NMWR 9-2520-583

NATIONAL MAINTENANCE WORK REQUIREMENTS

FOR

HMMWV TRANSFER CASE
(MODEL 218)

NSN 2520-01-163-4999

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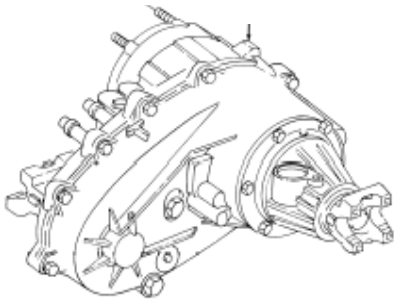
U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENTS COMMAND
WARREN, MICHIGAN 48397-5000

As of March 21, 2003



M 218 TRANSFER CASE

WARNING SUMMARY

- Improper cleaning methods and use of unauthorized cleaning solutions may cause injury to personnel or damage to equipment. See TM 9-247 for correct information.
- Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).
- Do not use compressed air to dry bearings. Spinning a dry bearing with compressed air may cause injury to personnel or damage to equipment.
- Direct all personnel to stand clear during hoisting operations. Failure to do this may cause injury.
- When steam cleaning, protective clothing must be used. Failure to do this may cause injury.
- When sanding fiberglass, personal protective equipment (respirator, goggles/shield, gloves, coveralls, etc.) must be used. Failure to do this may cause injury.
- Do not operate heater in enclosed areas. Exhaust gases can kill. Make sure work area is well ventilated and exhaust fumes are routed away from test area.
- Drycleaning solvent is flammable and will not be used near an open flame. A fire extinguisher will be kept nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel or damage to equipment.

INSERT LATEST CHANGED PAGES / WORK PACKAGES, DESTROY SUPERSEDED DATA

LIST OF EFFECTIVE PAGES / WORK PACKAGES

NOTE: The portion of text affected by the changes is indicated by a vertical line in the outer margins of the page.

Dates if issue for original and changed pages / work packages are:

Original… as of March 21, 2003

TOTAL NUMBER OF PAGES FRONT AND REAR MATTER IS 8 AND TOTAL NUMBER OF WORK PACKAGES IS 10 CONSISTING OF THE FOLLOWING:

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NATIONAL MAINTENANCE WORK REQUIREMENTS

FOR

HMMWV TRANSFER CASE (MODEL 218)

NSN 2520-01-163-4999

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Publications and Blank Forms), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACESS REQUEST FORM." The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or E-mail your letter or DA Form 2028 direct to: AMSTA-LC-CI Tech Pubs, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The E-mail address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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GENERAL INFORMATION 0001

THIS WORK PACKAGE (WP) COVERS:

Scope; Applicable Documents; Definitions; Transfer Case Repair Description; Maintenance Forms, Records, and Reports; Reporting Equipment Improvement Recommendations (EIR); Corrosion Prevention and Control (CRC); Quality of Material; and Engineering Change Proposals (ECP)

SCOPE

This NMWR covers the repair of the New Process Gear Model 218 Transfer Case, NSN 2520-01-163-4999, PN 12340073. The transfer case is used in the High Mobility Multipurpose Wheeled Vehicle (HMMWV). The procedures contained in this NMWR describe disassembly, inspection, component repair, and assembly of the Transfer Case. It will provide a transfer case that is serviceable and issuable to all customers without limitation or restriction, Condition Code A.

APPLICABLE DOCUMENTS

You can receive copies of the applicable documents upon request by contacting:

Commodity Business Unit
USA TACOM
AMSTA-LC-CHL
Jody.Mcinerney@us.army.mil
Warren MI 48397-5000

The following documents form a part of this NMWR to the extent specified herein.

1. TM 9-2320-280-34
2. TM 9-2320-280-24P
3. TM 9-214
4. MIL-P-14105C
5. TACOM Drawing Number 12340073
6. Packaging Instructions, **WP 0008**

DEFINITIONS

1. Repair: Restoring a component to its original performance condition, replacing parts if/as necessary.

2. OEM: The original equipment manufacturer. The company that originally manufactured, fabricated, or supplied a transfer case component or part. OEM may include items manufactured by a subcontractor for an original equipment manufacturer, provided that the name or trademark of the OEM is shown on the item, label, or container.

GENERAL INFORMATION - Continued 0001

3. After Market Part: Any part or component that has been manufactured or fabricated by a company other than the original equipment manufacturer or their approved subcontractors and sold as a replacement part for an OEM part or component.

4. Serviceable Part: Any part that is capable of meeting or exceeding the minimum OEM standards for performing the function for which it was originally desired.

5. Non-serviceable Part: Any part that no longer meets minimum OEM standards.

TRANSFER CASE REPAIR DESCRIPTION

1. Transfer case assemblies, Model 218, NSN 2520-01-163-4999 will be in various states of disrepair. Determine that component parts conform to established standard(s). Reject all nonconforming parts. All gear teeth, machine surfaces, shims, and bearing caps will be free from embedded metal chips or metal shavings. You will repair transfer case assemblies so that they meet the configuration of drawing 12340073 and the performance specifications described in **WP 0006**.

2. You can use OEM or equivalent after market repair parts when repairing the transfer case. When using other than OEM parts, the parts used must be able to be repaired or replaced using the existing procedures, tools, and repair parts specified in the HMMWV technical manuals.

3. Repaired transfer case assemblies must maintain the same transfer case to vehicle interface as the original equipment transfer case.

4. Transfers with cracked cases may be repaired, using new cases. See TM 9-2320-280-34 and 24P for procedures and parts.

5. You may cannibalize serviceable or repairable parts from any unrepairable transfer case assembly for use when repairing other transfer case assemblies.

6. During the course of repair, any sub-components/parts of the transfer case showing obvious signs of imminent failure, excessive wear, or deterioration will be replaced with a fully serviceable replacement.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment will be those prescribed by (as applicable) DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS); DA PAM 738-751, Functional Users Manual for the Army Maintenance Management - Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your transfer case assembly, model 218, NSN 2520-01-163-4999 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 or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to the address specified in DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS), or as specified by the acquiring activity. We will send you a reply.

CORROSION PREVENTION AND CONTROL (CPC)

1. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.
2. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.
3. If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem.
4. The form should be submitted to the address specified in DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS).

QUALITY OF MATERIAL

Parts and material used for replacement, repair, or modification shall meet the requirements of the equipment drawings and specified if standards are not provided in this NMWR.

ENGINEERING CHANGE PROPOSALS (ECP)

Engineering Change Proposals (ECPs) will be submitted using DD Form 1693 (Engineering Change Proposal [Short Form]). (Refer to MIL-STD-973, Configuration Management, for instructions.) Completed forms should be mailed directly to Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E-PDQR MS 267, Warren, MI 48397-5000.

END OF TASK

SUPPORTING INFORMATION 0002

THIS WORK PACKAGE (WP) COVERS:

Cleaning; General Inspection and General Repair

CLEANING

a. General Instructions. Cleaning procedures will be the same for the majority of parts and components which make up the vehicle subassemblies. General cleaning procedures are detailed in "b" through "h".

b. The Importance of Cleaning. Great care and effort are required in all cleaning operations. The presence of dirt and foreign material is a constant threat to satisfactory vehicle operation and maintenance. The following will apply to all cleaning operations:

1. Hands must be kept free of any accumulation of grease which can collect dust and grit.

2. Clean all parts before inspection, after repair, and before assembly.

3. After cleaning, all parts must be covered or wrapped in plastic or paper to protect them from dust and/or dirt.

c. Disassembled Parts Cleaning. Place all disassembled parts in wire baskets for cleaning.

1. Dry and cover all cleaned parts.

2. Place on or in "racks" and hold for inspection or repair.

3. All parts subject to rusting must be lightly oiled and wrapped.

4. Keep all related parts and components together. Do not mix parts.

WARNING

Improper cleaning methods and use of unauthorized cleaning solutions will injure personnel and damage equipment. See TM 9-247 for correct information.

d. Castings.

1. Clean inner and outer surfaces of castings and all areas subject to grease and oil with cleaning solvents.

2. Use a stiff brush to remove sludge and gum deposits.

SUPPORTING INFORMATION - Continued 0002

WARNING

Compress air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

3. Use compressed air to blow out all tapped capscrew holes and dry castings after cleaning.

e. Oil Passages. Particular attention must be given to all oil passages in castings and machined parts. Oil passages must be clean and free of any obstructions.

1. Clean passages with wire probes to break up any sludge or gum deposits.

2. Wash passages by flushing with solvents.

3. Dry passages with compressed air.

CAUTION

Do not allow solvents to come in contact with seals, cables, or flexible hoses. These cleaners cause leather, rubber, and synthetic materials to dry out, rot, and lose pliability making then unserviceable.

f. Nonmetallic Parts. Clean hoses and other nonmetallic parts with soap and water.

g. Bearings.

WARNING

Do not use compressed air to dry bearings. Spinning a dry bearing with compressed air may cause injury to personnel or damage to equipment.

1. Bearings require special cleaning. After removing surface oil and gum deposits. Wipe bearings dry with a lint-free cloth; do not use compressed air.

2. See TM 9-214 for information and care of bearings.

SUPPORTING INFORMATION - Continued 0002

h. Electrical Components.

1. Clean electrical components with clean cloth dampened with drycleaning solvent. Care must be taken not to damage protective insulation.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

2. Use compressed air to dry electrical components.

GENERAL INSPECTION

a. General Instructions. Procedures for inspections will be the same for many parts and components which make up the vehicle subassemblies. General procedures are detailed in "b" through "k". Dimensional standards for parts have been fixed at extremely close tolerances, so use specification tables. Use specified inspection equipment for inspection where cracks and other damage cannot be spotted visually. Exercise extreme care in all phases of inspection. Repair or replace all unserviceable components.

b. Castings.

1. Inspect all ferrous and nonferrous castings for cracks. See MIL-STD-6866, Inspection, Penetrant Methods. Particularly check areas around studs, pipe plugs, threaded inserts, and sharp corners. Replace cracked castings.

2. Inspect machined surfaces for nicks, burrs, and raised metal. Mark damaged areas for repair or replacement.

3. Inspect all pipe plugs, pipe plug openings, capscrews, and capscrew openings for damage and stripped threads. Replace if damaged or threads are stripped.

4. Check all gasket mating surfaces, flanges on housings, and supports for warpage with a straightedge or surface plate. Inspect mating flanges for discolorations which may indicate leakage. Replace if warped.

5. Check all castings for conformance to applicable repair standards. Refer to TM 9-214.

c. Bearings. Check all bearings for conformance to applicable repair standards.

SUPPORTING INFORMATION - Continued 0002

d. Bushings and Bushing Type Bearings.

1. Check all bushings and bushing type bearings for secure fit, evidence of heating, wear, burrs, nicks, and out-of-round condition.

2. Check for dirt in lubrication holes or grooves. Holes and grooves must be clean and free from damage.

e. Machined Parts.

1. Check machined parts for cracks, distortion, and damage.

2. Check all surfaces for nicks, burrs, and raised metal.

f. Studs, Bolts, Capscrews, and Nuts. Replace if bent, loose, stretched, or threads are damaged.

g. Gears.

NOTE

When gear teeth wear limits are not established, good judgement is required to determine if gear replacement is necessary.

1. Inspect all gears for cracks and missing teeth. Replace if cracked or teeth are missing.

2. Inspect gear teeth for wear, sharp fins, burrs, and galled or pitted surfaces.

3. Inspect splines for wear, burrs, and galled or pitted surfaces.

4. Check keyway slots for wear and/or damage.

h. Oil Seals. Oil seals are mandatory replacement items.

i. Casting Plugs. Inspect for leakage. Replace plugs when leakage is present.

j. Springs. Inspect for damaged, distorted, and collapsed coils.

k. Snaprings, Retaining Rings, and Washers. Many of these parts are mandatory replacement items. Inspect all others for obvious damage.

SUPPORTING INFORMATION - Continued 0002

GENERAL REPAIR

a. General Instructions. Repair of most parts and components is limited to general procedures outlined in applicable maintenance instructions and the following detailed procedures “b” through “h.”

CAUTION

Repaired items must be thoroughly cleaned to remove metal chips and abrasives to prevent them from entering working parts of vehicle components.

b. Castings.

1. All cracked castings will be replaced.

2. Only minor repairs to machined surfaces, flanges, and gasket mating surfaces are permitted. Remove minor nicks, burrs, and/or scratches by:

   a. Using fine mill file.
   b. Using abrasive cloth dipped in cleaning solvent.
   c. Lapping across a surface plate.
   d. Remachining of machined surfaced to repair damage, warpage, or uneven surfaces is not permitted. Replace castings.

3. Repair damaged threaded pipe plug and/or capscrew holes with a thread tap or repair oversize holes with threaded inserts.

c. Bearings. See TM 9-214.

d. Studs. Replace all bent and stretched studs. Repair minor thread damage with a thread restorer file. Replace studs having stripped or damaged threads as outlined below:

1. Remove, using a stud remover. Back studs out slowly to avoid heat buildup and seizure which can cause stud to break off.

2. If studs break off too short to use a stud remover, use extractor to remove.

3. Replacement studs have a special coating and must have a small amount of antiseize compound (NSN 8030-00-059-2761) applied on threads before stud is installed. Install replacement stud slowly to prevent heat buildup and snapping off.

SUPPORTING INFORMATION - Continued 0002

e. Gears.

1. Remove gears using pullers, as required.

2. Use the same methods described in paragraph b.2. (**WP 0002**) for castings to remove minor nicks, burrs, or scratches on gear teeth.

3. If keyways are worn or enlarged, replace gear.

f. Bushings and Bushing Type Bearings. When bushings and bushing type bearings seize to a shaft and spin in the bore, the associated part must also be inspected and replaced, as required.

g. Oil Seals.

1. Remove oil seals, being careful not to damage casting or adapter bore.

2. Always install new seal in bore using proper seal replacing tool.

h. Locking Threads. When using thread sealing compound:

1. Apply a liberal amount to both male and female threads on through-hole assemblies.

2. Apply a liberal amount into the bottom of a blind hole (non-through hole assemblies). Installing the fastener pneumatically forces the adhesive onto the threads.

3. Assemble parts shortly after applying thread sealing compound to allow adequate coating of threads.

END OF TASK

TRANSFER CASE REPAIR (Model 218) 0003

THIS WORK PACKAGE (WP) COVERS:

Disassembly

INITIAL SETUP:

Tools

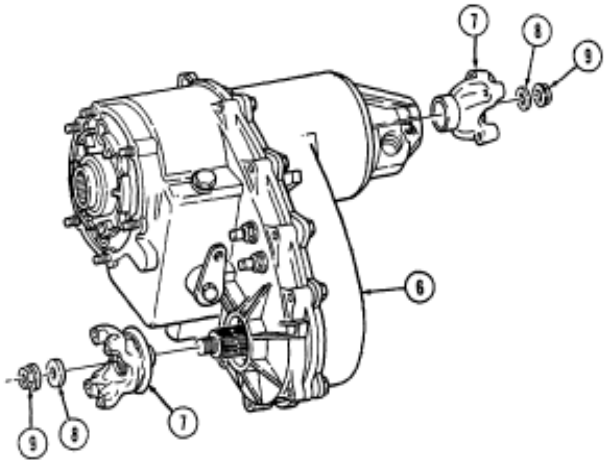
General mechanic's tool kit: automotive (NSN 5180-00-177-7033)

Materials/Parts

Transfer case support stand (P/N 5992393) (Refer to TM 9-2815-237-34)

DISASSEMBLY

1. Remove two nuts (9), seal washers (8), and output yokes (7) from transfer case (6). Discard seal washers (8).



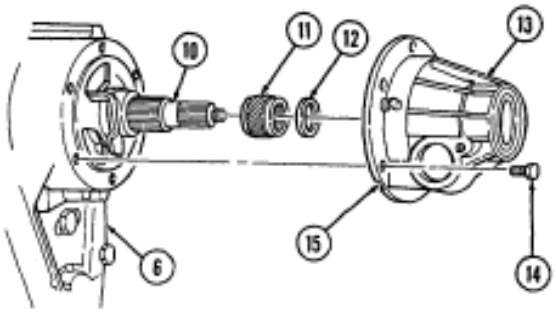
TRANSFER CASE REPAIR (Model 218) - Continued 0003

2. Mark rear retainer (13) and transfer case (6) for assembly.

3. Remove six capscrews (14) and rear retainer (13) from transfer case (6).

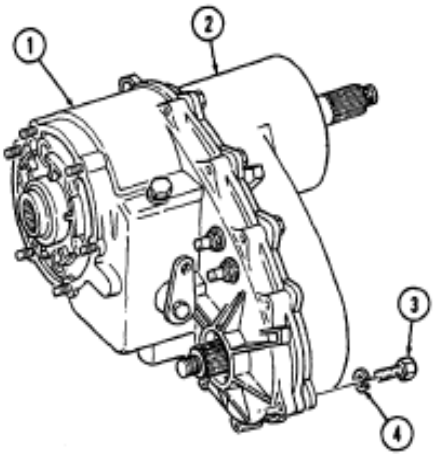
4. Insert screwdrivers in two notches (15) in rear retainer (13) and remove rear retainer (13) from transfer case (6).

5. Remove differential shim(s) (12) and speedometer drive gear (11) from rear output shaft (10). Tag shim(s) (12) for assembly.



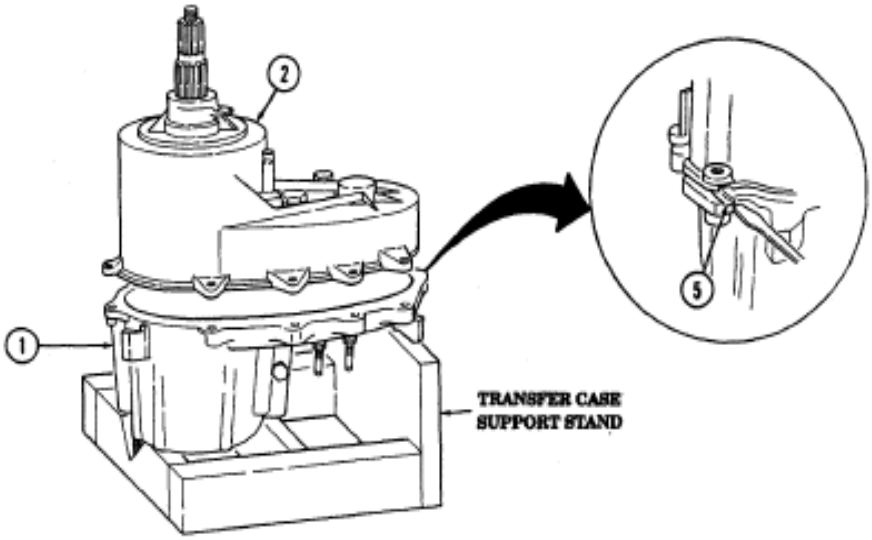
TRANSFER CASE REPAIR (Model 218) - Continued 0003

6. Remove ten capscrews (3) and two washers (4) from rear case (2) and front case (1).



7. Position transfer case on transfer case support stand.

8. Insert screwdrivers in two notches (5) at case ends and pry cases apart. Remove rear case (2) from front case (1).



TRANSFER CASE REPAIR (Model 218) - Continued 0003

NOTE

Pilot roller bearings will fall free when removing output shaft.

9. Remove oil pump (6), rear output shaft (7), and fifteen pilot roller bearings (16). Remove O-ring seal (8) from groove on mainshaft (14). Discard O-ring seal (8).

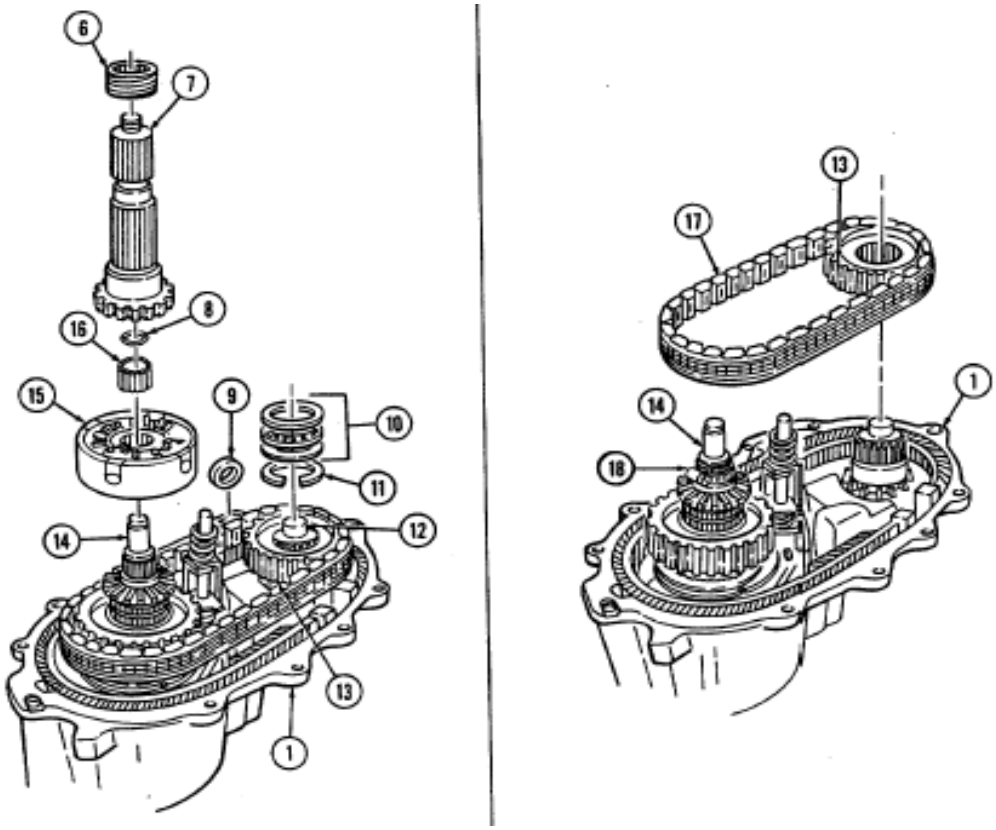
10. Remove differential (15) and magnet (9) from front case (1).

11. Remove front output shaft rear thrust bearing assembly (10) from front output shaft (12). Tag thrust bearing assembly (10) for assembly.

12. Remove snapring (11) from driven sprocket (13) and front output shaft (12).

13. Place hose clamp (18) around mainshaft (14) to hold assembly together.

14. Lift mainshaft (14) slightly, and remove driven sprocket (13) and drive chain (17) from front case (1).



TRANSFER CASE REPAIR (Model 218) - Continued 0003

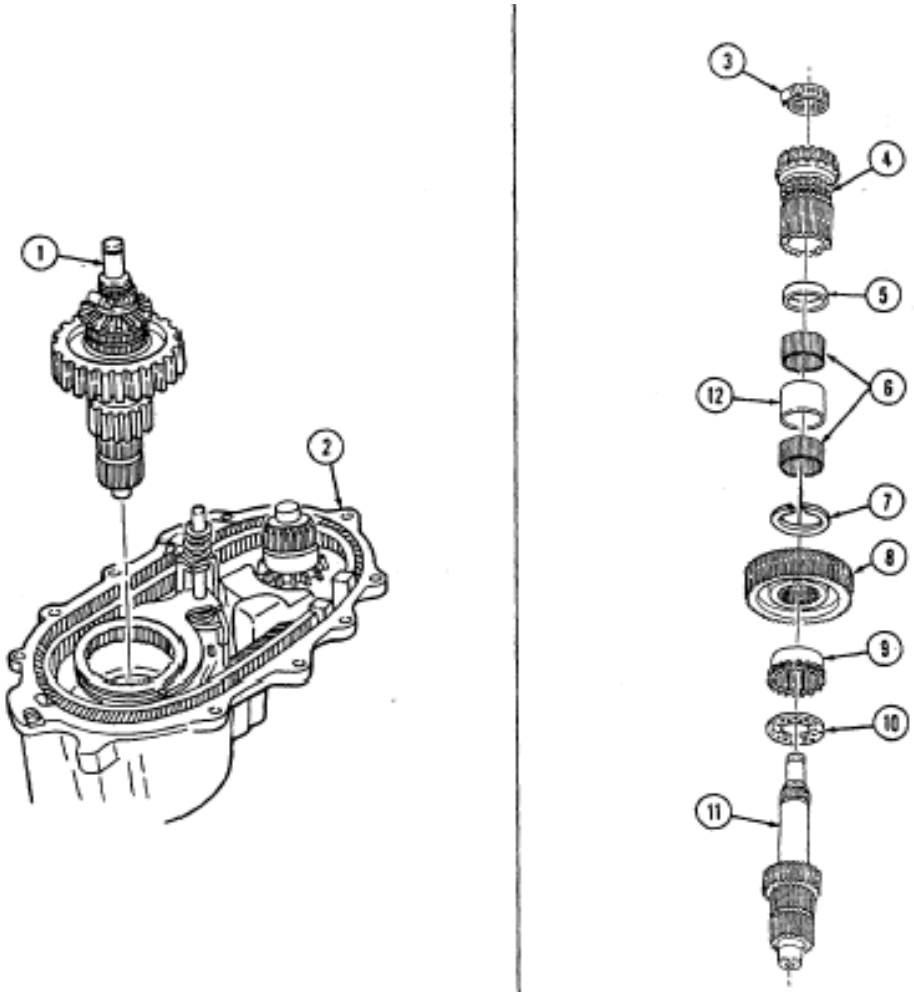
15. Remove mainshaft assembly (1) from front case (2).

NOTE

Needle bearings will fall free when removing side gear.

16. Remove hose clamp (3), side gear (4), drive gear (8), spacer ring (5), spacer sleeve (12), eighty-two needle bearings (6), side gear clutch (9), and mainshaft thrust washer (10) from mainshaft (11).

17. Remove snapring (7) from side gear (4).



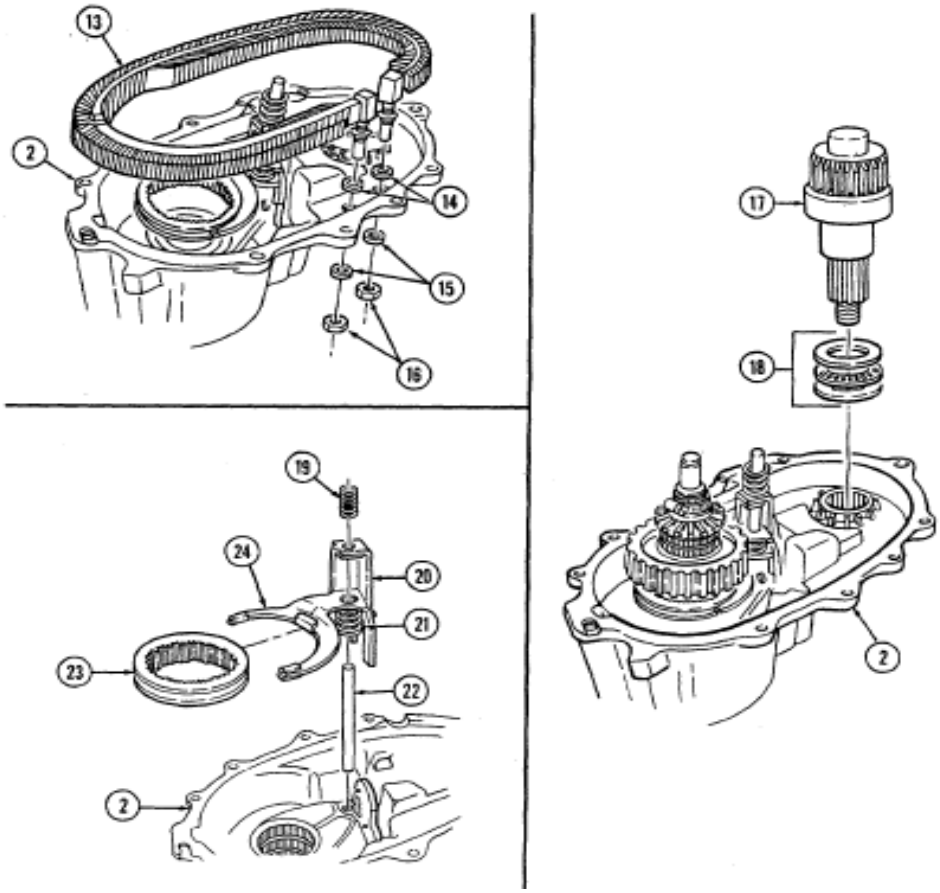
TRANSFER CASE REPAIR (Model 218) - Continued 0003

18. Remove two nuts (16), washers (15), and oil cooler (13) from front case (2).

19. Remove two seal washers (14) from oil cooler (13). Discard seal washers (14).

20. Remove front output shaft (17) and front thrust bearing assembly (18) from front case (2). Tag thrust bearing assembly (18) for assembly.

21. Remove shift rail spring (19), clutch sleeve (23), mode selector fork (24), mode selector fork bracket (20), mode selector fork spring (21), and shift rail (22) from front case (2).



TRANSFER CASE REPAIR (Model 218) - Continued 0003

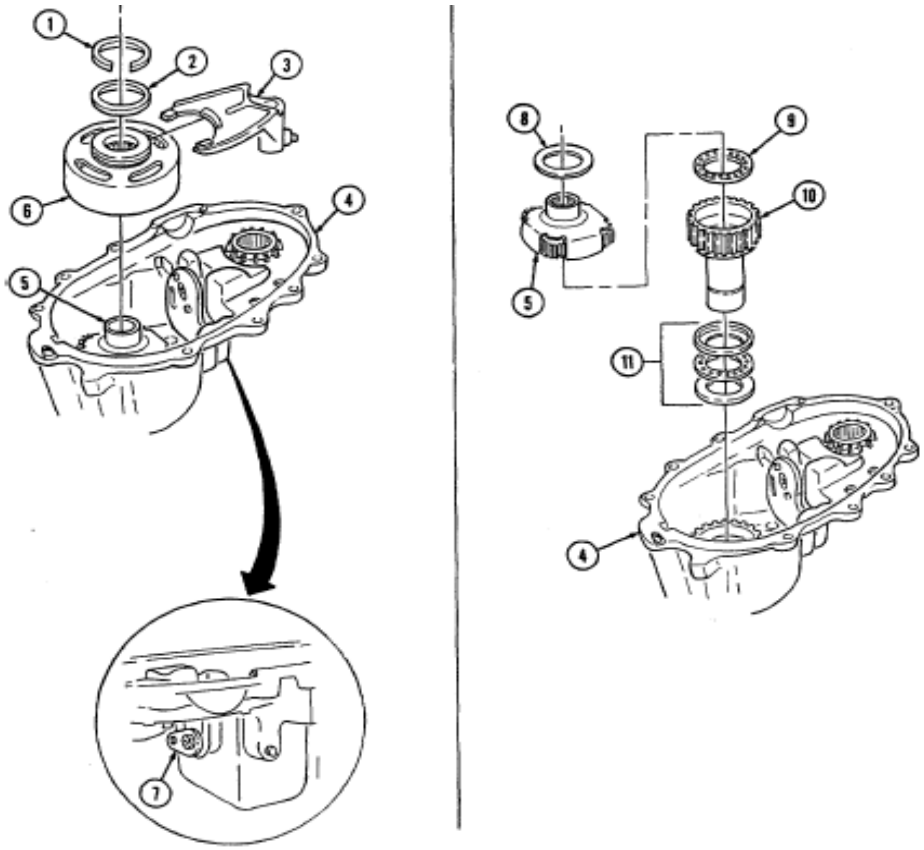
22. Move range operating lever (7) downward to last detent.

23. Remove snapring (1) from annulus gear (6) and planetary assembly (5).

24. Remove annulus gear thrust washer (2), annulus gear (6), and range fork (3) from front case (4).

25. Remove planetary thrust washer (8) and planetary assembly (5) from front case (4

26. Remove mainshaft thrust bearing (9), input gear (10), and input gear thrust bearing assembly (11) from front case (4). Tag thrust bearing (9) and thrust bearing assembly (11) for assembly.



TRANSFER CASE REPAIR (Model 218) - Continued 0003

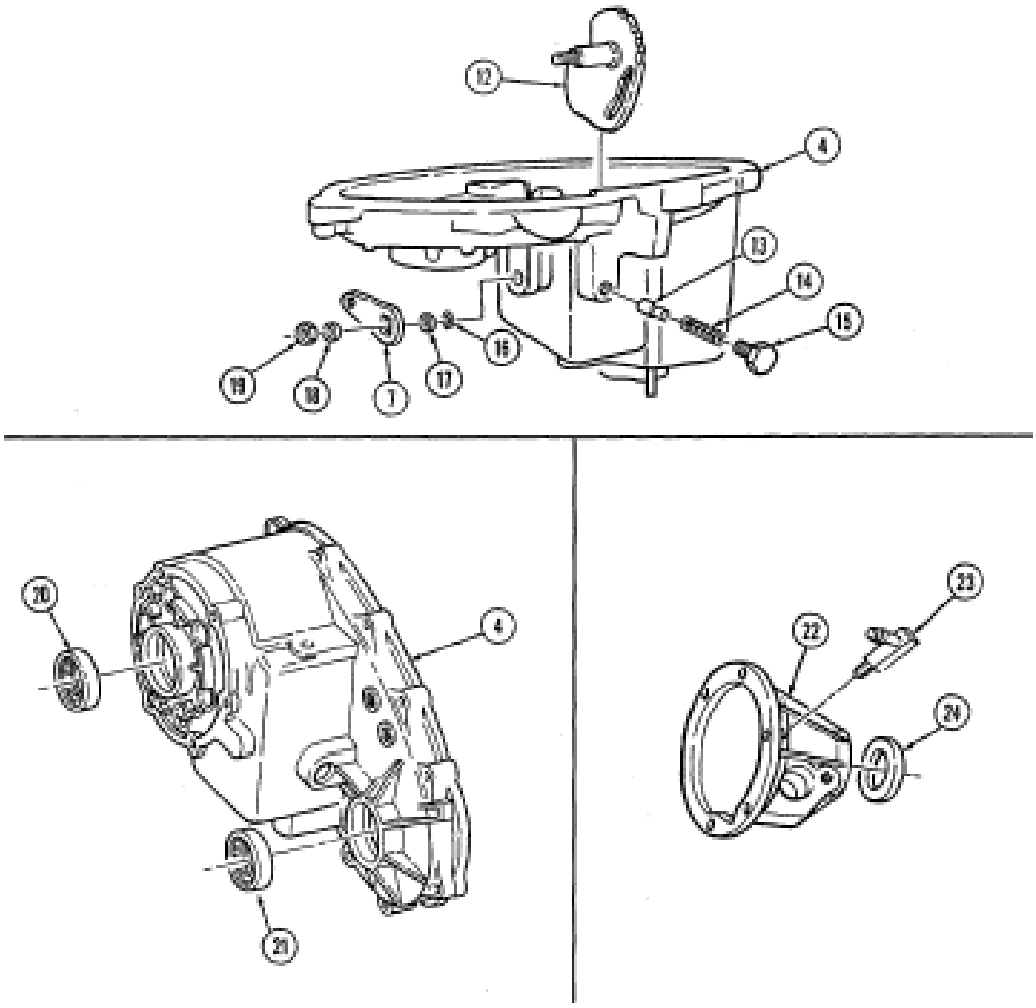
27. Remove spring retainer bolt (15), spring (14), and detent poppet (13) from front case (4).

28. Remove locknut (19), washer (18), operating lever (7), range sector (12), O-ring seal retainer (17), and O-ring seal (16) from front case (4). Discard O-ring seal (16) and locknut (19).

29. Remove input gear oil seal (20) and front output shaft oil seal (21) from front case (4). Discard seals (20) and (21).

30. Remove rear output shaft oil seal (24) from rear retainer (22). Discard seal (24).

31. Remove elbow (23) from rear retainer (22).



END OF TASK

TRANSFER CASE REPAIR (Model 218) 0004

THIS WORK PACKAGE (WP) COVERS:
Cleaning, Specific Inspection Procedures

INITIAL SETUP

Tools

General mechanic's tool kit: automotive	(NSN 5180-00-177-7033)

Materials/Parts

Rear output shaft seal	(NSN 5330-01-358-9532)
Anaerobic gasket sealer	(NSN 8030-01-374-3504)

Special Tools

Rear output shaft seal	(NSN 5120-01-196-0084)
Rear retainer bearing installer	(NSN 5120-01-185-8024)
Front output shaft front bearing installer	(NSN 5120-01-170-3728)
Front output shaft front bearing remover	(NSN 5120-01-169-4876)
Front output shaft rear bearing installer	(NSN 5120-01-195-2721)
Bearing remover set	(NSN 5120-01-201-7857)
Input gear bearing remover	(NSN 5120-01-195-4551)
Input gear bearing installer	(NSN 5120-01-185-7955)
Slide hammer adapter	(NSN 5120-01-391-5131)
Annulus gear bushing remover	(NSN 5120-01-185-7956)
Annulus gear bushing installer	(NSN 5120-01-247-6629)
Driver handle	(NSN 5120-00-677-2259)
Mainshaft bearing installer	(NSN 5120-01-265-4872)

CLEANING

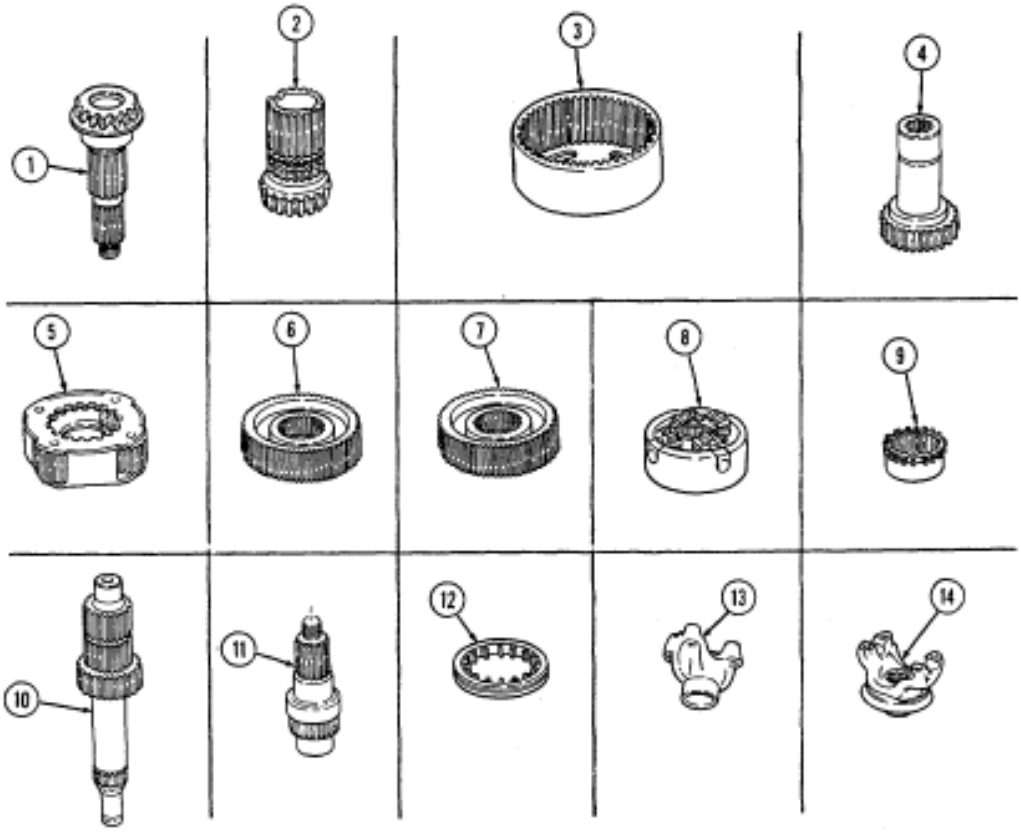
Clean all transfer case components in accordance with **CLEANING, WP 0002.**

TRANSFER CASE REPAIR (Model 218) - Continued 0004

SPECIFIC INSPECTION PROCEDURES

1. Inspect splines and gear teeth on rear output shaft (1), side gear (2), annulus gear (3), input gear (4), planetary assembly (5), drive gear (6), and driven gear (7) for damage. Replace any if damaged.

2. Inspect gear teeth and splines on differential assembly (8), side gear clutch (9), mainshaft (10), front output shaft (11), clutch ring (12), rear output shaft yoke (13) and front output shaft yoke (14) for damage. Replace any if damaged



TRANSFER CASE REPAIR (Model 218) - Continued 0004

3. Inspect thrust washers (16), snaprings (15), thrust bearings (17), and inner and outer thrust bearing races (18) for damage. Replace any if damaged.

4. Inspect rear case (21) and front case (19) for damage. Replace transfer case assembly if either are damaged.

5. Inspect lockplate (20) for damage. If damaged, perform steps 6 through 8, if not, go to step 9.

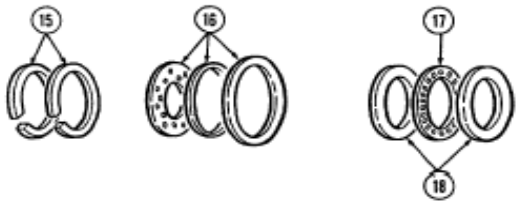
6. Remove six capscrews (22) from lockplate (20) and remove from front case (19).

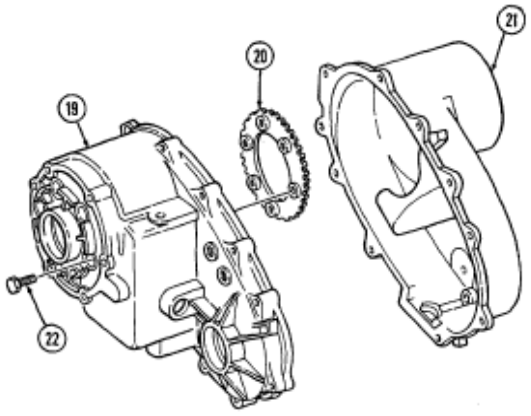
7. Apply anaerobic gasket sealer to lockplate (20) mounting surface and install in front case (19).

8. Coat six lockplate capscrews (22) with anaerobic gasket sealer and install capscrews (22) in lockplate (20). Tighten capscrews (22) to 30 lb-ft (41 N•m).

NOTE

If there has been any contamination which requires bearing replacement, the drive chain should be replaced. The same contaminants which wear out bearings will wear out the drive chain.





TRANSFER CASE REPAIR (Model 218) - Continued 0004

CAUTION

All bearings used in the transfer case must be correctly positioned to avoid covering the bearing oil feed holes. After replacing any bearing, check bearing position to be sure oil feed hole is not blocked. Incorrect bearing installation will lead to failure of transfer case.

9. Inspect rear retainer output shaft bearing (1) for damage. If damaged, perform steps 10 and If not, go to step 12.

10. Remove bearing (1) from rear retainer (2).

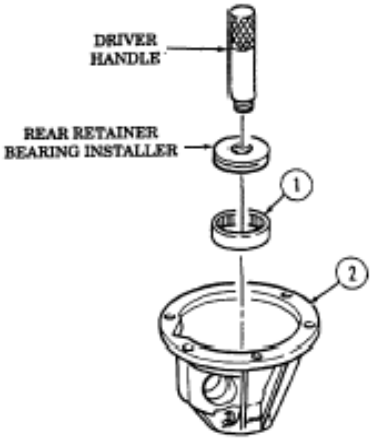
NOTE

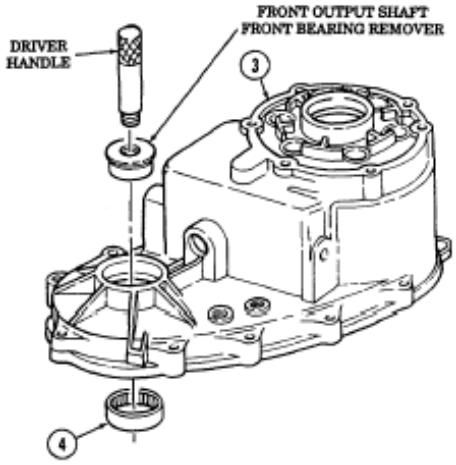
Be sure shielded side of bearing faces interior of transfer case after installation.

11. Using driver handle and rear retainer bearing installer, install bearing (1) in rear retainer (2).

12. Inspect front output shaft front bearing (4) for damage. If damaged, perform steps 13 and 14. If not, go to step 15.

13. Using driver handle and front output shaft front bearing remover, remove bearing (4) from front case (3).





TRANSFER CASE REPAIR (Model 218) - Continued 0004

14. Using driver handle and front output shaft front bearing installer, install bearing (4) in front case (3).

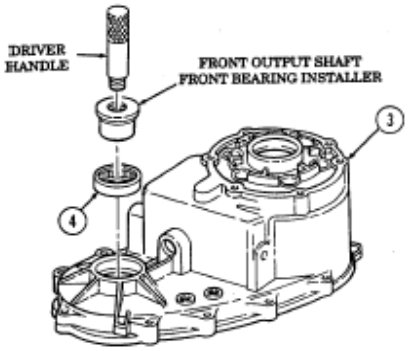
15. Inspect front output shaft rear bearing (6). If damaged, perform steps 16 and 17. If not, go to step 18.

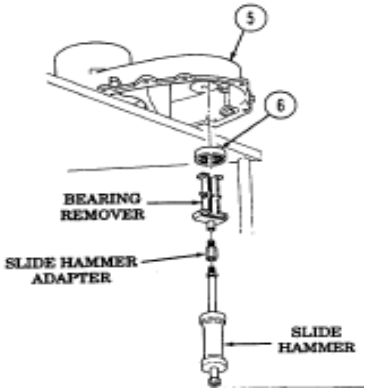
16. Using slide hammer, slide hammer adapter, and bearing remover, remove bearing (6) from rear case (5).

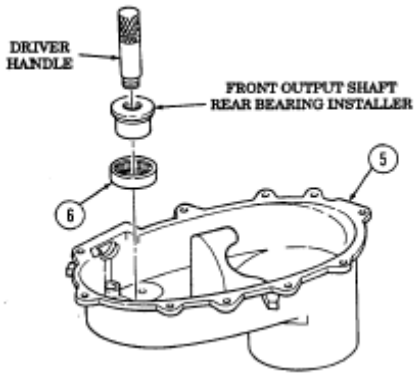
17. Using driver handle and front output shaft rear bearing installer, install bearing (6) in rear case (5).

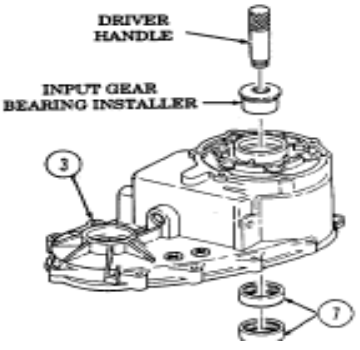
18. Inspect input gear front and rear bearings (7). If damaged, perform steps 19 through 21. If not, go to step 22.

19. Using driver handle and input gear bearing remover, remove both bearings (7) from front case (3) at the same time.









TRANSFER CASE REPAIR (Model 218) - Continued 0004

20. Using driver handle and input gear bearing installer, install rear bearing (1) in front case (2).

21. Using driver handle and input gear bearing installer, install front bearing (3) in front case (2).

22. Inspect mainshaft pilot bearing (4) for damage. If damaged, perform steps 23 through 25. If not, go to step 26.

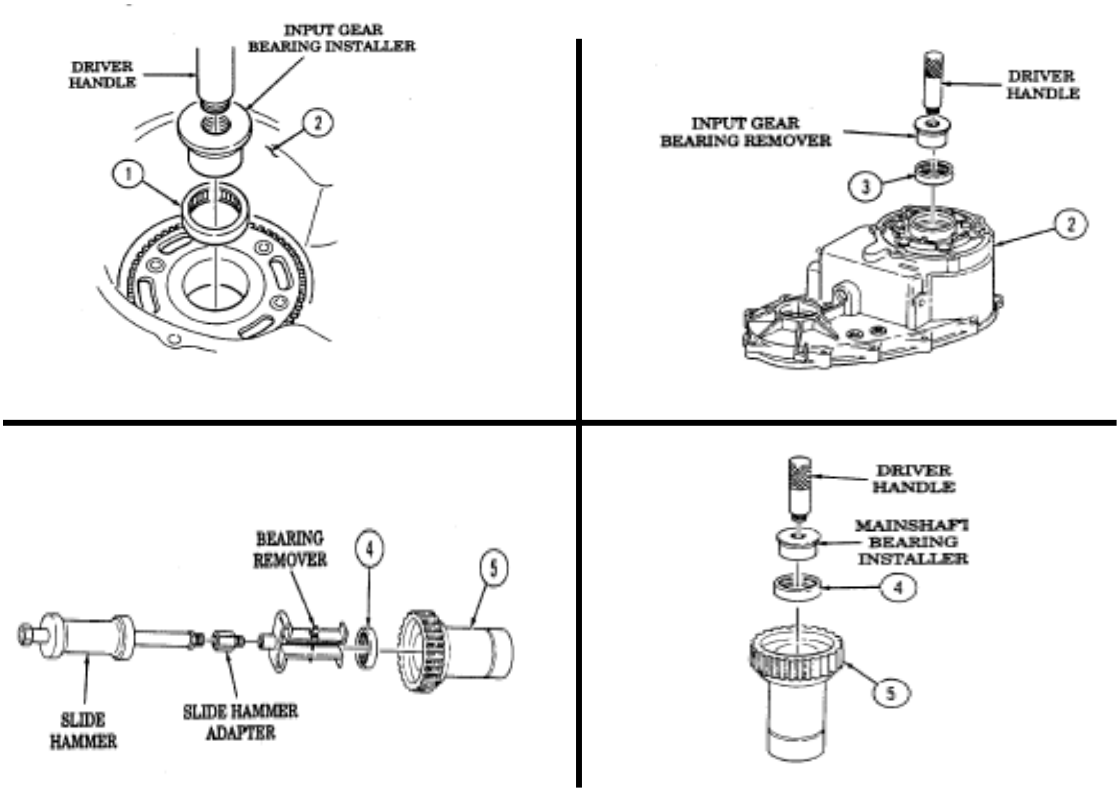
23. Using slide hammer, slide hammer adapter, and bearing remover, remove bearing (4) from input gear (5).

CAUTION

Correctly position mainshaft pilot bearing to avoid covering the bearing oil feed hole. Incorrect bearing installation will lead to failure of transfer case.

24. Using driver handle and mainshaft bearing installer, install bearing (4) in input gear (5).

25. Remove installation tools and check bearing (4) position to be sure bottom of bearing (4) is flush with top of oil feed hole.



TRANSFER CASE REPAIR (Model 218) - Continued 0004

26. Inspect rear case output shaft bearing (8). If damaged, perform steps 27 and 28. If not, go to step 29.

27. Using bearing remover, slide hammer adapter, and slide hammer, remove bearing (8) and seal (7) from rear case (6). Discard seal (7).

28. Using driver handle and rear output shaft bearing installer, install seal (7) and bearing (8) in rear case (6).

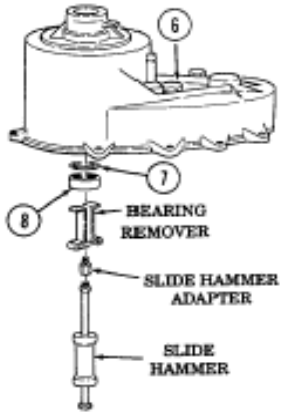
29. Inspect annulus gear bushing (10). If damaged, perform steps 30 and 31. If not, go to step 32.

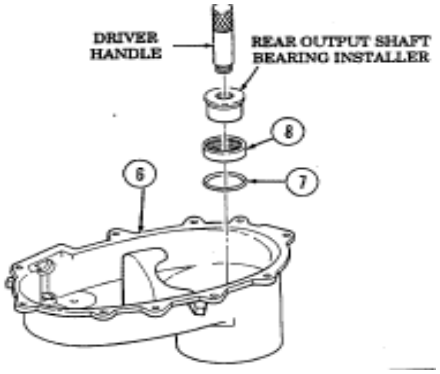
30. Using driver handle and annulus gear bushing remover, remove bushing (10) from annulus gear (9).

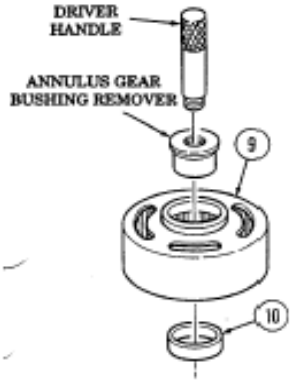
31. Using driver handle, annulus gear bushing remover and annulus gear bushing installer, install bushing (10) in annulus gear (9).

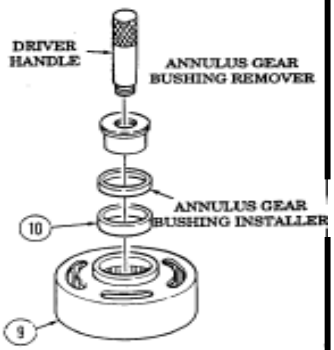
32. Inspect range fork (11), mode selector fork (13), and pads (12) for damage. Replace any if damaged.

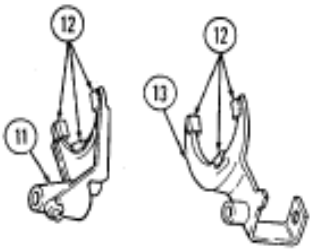
33. Refer to **WP 0002** for general inspection instructions for all other transfer case parts.











END OF TASK

TRANSFER CASE REPAIR (Model 218) - Continued 0005

THIS WORK PACKAGE (WP) COVERS:
Assembly

INITIAL SETUP:

Tools

General mechanic's tool kit: automotive	(NSN 5180-00-177-7033)
Dial indicator	(NSN 5210-00-277-8840)

Materials/Parts

Front output shaft seal	(NSN 5330-01-358-9532)
Seal, washer kit	(NSN 5310-01-148-2687)
Locknut	(NSN 5310-00-982-4908)
Input shaft seal	(NSN 5330-01-168-3870)
Mainshaft O-ring seal	(NSN 5330-01-174-8618)
Pinion adapter O-ring seal	(NSN 5330-01-195-8889)
Sector shaft O-ring seal	(NSN 5330-00-451-0118)
Petrolatum	(NSN 5330-01-272-8337)
Silicone sealant	(NSN 5330-01-398-3724)
Sealing compound	(NSN 8030-00-148-9833)
Transfer case support stand (P/N 5992393)	(Refer to TM 9-2320-280-34)

Special Tools

Yoke seal installer	(NSN 4910-01-179-5530)

NOTE

- Cleanliness is essential in all component assembly operations. Dirt and dust, even in minute quantities, are abrasive. Parts must be cleaned as specified, and kept clean. Wrap or cover parts and components when assembly procedures are not immediately completed.

- Coat all bearings and contact surfaces with operating oil (differential oil for differential parts, transmission oil for transmission parts, etc.) to ensure lubrication of parts during initial operation after repair.

TRANSFER CASE REPAIR (Model 218) - Continued 0005

ASSEMBLY

NOTE

. Ensure rubber surface of seal faces yoke seal installer.

1. Using yoke seal installer, install front output shaft seal (1) in front case (3).

NOTE

- Ensure input gear oil seal is installed with a 0.125 in. (3.17 mm) of seal out of front end housing as shown.
- Ensure rubber surface of seal faces yoke seal installer.

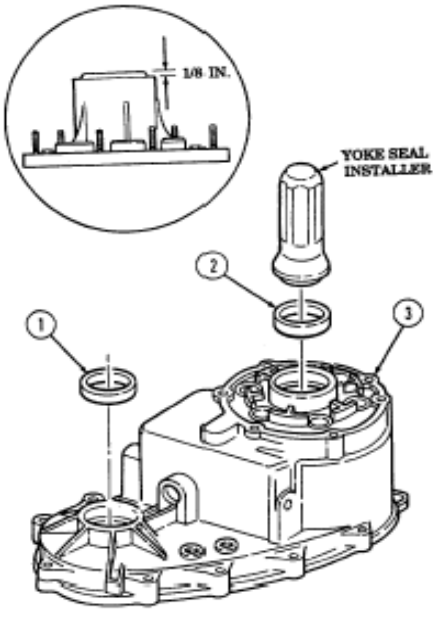
2. Using yoke seal installer, install input gear oil seal (2) in front case (3).

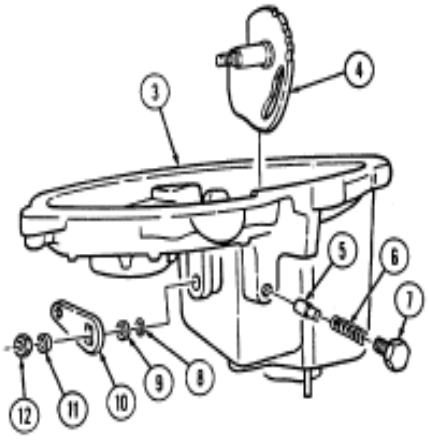
3. Install sector shaft O-ring seal (8) and retainer (9) in front case (3).

4. Install range sector (4) and operating lever (10) in front case (3) with washer (11) and locknut (12). Tighten locknut (12) to 28 lb-ft (38 N•m).

5. Install poppet (5), spring (6), and retaining bolt (7) in detent bore in front case (3). Tighten retaining bolt (7) to 22 lb-ft (30 N•m).

6. Move operating lever (10) down to last detent.





TRANSFER CASE REPAIR (Model 218) - Continued 0005

7. Place front case (3) on transfer case support stand.

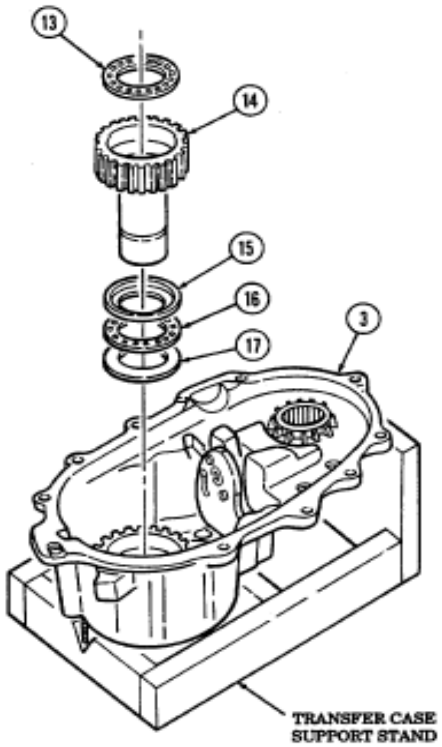
8. Install input gear flat bearing race (17) and thrust bearing (16) in counterbore in front case (3).

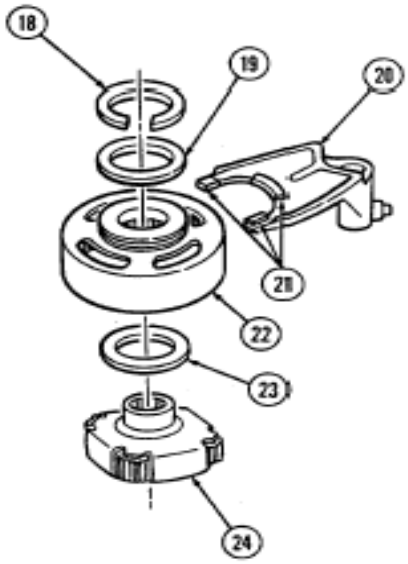
9. Install flanged O.D. bearing race (15) on input gear (14) and install input gear (14) in front case (3).

10. Install mainshaft thrust bearing (13) in recess in input gear (14).

11. Assemble planetary assembly (24), thrust washer (23), annulus gear (22), and annulus gear thrust washer (19), and install snapring (18).

12. Ensuring that three plastic pads (21) are in place on range fork (20), install range fork (20) in annulus gear (22).





TRANSFER CASE REPAIR (Model 218) - Continued 0005

13. Install planetary assembly (1) until seated on input gear (4), and position range fork lug (2) into detent slot in range sector (3).

14. Install two seal washers (7) on oil cooler manifolds (6) and position oil cooler (5) in front case (10).

CAUTION

Do not over-torque retaining nuts, or internal damage to the transfer case oil cooler may result.

15. Install two washers (8) and nuts (9) securing oil cooler (5) to front case (10), ensuring narrow side of washers (8) is next to nuts (9). Hold the end of the oil cooler stationary and use a pound-inch torque wrench to tighten nuts (9) to 15 lb-ft. (20-21 N•m)

NOTE

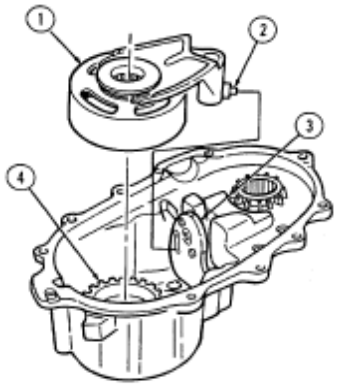
Oil in case bore may prevent shift rail from seating completely and prevent rear case installation.

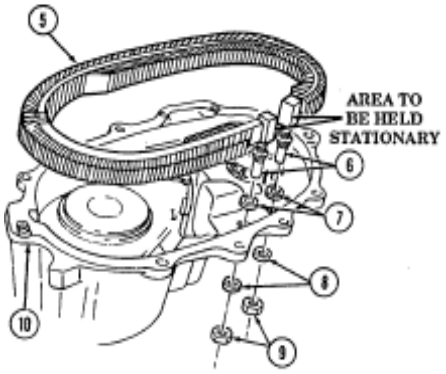
16. Remove all traces of oil from shift rail bore in front case (10).

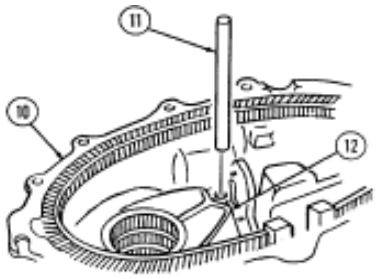
NOTE

Tapered end of shift rail must point up.

17. Install shift rail (11) through range fork (12) and into shift rail bore in front case (10). Be sure shift rail (11) is seated.







TRANSFER CASE REPAIR (Model 218) - Continued 0005

18. Assemble mode selector fork (14), mode selector fork spring (18), and mode selector fork bracket (16).

19. Ensuring that three plastic pads (13) are in place on mode selector fork (14), install mode selector fork (14) in groove in clutch sleeve (19).

20. Install mode selector fork (14), mode fork spring (18), mode selector fork bracket (16), clutch sleeve (19), and shift rail spring (15) on shift rail (17).

21. Install mainshaft thrust washer (22) on mainshaft (23).

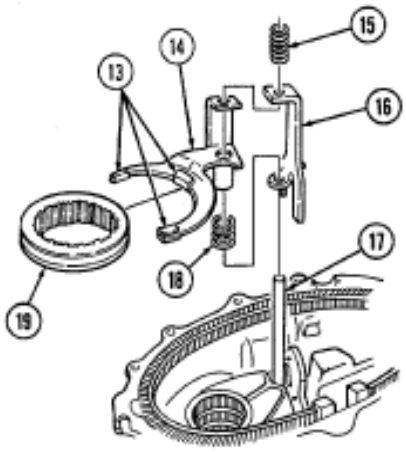
22. Apply petrolatum to surface of mainshaft (23) to hold needle bearings (21) in place.

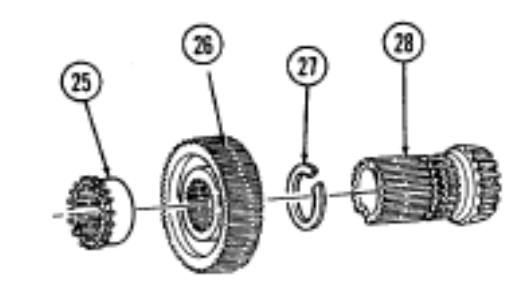
23. Assemble forty-one needle bearings (21) on mainshaft (23). Install spacer sleeve (24) on mainshaft (23).

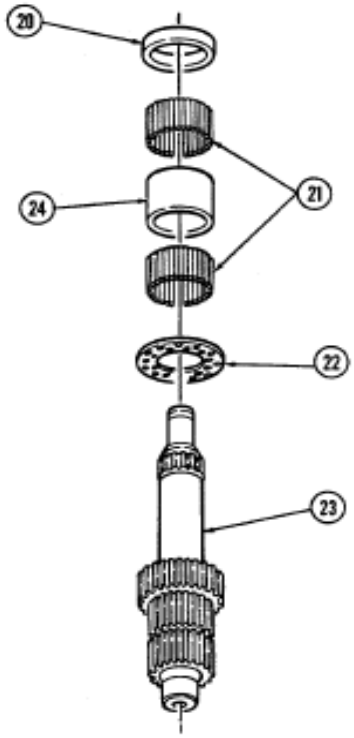
24. Assembly forty-one needle bearings (21) on mainshaft (23). Install spacer ring (20) on mainshaft (23).

25. Install snapring (27) in slot closest to center on side gear (28).

26. Install drive gear (26) and side gear clutch (25) on side gear (28).







TRANSFER CASE REPAIR (Model 218) - Continued 0005

CAUTION

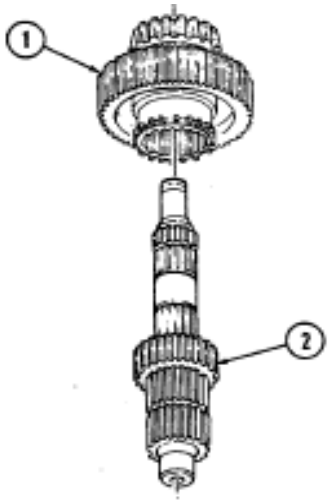
Care must be taken when assembling gears on mainshaft to avoid displacing bearings.

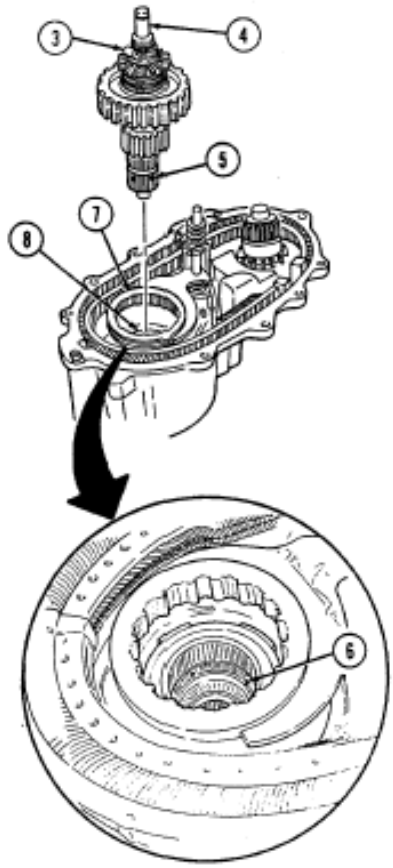
27. Install assembled gears (1) on mainshaft (2).

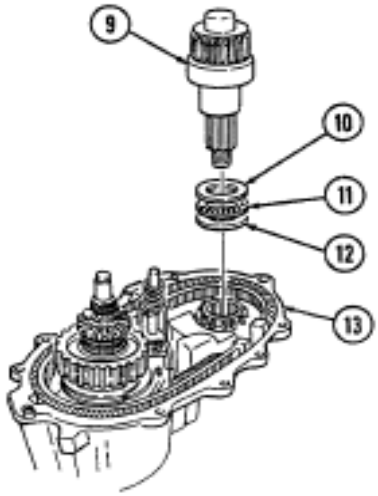
28. Install hose clamp (3) on end of mainshaft assembly (4) to hold assembled components together.

29. Install mainshaft assembly (4) through clutch sleeve (7) and into annulus gear (8), ensuring mainshaft oil holes (5) align with planetary oil holes (6).

30. Install front output shaft thick bearing race (12), bearing (11), thin bearing race (10), and front output shaft (9) in front case (13).







TRANSFER CASE REPAIR (Model 218) - Continued 0005

31. Position driven sprocket (15) in drive chain (14) and align driven sprocket (15) with front output shaft (9).

32. Pull up on mainshaft assembly (4) slightly and install drive chain (14) and driven sprocket (15) in front case (13).

33. Install snapring (23), thin bearing race (22), bearing (21), and thick bearing race (20) on front output shaft (9).

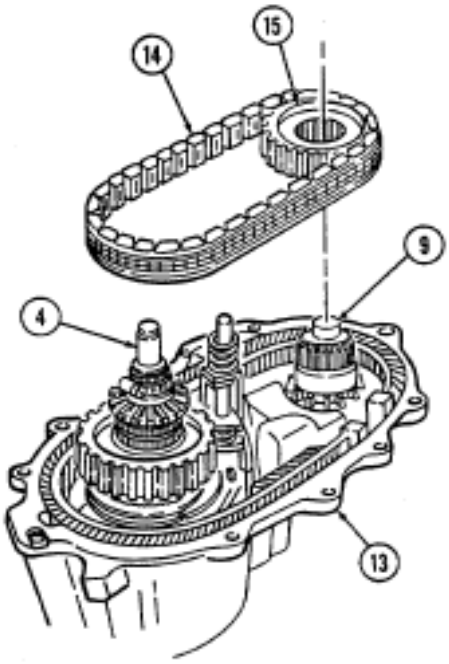
34. Remove hose clamp (3) from mainshaft assembly (4).

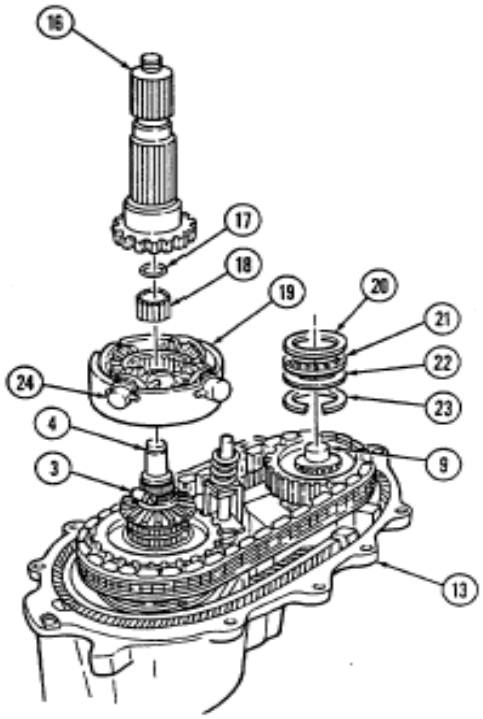
35. Apply petrolatum to end of rear output shaft (16) to hold pilot roller bearings (18) in place. Assemble fifteen pilot roller bearings (18) into end of rear output shaft (16).

36. Install O-ring seal (17) in groove on end of mainshaft assembly (4).

37. Install differential (19) over mainshaft assembly (4) with thrust blocks (24) facing up. Be sure differential (19) seats on mainshaft assembly (4).

38. Install rear output shaft (16) on differential (19). Push output shaft (16) over O-ring seal (17).





TRANSFER CASE REPAIR (Model 218) - Continued 0005

39. Install oil pump (3) on rear output shaft (4) with recess on inside diameter of oil pump (3) facing down, and snap in place.

40. Install magnet (5) in front case (6).

CAUTION

- Both front and rear case contact surfaces must be clean, dry, and free of oil prior to application of silicone sealant (RTV). Oil spills may be wiped from transfer case with a non-petroleum base cleaner. For proper bonding, case halves should be attached within five minutes and all capscrews tightened within one hour after application of silicone sealant (RTV).

- Make sure that the oil cooler is clear of transfer case housing during installation.

41. Apply silicone sealant to mating surface of front case (6).

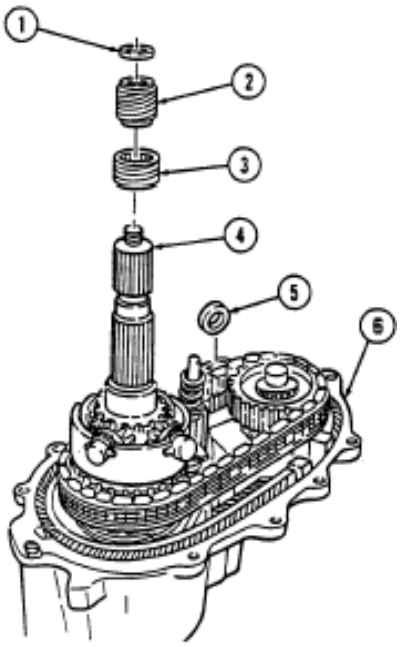
42. Align dowels (13) and install rear case (9) on front case (6) with two washers (7), long capscrew (8), and capscrew (12).

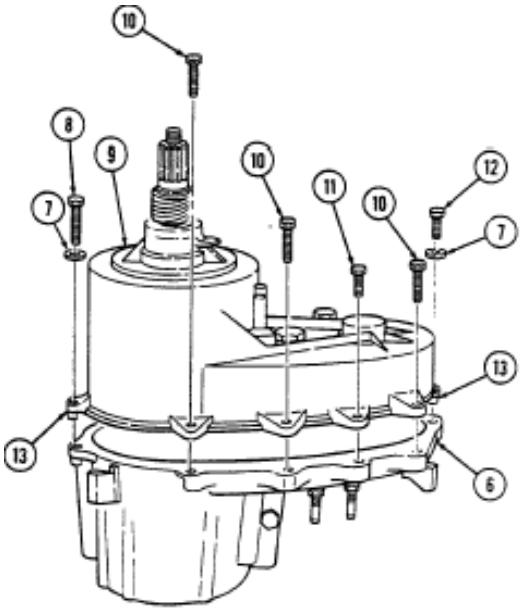
43. Install three capscrews (10), five capscrews (11), and rear case (9) on front case (6).

44. Tighten capscrews (8), (10), (12), and (11) to 22 lb-ft (30 N•m).

45. Install speedometer gear (2) on rear output shaft (4).

46. Install differential shims (1) on rear output shaft (4) with thickest shim (1) against rear output shaft (4).





TRANSFER CASE REPAIR (Model 218) - Continued 0005

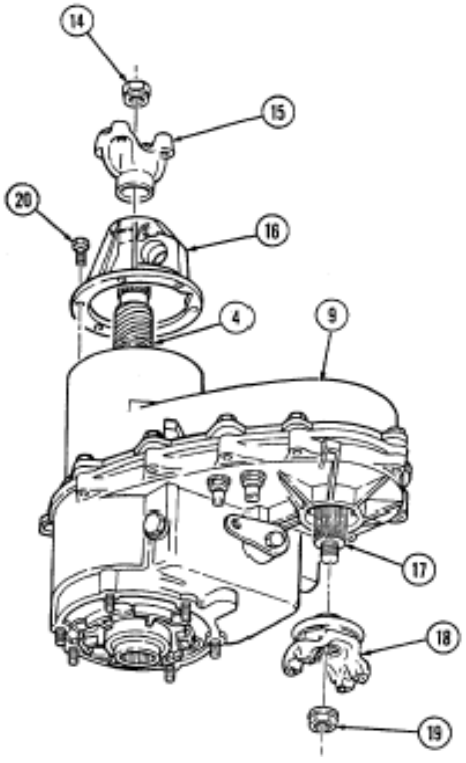
47. Align and install rear retainer (16) to rear case (9) with two capscrews (20) opposite each other. Tighten capscrews (20) to 22 lb-ft (30 N•m).

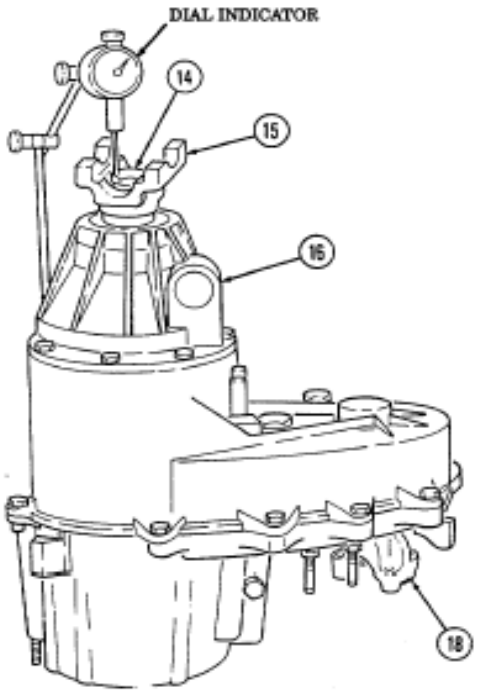
48. Install front output yoke (18) and seal washer and nut (19) on front output shaft (17). Install rear output yoke (15) and seal washer and nut (14) on rear output shaft (4). Finger tighten only.

49. Mount dial indicator on rear retainer (16), index dial indicator so it contacts top of yoke nut (14).

50. Rotate front output yoke (18) ten complete revolutions and zero dial indicator at the highest point.

51. Lift up on rear output yoke (15) and note end play reading on dial indicator. End play should be 0.008-0.020 in. (0.20-0.51 mm). If end play is correct, go to next step. If end play must be adjusted, remove rear retainer and add or subtract shims as necessary and recheck end play.





TRANSFER CASE REPAIR (Model 218) - Continued 0005

52. Remove two nuts (5), seal washers (4) and output yokes (7) and (3) from transfer case (1).

53. Remove two capscrews (2) and rear retainer (6) from transfer case (1).

NOTE

Ensure that the word "outside," molded on the seal is facing the yoke seal installer.

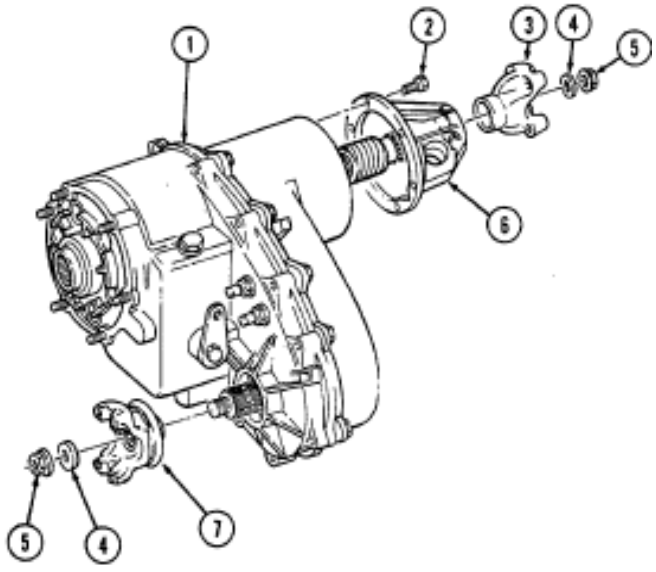
54. Using yoke seal installer, install oil seal (8) in rear retainer (6).

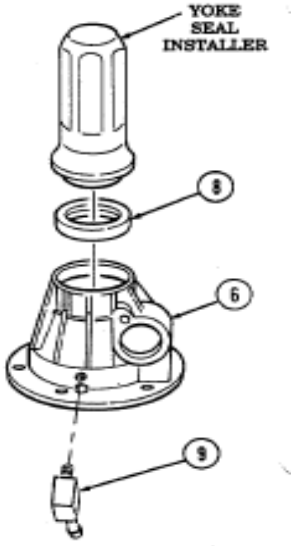
55. Apply sealing compound to threads of elbow (9).

56. Install elbow (9) into rear retainer (6).

57. Apply silicone sealant to rear retainer (6) mating surface. Align and install rear retainer (6) on transfer case (1) with six capscrews (2). Tighten capscrews (2) to 22 lb-ft (30 N•m).

58. Install front output yoke (7) and rear output yoke (3) on transfer case (1) with two seal washers (4) and nuts (5). Tighten nuts (5) to 110 lb-ft (149 N•m).





END OF TASK

AFTER REPAIR PERFORMANCE TEST and SPECIFICATIONS 0006

THIS WORK PACKAGE (WP) COVERS:
Performance Test and Specifications

After Repair Transfer Case Performance Specifications

1. Rating

Gear Ratios:

Low Range	2.61:1
High Range and High Lock Range	1:1

NOTE

You are not required to perform any specific submergence or environmental tests. We expect the use of OEM and/or qualified after market gaskets and seals to achieve these requirements.

After Repair Transfer Case Performance Test

You will do a performance test on each transfer case repaired. A Quality Assurance (QA) Representative must witness this testing.

a. Testing Fixture

Provide a test stand with the following capabilities:

1. A rotating power source.
2. Controls to operate transfer case shift lever.
3. Pressure test at 3 psi or vacuum test assembly. No leaks allowed.

AFTER REPAIR PERFORMANCE TEST and SPECIFICATIONS - Continued 0006

b. Setup

1. Transfer case shall be prepared for operation (properly lubricated) and installed in a suitable test fixture capable of simulating actual vehicle installation with all the necessary equipment to operate and monitor test.

2. Perform a free-running, no load, test by rotating the input shaft by hand in both directions.

    a. Neutral. Shift transfer case to N (neutral). The input shaft and both output yokes must turn freely. Turning the input shaft should not turn the output yokes.

    b. Low Lock. Shift the transfer case to L (low range). Turn the input shaft. Both output yokes must turn freely and smoothly.

    c. High. Shift the transfer case to H (high range). Turn the input shaft. Each output yoke must turn freely and smoothly when the other is held stationary.

    d. High Lock. Shift the transfer case to HL (high lock range). Turn the input shaft. Both output yokes must turn freely and smoothly.

END OF TASK

PARTS DISPOSAL and QUALITY ASSURANCE 0007

THIS WORK PACKAGE (WP) COVERS:
Parts Disposal and Quality Assurance

Parts Disposal

You are responsible for disposal of any unrepairable or unused parts or assemblies.

Quality Assurance

The repair activity will implement and maintain a Quality Assurance program that complies with ISO 9002 (dated 1994, tailored), “Quality System – Model for Quality Assurance in Production, Installation and Servicing.”

END OF TASK

TRANSFER CASE REPAIR (Model 218) 0008

THIS WORK PACKAGE (WP) COVERS:
Special Packaging Instructions

Special Packaging Instructions

Additional Packaging information can be found in this Web site. You must enter the Part Number at the Query screen. You will need to have the ImageR viewer to view the images. You can down load the viewer from the Web Site by going to the link below and following the directions.


218-63.C4


218-64.C4


218-65.C4


218-37sheet4.C4

https://www-tdps.tacom.army.mil/PACKInstructions.asp

TRANSFER CASE REPAIR (Model 218) - Continued 0008

An alternative to the packing called out in the above SPI would be to use the following generic split pack instructions:

SPECIAL PACKAGING INSTRUCTION

Form Approved OMB No. 0704-0188

1. PART OR DRAWING NO.	2. CAGE	3. SPI NO.
Foam-In-Place Split Pack Design	19207	AKFIPSPLIT
4. NATIONAL STOCK NO.	**5. DATE**	**6. REVISION**
	10/10/2001	A

7. QUP	8. ICQ	9. UNIT PACK WT.	10. UNIT PACK CU	11. UNIT PACK SIZE
001	N/A	See Contract	See Contract	See Contract

12. MILITARY PRESERVATION	18. STEPS	19. REQD	20. DESCRIPTION
MIL-STD-2073-1D, Method 42			
13. CLEANING	1-A		MIL-PRF-32033
MIL-STD-2073-1D, Method C-1	2-B	1	MIL-B-121, Type II, Grade A, Class 2
14. DRYING	3-C		MIL-PRF-83671, Class 1, Category 1
MIL-STD-2073-1D	4-D		Foam-In-Place Split Pack
15. PACKING	5-E	1	MIL-B-117, Type I, Class E, Style 1
a. LEVEL A			
MIL-STD-2073-1D,Table C.II and Note F			
b. LEVEL B			
MIL-STD-2073-1D,Table C.II and Note F			
16. MARKING			
MIL-STD-129 and Note G			

17. NOTES/DRAWING

A. Apply externally to all unpainted, unplated metallic surfaces. Apply internally by flushing or slushing. Drain excess. Alternate preservatives are acceptable provided the preservative is compatible internally with the operational fluid and externally removal is not required prior to operational use. An example of a possible alternative preservative is: MIL-PRF-21260.

B. Single wrap required. Secure wrap with tape.

C. Requirements and procedures for accomplishing foam-in-place using material specified may refer to MIL-HDBK-775.

D. This procedure is adaptable for many various items. It shall be achieved using a minimum of two consecutive pours with time allowed between each pour to permit the foam to set(become tack free). The foam chemicals shall be as specified in step 3 above.

1. Select the orientation best for the item considering the ready availability of supporting surfaces and to insure ease of removal.
2. Select a fiberboard box, ASTM D5118, Type CF, Cl Dom, Grade 275, Size shall be minimum that allows 2 inches of foam around all surfaces of the item.
3. Drape plastic sheet film, 4 mils minimum, loosely inside container covering bottom and extending over flaps. Smooth the sheet toward all corners. Tape to hold temporarily.
4. Place prefoamed support block to support weight of prepared item to required height in container bottom. If necessary to prevent foam from crushing place 1/4 inch plywood platen on top of support block.
5. Dispense enough foam mix into the container to encase block and allow to rise to the required height which is approximately to the middle of the item(first pour).
6. Fold plastic film inward completely covering foam before it completes its rise.
7. Immediately place and hold prepared item on top of the plastic film/foam and the foam support block until foam has risen completely and set enough to support the item. Caution: item may have a tendency to float during foaming and must be held in place.
8. Drape a second sheet of plastic film, 4 mils minimum, loosely inside the container, covering the prepared item and foam. Extend film over the flaps. Tape film to hold temporarily.
9. Dispense a sufficient amount of foam mix into the container to surround the item and fill the container with expanded foam(second pour).
10. Fold the plastic film inward when certain that the rising foam will fill the container. Fold the container flaps over, but do not secure. If the container becomes overfilled, trim off excess.
11. Close container with tape in accordance with ASTM D1974, any applicable 2B or 2C closure method.

E. Enclose the packaged item inside the specified bag and seal. The sealed bag shall then be enclosed within an appropriate outer container selected from the Table C.II of MIL-STD-2073-1D(reference packing 15a and b above). If Level A Packing is specified, 6 mil polyethylene film conforming to A-A-3174 or equivalent material shall be used as an over wrap(tape sealed) around the sealed bag to prevent chafing or rupture by the outer container.

F. Unitization: Shipments of identical items going to the same destination shall be palletized. Pallet loads must be stable, and to the greatest extent possible, provide a level top for ease of stacking. A palletized load shall not exceed 2,000 pounds and should not exceed 52 inches in length or width, or 54 inches in height. The load shall be contained in a manner that will permit safe handling during shipment and storage.

G. Special Marking. Apply "Reusable Container" marking to each exterior container in accordance with MIL-STD-129.

DD FORM 2169, JUN 1997 (EG) PREVIOUS EDITIONS ARE OBSOLETE. Page 1 of 1 Pages

Reset

Designed using Perform Pro, WHS/DIOR, Jun 97

TRANSFER CASE REPAIR (Model 218) - Continued 0008

If Transfer Case (Model 218) is received in container (8145-00-485-8250), it should be returned to the supply system in a container. The internal packing for the container can be found on WP 0008 00-4 and 00-5 below. The foam inserts for the reusable container can be purchased from GSA under NSN 8135-01-208-8710, size 36x36x3. Or you could also use NSN 8135-01-149-1734, size 96x45x1, however, it would need to be glued together since each foam pad is 2 ¼ inches thick.

TRANSFER CASE REPAIR (Model 218) - Continued 0008

March 11, 2003 12:35 AM

SPECIAL PACKAGING INSTRUCTION

Form Approved OMB No. 0704-0188 -DT

1. PART OR DRAWING NO. 57K3505	(CAGE) (19207)	(NOMENCLATURE) TRANSFER CASE W/CONTAINER**	2. CODE INDENT 19207	3. SPI NO. AK 14699893
4. NATIONAL STOCK NO. 2520-01-469-9893			5. DATE OF DRAWING 02-17-00	6. REVISION
7. QUP 1 EA.	8. ICQ NONE	9. UNIT PACK WT. (LB) 140.0*	10. UNIT PACK CU (CU. FT.) 9.896	11. UNIT PACK SIZE (IN.) 30.0 X 30.0 X 19.0

12. PRESERVATION	
a. LEVEL A	MIL-P-116, METHOD IId
b. LEVEL B	NOT APPLICABLE
13. CLEANING	MIL-P-116, PROCESS C-1
14. DRYING	MIL-P-116
15. PACKING	
a. LEVEL A	MIL-STD-2073-1 AND NOTE J
b. LEVEL B	NOT APPLICABLE
16. MARKING	MIL-STD-129 AND NOTE K

18. STEPS	19. REQD	20. DESCRIPTION
1-B		PRESERVATIVE: DEXRON III.
2-C		CLOSURE: MIL-C-5501.
3-D		PRESERVATIVE: MIL-L-21260, TYPE I, GR. 10.
4-E	1	WRAP: MIL-B-121, TYPE II, GR. A, CL. 2, SIZE 44 X 40.
5-F	1	BASE: A-A-55057.
6-G	6	CUSHIONING: MIL-P-26514, TYPE I, CL. 1.
7-H		DESICCANT: MIL-D-3464 (4 UNITS).
8-I	1	CONTAINER: 8145-00-485-8250.

17. NOTES/DRAWING

NOTES:

* WEIGHT OF CONTAINER AND CUSHIONING ALONE IS 53 LBS.
** TRANSFER CASE P/N 12447125.

A. QUALITY ASSURANCE PROVISIONS:

1. INSPECT THE PRESERVATION AND UNIT PACK IN ACCORDANCE WITH MIL-STD-2073-1.
2. INSPECT PACKING IN ACCORDANCE WITH MIL-STD-1186 AND APPLICABLE CONTAINER SPECIFICATION.

B. FILL TRANSFER ASSEMBLY TO OPERATING LEVEL WITH OIL. ROTATE INTERNAL MECHANISM, SUFFICIENTLY TO ASSURE COMPLETE COVERAGE OF ALL INTERNAL SURFACES. DRAIN ASSEMBLY.

C. SEAL ALL PORTS WITH PLUGS OR CAPS OF THE APPROPRIATE SIZE.

D. APPLY SPECIFIED OIL TO ALL EXTERNAL UNPAINTED, UNPLATED, FERROUS METAL SURFACES OF TRANSFER CASE ASSEMBLY.

E. SECURE WRAP USING TAPE.

F. PLYWOOD BASE SHALL CONFORM TO A-A-55057, TYPE A, EXPOSURE 1, 32/16 SPAN RATING, GRADE CDX, 1/2-INCH THICK. FOR FABRICATION AND PLACEMENT OF BASE SEE SKETCH ON PAGE 2.

G. FOR FABRICATION AND PLACEMENT OF CUSHIONING SEE SKETCHES ON PAGE 2. MATERIAL SHEET THICKNESS IS 2-1/4 INCHES.

H. PLACE FOUR UNITS OF DESICCANT NEAR TRANSFER CASE ASSEMBLY.

I. CAUTION: SEAT GASKET PROPERLY PRIOR TO SECUREMENT OF CONTAINER TOP.

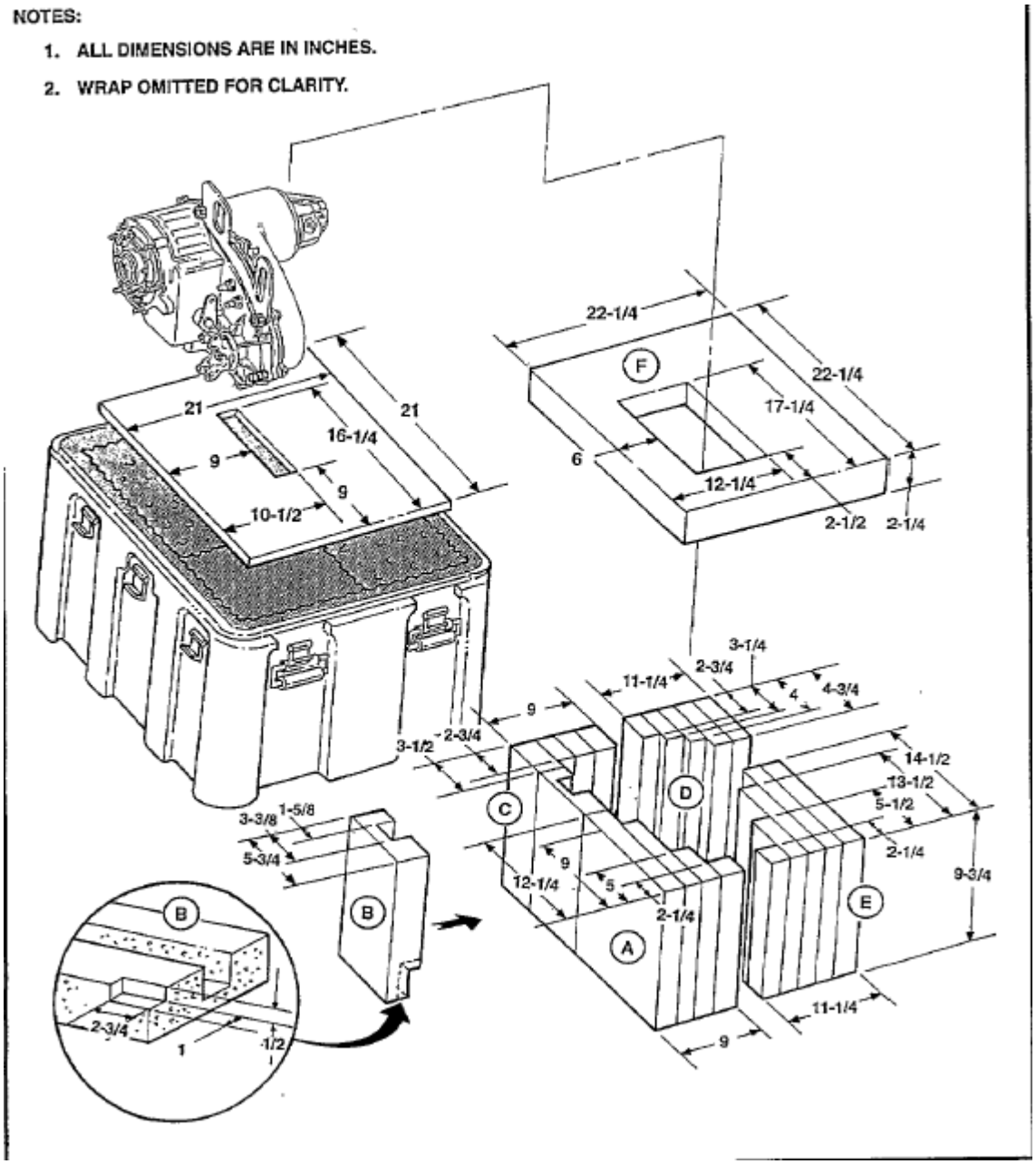
J. UNIT CONTAINER IS THE SHIPPING CONTAINER.

K. STENCIL CONTAINER USING 1/2 INCH LETTERING, "REUSABLE CONTAINER – DO NOT DESTROY".

TRANSFER CASE REPAIR (Model 218) - Continued 0008

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. WRAP OMITTED FOR CLARITY.



TRANSFER CASE REPAIR (Model 218) - Continued 0008

Packaging Requirements Sheet
(Special Packaging Instructions) DS6411

PRON: Not Applicable DATE: March 20, 2003

NSN 2520-01-163-4999

1. Military preservation, packing, and marking for the item identified above shall be accomplished in accordance with the specific requirements identified below, all the applicable requirements of, MIL-STD-2073-1, Revision D Date 10 May 2002 and the Special Packaging Instruction contained in the TDP.

PRESERVATION: MILITARY

LEVEL OF PACKING: A
QUANTITY PER UNIT PACKAGE: 001
SPI NUMBER

Unitization: Shipments of identical items going to the same destination shall be palletized if they have a total cubic displacement of 50 cubic feet or more unless skids or other forklift handling features are included on the containers. Pallet loads must be stable, and to the greatest extent possible, provide a level top for ease of stacking. A palletized load shall not exceed 4,000 pounds or 54 inches in height and shall allow for two rows of unit loads to be loaded side by side across the width of a standard ISO freight container (ref. ISO 668). The load shall be contained in a manner that will permit safe handling during shipment and storage.

2. Marking: In addition to any special markings called out on the SPI, all unit packages, intermediate packs, exterior shipping containers, and, as applicable, unitized loads shall be marked in accordance with MIL-STD-129, Revision P, Date: 15 December 2002 including bar coding. The contractor is responsible for application of special markings as discussed in the Military Standard regardless of whether specified in the contract or not. Special markings include, but are not limited to, Shelf-life markings, structural markings, and transportation special handling markings. The marking of pilferable and sensitive materiel will not identify the nature of the materiel.

   Contractors and vendors shall apply address markings using a bar coded military shipment label (MSL)for all shipments except contractor to contractor. The MSL will include both linear and 2D bar codes per the standard. The DD Form 250 or the commercial packing list shall have bar coding applied as per Direct Vendor Delivery Shipments in the standard (except for deliveries to DDSP New Cumberland Facility, DDD San Joaquin, Red River Munitions Center and Anniston Munitions Center).

Contractor to contractor shipments shall have the address markings applied to the identification marked side of the exterior shipping container or to the unitized load markings. The following shall be marked "FROM: name and address of consignor and TO: name and address of consignee".

3. Heat Treatment and Marking of Wood Packaging Materials: All non-manufactured wood used in packaging shall be heat treated to a core temperature of 56 degrees Celsius for a minimum of 30 minutes. The box/pallet manufacturer and the manufacturer of wood used as inner packaging shall be affiliated with an inspection agency accredited by the board of review of the American Lumber Standard Committee. The box/pallet manufacturer and the manufacturer of wood used as inner packaging shall ensure tractability to the original source of heat treatment. Each box/pallet shall be marked to show the conformance to the International Plant Protection Convention Standard. Boxes/pallets and any wood used as inner packaging made of non-manufactured wood shall be heat-treated. The quality mark shall be placed on both ends of the outer packaging, between the end cleats or end battens; on two sides of the pallet. . Foreign manufacturers shall have the heat treatment of non-manufactured wood products verified in accordance with their National Plant Protection Organization's compliance program.

4. These SPI's has been validated and the method of preservation/packing has proven successful in meeting the needs of the military distribution system, including indeterminate storage and shipment throughout the world. Special instructions and/or tailoring of the SPI is detailed in the Supplemental Instructions in Paragraph E below. A prototype package is required to validate the sizes and fit requirements of the SPI. Minor dimensional and size changes are acceptable provided contractor provides the TACOM Packaging Office with notification 60 days prior to delivery(packaging@tacom.army.mil). Any design changes or changes in the method of preservation that provide a cost savings without degrading the method of preservation or packing or affecting the serviceability of the item will be considered and responded to within 10 days of submission to TACOM. TACOM reserves the right to require testing to validate alternate industrial preservation methods, materials, alternate blocking, bracing, cushioning, and packing.

5. SUPPLEMEMTAL INSTRUCTIONS: - the original packaging per first attachment, the option to use the generic FIP split packaging. Or if the transfer Case comes in a composite container - it should go out in that container with the insert as described in the third attachment. Reuse of Packaging Materials: The cushioning material used in the composite reusable container should be reused provided: No visible damage to material and foam cushioning has not taken a permanent set. Always use new barrier material, evacuate air from the barrier bag, and conduct a snap test after two hours on each bag to insure seal is holding. Any foam-in-place packaging should not be reused.

MANDATORY REPLACEMENT LIST 0009

THIS WORK PACKAGE (WP) COVERS:
Mandatory Replacement List

MANDATORY REPLACEMENT LIST

Mandatory replacement parts listed are those parts considered unserviceable after removal during disassembly procedures. All gaskets, seals, cotter pins, and standard stock of this type will be replaced as well as those components which are considered incapable of proper performance until the next recapitalization effort. To eliminate the necessity of more costly inspections all other items of negligible cost are also to be replaced.

ITEM DESCRIPTION	PART NUMBER	NSN	QTY
Seal, Output Shaft, Rear	5740124	5330-01-424-4115	1
Seal, Output Shaft, Front	29960-0511	5330-01-358-9532	1
Washer, Yoke Rear Output	5740010	5310-01-148-2687	1
Packing, Preformed Mainshaft	5740099	5331-01-174-8618	1
Seal, Plain Encased Input Shaft	5740017	5330-01-168-3870	1
Packing, Preformed Range Lever	5740012	5330-00-451-0118	1
Nut, Self-Locking HE Transfer Case, 3/8-24	MS21045-6	5310-00-982-4908	1
Chain, Roller	5740090	2520-01-178-9768	1
Pad, Fork Transfer Shift	5740114	2520-01-162-8985	5
Pad, Fork Transfer Shift	5740223	2590-01-159-8757	1
Oil Pump	5740018	2520-01-189-9750	1
Roll Pin	9417375	2520-01-160-4642	4
Packing, Preformed Oil Cooler Assembly	5741062	5331-01-209-7726	2
Seal, Plain Encased Bearing	4633	5330-00-497-4633	1
Washer, Yoke Front Output	5237	5310-01-186-5237	1