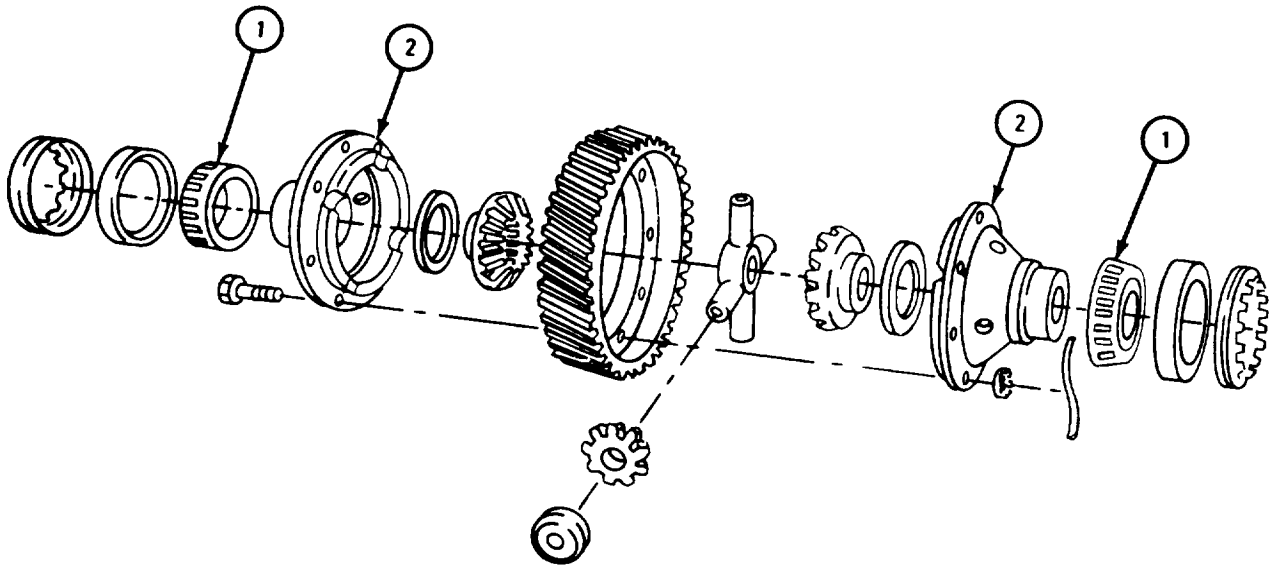
FRAME 3

NOTE

Readings must be within limits given in table 9-2. The letter T indicates a tight fit. If readings are not within given limits, throw away parts and get new ones.

1. Measure fit of bearing cone (1) to case (2).

GO TO FRAME 4



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 103276

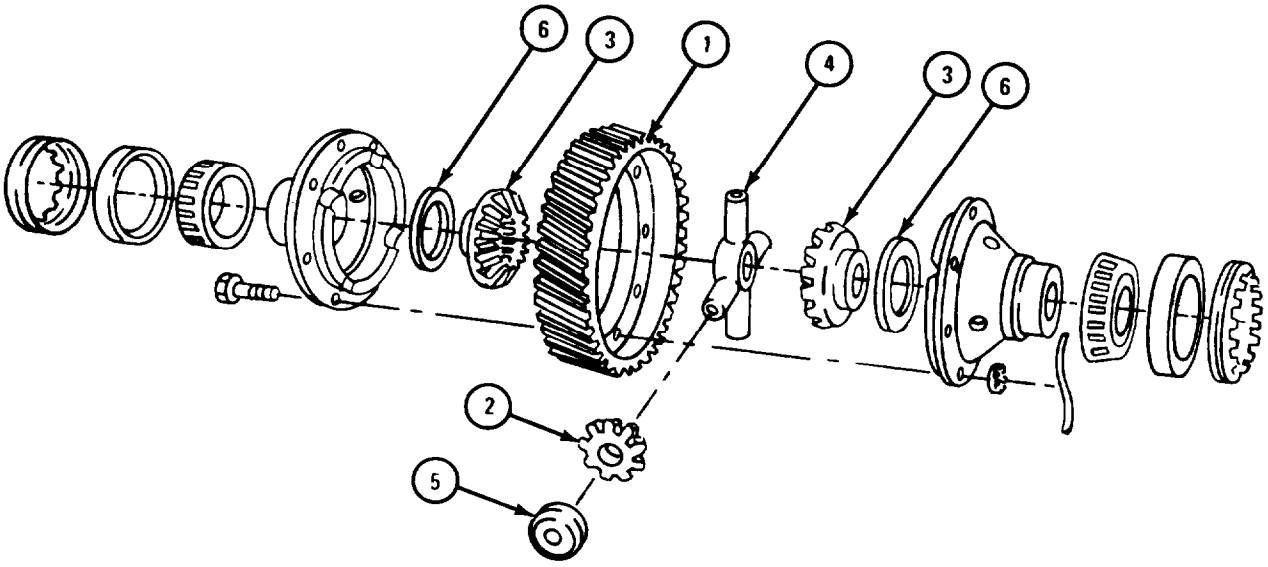
Table 9-2. Differential Case Half Wear Limits

Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	Bearing cone to case	0.0015T to 0.003T	None

FRAME 4

1. Check that teeth of helical drive gear (1), four spider gears (2), and two side gears (3) are not chipped, burred, cracked, scored or broken. Replace gear if damage cannot be repaired with a honing stone. If spider gear or side gear is damaged, replace all six spider and side gears.
2. Check that bushings inside spider gears (2) are not pitted or damaged in any other way. Replace all spider gears and side gears (3) if any bushing is damaged.
3. Check that spider (4) is not cracked. If spider is cracked, get a new one.
4. Check that four thrust washers (5) and two thrust washers (6) are not scored or worn unevenly. Replace parts if they are damaged.

GO TO FRAME 5



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087206

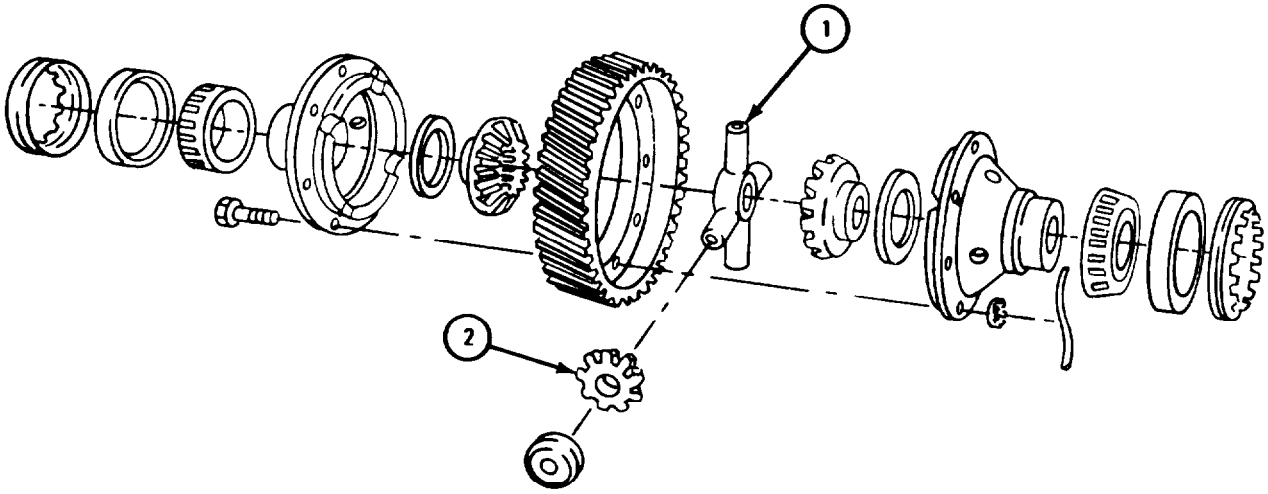
FRAME 5

NOTE

Readings must be within limits given in table 9-3. If readings are not within given limits, throw away parts and get new ones.

1. Measure outside diameter of differential spider (1).
2. Measure inside diameter of spider bushing (2).
3. Measure fit between differential spider (1) and spider bushing (2).

GO TO FRAME 6



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

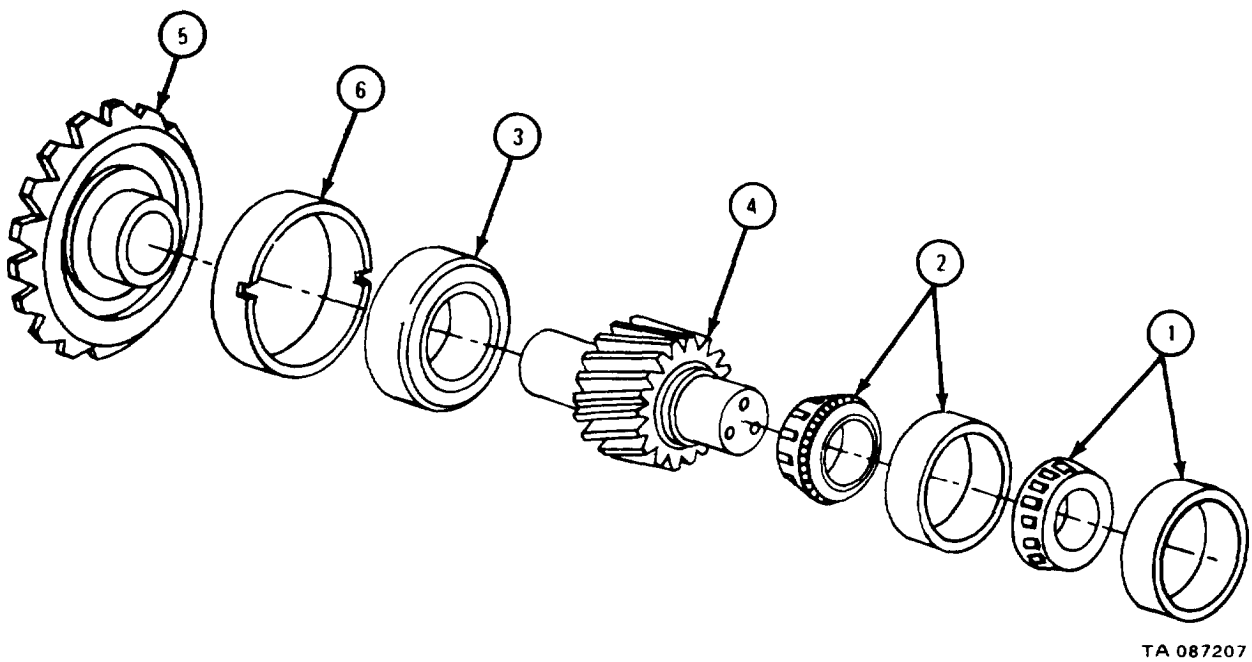
Table 9-3. Differential Spider Assembly Wear Limits

Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Differential spider outside diameter	1.123 to 1.122	None
2	Spider bushing inside diameter	1.127 to 1.129	None
1 and 2	Spider to bushing	0.009 to 0.007	None

FRAME 6

1. Check that bearing assemblies (1 and 2) and bearing (3) are not damaged. Refer to para 7-7.
2. Check that teeth on spur gear pinion (4) are not broken. If teeth are damaged, get a new spur gear pinion.
3. Check that hypoid drive gear (5) and sleeve (6) are not cracked. If parts are damaged, get new ones.

GO TO FRAME 7



TA 087207

FRAME 7

NOTE

Readings must be within limits given in table 9-4. The letter L indicates a loose fit and the letter T indicates a tight fit. If readings are not within given limits, throw away parts and get new ones.

1. Measure fit between inner bearing (1) and hypoid gear (2).
2. Measure fit between bearing (3) and sleeve on hypoid gear (1).
3. Measure fit between bearings (4 and 5) and gear (6).

GO TO FRAME 8

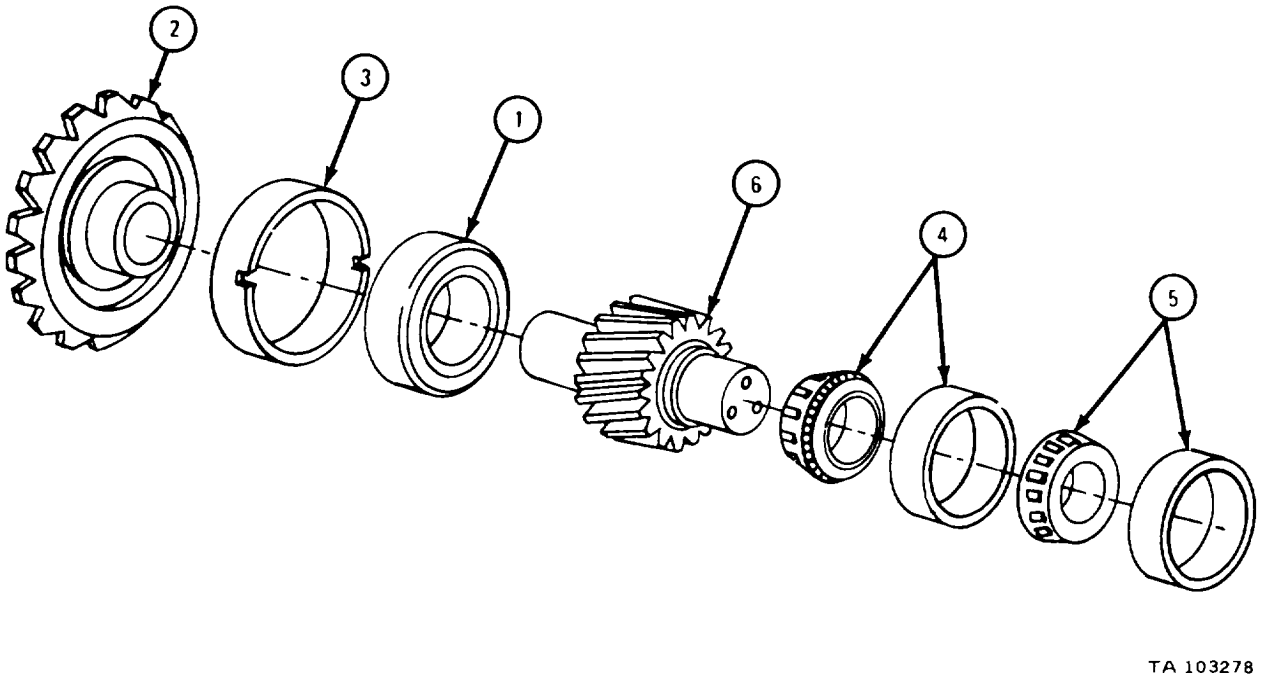


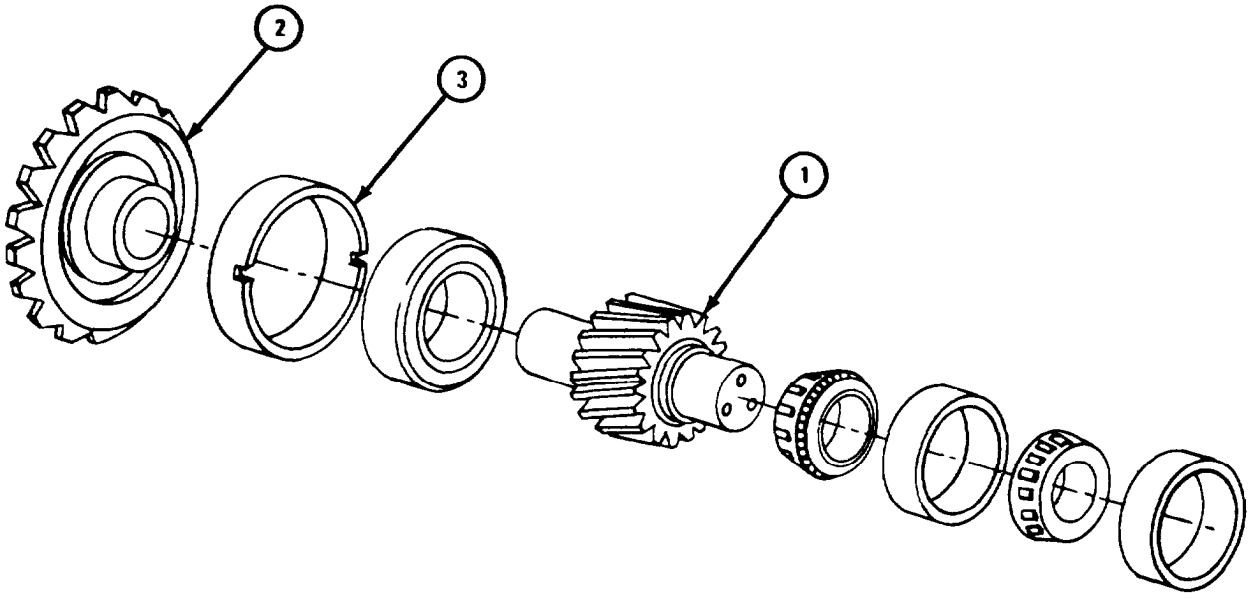
Table 9-4. Differential Hypoid Gear Assembly Wear Limits

Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	Fit between inner bearing and hypoid gear	0.006T to 0.0011L	None
1 and 3	Fit between bearing to sleeve on hypoid gear	0.0020L to 0.0042L	None
4, 5, and 6	Fit between bearing and gear	0.000 to 0.0015T	None

FRAME 8

1. Check that teeth of spur gear pinion (1) and hypoid drive gear (2) are not chipped, cracked, scored or broken. Replace gear if damage cannot be repaired with a honing stone.
2. Check that sleeve (3) is not scored, cracked or damaged in any other way. Replace sleeve if it is damaged.

GO TO FRAME 9



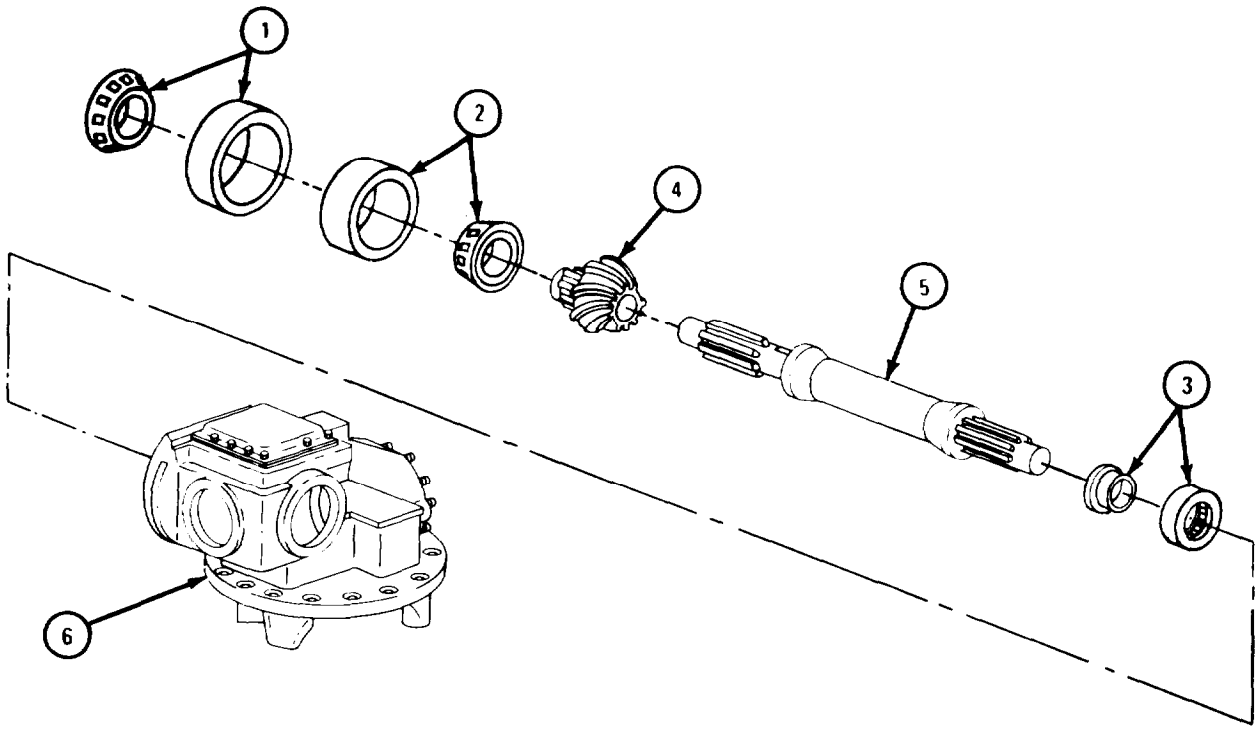
NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087208

FRAME 9

1. Check that outer bearing assembly (1), inner bearing assembly (2), and rear bearing assembly (3) are not damaged. Refer to para 7-7.
2. Check that bevel pinion gear (4), drive shaft (5), and differential carrier housing (6) are not chipped, burred, cracked, scored or broken. Replace parts if damage cannot be repaired with a honing stone.

GO TO FRAME 10



TA 087209

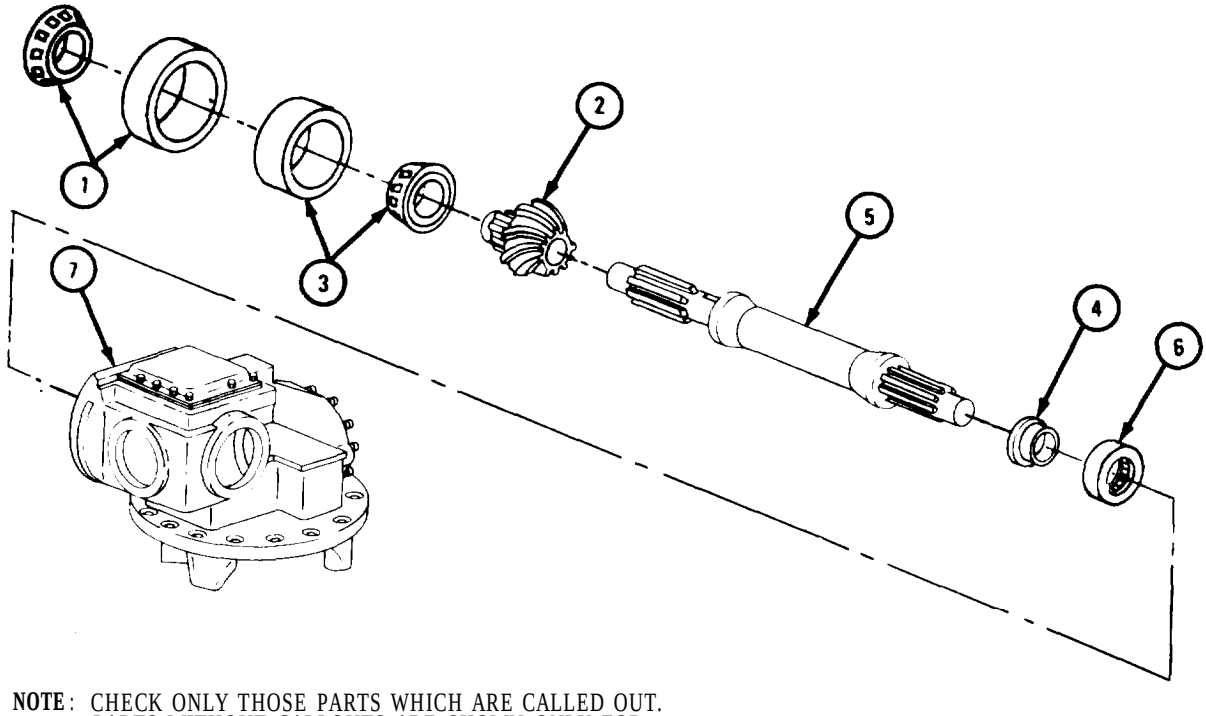
FRAME 10

NOTE

Readings must be within limits given in table 9-5. The letter L indicates a loose fit and the letter T indicates a tight fit. If readings are not within given limits, throw away both gears and get new ones.

1. Measure fit between outer hypoid drive pinion bearing cone (1) and hypoid drive pinion (2).
2. Measure fit between inner hypoid drive pinion bearing cone (3) and hypoid drive pinion (2).
3. Measure fit of hypoid pinion shaft rear bearing (4) on hypoid drive pinion shaft (5).
4. Measure fit of hypoid pinion shaft rear bearing (6) in carrier (7).

END OF TASK



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 103279

Table 9-5. Differential Hypoid Drive Pinion Assembly Wear Limits

Index Number	Item Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1 and 2	Fit of outer hypoid drive pinion cone on pinion	0.0002L to 0.0022L	None
2 and 3	Fit of inner hypoid drive pinion cone on pinion	0.001T to 0.0025T	None
4 and 5	Fit of hypoid shaft rear bearing on hypoid drive pinion shaft	0.0006T to 0.0013T	None
6 and 7	Fit of hypoid pinion shaft rear bearing in carrier	0.0005L to 0.0007T	None

f. Assembly and Adjustment.

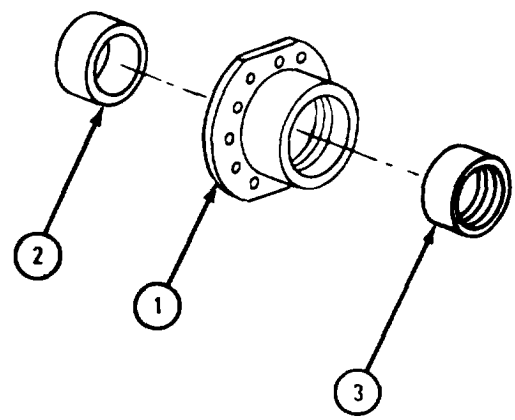
FRAME 1

NOTE

Coat bearings, gears, and seals with gear oil during assembly.

1. Take off shims which were tied to retainer (1) in disassembly.
2. Using remover and replacer, press outer bearing cup (2) and inner bearing cup (3) into retainer (1). Thick side of cups must be toward shoulder inside retainer.

GO TO FRAME 2

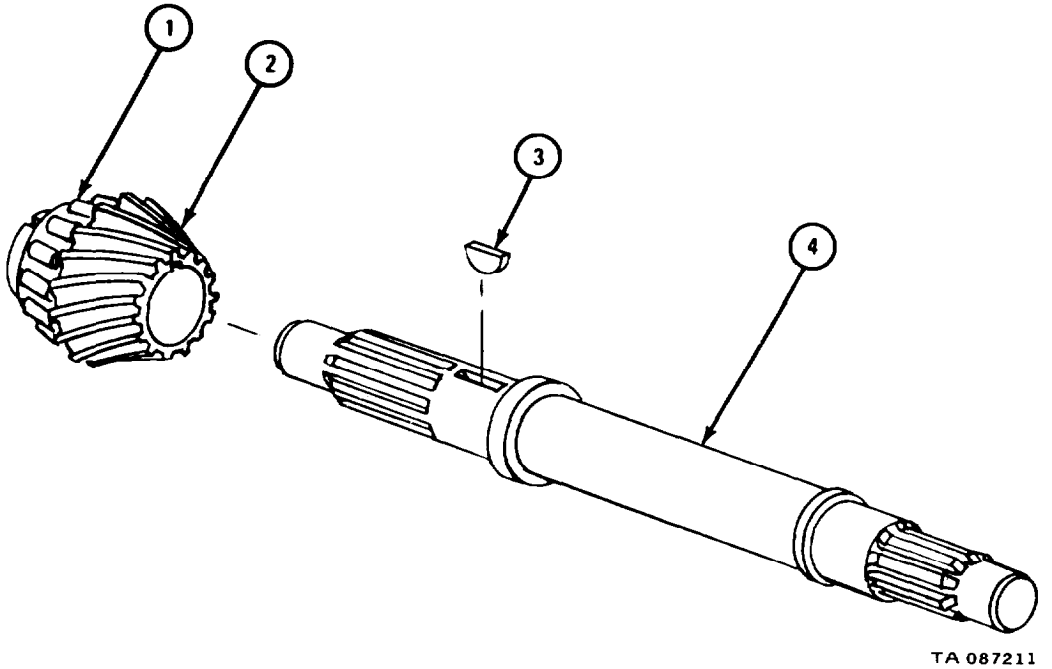


TA 087210

FRAME 2

1. Press inner bearing cone (1) on bevel pinion gear (2) with thick side of cone towards gear.
2. Tap key (3) into keyway of drive shaft (4).
3. Coat long spline end of drive shaft (4) with white lead pigment.
4. Start gear (2) with cone (1) on drive shaft (4). Line up keyway in gear with key (3).
5. Using arbor press, press on gear (2) with cone (1) until gear is firmly seated against shoulder of drive shaft (4).
6. Clamp drive shaft (4) in vise.

GO TO FRAME 3



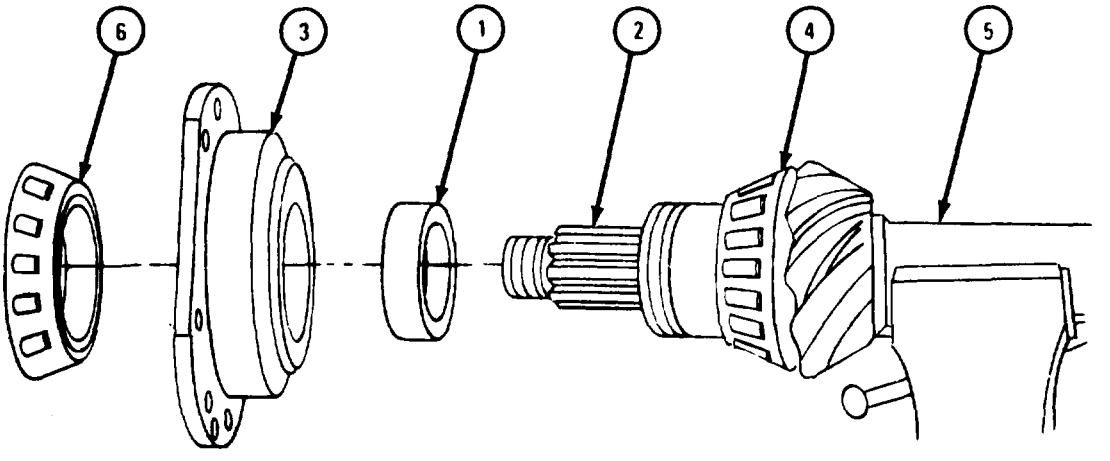
FRAME 3

NOTE

Collar (1) is used to set preload on bevel pinion gear bearings. Use same collar taken out in disassembly the first time preload is checked.

1. Put collar (1) on drive shaft (2). Put retainer assembly (3) in place on inner bearing cone (4) of drive shaft assembly (5) with flange side of retainer assembly facing out.
2. Put on outer bearing cone (6).

GO TO FRAME 4

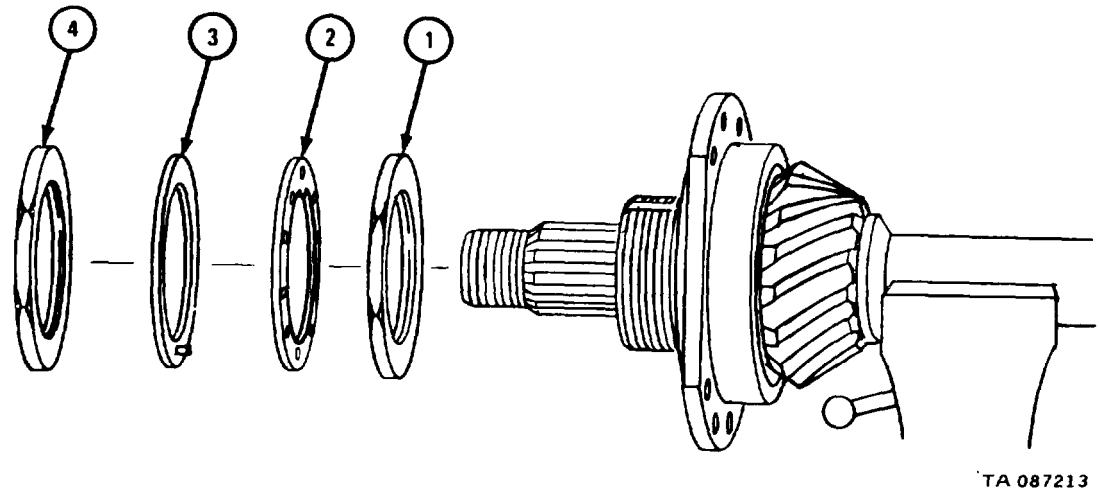


TA 087212

FRAME 4

1. Put on inner nut (1). Tighten inner nut to 500 pound-feet.
2. Put keywasher (2) in place with hole over stud on inner nut (1). If hole does not go on stud, tighten nut untiI it does. Put on lockwasher (3) so that stud alines with keywasher holes.
3. Put on outer nut (4). Tighten outer nut to 500 pound-feet.

GO TO FRAME 5

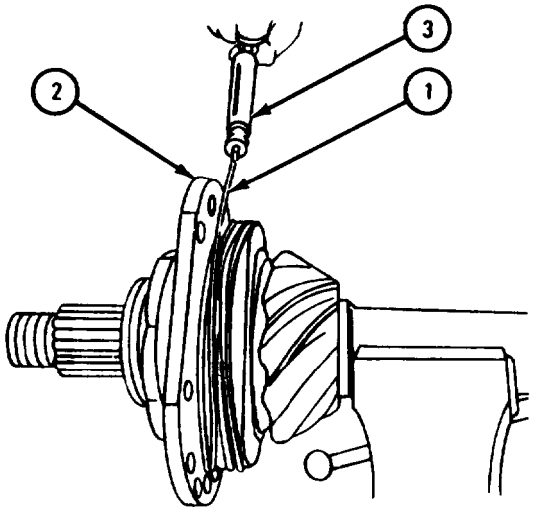


TA 087213

FRAME 5

1. Wrap a length of string (1) around retainer assembly (2) as shown. Join string to bearing preload scale (3).
2. Using bearing preload scale (3), check preload. If new bearings were put in retainer assembly (2), preload must be 12 to 18 pound-inches. If original bearings were used, preload must be 4 to 8 pound-inches.
3. Take off string (1) and bearing preload scale (3).

IF PRELOAD IS NOT WITHIN LIMITS GIVEN, GO TO FRAME 6.
IF PRELOAD IS WITHIN LIMITS GIVEN, GO TO FRAME 8

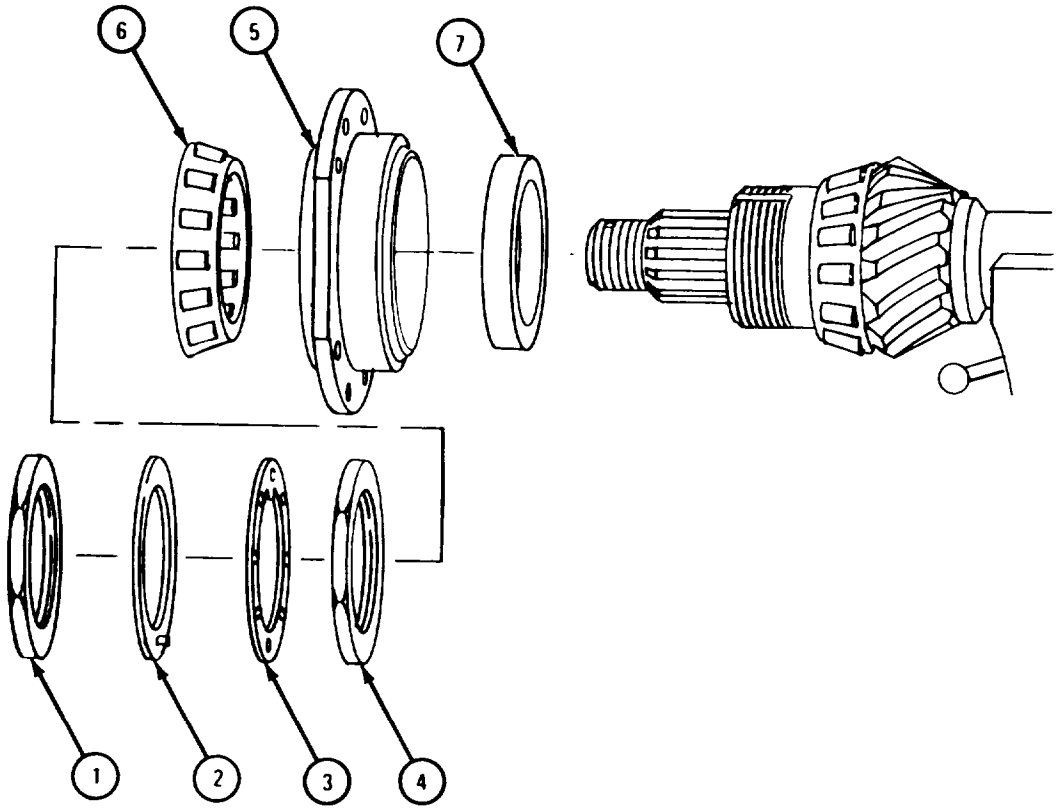


TA 087214

FRAME 6

1. Take off outer nut (1).
2. Take off lockwasher (2) and keywasher (3).
3. Take off inner nut (4).
4. Tap lightly on retainer assembly (5) to loosen outer bearing cone (6).
5. Slide off outer bearing cone (6), collar (7), and retainer assembly (5).

GO TO FRAME 7



TA 087215

FRAME 7

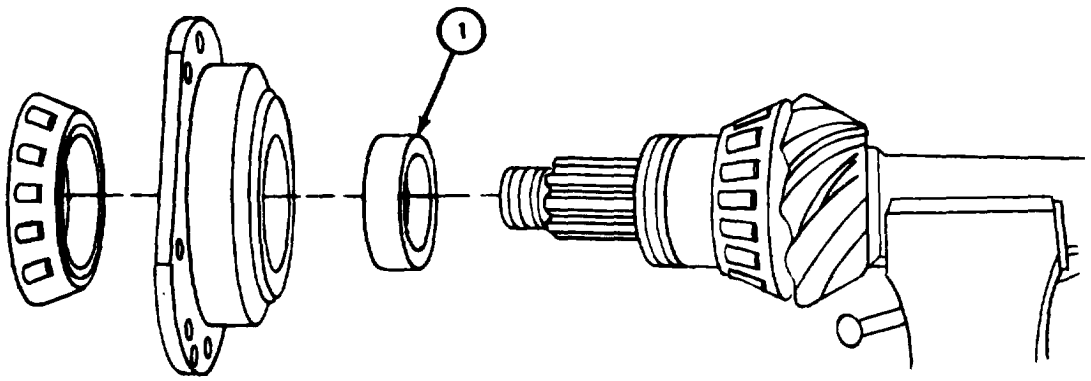
1. Measure thickness of collar (1).

NOTE

Original collar (1) may be made thinner by rubbing it on crocus cloth laid on a face plate.

2. If bevel pinion gear preload checked in frame 5 was more than limits given, use a thicker collar from bevel pinion gear spacer kit.
3. If preload was less than limits given, use a thinner collar from bevel pinion gear spacer kit.

GO TO FRAME 8

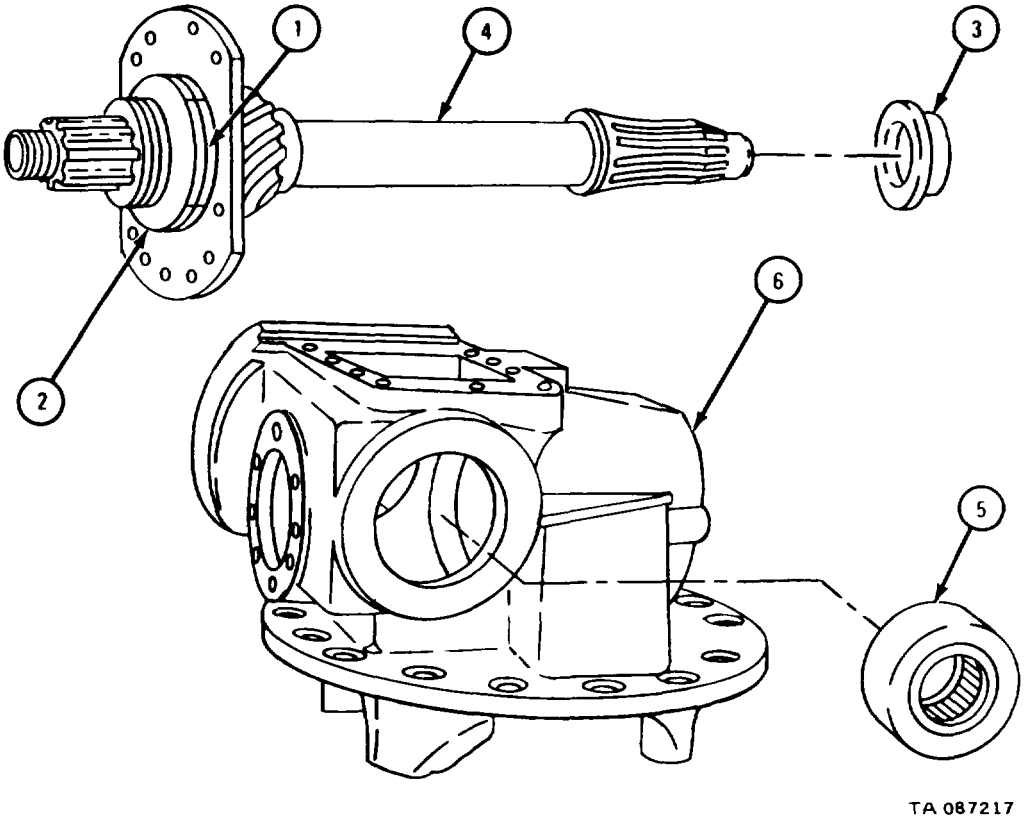


TA 087216

FRAME 8

1. Bend locktab on washer (1) over outer locknut (2).
2. Put on bearing inner race (3).
3. Take drive shaft assembly (4) out of vise.
4. Using remover and replacer, and hammer, put bearing (5) in place in housing (6).

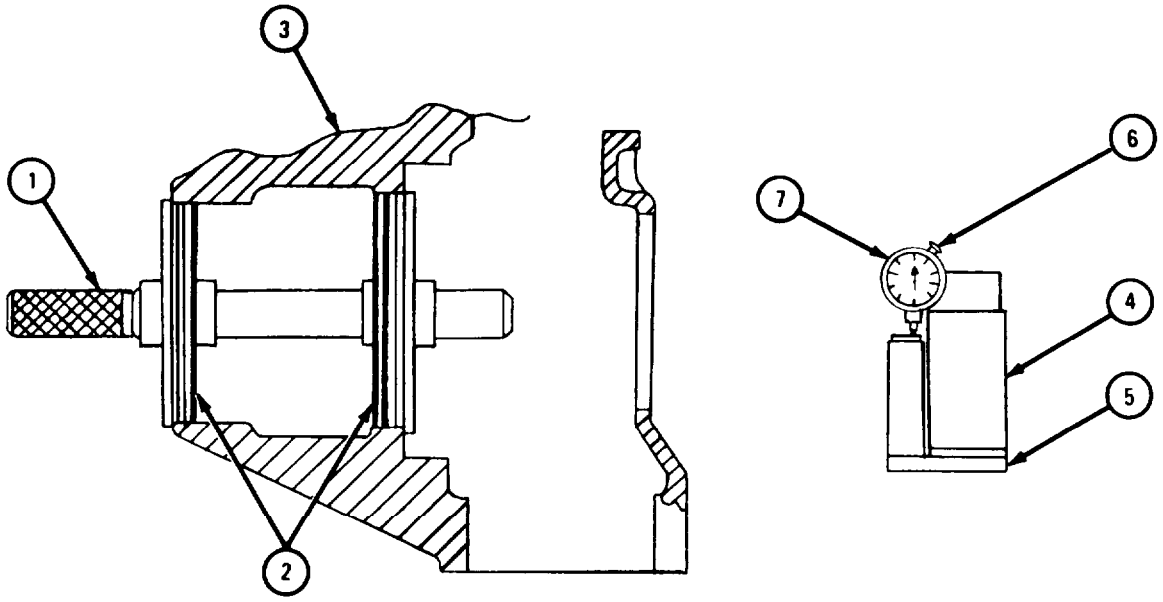
GO TO FRAME 9



FRAME 9

1. Put arbor (1) and two disks (2) in place in spur gear pinion bore of housing (3).
2. Place gage holder (4) on master block (5) as shown.
3. Loosen dial face screw (6).
4 Turn dial face (7) until 0 on dial face is in line with pointer.
5. Tighten dial face screw (6).

GO TO FRAME 10



TA 087218

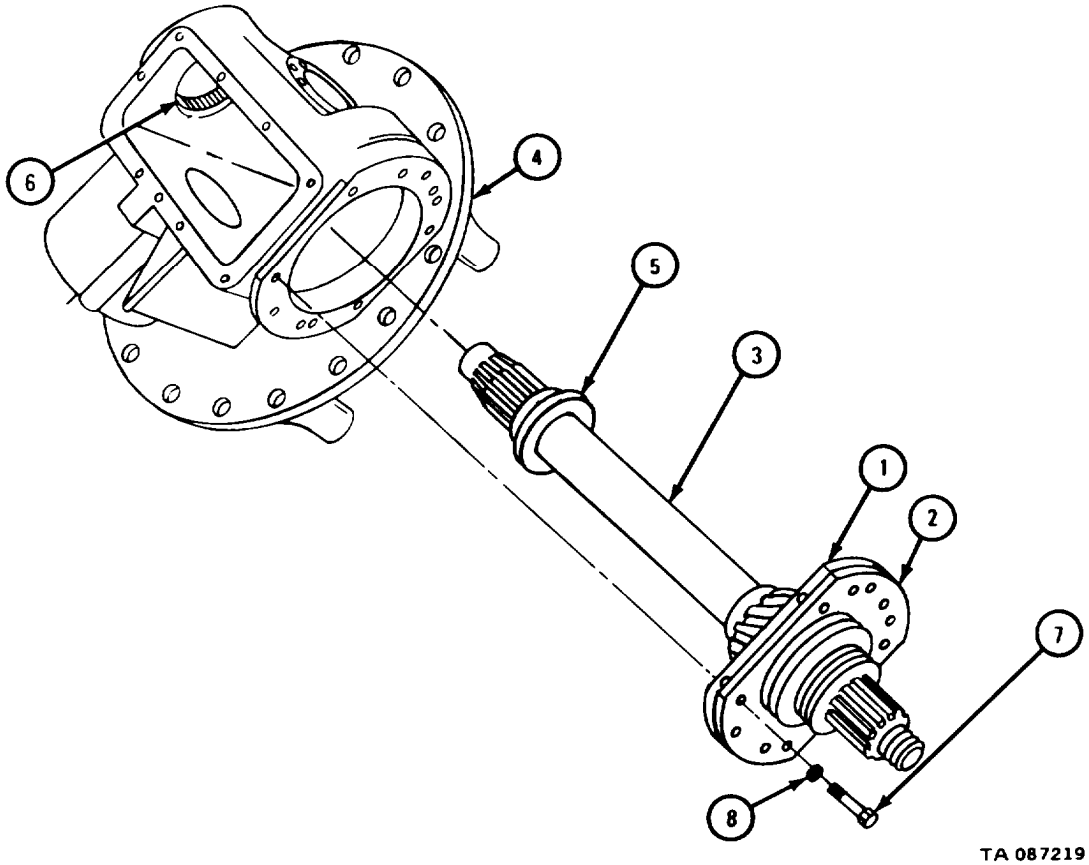
FRAME 10

NOTE

Shims (1) are used to set bevel pinion gear tooth depth. Use same shims taken out in disassembly the first time gear tooth depth is checked.

1. Put needed number of shims (1) in place on gear side of retainer assembly (2).
2. Slide drive shaft assembly (3) with shims (1) into bore in differential carrier assembly (4). Line up bearing inner race (5) with bearing (6).
3. Line up holes in shims (1), retainer assembly (2), and differential carrier assembly (3).
4. Seat drive shaft assembly (3) with shims (1) against differential carrier assembly (4).
5. Put in eight screws (7) with flat washers (8).

GO TO FRAME 11

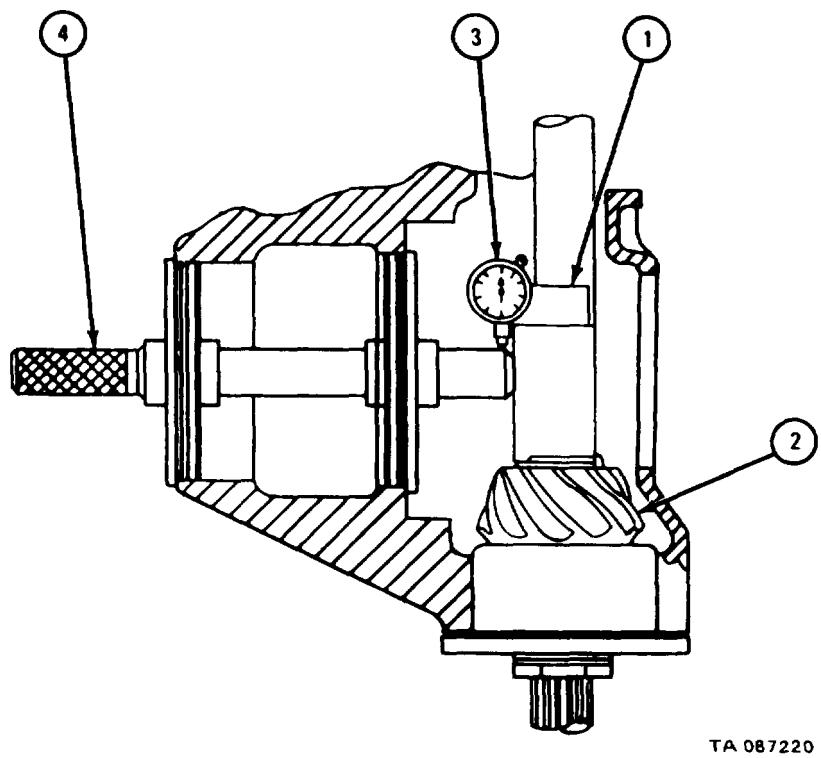


FRAME 11

1. Hold differential hypoid drive pinion setting gage holder (1) firmly in place against bevel pinion gear (2).
2. Turn bevel pinion gear (2) so button of dial indicator (3) rides across arbor (4). Note maximum dial indicator reading.
3. Take out gage holder (1).
4. Check measurement marked on tooth end of bevel pinion gear (2). It should be the same as reading noted in step 2.

IF DIAL INDICATOR READING IS NOT THE SAME AS MARKING ON BEVEL PINION GEAR, GO TO FRAME 12.

IF READING IS THE SAME AS MARKING, GO TO FRAME 13



FRAME 12

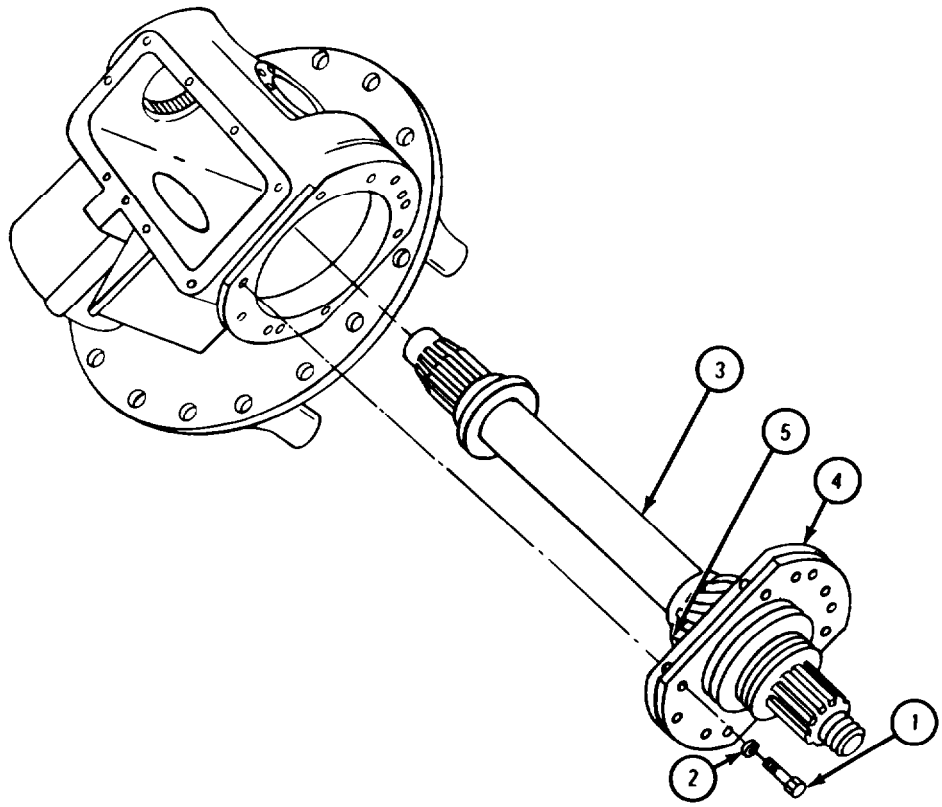
1. Take out eight screws (1) with washers (2).
2. Tap on rear end of drive shaft assembly (3) to loosen it. Slide out drive shaft assembly with shims (4).
3. Take off shims (4 .

NOTE

Use shims taken from carrier gasket and shim kit.

4. If dial indicator reading made in frame 11 was more than marking on bevel pinion gear (5), add a shim or use thicker shim in its place. Shim used should be same size as difference between reading and marking.
5. If dial indicator reading was less than marking on bevel pinion gear (5), take away a shim or use thinner shim in its place.

GO BACK TO FRAME 10

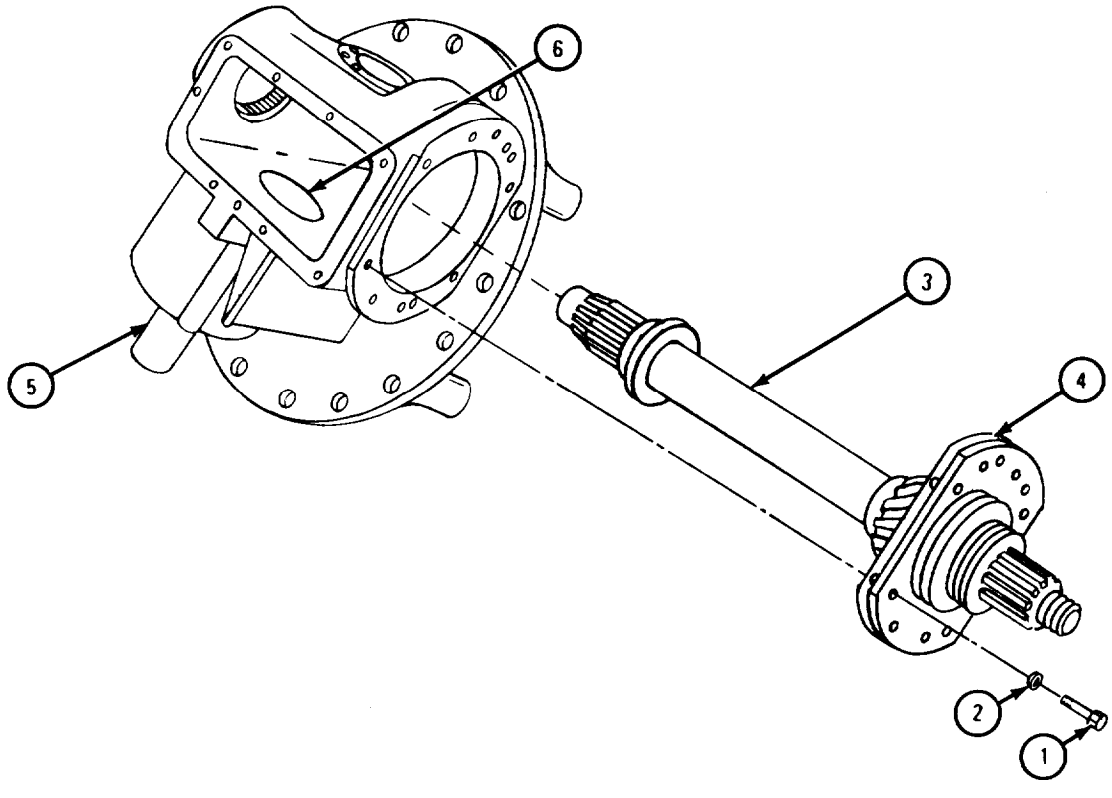


TA 087221

FRAME 13

1. Take out eight capscrews (1) with lockwashers (2).
2. Tap on rear end of drive shaft assembly (3) to loosen it. Slide out drive shaft assembly with needed number of shims (4). Leave shims on drive shaft assembly.
3. Take out arbor (5) and two disks (6).

GO TO FRAME 14

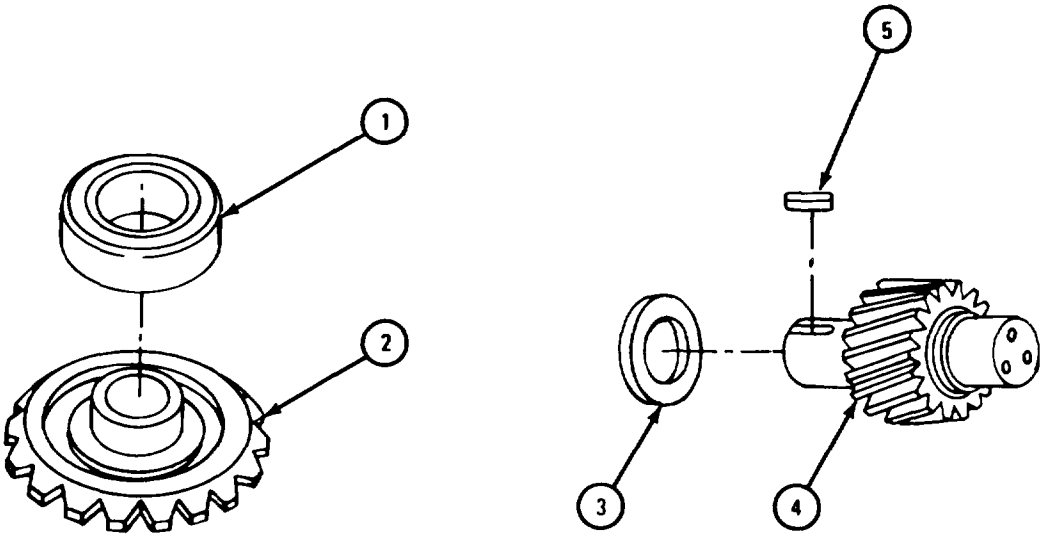


TA 087222

FRAME 14

1. Press bearing (1) onto hub of hypoid drive gear (2).
2. Slide spacing washer (3) onto spur gear pinion (4).
3. Tap key (5) into keyway of spur gear pinion (4).
4. Coat keyed end of spur gear pinion (4) with white lead pigment.

GO TO FRAME 15

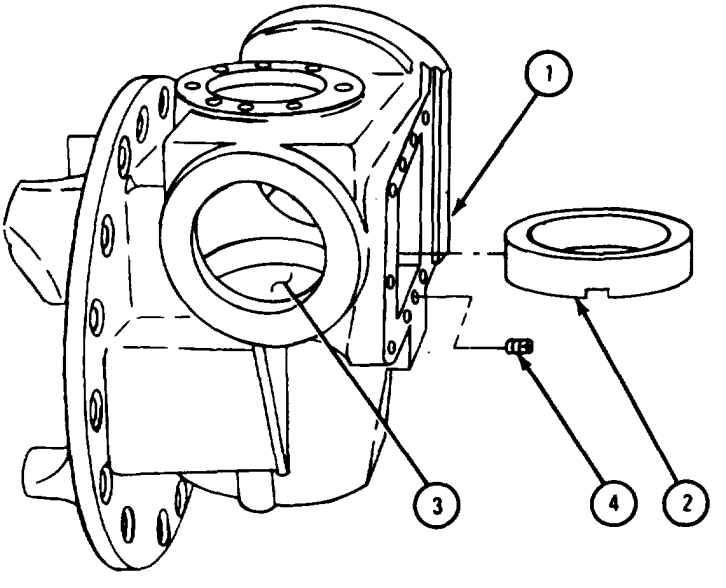


TA 087223

FRAME 15

1. Place differential carrier assembly (1) on arbor press in position shown.
2. Put sleeve (2) in differential carrier assembly (1) with notches in sleeve toward shoulder of bore (3). A line screw hole in sleeve with screw hole in carrier.
3. Using arbor press and remover and replacer, seat sleeve (2) against shoulder of bore (3).
4. Screw in and tighten setscrew (4).

GO TO FRAME 16

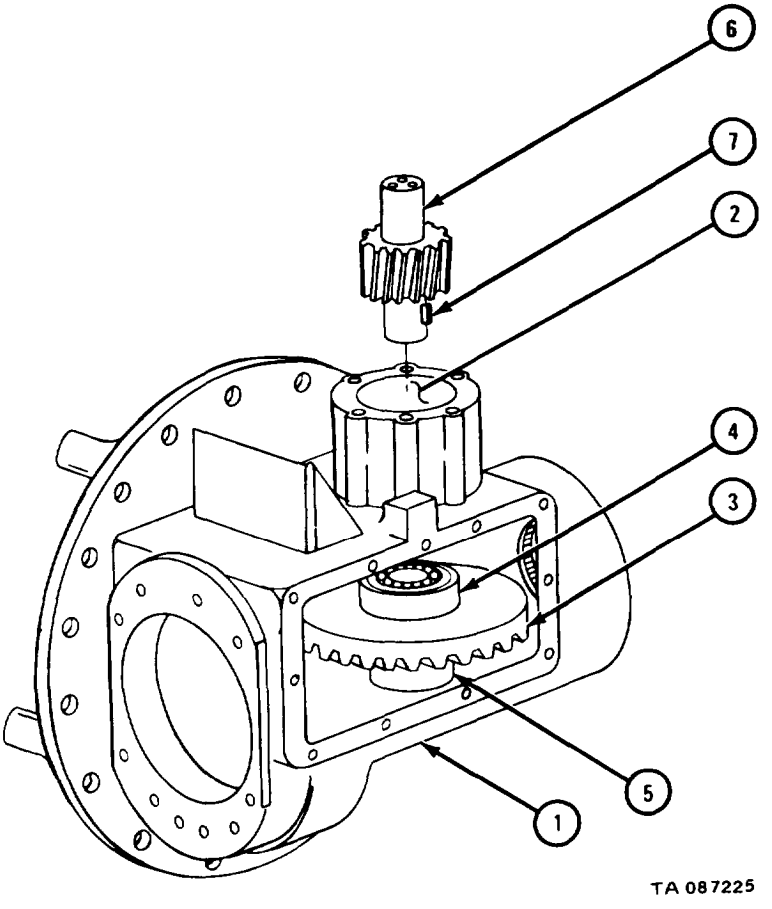


TA 087224

FRAME 16

1. Turn differential carrier assembly (1) over so bore (2) is on top.
2. Put hypoid drive gear (3) with bearing (4) inside differential carrier assembly (1). Rest hub of hypoid drive gear on adapter (5).
3. put spur gear pinion (6) through bore (2). Aline key (7) in spur gear pinion with keyway in hypoid drive gear (3).
4. Press spur gear pinion (6) into bore of hypoid drive gear (3).
5. Take out adapter (5).
6. Turn differential carrier assembly (1) over so bore (2) is on bottom.

GO TO FRAME 17

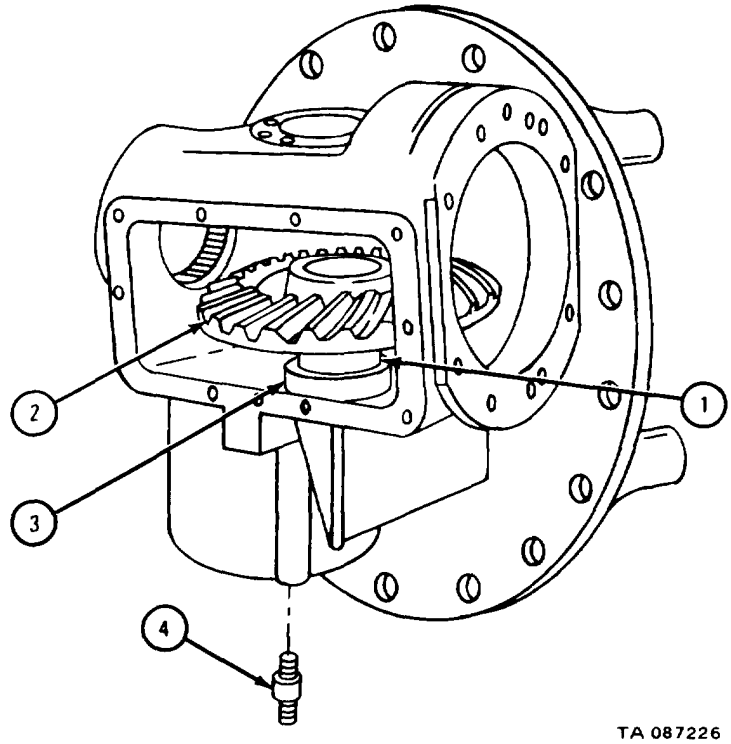


TA 087225

FRAME 17

1. Press bearing (1) on hypoid drive gear (2) into sleeve (3).
2. Put in six studs (4).

GO TO FRAME 18

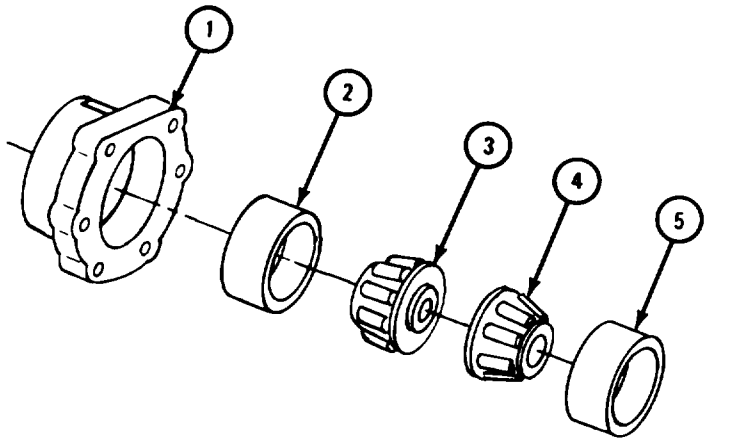


TA 087226

FRAME 18

1. Take off shims which were tied to cap (1). Use same number of shims the first time cap is put in place.
2. Using bearing replacer, put inner bearing cup (2) in cap (1). Thick side of cup must face out.
3. Turn cap (1) over. Put in inner bearing cone (3) and outer bearing cone (4) with large diameters of cones together.
4. Using bearing replacer, put in outer bearing cup (5).

GO TO FRAME 19

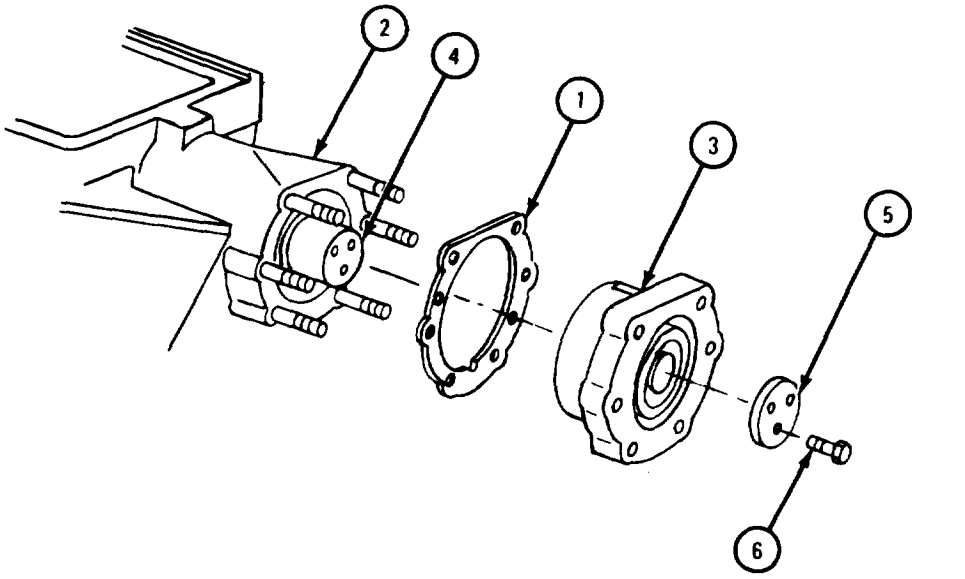


TA 087227

FRAME 19

1. Put needed number of shims (1) in place on differential carrier assembly (2). Line up oil holes in shims and differential carrier assembly.
2. Place cap assembly (3) over end of spur gear pinion (4). Line up oil holes in cap assembly and differential carrier assembly (2).
3. Lightly tap cap assembly (3) into place.
4. Put retaining plate (5) in place.
5. Put in three screws (6).

GO TO FRAME 20

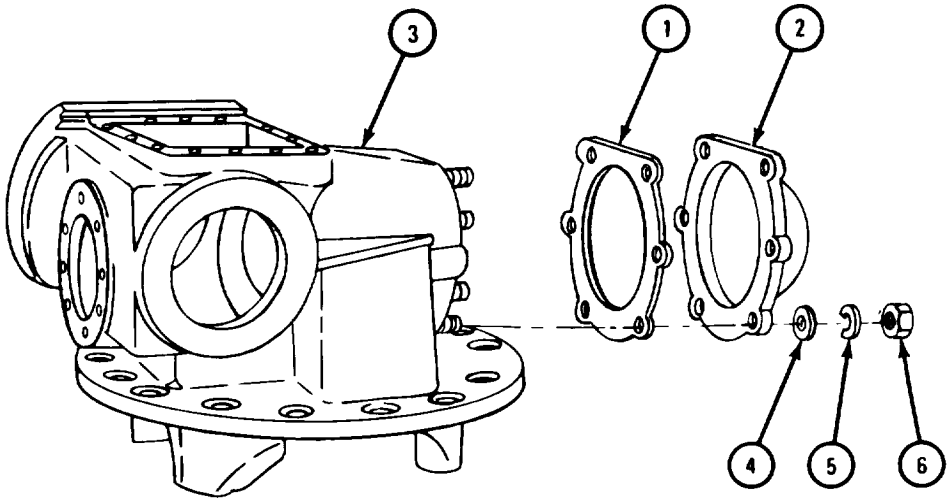


TA 087228

FRAME 20

1. Take off needed number of shims (1) which were tied to outer bearing cover (2). Use same number of shims the first time outer bearing cover is put in place.
2. Put needed number of shims (1) and outer bearing cover (2) in place on differential carrier assembly (3). Line up oil holes in shims, outer bearing cover (2), and differential carrier assembly.
3. Put in six flat washers (4), lockwashers (5), and nuts (6).

GO TO FRAME 21

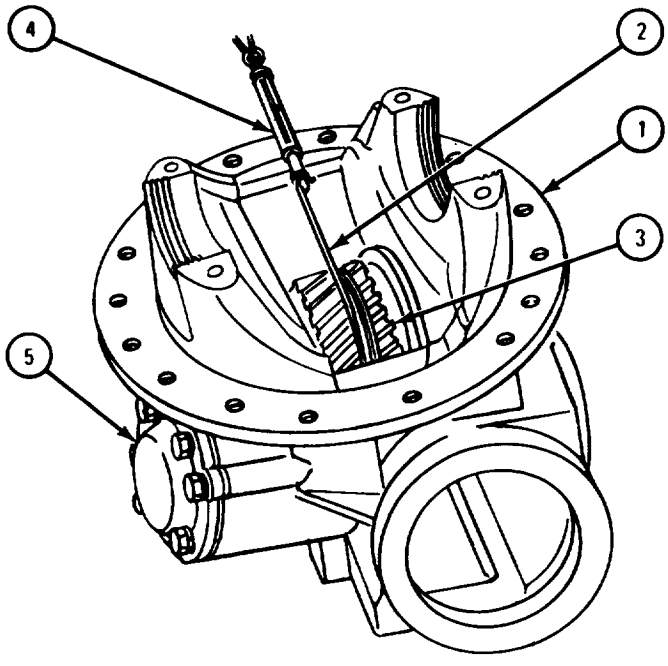


TA 087229

FRAME 21

1. Turn over differential carrier assembly (1).
2. Wrap a length of string (2) around spur gear pinion (3) as shown. Join string to bearing preload scale (4).
3. Using bearing preload scale (4), check preload. If new bearings were put in cap assembly (5), preload must be 12 to 18 pound–inches. If original bearings were used, preload must be 4 to 8 pound–inches.
4. Turn over differential carrier assembly (1).

IF PRELOAD IS NOT WITHIN LIMITS GIVEN, GO TO FRAME 22.
IF PRELOAD IS WITHIN LIMITS GIVEN, GO TO FRAME 23

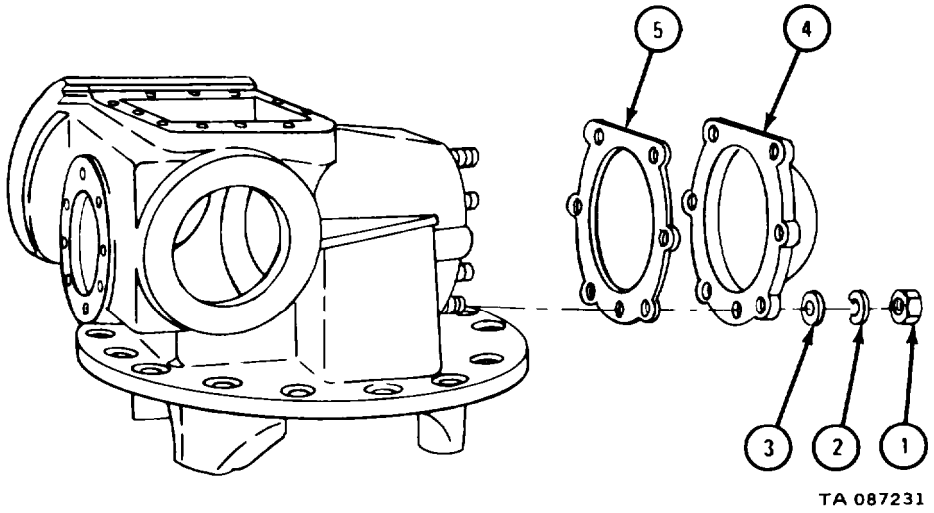


TA 087230

FRAME 22

1. Take out six nuts (1), lockwashers (2), and flat washers (3).
2. Take off outer bearing cover (4) and needed number of shims (5).
3. Measure thickness of shims (5).
4. If preload checked in frame 21 was more than limits given, use an extra shim from carrier gasket and shim kit or a thicker shim.
5. If preload was less than limits given, use one less shim or a thinner shim.

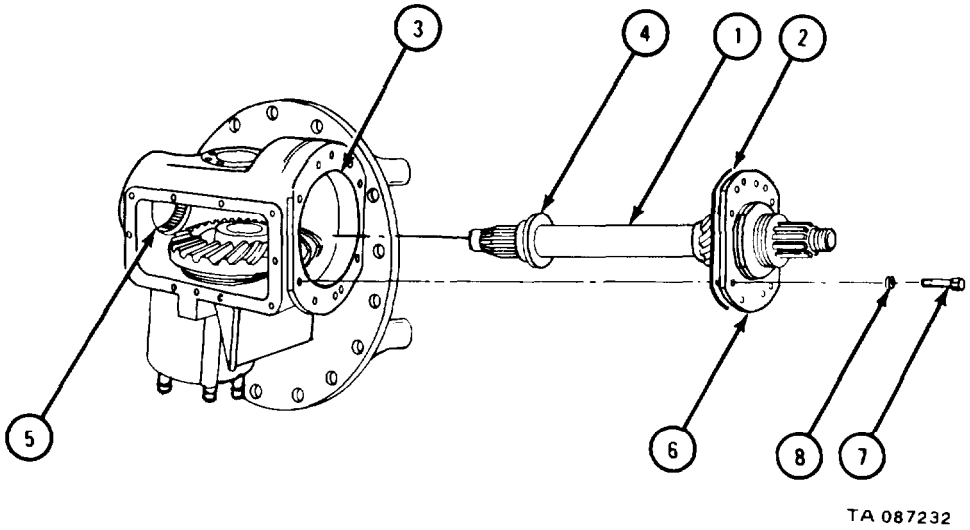
GO BACK TO FRAME 20



FRAME 23

1. Slide drive shaft assembly (1) with needed number of shims (2) into bore in differential carrier assembly (3). Line up bearing inner race (4) with bearing (5)
2. Line up holes in shims (2), retainer assembly (6), and differential carrier assembly (3).
3. Seat drive shaft assembly (1) with shims (2) against differential carrier assembly (3).
4. Put in eight capscrews (7) with washers (8).

GO TO FRAME 24

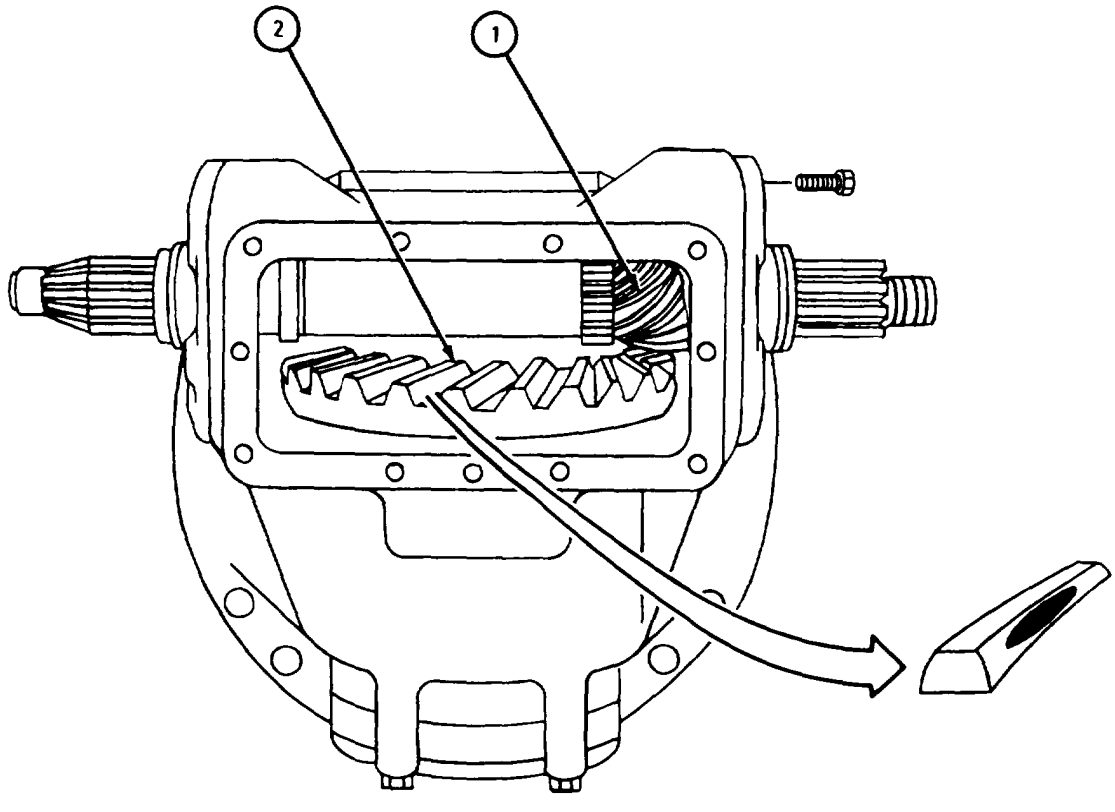


TA 087232

FRAME 24

1. Coat three teeth of bevel pinion gear (1) with prussian blue.
2. Turn bevel pinion gear (1) and check pattern on hypoid drive gear (2). Pattern should be centered and cover about 80% of hypoid drive gear teeth as shown.

IF PATTERN IS NOT CORRECT, GO TO FRAME 25.
IF PATTERN IS CORRECT, GO TO FRAME 30

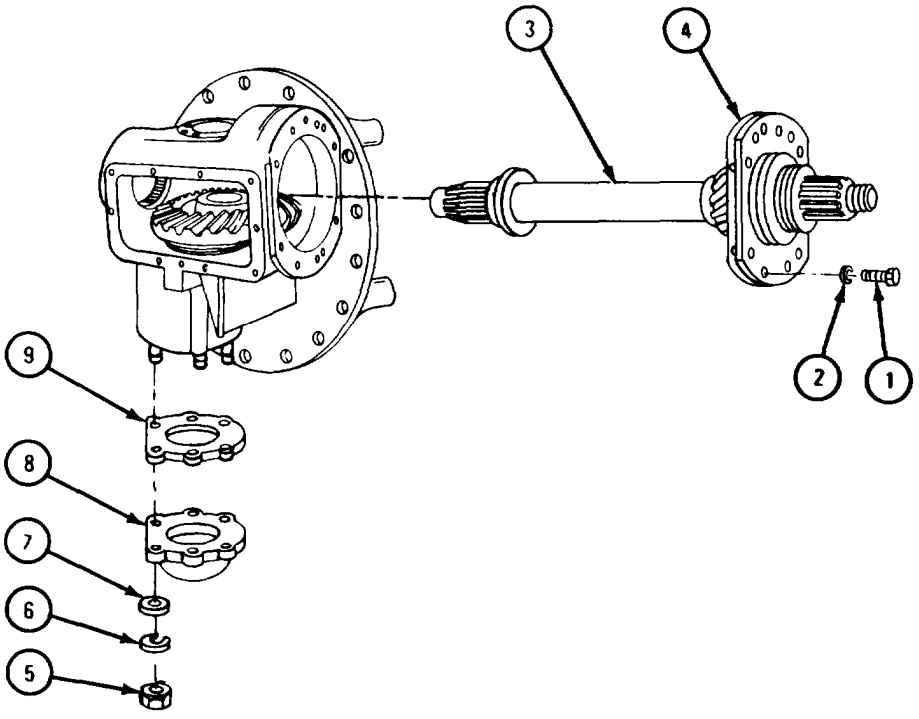


TA 087233

FRAME 25

1. Take out eight capscrews (1) with washers (2).
2. Tap on rear end of drive shaft assembly (3) to loosen it. Slide out drive shaft assembly with needed number of shims (4).
3. Take off shims (4).
4. Take off six nuts (5), lockwashers (6), and flat washers (7).
5. Take off cover (8) and needed number of shims (9).

GO TO FRAME 26

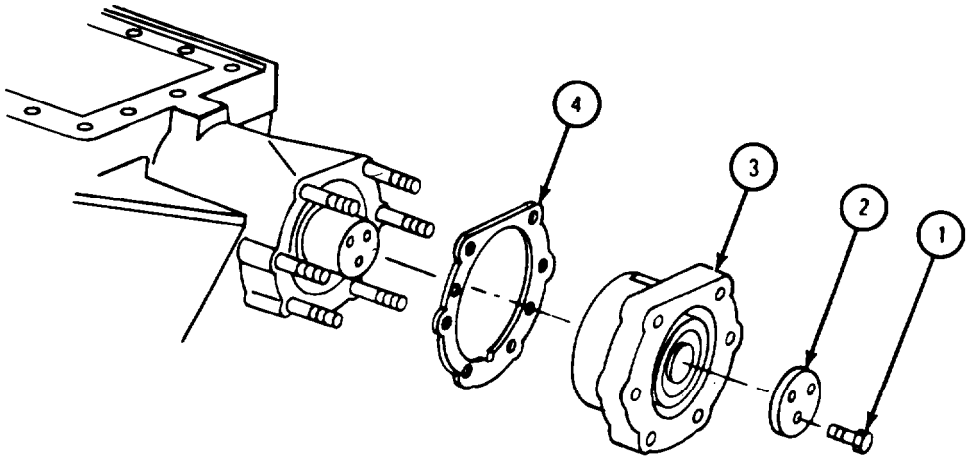


TA 087234

FRAME 26

1. Take out three screws (l).
2. Take off retaining plate (2).
3. Screw three puller screws into jacking holes in cap assembly (3). Tighten puller screws until cap assembly is free. Take off cap assembly and shims (4).
4. Take out puller screws.

GO TO FRAME 27



TA 087235

FRAME 27

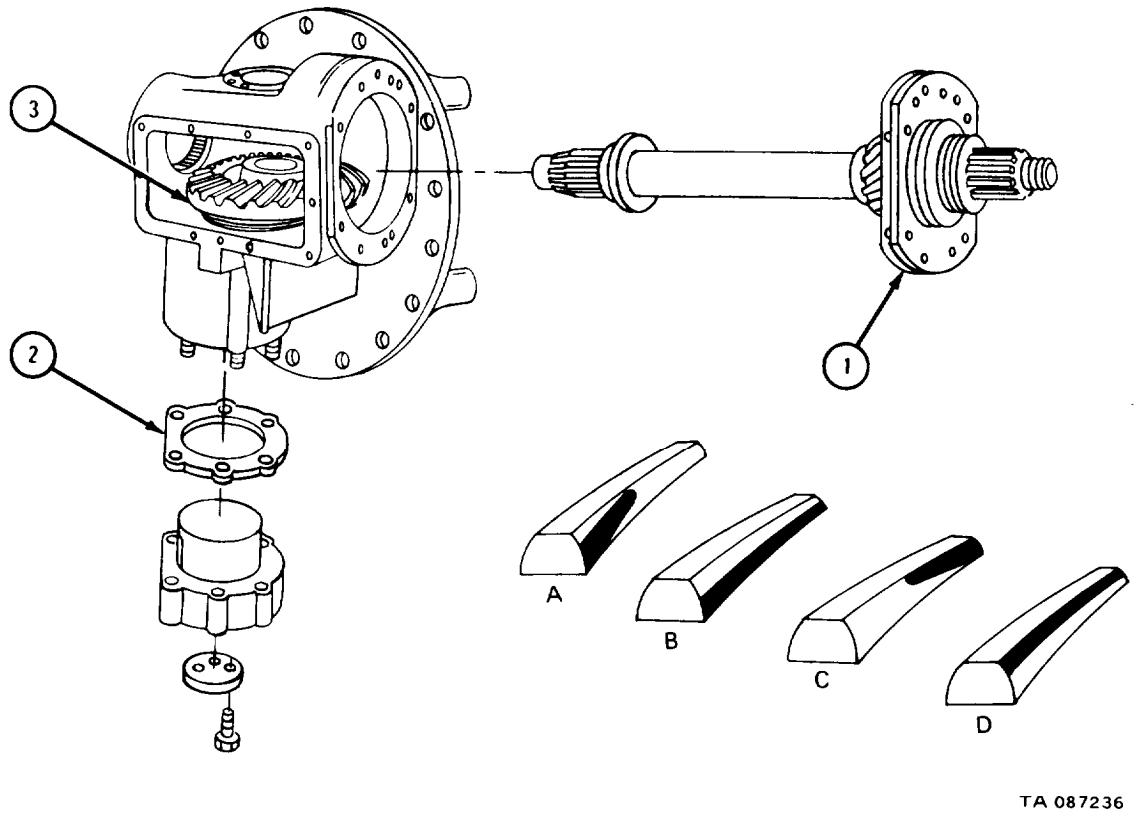
1. Measure thickness of shims (1) and shims (2).
2. If tooth pattern on hypoid drive gear (3) checked in frame 24 looked like pattern A or pattern B, do step 3. If tooth pattern looked like pattern C or pattern D, do step 4.

NOTE

Use shims from carrier gasket and shim kit.

3. Take away one shim from shims (1) or use a thinner shim in place of another. Add one shim to shims (2) or use a thicker shim in its place.
4. Add one shim to shims (1) or use a thicker shim in its place. Take away one shim from shims (2) or use a thinner shim in its place.

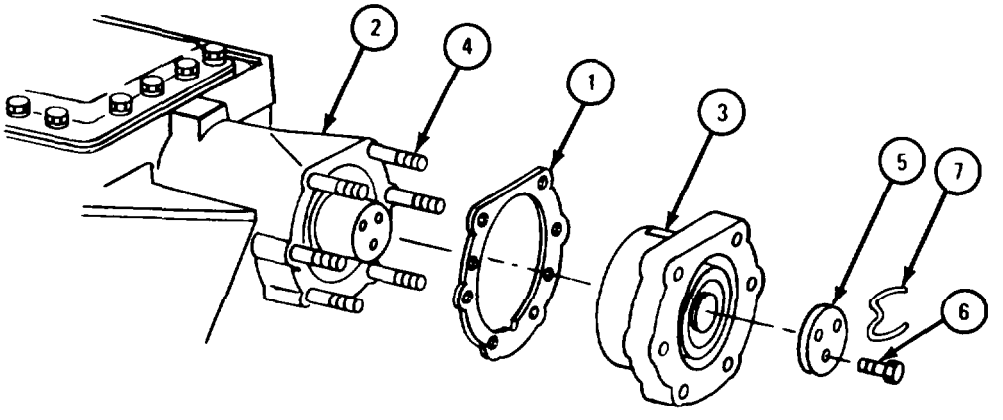
GO TO FRAME 28



FRAME 28

1. Put needed number of shims (1) in place on differential carrier assembly (2). Line up oil holes in shims and differential carrier assembly.
2. Place cap assembly (3) over end of spur gear pinion (4). Line up oil holes in cap assembly and differential carrier assembly (2) .
3. Lightly tap cap assembly (3) into place.
4. Put retaining plate (5) in place.
5. Put in three screws (6).
6. Put in safety wire (7) .

GO TO FRAME 29

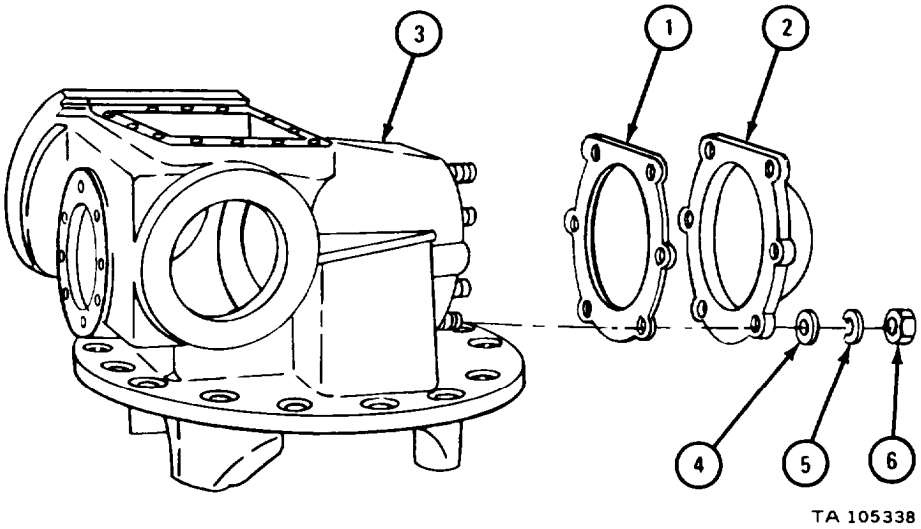


TA 105337

FRAME 29

1. Put needed number of shims (1) and outer bearing cover (2) in place on differential carrier assembly (3). Line up oil holes in shims, outer bearing cover, and differential carrier assembly.
2. Put in six flat washers (4), lockwashers (5), and nuts (6).

GO BACK TO FRAME 24

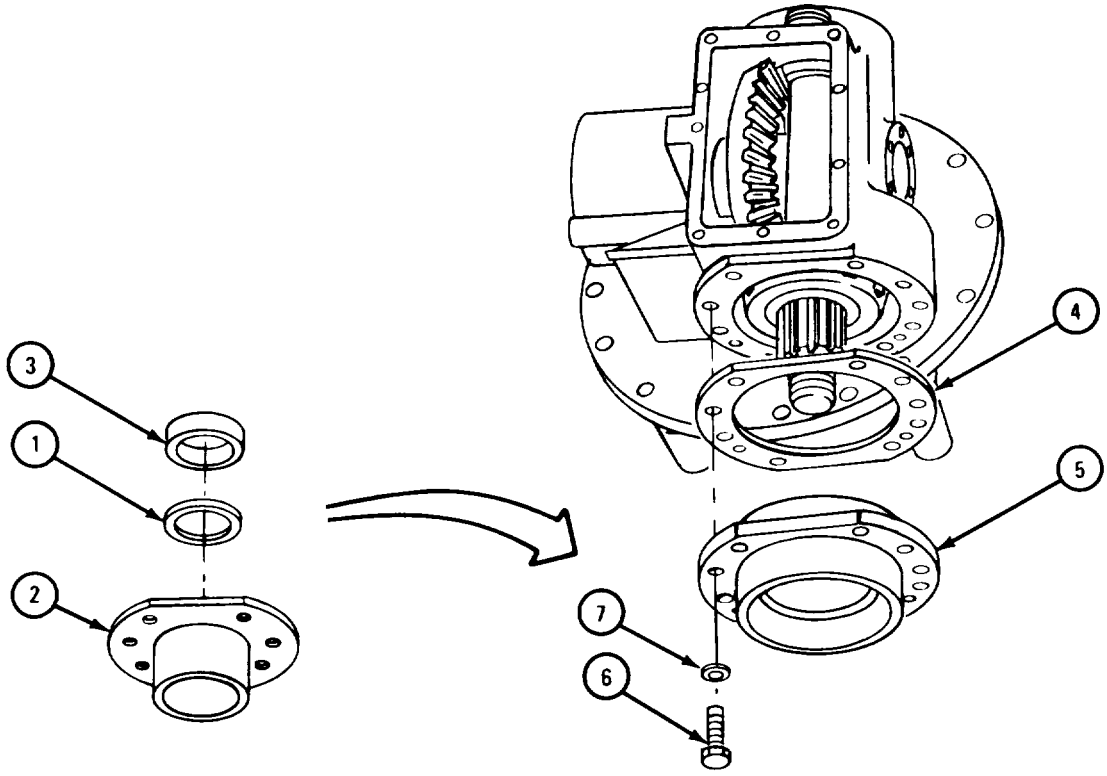


TA 105338

FRAME 30

1. Put gasket (1) in place in front bearing cover (2).
2. Using replacer, put in seal (3).
3. Put gasket (4) and front bearing cover assembly (5) in place. Make sure all screw holes line up.
4. Put in eight screws (6) and lockwashers (7). Tighten screws to 78 to 88 pound-feet.

GO TO FRAME 31

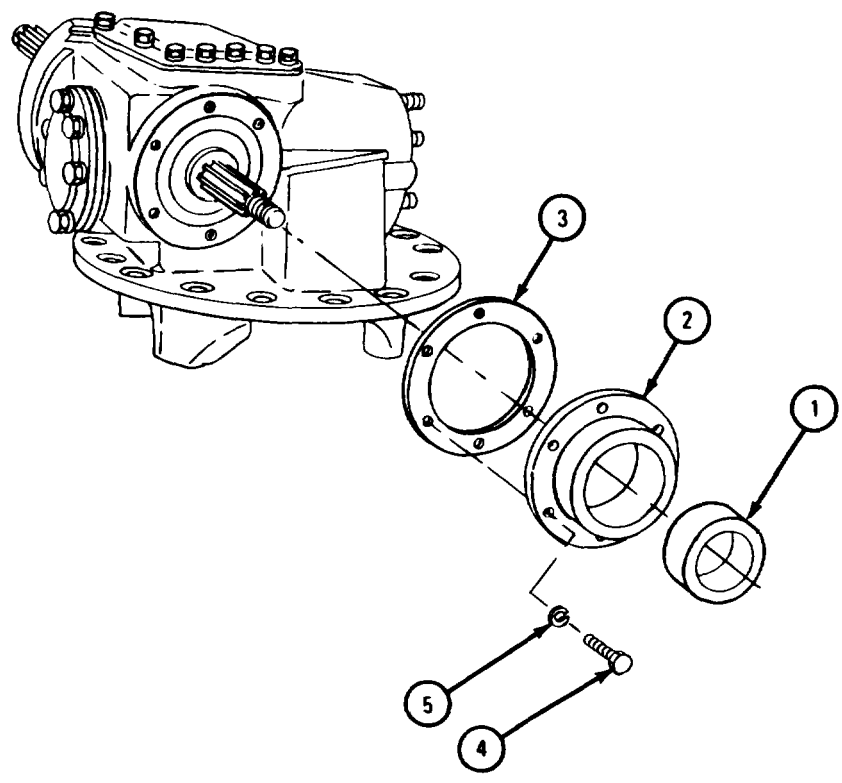


TA 087239

FRAME 31

1. Using replacer, put seal (1) into rear bearing cover (2).
2. Put gasket (3) and rear bearing cover (2) with seal (1) in place.
3. Put in six screws (4) and lockwashers (5). Tighten screws to 25 to 35 pound-feet.

GO TO FRAME 32



TA 087240

FRAME 32

1. Put thrust washer (1) in place.

CAUTION

Never drive companion flanges (2) onto drive shaft assembly (3) or drive shaft bearings will be damaged.

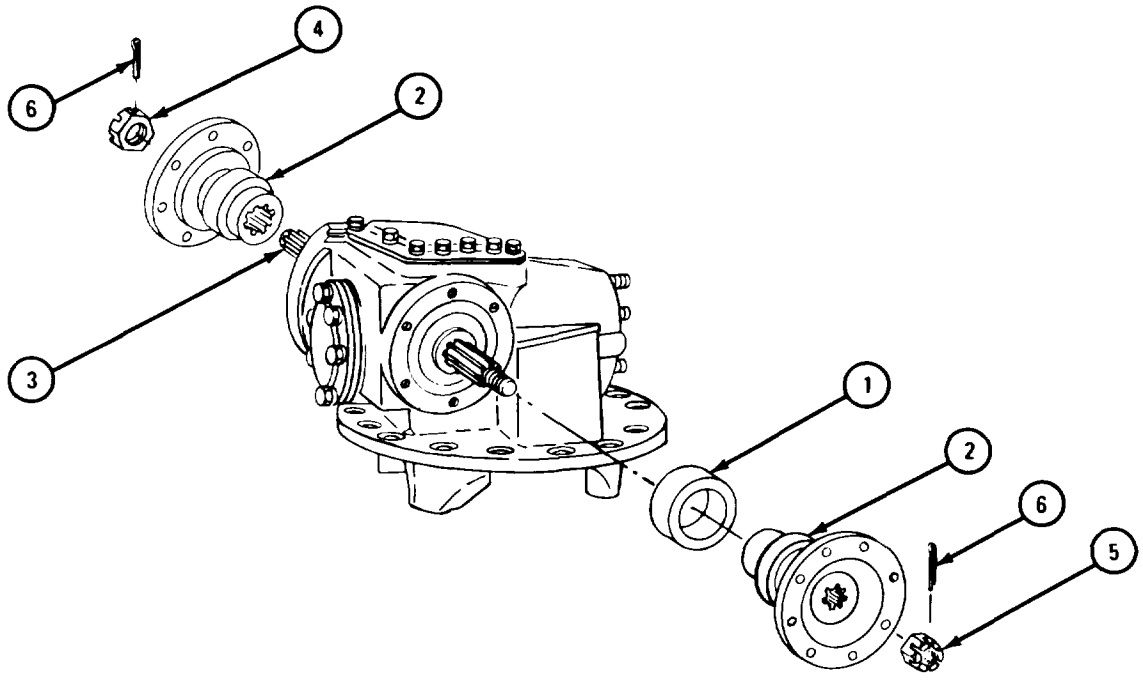
2. Using differential case companion flange replacer, put two companion flanges (2) onto drive shaft assembly (3).
3. Put on two nuts (4 and 5).

Soldier A 4. Hold nut (4) as soldier B tightens nut (5).

Soldier B 5. Tighten nut (5) to 800 pound-feet.

6. Put in two cotter pins (6).

GO TO FRAME 33

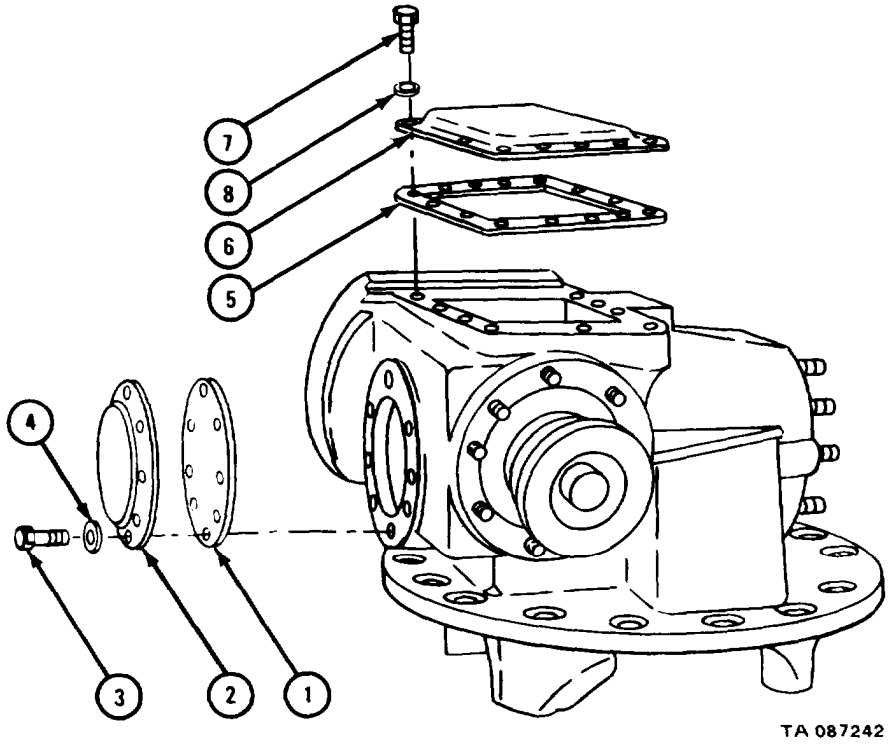


TA 087241

FRAME 33

1. Put gasket (1) and side cover (2) in place.
2. Put in eight screws (3) and flat washers (4).
3. Put gasket (5) and top cover (6) in place.
4. Put in 10 screws (7) and flat washers (8).

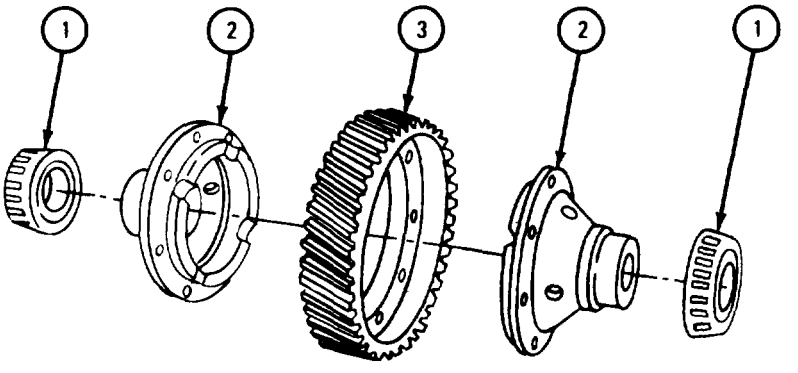
GO TO FRAME 34



FRAME 34

1. Press two bearing cones (1) onto two differential case halves (2).
2. Mounting flange inside of helical drive gear (3) is off center. During disassembly, the positions of differential case halves (2) on helical drive gear were marked.
3. Lay differential case half (2) that mounts towards outside of helical drive gear on bench with flange side up.

GO TO FRAME 35

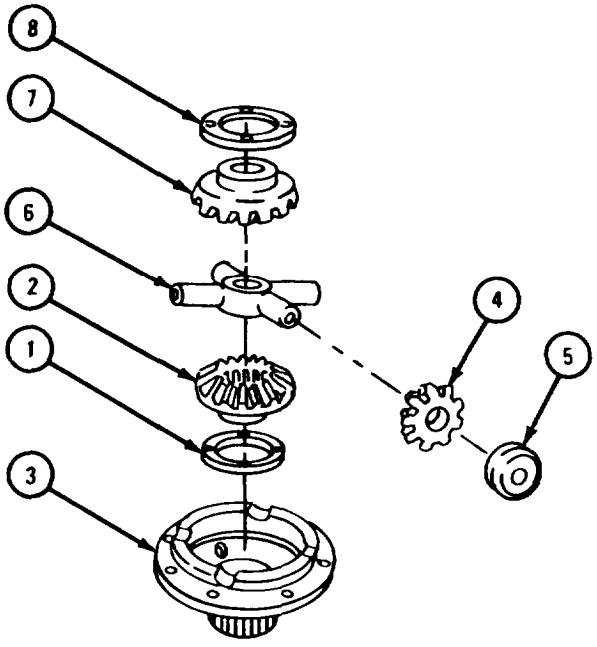


TA 087243

FRAME 35

1. Put thrust washer (1) and side gear (2) in place in differential case half (3).
2. Slide four spider gears (4) and four thrust washers (5) onto spider (6).
3. Put spider (6) with thrust washers (5) and spider gears (4) in place.
4. Put side gear (7) and thrust washer (8) in place. Make sure all gear teeth are in mesh.

GO TO FRAME 36

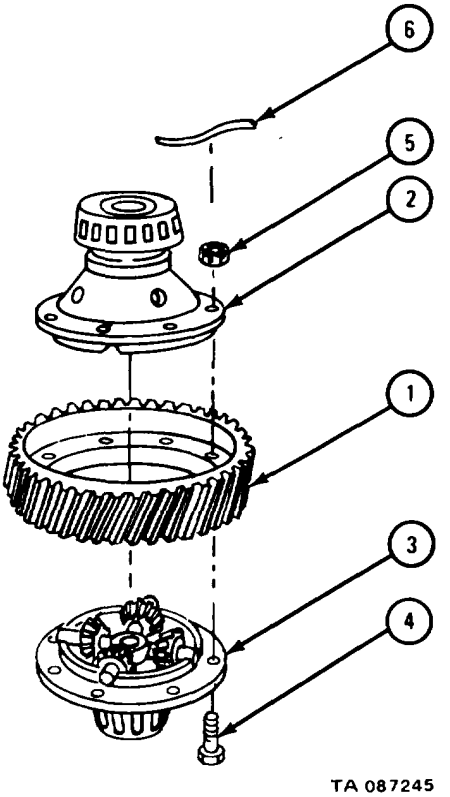


TA 087244

FRAME 36

1. Put helical drive gear (1) and differential case half (2) in place. Make sure marks on helical drive gear and differential case halves (2 and 3) line up.
2. Push eight screws (4) up through screw holes in differential case halves (2 and 3) and helical drive gear (1). Put on eight nuts (5).
3. Tighten nuts (5) to 115 pound-feet.
4. Put safety wire (6) through holes in screws (4). Twist ends of safety wire together.

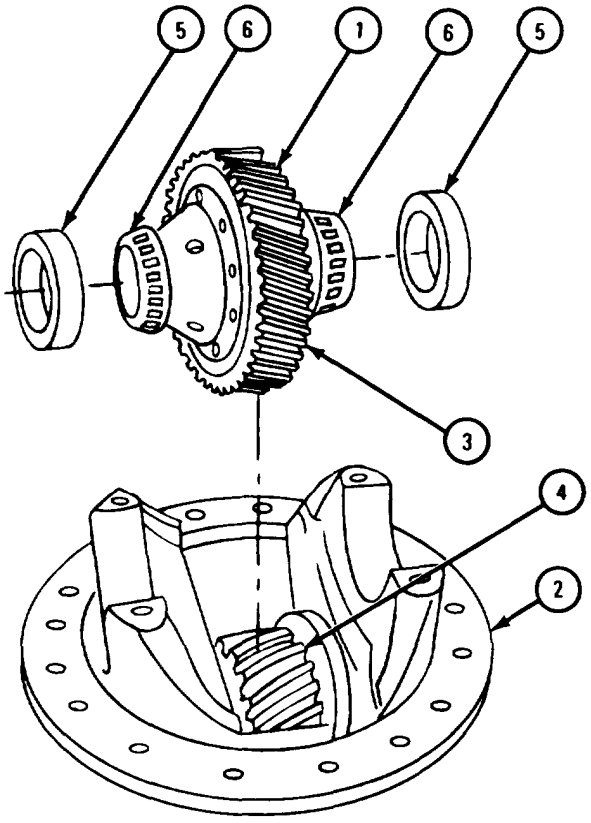
GO TO FRAME 37



FRAME 37

1. Lift differential case assembly (1) into place in differential carrier assembly (2) . Make sure helical drive gear (3) meshes with spur gear pinion (4).
2. Lift differential case assembly (1) one side at a time. Put two bearing cups (5) over two bearing cones (6). Seat bearing cups in differential carrier assembly (2).

GO TO FRAME 38

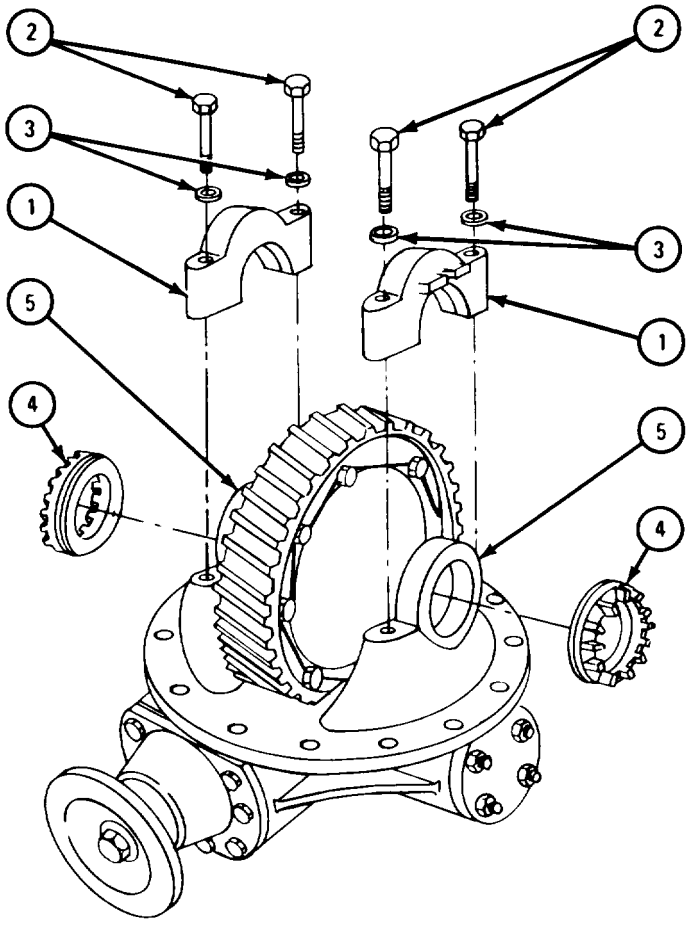


TA 087246

FRAME 38

1. Put two caps (1) in place as marked.
2. Put in and finger tighten four screws (2) and washers (3).
3. Put in two adjusting nuts (4) partway.
4. Tighten screws (2) just enough to firmly hold two bearing cups (5).
5. Tighten adjusting nuts (4) a little at a time. Tighten nuts until both adjusting nuts are tight and screwed in the same distance.

GO TO FRAME 39

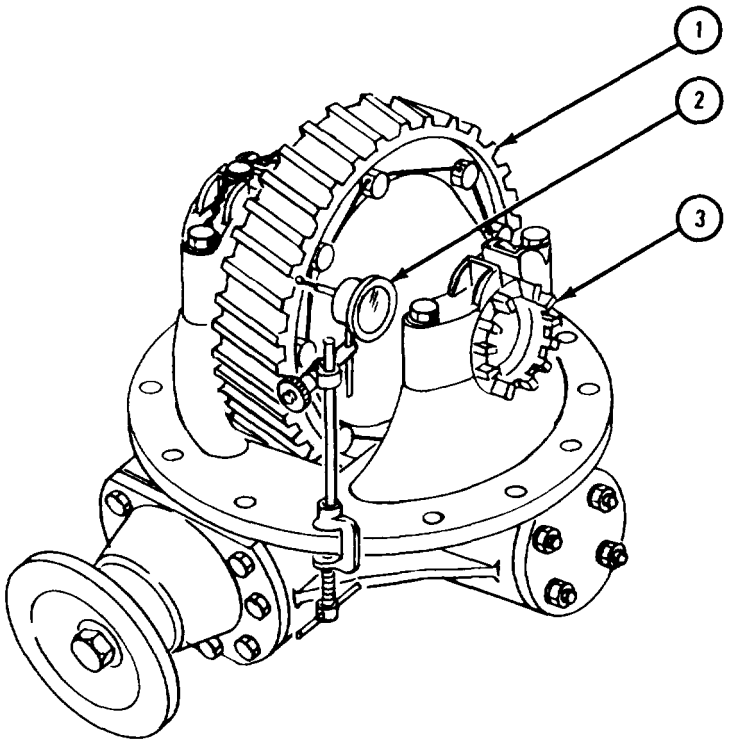


TA 087247

FRAME 39

1. Turn helical drive gear (1) several times to seat bearings.
2. Place dial indicator (2) so plunger is against side face of helical drive gear (1).
3. Push and pull on helical drive gear (1) and check reading on dial indicator (2).
4. Tighten two adjusting nuts (3) a little at a time. Push and pull on helical drive gear (1) each time until reading on dial indicator is 0.000 inch.
5. Turn helical drive gear (1). Using dial indicator (2), check that runout is 0.008 inch or less.

GO TO FRAME 40

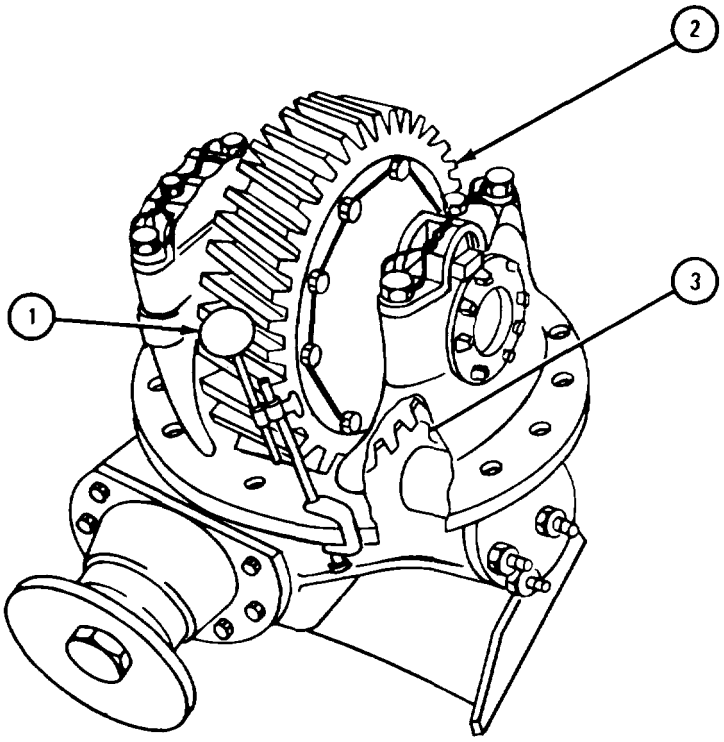


TA 087248

FRAME 40

1. Move dial indicator (1) so its plunger is against a tooth of helical drive gear (2).
2. Hold spur gear pinion (3) to keep it from turning. Rock helical drive gear (2) back and forth. Reading on dial indicator (1) shouId be between 0.007 and 0.014 inch.
3. If reading in helical drive gear (2) was not within limits, put in new pinion drive gear and new differential drive gear and do steps 1 and 2 again.
4. Take off dial indicator (1).

GO TO FRAME 41

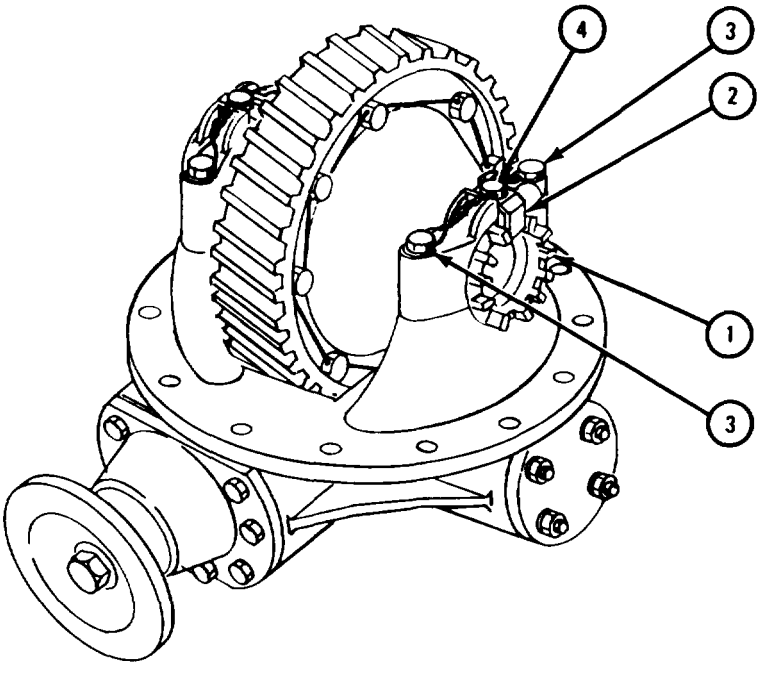


TA 087249

FRAME 41

1. Tighten each of two adjusting nuts (1) one notch. If slots in adjusting nuts will not line up with two adjusting nut locks (2), loosen adjusting nuts enough to aline them.
2. Tighten four screws (3) to 300 pound-feet.
3. Put two adjusting nut locks (2) in place.
4. Put in and tighten two screws (4).
5. Put safety wire on screws (3 and 4) as shown.

END OF TASK



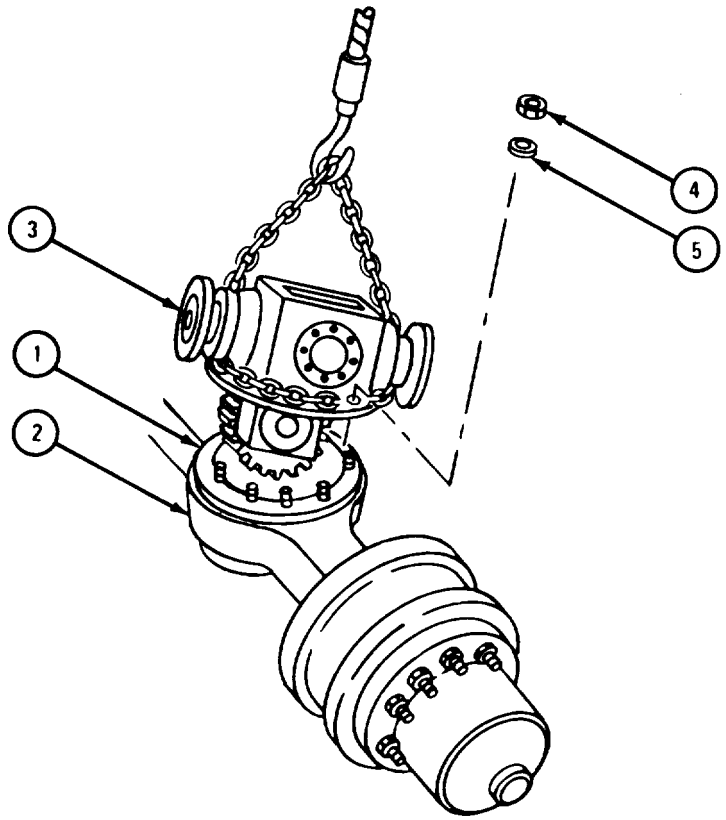
TA 087250

g. Replacement.

FRAME 1

1. Put differential carrier gasket (1) in place on axle housing (2).
2. Lift differential carrier assembly (3) into axle housing (2).
3. Put on 18 nuts (4) and lockwashers (5). Tighten hub to 140 to 155 pound-feet.

GO TO FRAME 2



TA 087251

FRAME 2

NOTE

Follow-on Maintenance Action Required:

1. For front axle differential. do the followinq:
   a. Replace front axle assembly. Refer to para 9-3.
   b. Replace and bleed brake hydraulic lines. Refer to Hydraulic Lines Removal and Replacement, TM 9-2320-211-20.
   c. Replace power steering cylinder assembly. Refer to Part 2, para 13-5.
   d. Replace drag link. Refer to TM 9-2320-211-20.
   e. Replace wheels and tires. Refer to TM 9-2320-211-10.
   f. Jack down truck and take out safety jacks. Refer to TM 9-2320-211-20.
   g. Replace propeller shaft. Refer to TM 9-2320-211-20.
   h. Replace axle shafts. Refer to para 9-5.
   i. Fill differential. Refer to LO 9-2320-211-12.
2. For forward-rear axle or rear-rear axle differential, do the following:
   a. Replace axle housing. Refer to para 10-3.
   b. Replace and bleed brake hydraulic lines. Refer to Hydraulic Lines Removal and Replacement, TM 9-2320-211-20.
   c. Replace torque rods. Refer to Part 2, para 15-7.
   d. Replace wheels and tires. Refer to TM 9-2320-211-10.
   e. Jack down truck and take out safety jacks. Refer to TM 9-2320-211-20.
   f. Replace propeller shafts. Refer to TM 9-2320-211-20.
   g. Replace axle shafts. Refer to TM 9-2320-211-20.
   h. Fill differential. Refer to LO 9-2320-211-12.

END OF TASK

Section IV. STEERING MECHANISM

9-5. FRONT AXLE SHAFTS, BEARINGS, SEALS, KNUCKLES, AND ARMS REMOVAL, REPAIR, REPLACEMENT, AND TESTS AND ADJUSTMENTS.

NOTE

This task is the same for both sides of front axle assembly, except where noted.

TOOLS: Bearing remover, pn 7950127
Bearing remover and replacer, pn 7950130
Bearing replacer, pn 7950129

SUPPLIES: Axle shaft seal (2)
Axle shaft seal assembly (2)
Trunnion bearing spacer set

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Jack up front of truck and put safety jacks under frame rails behind front axle. Refer to TM 9-2320-211-20.

(2) Remove front tires and wheels. Refer to TM 9-2320-211-20.

(3) Remove front hub and brake drum assembly. Refer to TM 9-2320-211-20.

(4) Remove tie rod assembly. Refer to TM 9-2320-211-20.

(5) Remove drag link. Refer to TM 9-2320-211-20.

(6) Remove front moisture seal and dust boots. Refer to TM 9-2320-211-20.

(7) Remove steering power cylinder. Refer to Part 2, para 13-5.

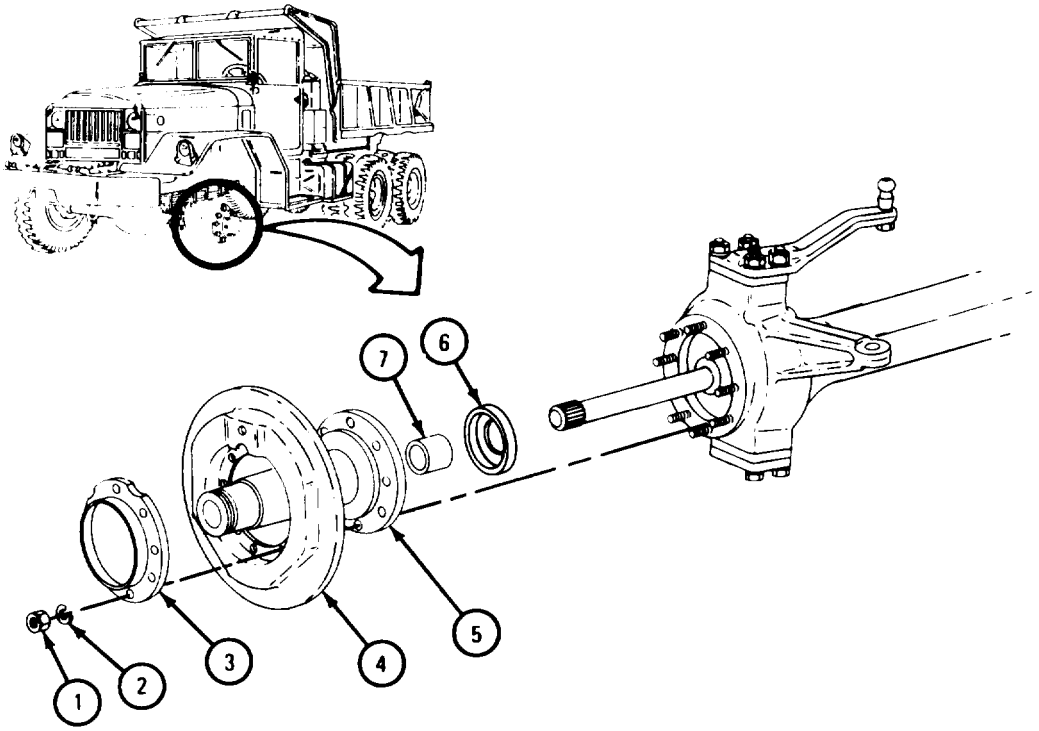
(8) Drain front axle. Refer to LO 9-2320-211-12.

b. Removal.

FRAME 1

1. Take off 10 nuts (1) and 10 lockwashers (2).
2. Take off oil slinger (3).
3. Take off backing plate (4) with brakeshoes.
4. Take off spindle (5) to loosen it. Take off spindle. Take off washer (6).
5. Take spindle bearing sleeve (7) out of spindle (5).

GO TO FRAME 2

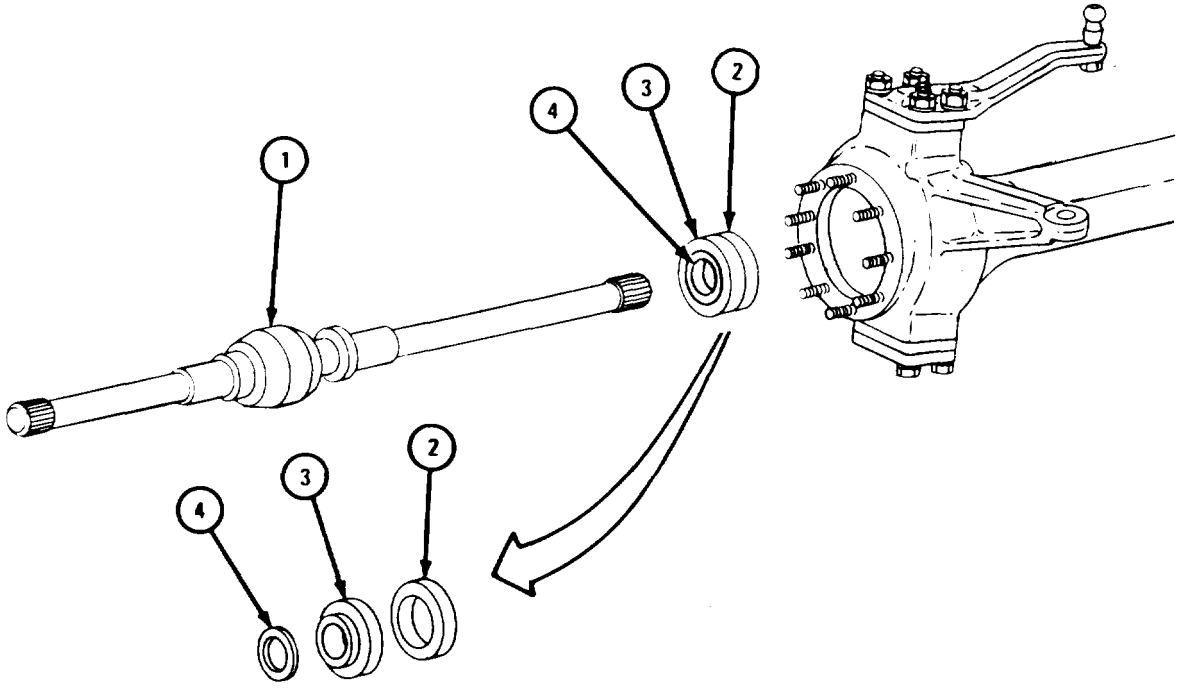


TA 087154

FRAME 2

1. Pull out axle shaft (1).
2. Take out axle shaft seal assembly (2) with axle shaft seal (3) and washer (4).
3. Take axle shaft seal (3) off axle shaft seal assembly (2). Throw away seal.

FOR LEFT SIDE OF AXLE, GO TO FRAME 3.
FOR RIGHT SIDE OF AXLE, GO TO FRAME 4

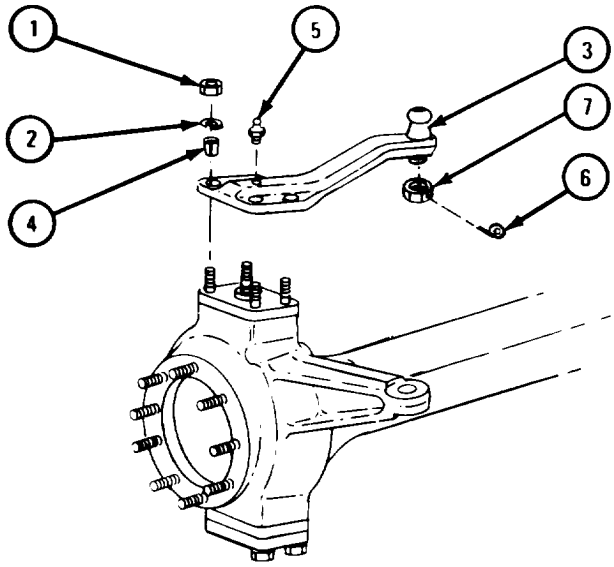


TA 087155

FRAME 3

1. Take off four nuts (1) and lockwashers (2).
2. Tap steering arm (3) lightly.
3. Take off steering arm (3) and four split dowels (4).
4. Take out grease fitting (5).
5. Pull out and throw away cotter pin (6).
6. Take off nut (7).
7. Take out ball and stud assembly (8).

GO TO FRAME 5

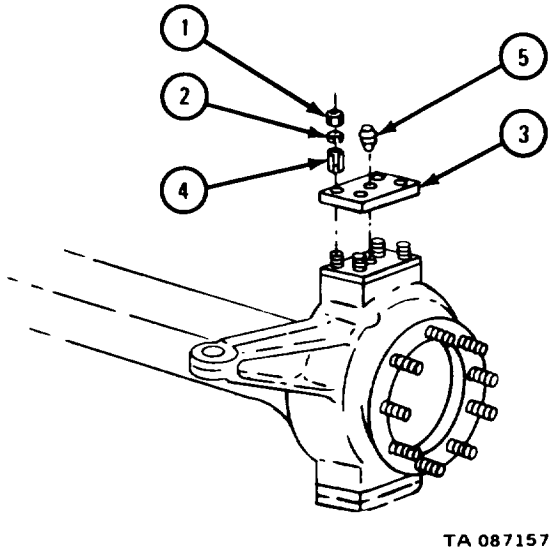


TA 087156

FRAME 4

1. Take off four nuts (1) and lockwashers (2).
2. Tap sleeve plate (3) lightly.
3. Take off sleeve plate (3) and four split dowels (4).
4. Take out grease fitting (5).

GO TO FRAME 5

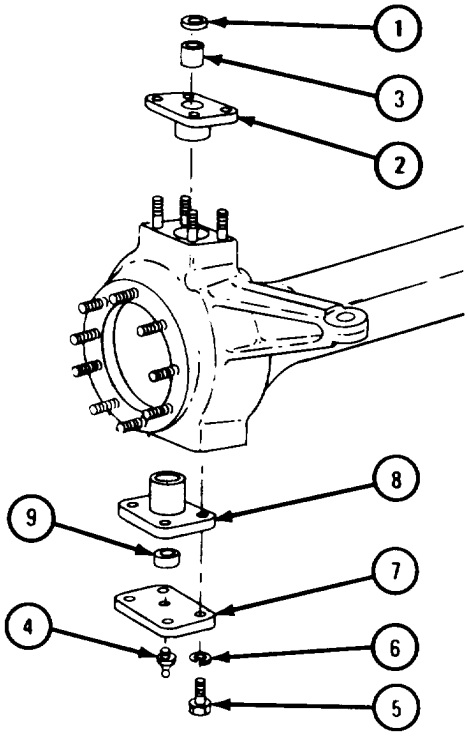


TA 087157

FRAME 5

1. Take out spacer (1).
2. Take off sleeve (2) with bearing (3).
3. Take bearing (3) out of sleeve (2).
4. Take out grease fitting (4).
5. Take out two screws (5) and lockwashers (6).
6. Take off sleeve plate (7) and sleeve (8) with bearing (9).
7. Take bearing (9) out of sleeve (8).

GO TO FRAME 6



TA 087158

FRAME 6

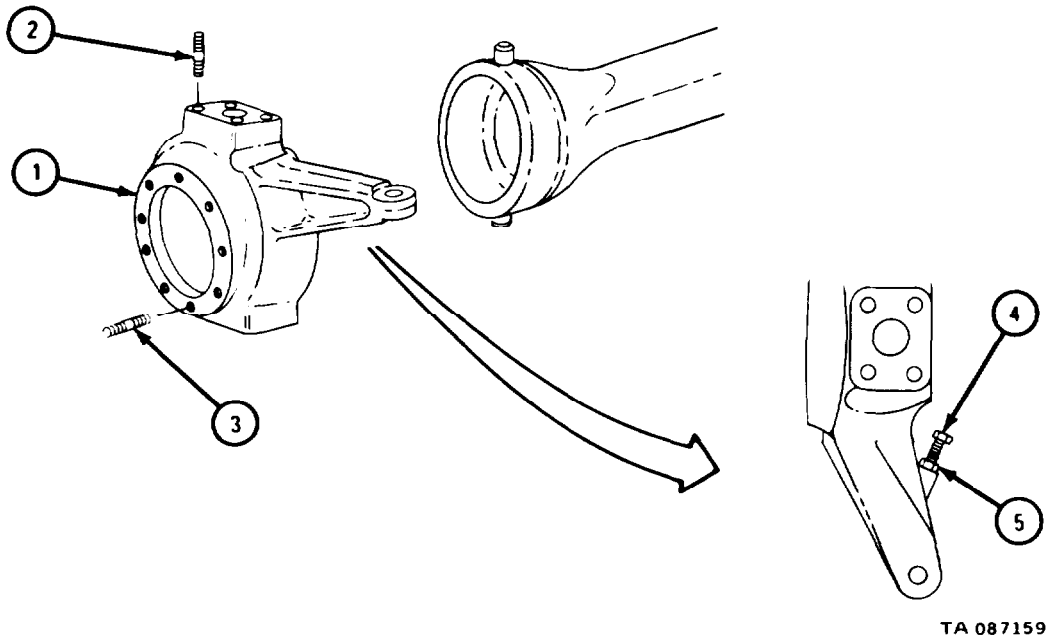
1. Takeoff steering knuckle (1).

NOTE

Do not take out studs unless they are damaged.

2. Take out four studs (2) and ten studs (3).
3. Knock welds off screw (4) and nut (5).
4. Takeout screw (4) and takeoff nut (5).

END OF TASK



TA 087159

c. Cleaning. There are no special cleaning procedures required. Refer to cleaning procedures given in para 1-3.

d. Inspection and Repair.

FRAME 1

NOTE

Readings must be within limits given in table 9-6. If readings are not within given limits, throw away part and get a new one.

1. Check that bearings (1 and 2) are not pitted or scored. If bearings are damaged, get new ones in their place.
2. Measure inside diameter of bearings (1 and 2).
3. Measure outside diameter of two steering knuckle pins (3). If steering knuckle pins are worn more than wear limits get a new axle housing.
4. Check that machined surfaces of axle shaft (4) are not scored or pitted. Check that splines on axle shaft are not twisted, chipped, cracked or broken. If axle shaft or splines are damaged, get a new axle shaft.
5. Measure outside diameter of bearing journals on axle shaft (4).
6. Measure inside diameter of bearing sleeve (5).
7. Check that axle housing (6) has no cracks, scratches or burrs on machined surf aces. File off scratches or burrs with a fine mill file.

END OF TASK

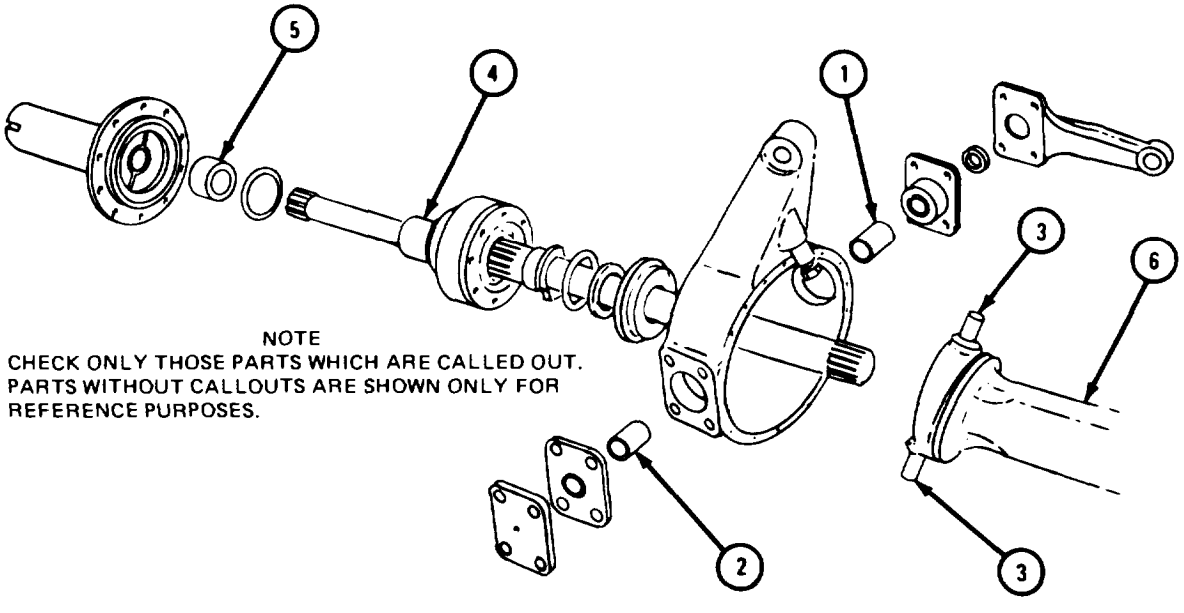


Table 9-6. Front Axle Assembly Wear Limits

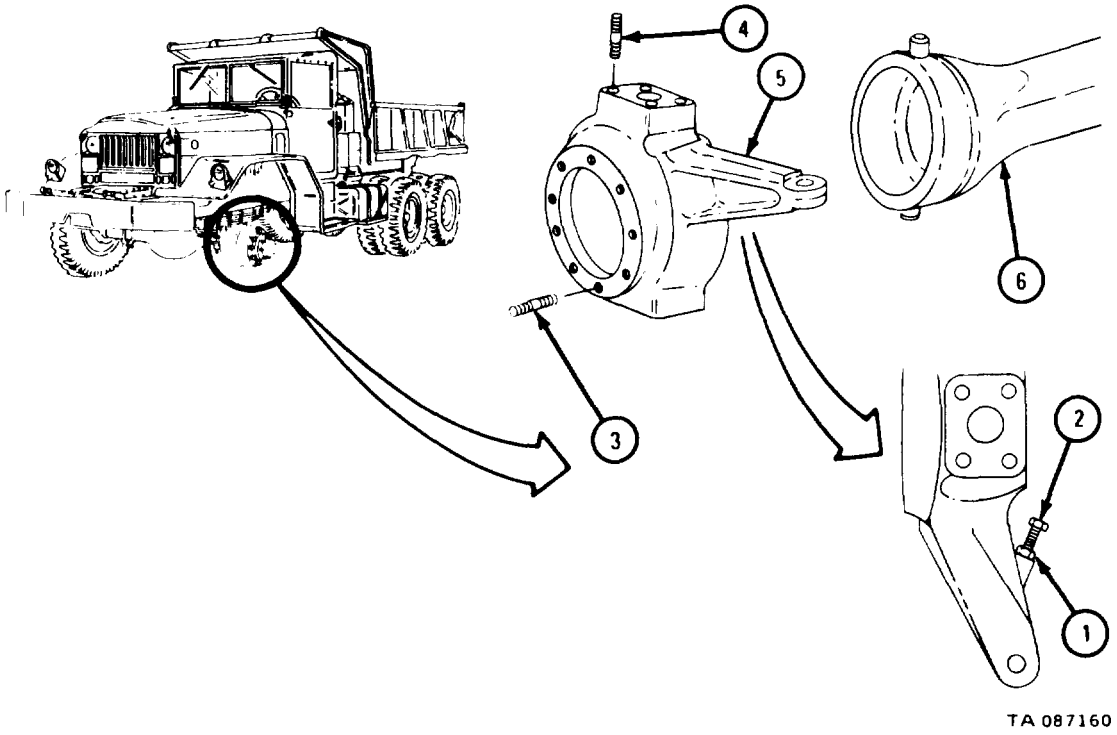
Index Number	Item/Point of Measurement	Wear Limit (inches)
1	Bearing inside diameter	1.500 to 1.501
2	Bearing inside diameter	1.500 to 1.501
3	Steering knuckle pin outside diameter	1.4985 to 1.4990
4	Bearing journal on axle shaft outside diameter	2.234 to 2.231
5	Bearing sleeve inside diameter	2.249 to 2.251

e. Replacement.

FRAME 1

1. Put nut (1) on screw (2).
2. Put in screw (2).
3. Put in ten studs (3) and four studs (4).
4. Put steering knuckle (5) in place on axle housing (6).

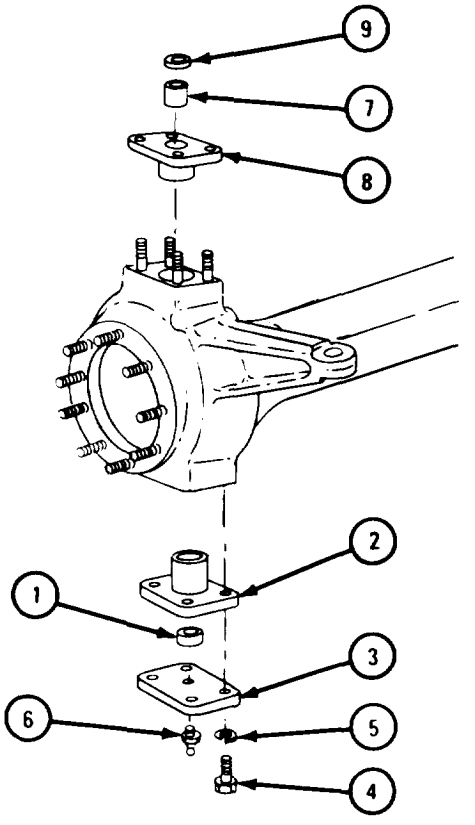
GO TO FRAME 2



FRAME 2

1. Put bearing (1) in sleeve (2).
2. Put sleeve (2) in place.
3. Put sleeve plate (3) in place.
4. Put in two screws (4) and lockwashers (5).
5. Put in grease fitting (6).
6. Put bearing (7) in sleeve (8).
7. Put sleeve (8) in place.
8. Put spacer (9) in place.

FOR LEFT SIDE OF FRONT AXLE, GO TO FRAME 3.
FOR RIGHT SIDE OF FRONT AXLE, GO TO FRAME 4

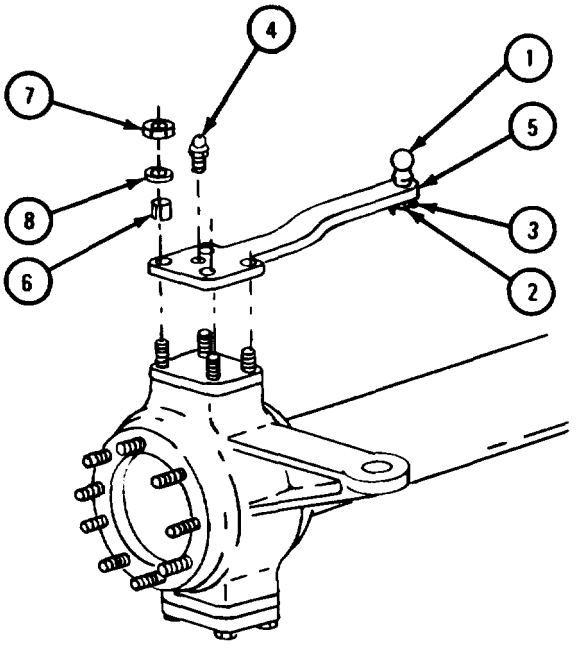


TA 087161

FRAME 3

1. Put ball and stud assembly (1) in place.
2. Put on nut (2), alining holes for cotter pin (3).
3. Put in cotter pin (3).
4. Put in grease fitting (4).
5. Put steering arm (5) and four split dowels (6) in place.
6. Put on and torque four nuts (7) and lockwashers (8) to 155 to 200 pound-feet.

GO TO FRAME 5

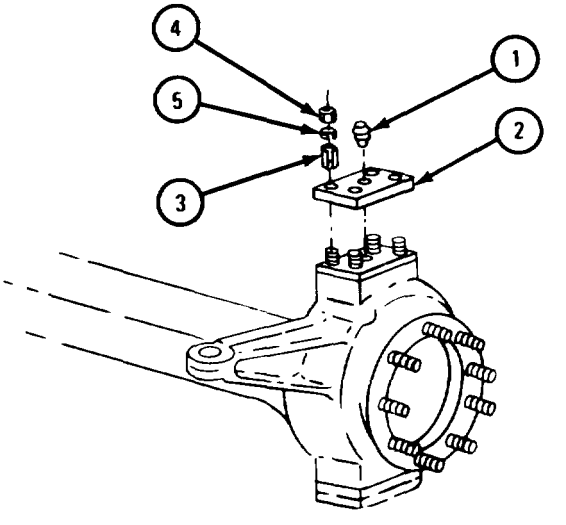


TA 087162

FRAME 4

1. Put grease fitting (1) in sleeve plate (2).
2. Put sleeve plate (2) and four split dowels (3) in place.
3. Put on and tighten four nuts (4) and lockwashers (5) to 155 to 200 pound-feet.

GO TO FRAME 5

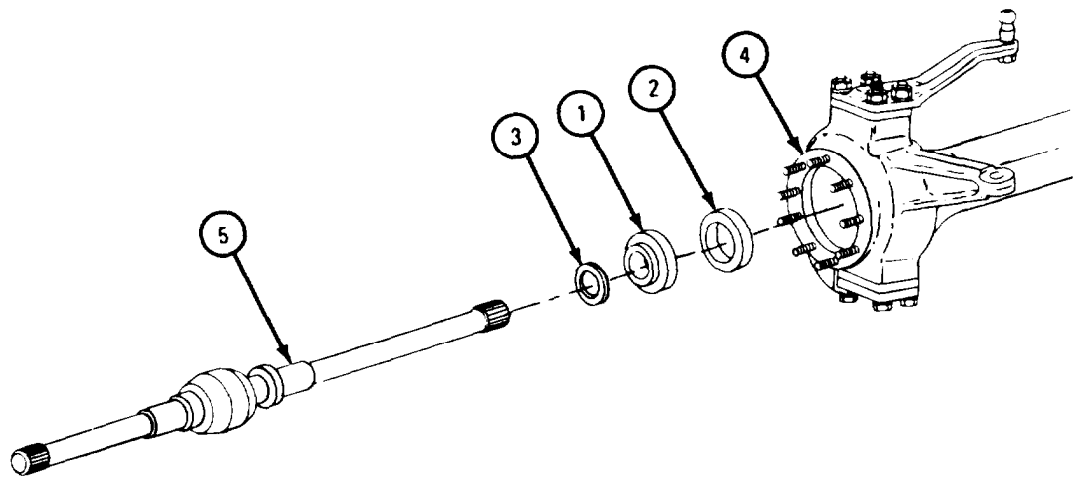


TA 087163

FRAME 5

1. Put axle shaft seal (l) on axle shaft seal assembly (2).
2. Put washer (3) on axle shaft seals (1).
3. Put washer (3), seal (1), and seal assembly (2) in tie housing(4).
4. Put in axle shaft (5).

GO TO FRAME 6



TA 087164

FRAME 6

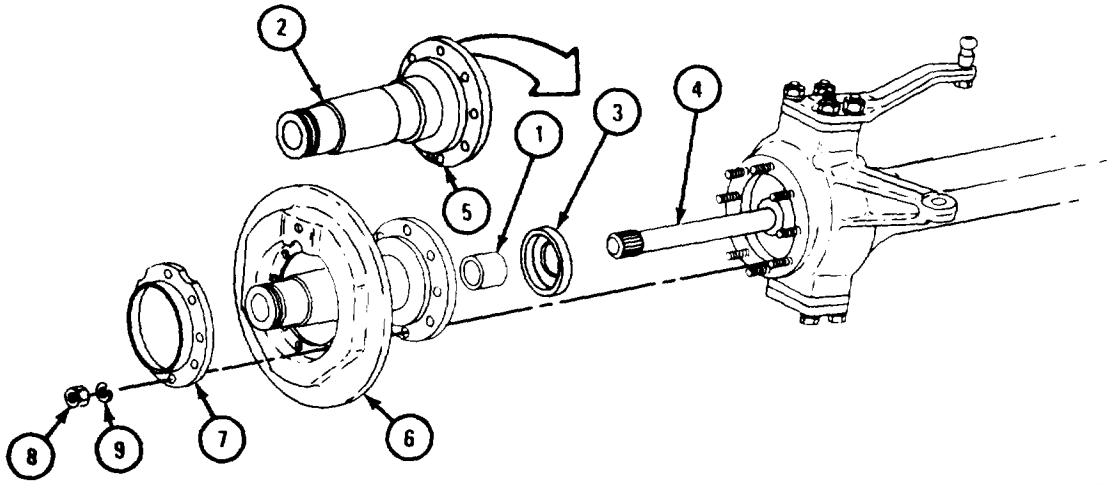
1. Using bearing replacer, put spindle bearing sleeve (1) in place in spindle (2).
2. Put washer (3) in place on one shaft (4).
3. Put spindle (2) on axle shaft (4) with oil drain slot (5) down.
4. Put backing plate with brakeshoes (6) in place. Put oil slinger (7) in place.
5. Put in 10 nuts (8) and 10 lockwashers (9).

NOTE

Follow-on Maintenance Action Required:

1. Replace moisture seal and dust boot. Refer to TM 9-2320-211-20.
2. Replace steering control power cylinder. Refer to Part 2, para 13-5.
3. Replace drag link. Refer to TM 9-2320-211-20.
4. Replace tie rod assembly. Refer to TM 9-2320-211-20.
5. Replace hub and brake drum assembly. Refer to TM 9-2320-211-20.
6. Replace front wheels and tires. Refer to TM 9-2320-211-10.
7. Grease front axle assembly. Refer to LO 9-2320-211-12.
8. Take out safety jacks and lower truck. Refer to TM 9-2320-211-20.
9. Fill front axle. Refer to LO 9-2320-211-12.

END OF TASK



TA 087165

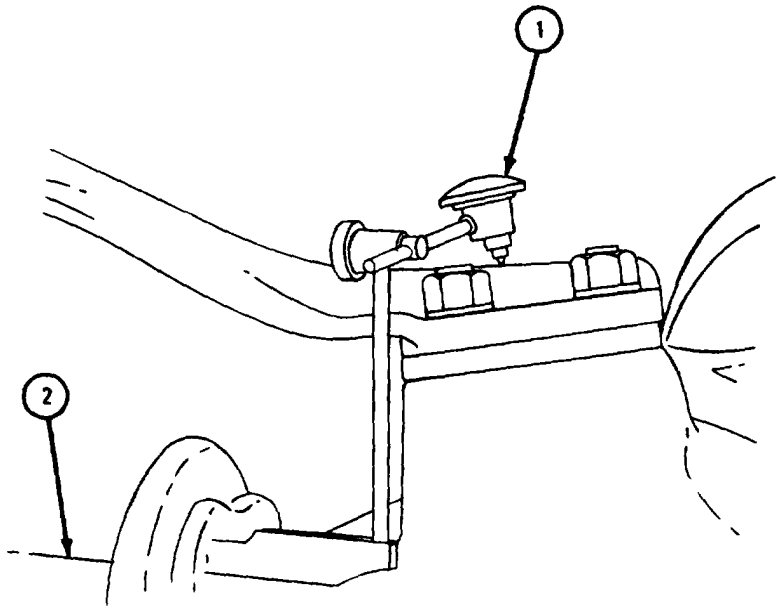
f. Tests and Adjustments.

(1) Steering knuckIe end play test and adjustment.

FRAME 1

1. Put dial indicator (1) on front axle housing (2) as shown.
2. Jack front axle housing (2) off ground. Refer to TM9-2320-211-20.
3. Check that reading on dial indicator (1) is between 0.005 inch and 0.013 inch.
4. Take off dial indicator (1). If reading is correct, do step 5. If reading is not correct, go to frame 2.
5. Jack down truck. Refer to TM 9-2320-211-10.

GO TO FRAME 2

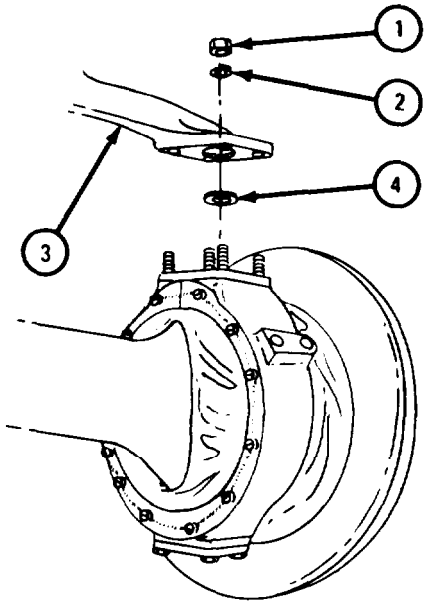


TA 087167

FRAME 2

1. Take off four nuts (1) and lockwashers (2).
2. Lift up steering arm (3).
3. Take out spacer (4).
4. If reading in frame 1 was less than limits given, use a thinner spacer from trunnion bearing spacer set. If reading was more than limits given, use a thicker spacer from trunnion bearing spacer set.

GO TO FRAME 3

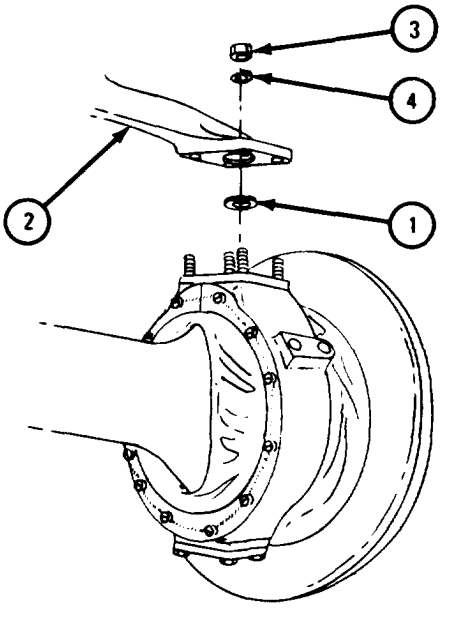


TA 087168

FRAME 3

1. Put spacer (1) from trunnion bearing spacer set in place.
2. Push steering arm (2) into place.
3. Put on and tighten four nuts (3) and lockwashers (4) to 155 to 200 pound-feet.
4. Do frame 1 again.

END OF TASK



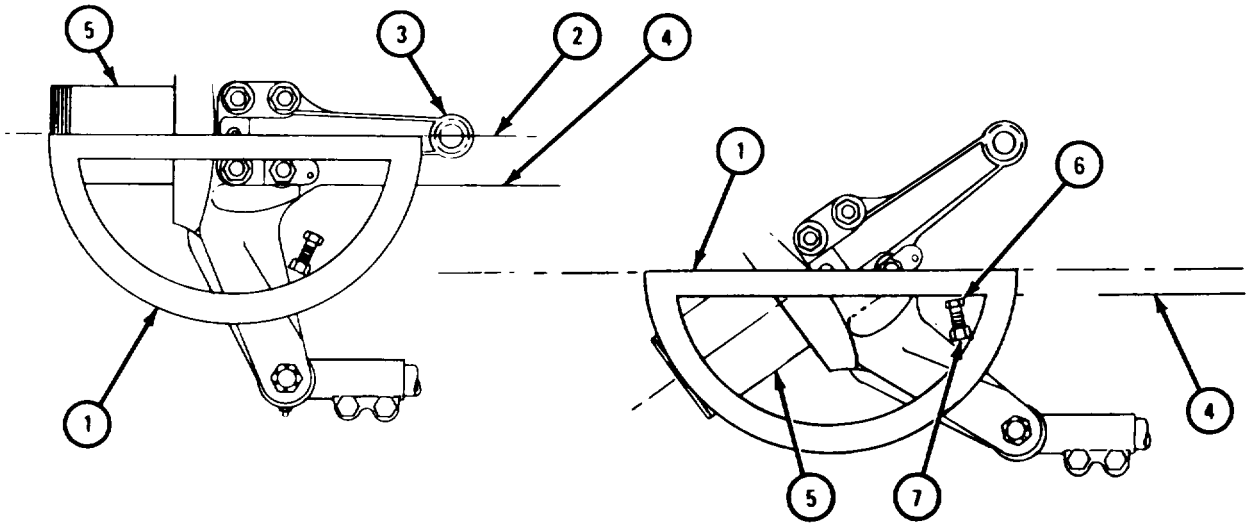
TA 087169

(2) Turning angle adjustment.

FRAME 1

1. Hold protractor (1) on centerline (2) of steering arm (3), axle housing (4), and spindle (5) as shown.
2. Push steering arm (3) towards front of truck until centerline of spindle (5) is between 28° and 29° on protractor (1).
3. Turn adjusting screw (6) out until it touches axle housing (4).
4. Hold adjusting screw (6).
5. Tighten nut (7) to 94 to 120 pound-feet.
6. Spot weld bottom and top of nut (7).

END OF TASK



TA 087170

(3) Wheel alinement. Refer to TM 9-2320-211-20.

CHAPTER 10

REAR AXLE GROUP MAINTENANCE

Section 1. SCOPE

10-1. EQUIPMENT ITEMS COVERED . This chapter gives equipment maintenance procedures for the rear axle assemblies for which there are authorized corrective maintenance tasks at the direct and general support maintenance level.

10-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. REAR AXLE ASSEMBLIES

10-3. FORWARD-REAR AND REAR-REAR SUSPENSION AXLE ASSEMBLY REMOVAL AND REPLACEMENT.

NOTE

This task is the same for forward-rear and rear-rear suspension axle assemblies.

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: Two

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Jack up and support truck. Refer to TM 9-2320-211-20.

(2) Remove rear outer and inner wheels. Refer to TM 9-2320-211-10.

(3) Remove rear brake lines, hoses, and connectors. Refer to Hydraulic Lines and Fittings Removal and Replacement, TM 9-2320-211-20.

(4) Remove forward-rear and rear-rear propeller shafts. Refer to TM 9-2320-211-20.

(5) Drain axle housings. Refer to LO 9-2320-211-12.

(6) Remove upper and lower torque rods and brackets. Refer to Part 2, para 15-7.

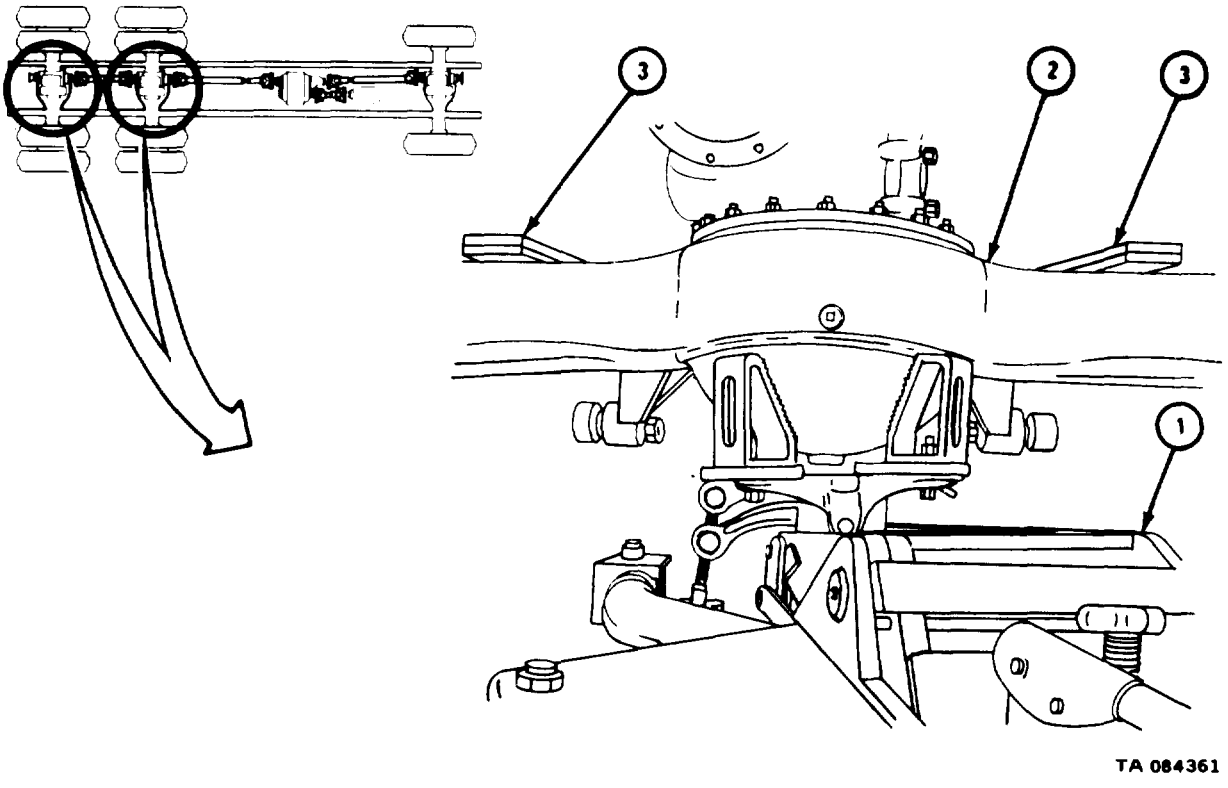
b. Removal.

FRAME 1

Soldiers A and B

1. With hydraulic jack (1) in place as shown, lift axle housing (2) enough to take weight off front end of rear springs (3).
2. Slide axle housing (2) away from both rear springs (3).
3. Lower hydraulic jack (1) and axle housing (2) and slide them out from under truck.
4. Using hoist, lift axle housing (2) off hydraulic jack (1).

END OF TASK

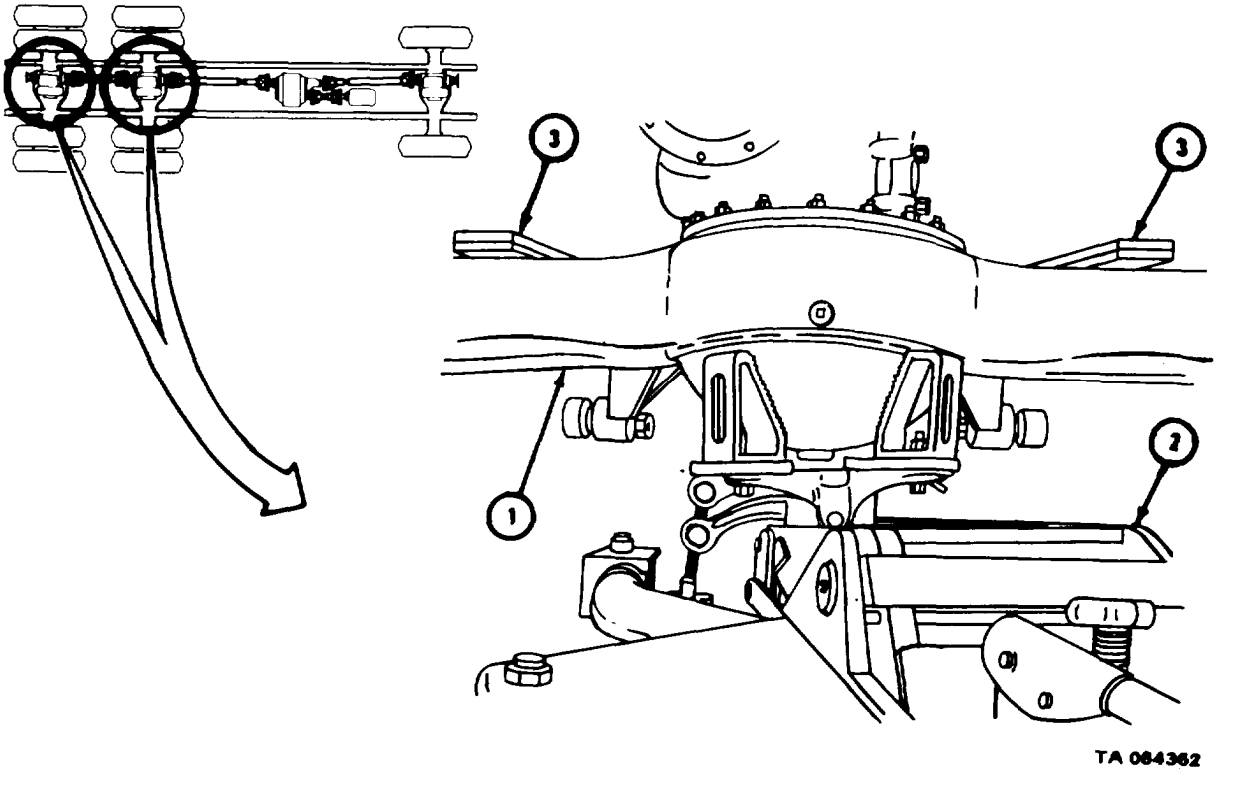


c. Replacement.

FRAME 1

Soldiers A and B	1.	Using hoist, lift axle housing (1) onto hydraulic jack (2). Take off hoist.
	2.	Slide axle housing (1) and hydraulic jack (2) under truck.
Soldier A	3.	Guide axle housing (1) as soldier B lifts it up.
Soldier B	4.	Using hydraulic jack (2), raise axle housing (1) to height of both rear springs (3).
Soldiers A and B	5.	Slide axle housing (1) on hydraulic jack (2) into place.
	6.	Take out hydraulic jack (2).

GO TO FRAME 2



FRAME 2

NOTE

Follow-on Maintenance Action Required:

1. Replace upper and lower torque rods and brackets. Refer to Part 2, para 15-7.
2. Replace rear-rear and forward-rear propeller shafts. Refer to TM 9-2320-211-20.
3. Replace rear brake lines, hoses, and connectors. Refer to Hydraulic Lines and Fittings Removal and Replacement , TM 9-2320-211-20.
4. Replace rear inner and outer wheels. Refer to TM 9-2320-211-10.
5. Take out supports and jack down truck. Refer to TM 9-2320-211-20.
6. Lubricate axle housing. Refer to LO 9-2320-211-12.
7. Bleed and adjust brakes. Refer to TM 9-2320-211-20.

END OF TASK

10-4. FORWARD-REAR AND REAR-REAR SUSPENSION AXLE ASSEMBLY REPAIR.

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2) , Fed. Spec P-D-680
Rear axle housing plug gasket

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Jack up truck and put safety jacks under each rear spring seat. Refer to TM 9-2320-211-20.

(2) Remove rear wheels on axle assembly to be repaired. Refer to TM 9-2320-211-10.

(3) Remove rear brake lines, hoses, and connectors. Refer to Hydraulic Lines and Fittings Removal and Replacement, TM 9-2320-211-20.

(4) Remove rear propeller shafts. Refer to TM 9-2320-211-20.

(5) Drain axle housings. Refer to LO 9-2320-211-12.

(6) Remove upper and lower torque rods and brackets. Refer to Part 2, para 15-7.

(7) Remove forward-rear or rear-rear suspension axle assembly to be repaired. Refer to para 10-3.

(8) Remove rear axles. Refer to TM 9-2320-211-20.

(9) Remove rear hub and drum assemblies. Refer to TM 9-2320-211-20.

(10) Remove brakeshoe assemblies. Refer to TM 9-2320-211-20.

(11) Remove wheel cylinders. Refer to TM 9-2320-211-20.

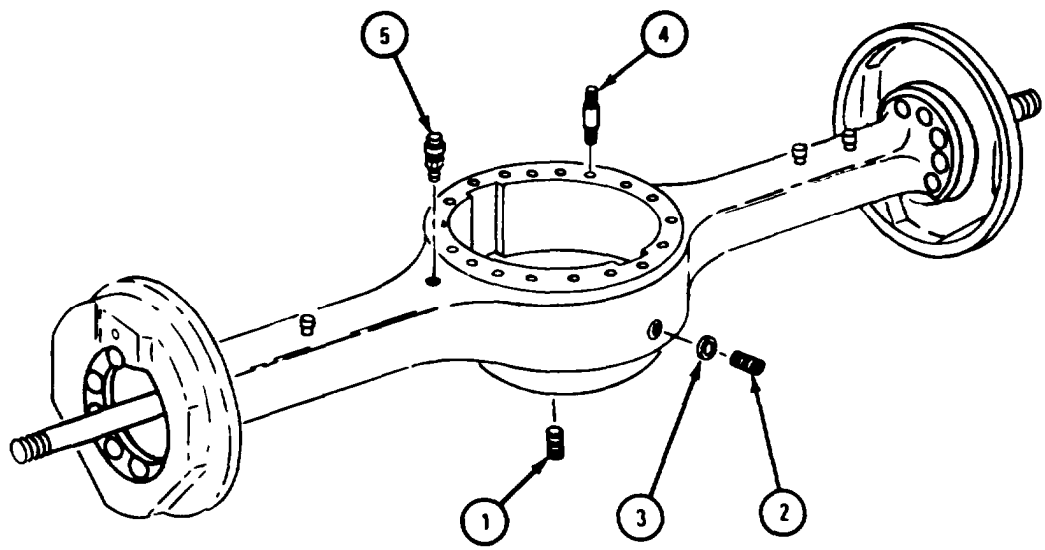
(12) Remove differentials. Refer to para 9-4.

b. Disassembly.

FRAME 1

1. Takeout plug (1), plug (2), and gasket (3). Throwaway gasket.
2. Takeout 18 studs (4).
3. Take out relief valve (5).

END OF TASK



WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

c. Cleaning. Clean all parts with solvent.

d. Inspection and Repair.

FRAME 1

CAUTION

If pins (1) are drilled out, be careful not to use a bit larger than pin. Damage to hole for pin in axle housing will result.

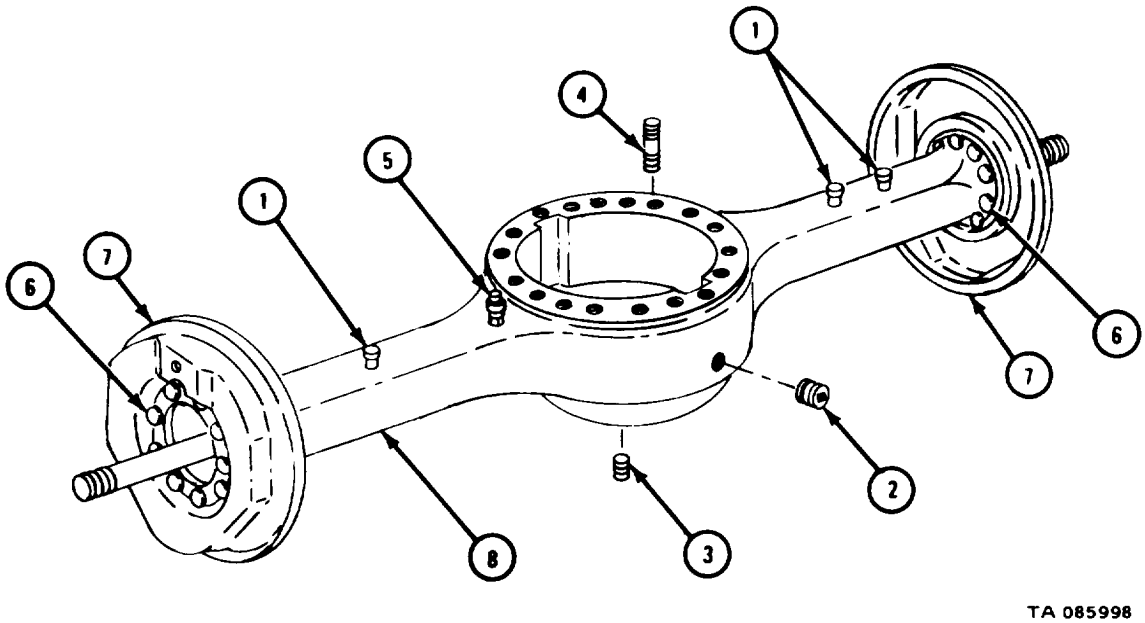
1. Check that three pins (1) are not damaged. If pins (1) are damaged, drill them out and put in new ones.
2. Check that plug (2), plug (3), 18 studs (4), and relief valve (5) are not damaged. If they are damaged, throw them away and get new ones.

CAUTION

If rivets (6) are damaged and must be drilled out, be careful not to use a bit larger than rivet hole in backing plate (7). Damage to holes in backing plate will result.

3. Check that rivets (6) in backing plate (7) are not loose or cracked. Drill out loose or cracked rivets and put in new ones.
4. Check that axle housing (8) has no scratches or burrs on machined surfaces. Fix burrs or scratches with a fine mill file.

END OF TASK

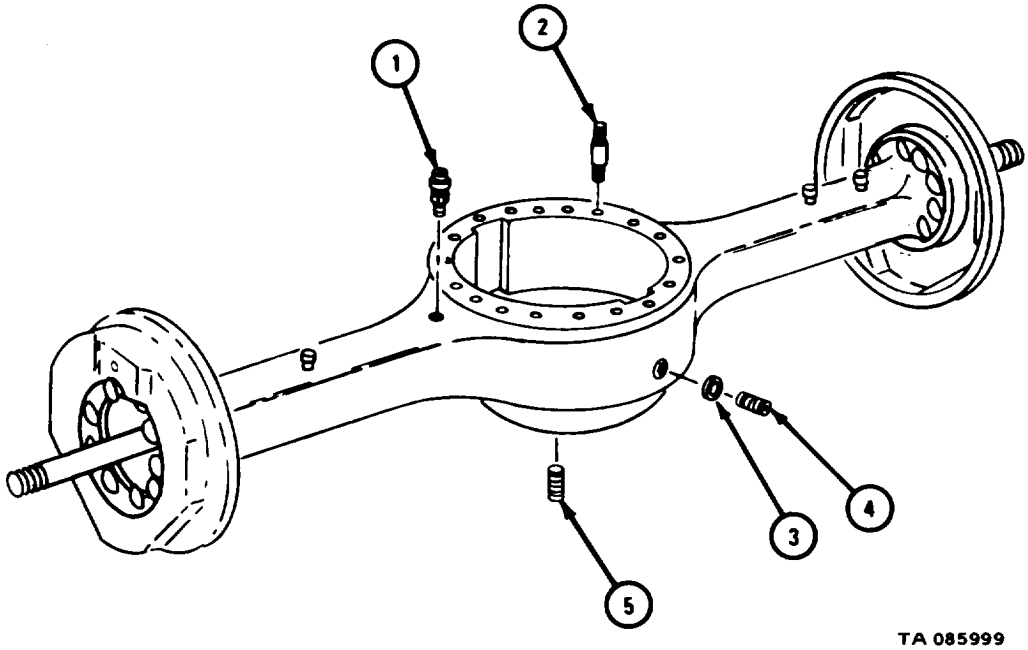


e. Assembly.

FRAME 1

1. Screw in and tighten relief valve (1).
2. Put in 18 studs (2).
3. Put gasket (3) in place.
4. Screw in and tighten plugs (4 and 5).

GO TO FRAME 2



FRAME 2

NOTE

Follow-on Maintenance Action Required:

1. Replace differentials. Refer to para 9-4.
2. Replace wheel cylinders. Refer to TM 9-2320-211-20.
3. Replace brakeshoe assemblies. Refer to TM 9-2320-211-20.
4. Replace rear hub and drum assemblies. Refer to TM 9-2320-211-20.
5. Replace rear axles. Refer to TM 9-2320-211-20.
6. Replace forward-rear or rear-rear suspension axle assembly after repairs. Refer to para 10–3.
7. Replace upper and lower torque rods and brackets. Refer to Part 2, para 15-7.
8. Refill axle housing. Refer to LO 9-2320-211-12.
9. Replace rear propeller shafts. Refer to TM 9-2320-211-20.
10. Replace rear brake lines, hoses, and connectors. Refer to Hydraulic Lines and Fittings Removal and Replacement, TM 9-2320-211-20.
11. Replace rear wheels on axle assembly after repairs. Refer to TM 9-2320-211-10.
12. Remove safety jacks from under each rear spring seat, and lower truck. Refer to TM 9-2320-211-20.

END OF TASK

By Order of the Secretaries of the Army and the Air Force:

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General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
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9-25	9-4 c		
9-89	9-5 b		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Item 2, size and fit of new parts gives 2.7490 to 2.7405. Should give 2.7490 to 2.7495.

FRAME 10, change illustration callouts. Reason: callouts for bevel pinion gear (2) and inner bearing cone (4) are reversed.

FRAME 4, add step 4 to read "Take out grease fitting (5)."

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REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

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DEPARTMENT OF THE ARMY

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U.S. Army Tank-Automotive Command
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TEAR ALONG PERFORATED LINE

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

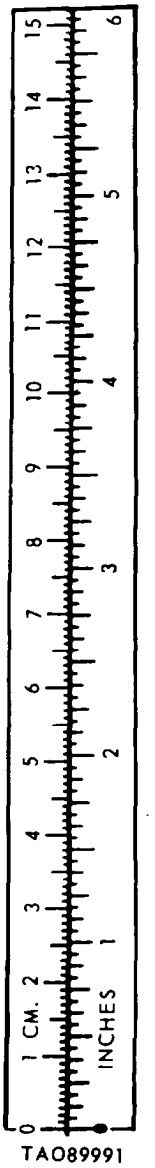
TEMPERATURE

$5/9\,(^0F - 32) = {}^0C$
212^0 Fahrenheit is equivalent to 100^0 Celsius
90^0 Fahrenheit is equivalent to 32.2^0 Celsius
32^0 Fahrenheit is equivalent to 0^0 Celsius
$9/5\,C^0 + 32 = F^0$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



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