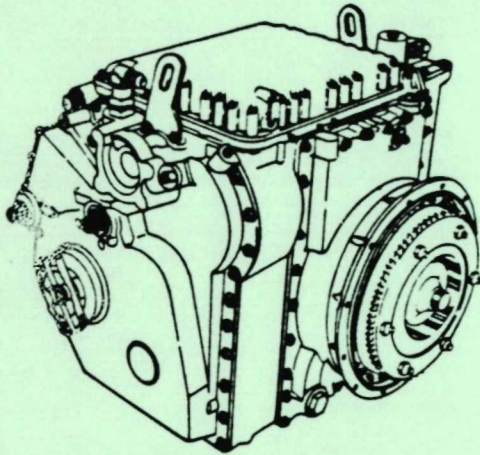


**TECHNICAL MANUAL**

**INTERMEDIATE, DIRECT, AND  
GENERAL SUPPORT  
MAINTENANCE MANUAL  
(INCLUDING REPAIR PARTS AND  
SPECIAL TOOLS LIST)**



**CROSS DRIVE TRANSMISSION  
W/CONTAINER**

**MODEL X200-4**

**NSN 2520-01-201-4784**

**DETROIT DIESEL ALLISON  
DIVISION, GMC**

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**WARNING**

To troubleshoot transmission, stop engine before installing or removing pressure gages from transmission.

Use extreme care when making pressure checks on transmission with vehicle in motion. Watch for pivot steer.

Perform tests outdoors or in a well-ventilated area to avoid illness or death caused by inhalation of carbon monoxide from the engine exhaust.

Dry cleaning solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 138°F (50°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Compressed air used for testing or cleaning purposes must not exceed 30 pounds of pressure per square inch. Use only with effective chip guards and protective personal equipment including goggles or face shield and gloves. Never blow compressed air toward another person.

Hot equipment, hot parts, and steam can burn you. To avoid injury, use with effective personal protective equipment (goggles, face shield gloves, etc.). Always wear leather gloves when working with steam equipment to protect you from parts that are or might be hot. Never point a steam hose toward another person.

Shipping container will normally have up to one psi internal differential pressure, but high ambient temperature and check valve malfunction may cause increased pressure within the container. Opening a pressurized container may cause bodily injury. To avoid injury, be sure internal and external pressures have been equalized.

Check slings and lifting devices for cuts, breaks, or wear before hoisting transmission and during hoisting. Slings and lifting devices can break and cause injury or death.

Transmission weighs about 910 pounds (413 kg). Transmission and container weigh about 1500 pounds (680 kg). To avoid injury or death, keep out from under and clear of transmission at all times. Do not let transmission swing freely during hoisting.

Adapter plate weighs 127 pounds (58 kg). Lift plate with hoist to avoid injury.



WARNING

When rotating transmission vertical to horizontal position, weight of transmission is transferred from one sling to the other. When the center of gravity shifts, transmission may suddenly tilt, thrusting heavy momentary stress on sling and hoist. To avoid injury or death, keep out from under and clear of transmission at all times.

Spring-loaded parts can fly and injure you. Always follow specified instructions when removing bolts from covers that are attached to valve assemblies.

Heavy parts must be lifted using sling and hoist. To avoid injury, keep clear of parts at all times. Do not let parts swing freely during hoisting.

Do not rotate transmission on maintenance stand with input housing removed. Bevel gear assembly will fall and could cause injury.

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

Frozen parts can stick to your fingers and cause serious injury. Always wear leather gloves when working with parts that have been frozen in dry ice.

Tribasic sodium phosphate can burn eyes and cause skin irritation. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Flush skin with water. Wash clothing before reuse.



HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C.

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

CROSS DRIVE TRANSMISSION WITH CONTAINER  
X200-4 (NSN 2520-01-201-4784)

REPORTING 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 procedures, please let us know. Mail your letter DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to:

ATTN: AMSTA-MB  
Commander  
U.S. Army Tank-Automotive Command  
Warren, MI 48397-5000

A reply will be furnished to you.

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## HOW TO USE THIS MANUAL

### OVERVIEW

This manual has been prepared to tell you how to perform Direct and General Support maintenance on the Detroit Diesel Allison Model X200-4 cross drive transmission. Your success in accomplishing your assigned tasks depends very much upon how well you learn to use this manual.

- You must make yourself familiar with every part of the manual before beginning any troubleshooting or maintenance assignments.
- It is particularly important for you to understand and remember the contents of Chapter 3, General Maintenance Instructions, before doing any work on the transmission.
- You must familiarize yourself with the entire maintenance procedures before beginning the maintenance task.

### FRONT COVER

An index on the front cover provides you with a quick reference to some of the most important areas of the manual. This index is arranged by subject and page number, in page number order.

### INSIDE THE FRONT COVER

Warnings are placed in the manual when you are about to do something which could injure or kill you or someone else. Always take the precautions described in the warnings. A summary of warnings used throughout the manual begins inside the front cover of the manual. For your safety and the safety of others around you, be sure you understand all of these warnings.

### TABLE OF CONTENTS

This table of contents lists the main subjects of the manual and shows the page number where each begins. These main subjects are made up of chapters, section, appendixes, the glossary and the alphabetical index.

Chapter Headings. Some main topics are listed in the table of contents by chapter only; other topics show chapter and section numbers. When the table of contents shows only the chapter for a subject, you will find a chapter index in the manual on the page where the chapter begins. This chapter index will guide you to the subjects in that chapter.

For example, the table of contents shows no sectional divisions under Chapter 3, General Maintenance Instructions. When you go to the beginning of Chapter 3 on page 3-1 you will find a chapter index guiding you to all of the topics within Chapter 3.

Section Headings. When the table of contents shows section headings beneath the chapter heading, all indexes in the chapter are located with the section headings; there will not be a chapter index.

## HOW TO USE THIS MANUAL (Continued)

Look at Chapter 4, Transmission Maintenance Procedures, in the table of contents. There are four sections shown in this chapter. There will be no chapter index; all indexes are with the sectional headings. When you turn to page 4-1, there will be an index, but it will be for Section I instead of for the chapter.

## INTRODUCTION

The introduction to the manual provides you with general information about the transmission and pictorially identifies major assemblies and subassemblies of the transmission.

Nomenclature Cross-Reference List. Sometimes a part is generally known by a common name which is not the same as the formal name used in the Repair Parts and Special Tools List (RPSTL). When maintenance procedures use the common name for a part, the Nomenclature Cross-Reference List, page 1-2, will usually provide the formal name for the part as shown in the RPSTL.

For example, the name used by maintenance personnel for the hydrostatic pump and motor assembly is "hydrostat." The RPSTL calls this unit "hydrostatic pump and motor" (assembly). If you were to look in the RPSTL for "hydrostat" and did not find it, then you would go to the Nomenclature Cross-Reference List to determine what the part is called in the RPSTL.

There are a few common terms which will not appear in the nomenclature Cross-Reference List and they will not appear in the RPSTL. One of these terms is "range pack," meaning all of the parts in one area of the transmission (mostly clutch assemblies) which function individually or collectively to vary the speed and power output or to change forward-reverse direction. Since the term "range pack" is a collective term applying to several parts and assemblies in the RPSTL, it has no specific RPSTL equivalent. Therefore, the term "range pack" will appear in the glossary only. If you encounter a term which is not shown in the Nomenclature Cross-Reference List or the RPSTL, check the glossary.

Equipment Data. An equipment data list provides particulars about the transmission such as input horsepower, ratios of forward and reverse ranges, oil capacity and transmission weight.

## TROUBLESHOOTING

Troubleshooting, or fault-identification, enables maintenance personnel to systematically accomplish the following:

- Determine probable cause of transmission malfunction based upon symptoms provided by operating personnel.
- Go through a series of logical checks and tests to verify probable cause for malfunction, or to identify unknown causes.
- Determine what parts need to be replaced or repaired, or what area of the transmission requires maintenance action.



## HOW TO USE THIS MANUAL (Continued)

Troubleshooting usually begins with symptoms reported by operating personnel. Most troubleshooting is performed by Organization maintenance personnel acting upon symptoms reports. However, Direct Support personnel are responsible for verification of any diagnosis made by Organization. In addition, certain troubleshooting activities are authorized for Direct Support, such as testing solenoids and wiring harness after removal of the transmission top cover. Organization troubleshooting as verified by Direct Support, and Direct Support troubleshooting, provide General Support maintenance personnel with diagnosis of transmission malfunction or failure.

Troubleshooting authorized for this manual begins with reported symptoms of transmission malfunction and takes into consideration troubleshooting previously done at another level. All troubleshooting in the manual is classified by symptom (the symptom encountered at operation level). Look for the symptom in the Symptom Index located in Chapter 2, Troubleshooting Procedures. The symptom index will guide you to the page where the troubleshooting procedure for this symptom is located.

The troubleshooting procedure tells you what tools to use, how to use them, and what results to look for at each step. According to results you obtain from each inspection or test, troubleshooting instructions will take you to additional inspections or tests, or to a maintenance procedure in Chapter 4, Transmission Maintenance Procedures.

Suppose that you are responsible for maintaining and repairing transmissions. A transmission assigned to you has paperwork identifying the symptom and it tells you what troubleshooting has been done, with the results. What do you do? During training they told you the surest and quickest way to fix your transmission was by using your manual, so you grab your manual.

How do you start? Turn to the cover of your manual. On the right side you will find a listing for "TROUBLESHOOTING PROCEDURES." It tells you to go to page 2-1.

On page 2-1 you will find an index with the listing "Symptom Index." It tells you to go to page 2-2. What kind of problem do you have? Open your manual to page 2-2. In the Symptom Index find the listing for your symptom. Next to the symptom is the page number of the troubleshooting procedure that will help you solve your problem.

How do you determine what is causing your problem? Turn to the page directed by the Symptom Index. You will find there the troubleshooting procedure you need.

The troubleshooting procedure has columns with headings: MALFUNCTION, TEST OR INSPECTION, CORRECTIVE ACTION. The PRELIMINARY TROUBLESHOOTING information at the beginning of the procedure tells you the results of troubleshooting action already taken by Organization maintenance personnel.

Starting at Step 1, procedures tell you what additional direct support troubleshooting action you can take and what to look for as a result. Procedural steps, including tests and pressure checks, continue until you reach the point where you can be told to go to a specific maintenance procedure in Chapter 4 to fix the transmission.

## HOW TO USE THIS MANUAL (Continued)

## GENERAL MAINTENANCE INSTRUCTIONS

Chapter 3, General Maintenance Instructions (GMI) provides general instructions which are applicable to all areas of troubleshooting and transmission maintenance. A chapter index is provided to guide you to specific maintenance instructions such as cleaning, inspecting and mandatory replacement parts.

Maintenance instructions in the GMI are always used repeatedly throughout all of your work on the transmission. Most of the instructions in the GMI are not repeated in Chapter 4, Transmission Maintenance Procedures. It would be laborious for you to read through the standard cleaning and inspection steps every time you removed something from the transmission. For that reason, certain general procedures which are used over and over are provided only once -- in the GMI. These general procedures are just as much a part of transmission maintenance procedures as the maintenance procedures provided in Chapter 4. The difference is that procedures in Chapter 4 are provided for you where needed; you will have to apply Chapter 3 procedures to Chapter 4 tasks from your memory.

When procedures provided in the GMI (such as cleaning or inspection) are not adequate for a maintenance task, then specific instructions will be provided in the text of the Chapter 4 maintenance procedures. For example, acceptability of a part that you have removed from the transmission may depend upon certain dimensions obtained by measurement during inspection. In such event, specific inspection instructions will be provided in Chapter 4 where used.

## TRANSMISSION MAINTENANCE PROCEDURES

Maintenance procedures in Chapter 4 begin with removing the transmission from the container. They proceed in logical sequence until the transmission has been completely disassembled, repaired and assembled. Maintenance procedures are organized in the following order:

- Disassembling the transmission into major assemblies (Section II).
- Assembling the transmission from major assemblies (Section II).
- Disassembling, repairing and assembling the major assemblies (Section IV).

The section index will guide you to the page for each procedural paragraph within that section. Procedural paragraphs are numbered in sequence throughout Chapter 4. Each paragraph is identified by a paragraph number and the name of a major maintenance procedure.

Procedural paragraphs are divided into tasks. The actual maintenance work is performed from instructions at the task level. Tasks are named and numbered sequentially throughout the paragraph and they are arranged in logical disassembly, repair or assembly order.

A paragraph index is located on the first page of each procedural paragraph. The index provides the number and name of each task within the paragraph and the page where the task begins.



## HOW TO USE THIS MANUAL (Continued)

The initial setup page (first page) of each task provides a list of COMMON TOOLS you will need to perform the task. These common tools are listed by description.

SPECIAL TOOLS, when required, are listed by noun, manufacturer's code (FSCM) and manufacturer's part number.

FABRICATED TOOLS (locally manufactured), when required, are listed by noun and referenced to Appendix D of the manual where instructions for making the tools are provided.

All repair parts are listed in the RPSTL. In addition, mandatory replacement parts are listed under REPAIR PARTS on the initial setup page for each task, when required.

Expendable items are listed under SUPPLIES by noun and quantity (when the quantity is more than one). Each supply item is referenced to Appendix C where all expendables are listed. For example, the notation "(Item 8, Appendix C)" following the name of a supply item means that the description of the item is located on the list of expendable items, Appendix C, under item 8.

Special conditions, such as unusual environmental conditions, are shown in a NOTE before procedural steps begin. The most common note regarding special conditions occurs in procedures when the transmission is mounted on the maintenance stand.

Procedures which must be accomplished before you can perform your assigned maintenance task are shown on the initial setup page under PRELIMINARY PROCEDURES. Usually, PRELIMINARY PROCEDURES will show only one procedure to be done just before your assigned task. When you go back to the task shown in PRELIMINARY PROCEDURES, you will find another preliminary procedure in that task. This arrangement of cross-referencing tasks with preliminary tasks continues in sequence until you get back to the very first task required.

Additional procedures which must be accomplished after your assigned task has been completed are shown under FOLLOW-ON PROCEDURES. For example, after each "remove" task the equivalent "install" task will be shown in FOLLOW-ON PROCEDURES, identified by paragraph number, name and task number.

When repairable parts are removed, a REPAIR reference is entered beneath the removal procedure directing you to the paragraph number, name and task number where repair instructions are provided.

## FINAL ADJUSTMENTS AND PREPARATION FOR STORAGE OR SHIPMENT

After the transmission has been repaired, preliminary brake adjustment must be made by torque wrench check before the transmission is placed in the container. The torque wrench brake check is provided in Chapter 5. (Final brake adjustment and steering adjustment are performed by Organization maintenance after the transmission has been installed in the vehicle.)

Chapter 5 also contains procedures to enable you to install the transmission in the container in preparation for storage or shipment.

## HOW TO USE THIS MANUAL (Continued)

## REFERENCES TO OTHER PUBLICATIONS

Appendix A provides a reference list of other manuals or publications which may provide additional information for your maintenance tasks.

## REPAIR PARTS AND SPECIAL TOOLS LIST

Appendix B lists and illustrates all of the parts of the transmission; codes parts for procurement, level of maintenance and level of disposal when an item is no longer serviceable; lists and illustrates special tools; contains a National Stock Number (NSN) index and a part number index. A description of each section of the RPSTL is provided on page B-1 in the manual.

How to Use the RPSTL for Maintenance Procedures. The RPSTL is designed so that you can find parts whether you know the NSN, the manufacturer's part number, or if you have no identification number.

If you know the NSN, go to RPSTL page I-1, locate the NSN and obtain the Figure and Item numbers shown for that NSN. Next, go to the illustrated parts in Section II of the RPSTL. Parts are grouped by function and they are illustrated in consecutively numbered figures. Go through the illustrations until you come to a page with your figure number shown at the bottom of the illustration.

Next, look at the illustration and find the item number you want in the callouts. Verify that the item number you obtained points to the part you want in the illustration. If it does, then go to the printed page following the illustration and, using your item number, find the SMR code (explained on page B-2), FSCM code (explained on page B-5), manufacturer's part number, name of the part and quantity used.

For example, suppose that you know that the NSN of a part is 5330-00-001-4904 and you need more information about the part.

Go to page I-1 and find 5330-00-001-4904 in the column under the heading "STOCK NUMBER." To the right of the STOCK NUMBER column there are two columns, one headed FIG. and the other ITEM. Look to the right of your number 5330-000-001-4904 and see 16 in the FIG. column and 12 in the ITEM column. You now need to locate Figure 16, Item 12 in the illustrated parts list.

Go back to Section II where parts are illustrated and locate the illustration with "Figure 16. Forward Clutch" under the picture. Find item number 12 in the illustration and see if it looks like the part you want. If item 12 does not look like the part you want, you may have a wrong NSN, or you need to recheck the index to make sure you obtained the correct figure and item number for NSN 5330-00-001-4904.



## HOW TO USE THIS MANUAL (Continued)

If the part shown for Item 12 looks like the part you want, go to page 16-1 following Figure 16 and go down the ITEM NO column (Col. 1) to number 12. To the right of item number 12 is SMR code PAHZZ. To the right of PAHZZ is FSCM code 73342. To the right of 73342 is part number 8623101. To the right of 8623101 is the part name: Seal, outer. The quantity (QTY) column shows a requirement for 1.

If you do not know the NSN for a part, but you have the manufacturer's part number, locate the manufacturer's part number in the RPSTL index. The STOCK NUMBER column beside the PART NUMBER column will provide you with the NSN.

If you do not know the NSN and you do not know the manufacturer's part number, thumb through the illustrated parts section of the RPSTL until you come to the functional group you need. Look for an illustration that has the part you need, then take the item number shown in the illustration for that part; make a note of the figure number shown at the bottom of the illustration. Go back to the index beginning at RPSTL page I-1 and search through the index pages until you find your figure and item number in the FIG and ITEM columns. The NSN, manufacturer's part number and FSCM will be listed on the line with your figure and item number.

## EXPENDABLE SUPPLIES AND MATERIALS LIST

Appendix C lists petrolatum, wiping rags and similar items which are used in repairing the transmission. Expendable items are called out under SUPPLIES on initial setup pages in maintenance procedures where reference is provided to the location of the expendable item in Appendix C. For example, "(Item 8, Appendix C)."

## ILLUSTRATED LIST OF MANUFACTURED ITEMS

Appendix D provides information for making locally fabricated items. These items are called out on the initial setup pages of procedures under FABRICATED TOOLS where reference is made to the appendix, such as "(Refer to Appendix D)."

This appendix contains procedures and illustrations to manufacture the required part. A cross-reference is provided in the appendix to show the paragraph number and paragraph name in the maintenance procedures where the tool will be used.

## GLOSSARY

The glossary contains abbreviations, terms and definitions which may be unique to transmissions. Words or terms which are generally understood among maintenance personnel are not listed in the glossary.

## CHAPTER I

### INTRODUCTION

#### Section I. GENERAL INFORMATION

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#### 1-1. SCOPE

Type of Manual. Direct Support and General Support Maintenance and RPSTL.

Model No. and Equipment Name. X200-4 Hydromechanical Cross Drive Transmission.

Purpose of Equipment. Transmits power from engine to final drive. Provides steering and braking.

Equipment Applications. Transmission Model X200-4 is part of the vehicle drive system in the following:

- M730A2 Guided Missile Equipment Carriers which are in the RISE (Reliability Improvement of Selected Equipment) Vehicle Program.
- M113A3 Full Tracked Armored Personnel Carrier.

#### 1-2. MAINTENANCE FORMS, RECORDS AND REPORTS

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

#### 1-3. PREPARATION FOR STORAGE OR SHIPMENT

Prepare the transmission for storage or shipment per instructions in Chapter 5 of this manual.



#### 1-4. NOMENCLATURE CROSS-REFERENCE LIST

This list matches common names used in this manual with official nomenclature used in description column of Repair Parts and Special Tools List (RPSTL), Appendix B.

<u>Common Name</u>	<u>Official Nomenclature</u>
hydrostat	hydrostatic pump and motor assembly
thrust washer	thrust washer bearing
clutch backing plate	clutch disk
external-tanged clutch plate	clutch disk
reaction plate	clutch disk
internal-splined clutch plate	clutch disk
friction-faced clutch plate	clutch disk
lube tube	metallic tube
scavenge tube	metallic tube
filter-in tube	metallic tube
filter-out tube	metallic tube
sump communication tube	metallic tube
range input shaft	shouldered shaft
cam shaft	control cam
helical coil insert	screw thread insert
petroleum jelly	petrolatum

#### 1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your transmission 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. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at:

Commander  
U.S. Army Tank-Automotive Command  
AMSTA-QRT  
Warren, Michigan 48397-5000

We'll send you a reply.

#### 1-6. FUNCTIONS OF THE TRANSMISSION

Vehicle Drive Power. Power is transmitted from engine to transmission through the torque converter. The torque converter is a fluid coupling and torque multiplier. The increased torque from the torque converter is extended through selected planetary gears to output shafts.

Left and right output shafts transmit power to the final drive assemblies. The final drive units operate sprocket drive shafts for left and right tracks.

A clutch arrangement in the transmission enables gear selection.

Steering. Steering is accomplished through the transmission.

Braking. Braking is accomplished through the transmission.

## 1-7. TRANSMISSION OPERATION

Transmission operating procedures are included in vehicle operation manuals. Refer to TM 9-1450-300-10 or TM 9-2350-277-10.

## 1-8. TRANSMISSION REMOVAL AND INSTALLATION

Procedures to remove and install the transmission are included in vehicle maintenance manuals. Refer to TM 9-1450-300-34 or TM 9-2350-277-34.

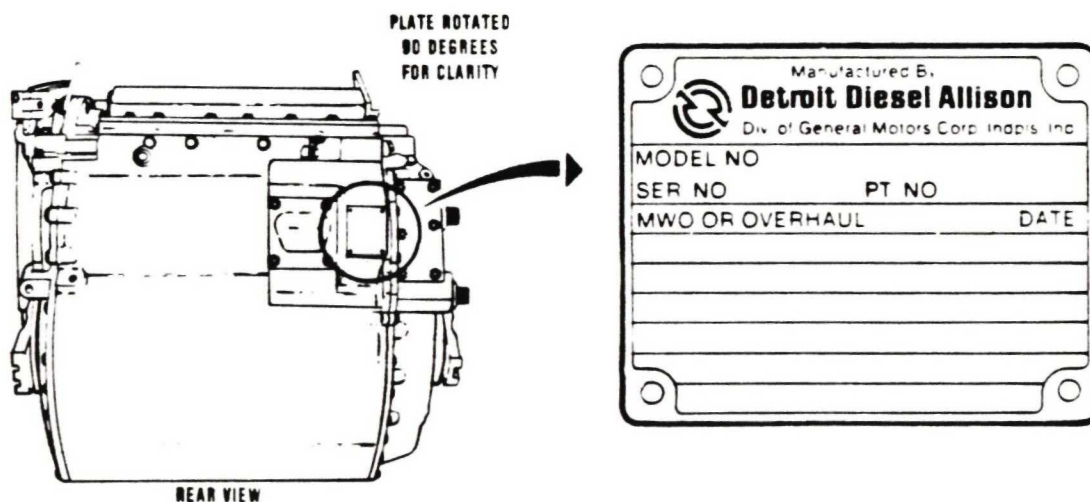
## 1-9. IDENTIFICATION PLATE, MWO/OVERHAUL DATA PLATE

Identification Plate. The transmission identification plate is located in the upper right quadrant on the rear side of the transmission.

MWO/Overhaul Data Plate. Part of the identification plate. Each transmission overhaul shall be recorded on this plate. Minimum information to be recorded is:

- Initials of overhaul facility.
- Serial number of transmission.
- Identification of any MWO applied.
- Date of overhaul or MWO application.

Replace Identification, MWO/Overhaul Data Plate. Refer to paragraph 4-29 REPAIR CENTER HOUSING COMPONENTS, TASK 8, for instructions to remove or install the identification plate.



TAM5501

Fig. 1-2. Location and View of Identification Plate



## Section II. LOCATION AND DESCRIPTION OF MAJOR TRANSMISSION ASSEMBLIES

Paragraph	Title	Page
I-10	Major Assemblies of the Transmission	I-4

## I-10. MAJOR ASSEMBLIES OF THE TRANSMISSION

Transmission Top Cover Assembly. Covers the control valve assemblies. Contains push-start control rod and houses the vacuum modulator.

Control Valve Assemblies. Include the valves, springs, and other components which control the selection of ranges and automatic shifting of gears. The control valve assemblies are mounted on the separator plate and oil transfer plate assembly at the top of the transmission center housing.

Separator Plate, Oil Transfer Plate Assembly. Channel oil between control valve assemblies and transmission center housing.

Left End Cover Assembly. Covers range gears, range pack, and hydrostatic gears. Contains oil filter and filter cover, output shaft, and coupling that transfers power to final drive.

Right End Cover Assembly. Covers left brake assembly, governor body, equalizer valve, steer shaft and gears, range output gears, and hydrostatic drive gear. Contains right brake assembly, steer gears, brake apply shafts for left and right brakes, brake apply valve, brake coolant valve, right brake adjust access cover, and output coupling that transfers power to final drive.

Torque Converter Components. The torque converter consists of three elements: pump assembly, stator assembly, and turbine assembly. The pump assembly is driven by the engine through the flywheel. The turbine assembly is the output element. The stator assembly is the reaction (torque-multiplying) element.

Input Housing Assembly. Covers the bevel gear assembly and the hydrostatic pump and motor steer control assembly. Houses the torque converter components. Contains port for steer shaft and access port for steering adjustment.

Bevel Gear Assembly. Contains bevel gears for transfer of power to left and right sides in cross-drive system. Houses and drives oil pumps and houses push-start valve.

Hydrostatic Pump and Motor Assembly. Power steering unit. The steer control assembly must be removed in order to remove the hydrostat from the transmission. External gears are removed when the hydrostat is replaced. Otherwise, the hydrostat is not dealt with at the Direct and General Support maintenance level.

Center Housing Assembly. The main part of the transmission. Channels oil to various assemblies and houses all major transmission assemblies. Contains drilled and tapped bosses on bottom for mounting transmission to maintenance stand.

1-10. MAJOR ASSEMBLIES OF THE TRANSMISSION (Continued)

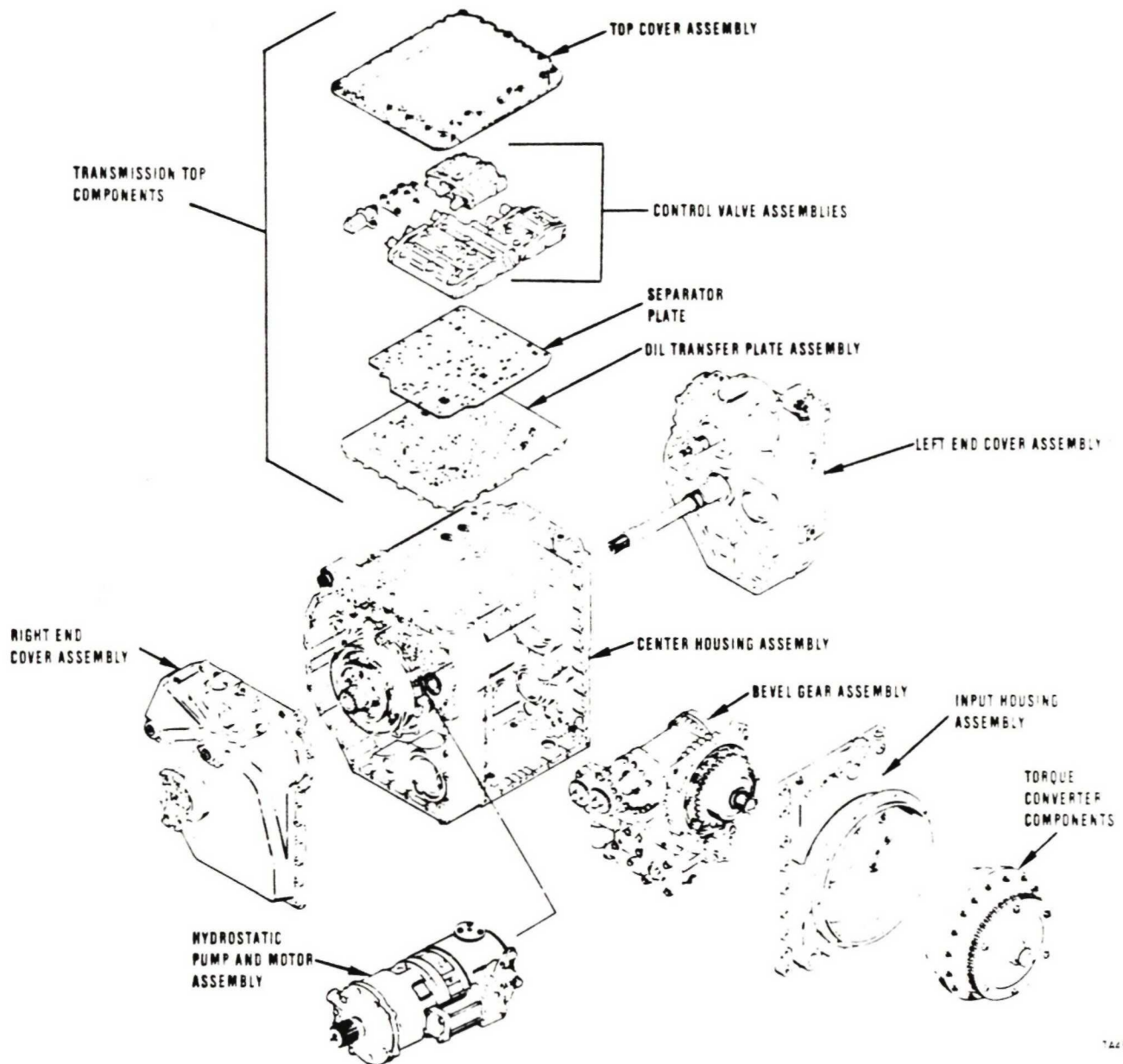


Fig. 1-3. Major Assemblies of the Transmission



## Section III. LOCATION OF MAJOR ASSEMBLIES

Paragraph	Title	Page
1-11	Transmission Top Components	1-6
1-12	Major Components of the Right End Cover Assembly	1-7
1-13	Major Components of the Left End Cover Assembly	1-8
1-14	Major Components of the Torque Converter and Input Housing Assembly	1-9
1-15	Major Components of the Bevel Gear Assembly	1-10
1-16	Major Components of the Center Housing, Left Side	1-11
1-17	Major Components of the Center Housing, Right Side	1-12

## 1-11. TRANSMISSION TOP COMPONENTS

The functional components on top of the transmission are control valve assemblies and solenoids. All components must be removed from the top of the transmission prior to removal of the range pack. Sensor tubes and bolts extending into the range pack are accessed from the top of the center housing, beneath transmission top components.

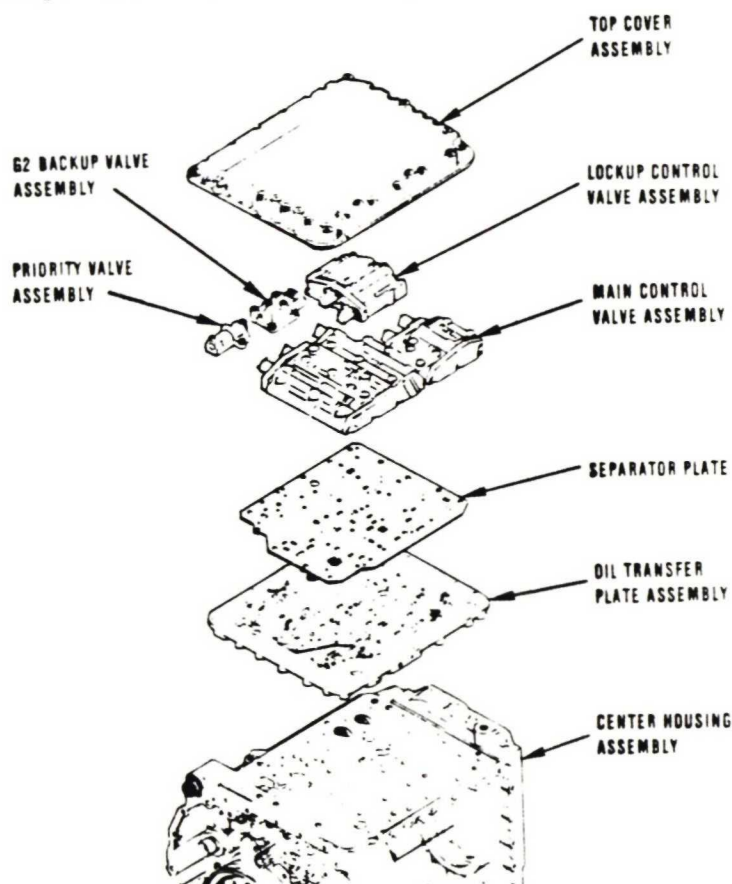
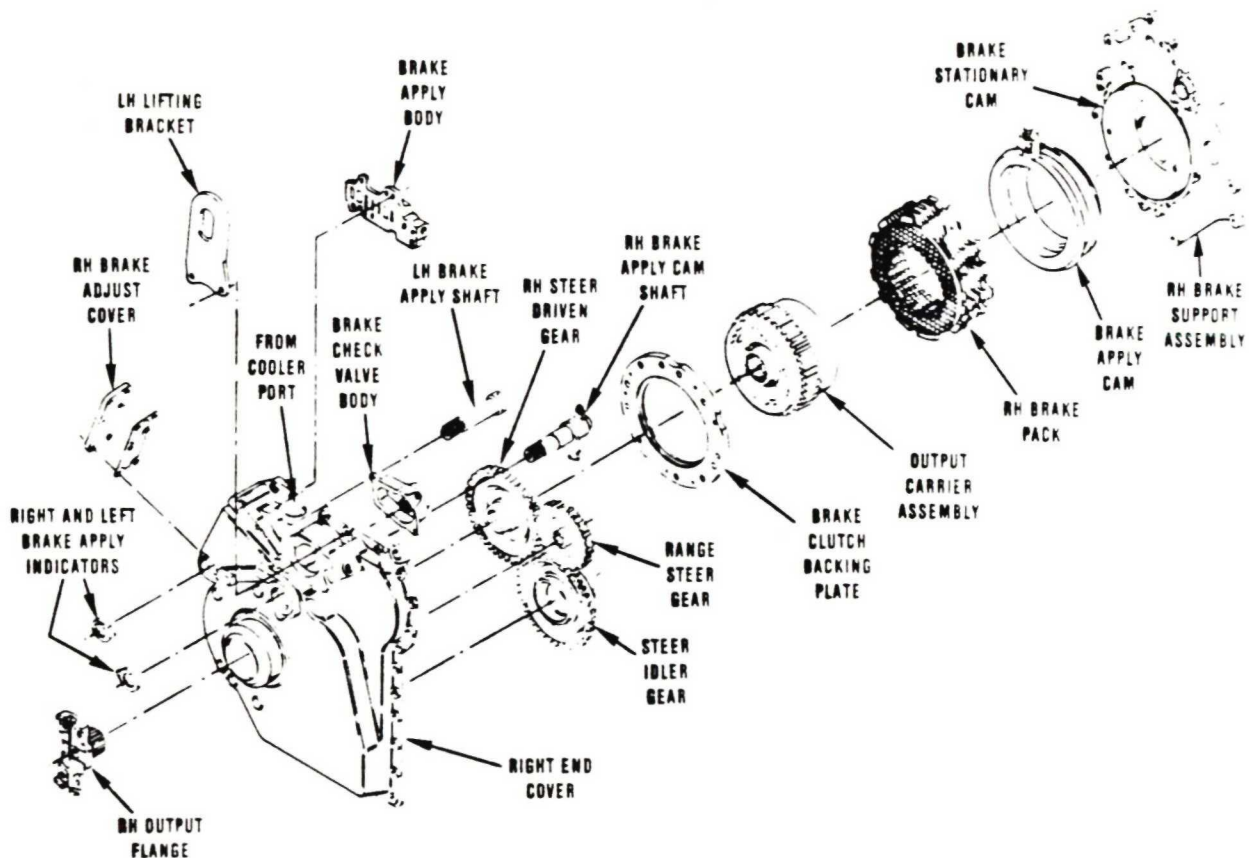


Fig. 1-4. Exploded View of Major Top Components

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## 1-12. MAJOR COMPONENTS OF THE RIGHT END COVER ASSEMBLY

The right brake apply shaft and an extension of the left brake apply shaft connect to external brake control linkage. The right output flange connects to final drive linkage. The majority of right end cover internal components relate to the right brake or steering components.



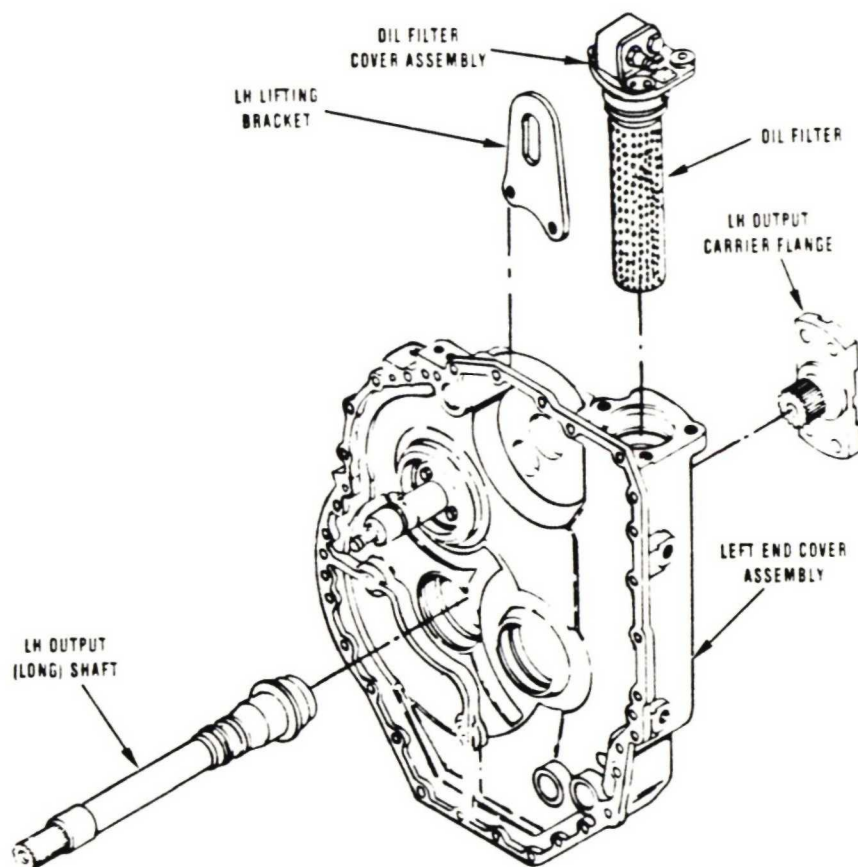
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Fig. 1-5. Exploded View of Major Components  
Right End Cover Assembly



### 1-13. MAJOR COMPONENTS OF THE LEFT END COVER ASSEMBLY

The left end cover assembly houses the oil filter. The left output flange connects to final drive linkage.



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Fig. 1-6. Exploded View of Major Components  
Left End Cover Assembly

# 1-14. MAJOR COMPONENTS OF THE TORQUE CONVERTER AND INPUT HOUSING ASSEMBLY

The converter pump cover and ring gear are splined to the flywheel of the vehicle engine, which transfers power from the engine to the converter components. A shaft extends from the bevel gear assembly through the input housing and into the converter. This turbine shaft transmits power from the torque converter to the bevel gear assembly.

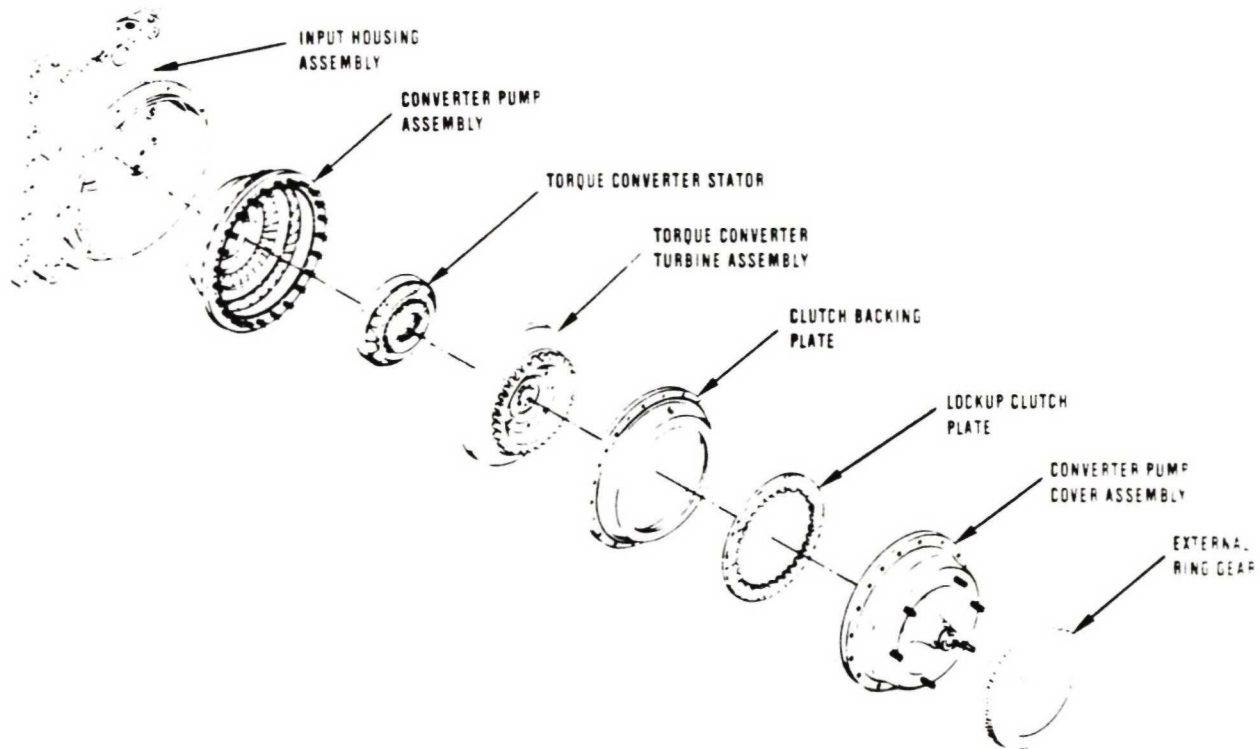
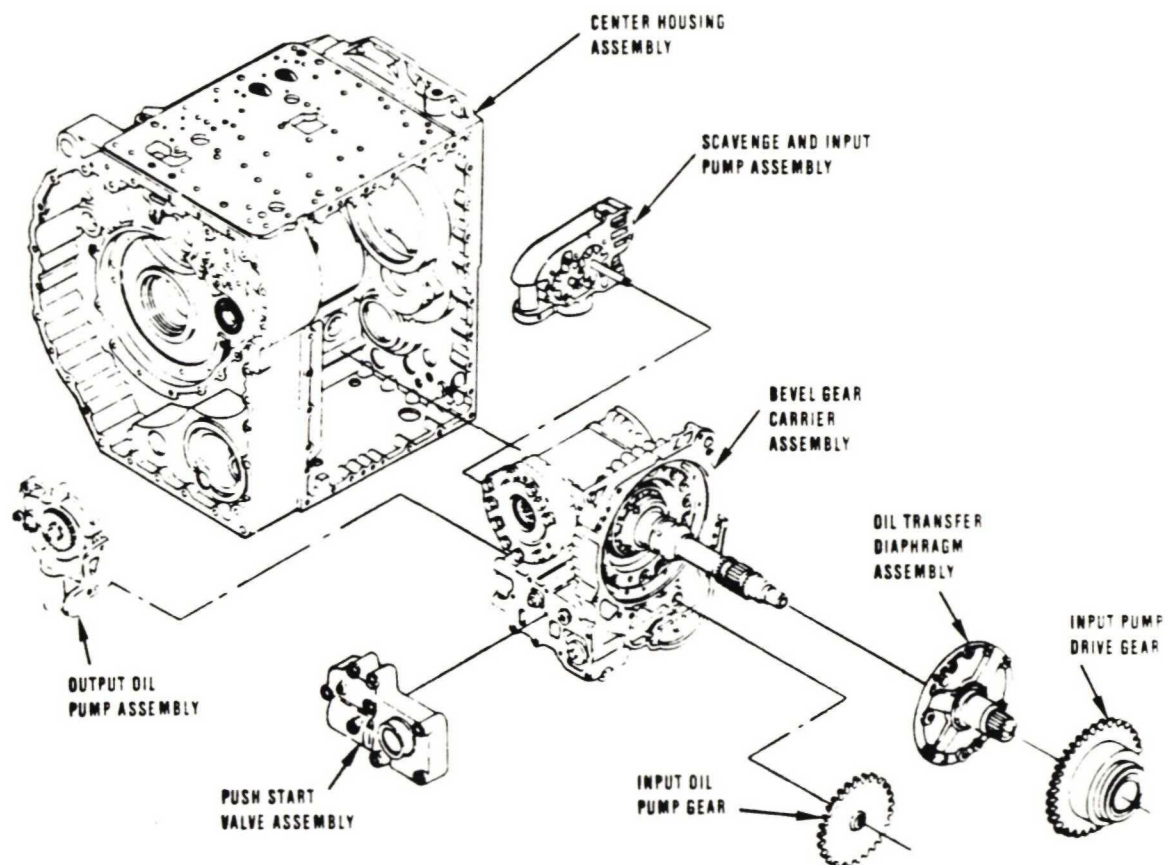


Fig. 1-7. Input Housing and Exploded View of the Torque Converter



## 1-15. MAJOR COMPONENTS OF THE BEVEL GEAR ASSEMBLY

The following illustration shows most of the bevel gear assembly components which are removed and installed at the Direct and General Support level of maintenance.



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Fig. 1-8. Exploded View of Bevel Gear Assembly Components

# 1-16. MAJOR COMPONENTS OF THE CENTER HOUSING, LEFT SIDE

The main items in the left side of the transmission make up the range pack. The range pack is a group of clutch assemblies and planetary gear assemblies which enable transmission speed and power output to be changed. The range pack also enables the vehicle to move in forward or reverse direction.

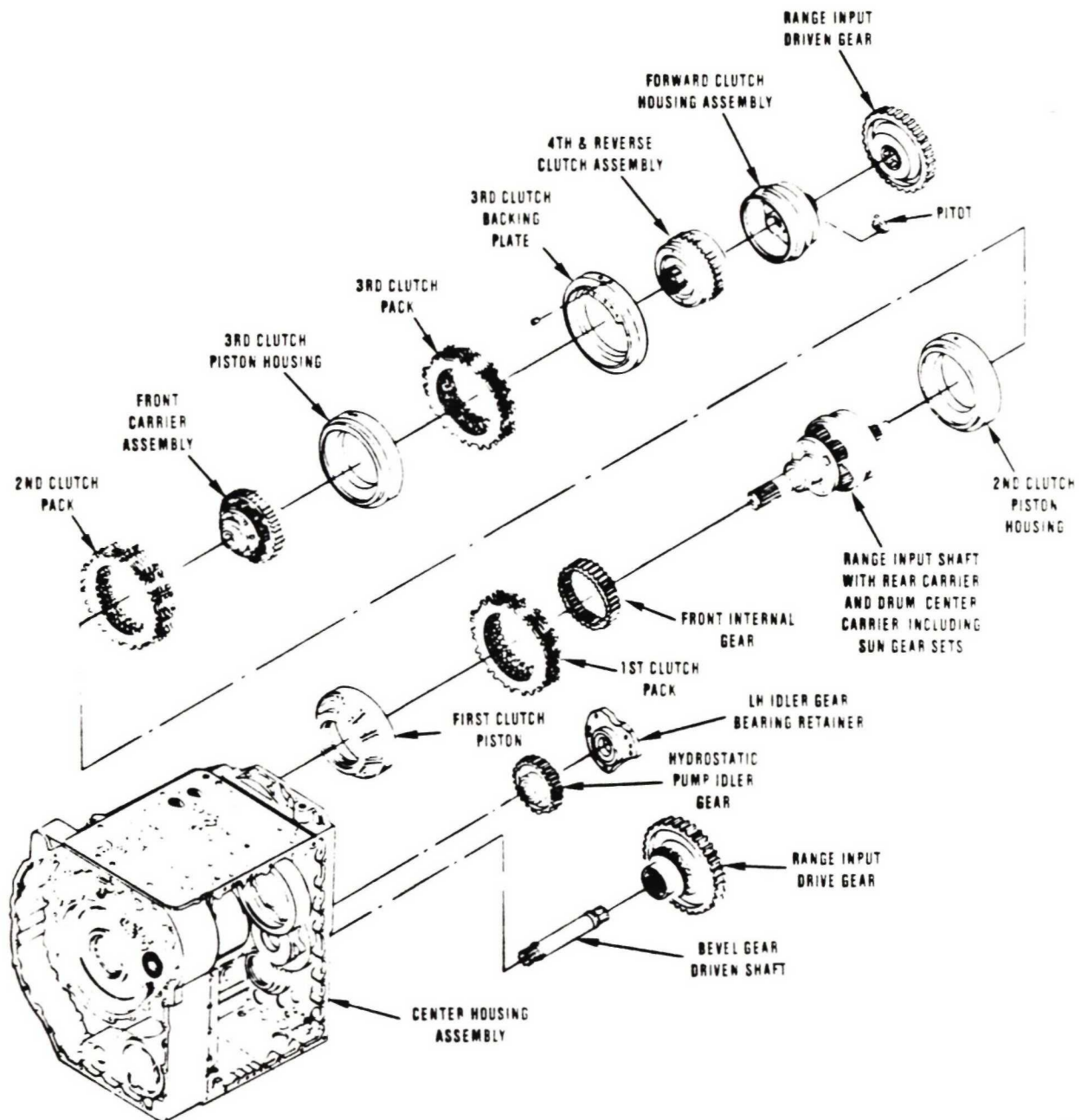


Fig. 1-9. Exploded View of Major Components--  
Left Side of Center Housing Assembly



# 1-17. MAJOR COMPONENTS OF THE CENTER HOUSING, RIGHT SIDE

The main item in the right side of the center housing is the left brake assembly. The governor is housed in the right side. The hydrostat, right output shaft and sump communication tube are removed from this side of the center housing.

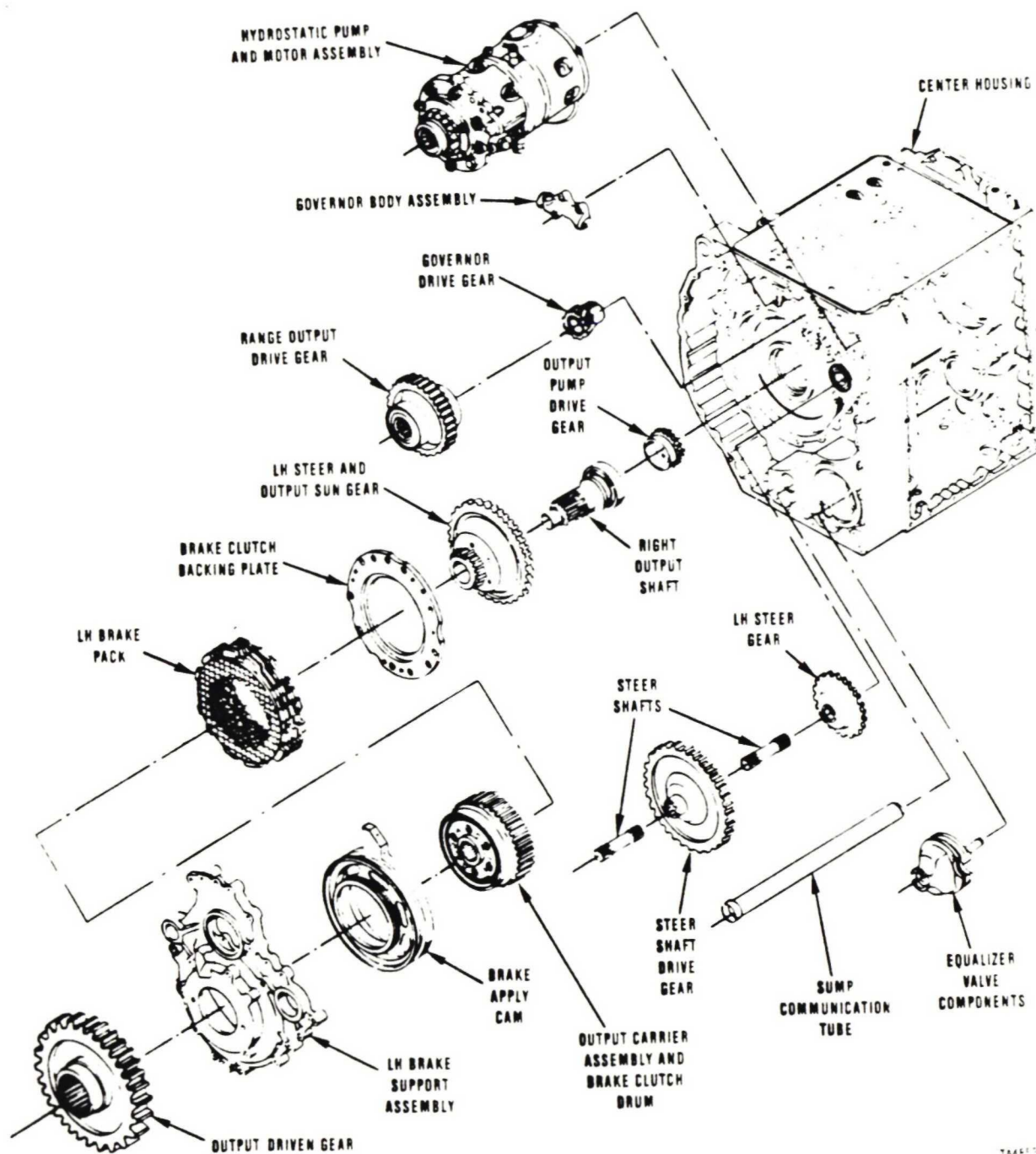


Fig. 1-10. Exploded View of Major Components--  
Right Side of Center Housing Assembly

## Section IV. EQUIPMENT DATA

Paragraph	Title	Page
1-18	Transmission Data	1-13

## 1-18. TRANSMISSION DATA

Operator's instructions are located in vehicle operation manuals. Reference to the appropriate vehicle technical manual is in Appendix A, References.

MANUFACTURER	Detroit Diesel Allison Division, GMC
MODEL	X200-4
RATINGS:	
Input horsepower, net (max.)	265
Input speed	2800 rpm
Gross vehicle weight	30,000 pounds at 40 mph
HYDRAULIC TORQUE CONVERTER:	
Type	Single stage, three element, polyphase
Stall torque ratio	3.32:1
Lockup clutch	Automatic second through fourth range
GEARING TYPE	Constant mesh, spur type, planetary
RANGES	Four forward, one reverse
Ratios:	
First	4.16:1
Second	2.34:1
Third	1.46:1
Fourth	1.04:1
Reverse	6.62:1
STEERING TYPE	Infinitely variable, hydrostatically controlled differential
Range:	Minimum Steer Ratio:
First	2.31:1
Second	1.58:1
Third	1.32:1
Fourth	1.22:1
Neutral	Pivot



**1-18. TRANSMISSION DATA (Continued)**

<b>BRAKES</b>	
Type	Multiple wet plate
Service apply	Hydraulic with mechanical actuation
Parking/emergency apply	Mechanical back-up service brakes
<b>DECELERATION RATE</b>	
16 feet/second/second	
<b>OIL SYSTEM:</b>	
Capacity	12 gallons
Sump	Integral
Filter	Integral, two stage with differential pressure warning switch and automatic bypass
<b>WEIGHT (DRY)</b>	
with container	910 pounds Approximately 1500 pounds

**Section V. CONTAINER**

Paragraph	Title	Page
1-19	Purpose and Description of Container	1-14

**1-19. PURPOSE AND DESCRIPTION OF CONTAINER**

The transmission is installed in a protective container for storage or shipment. Desiccant (Item 7, Appendix C) is placed within the container to absorb moisture. The container has a humidity indicator, an air release valve, and a desiccant receptacle. It is equipped for handling by forklift.

**Basic container data:**

<b>DIMENSIONS:</b>	
Height	42.64 inches
Width	48.56 inches
Depth	44.75 inches
<b>WEIGHT:</b>	
Empty	Approximately 500 pounds
With transmission	Approximately 1500 pounds

# 1-19. PURPOSE AND DESCRIPTION OF CONTAINER (Continued)

The transmission is installed in the container and removed from the container by Direct Support maintenance personnel.

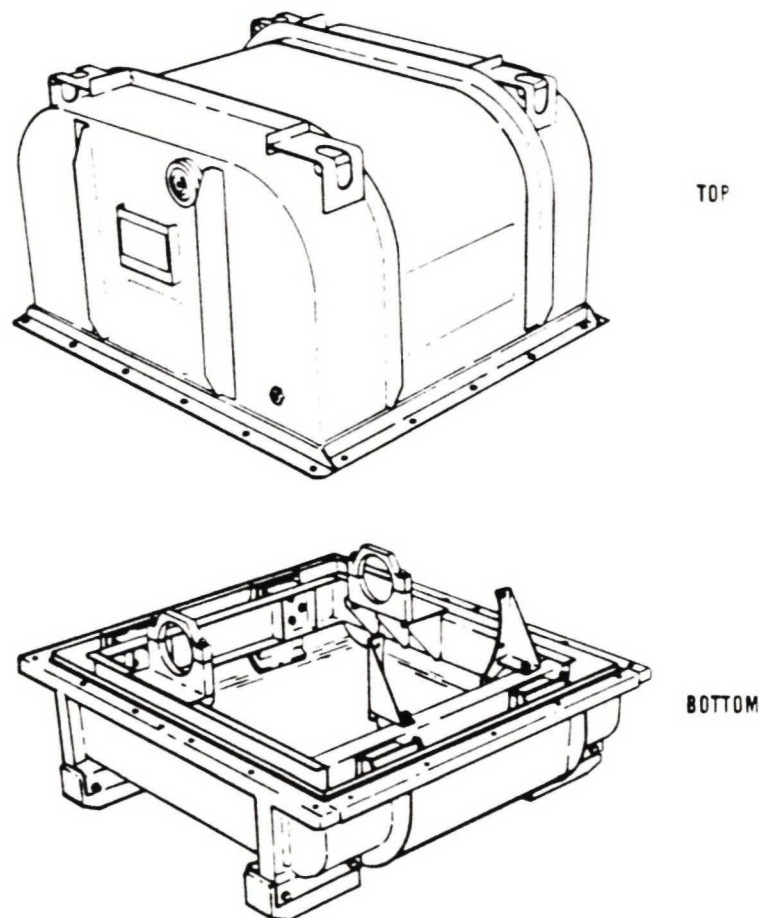


Fig. 1-11. External View of Container Top, Internal View of Container Bottom



## CHAPTER 2

### TROUBLESHOOTING PROCEDURES

#### OVERVIEW

Troubleshooting is a logical, systematic search for the cause(s) of malfunction(s). Direct Support troubleshooting of the transmission can only be performed with the transmission installed in the vehicle.

#### NOTE

When troubleshooting is performed with the transmission in a vehicle, the information in this manual will be used in conjunction with the information contained in the applicable - 20 level vehicle manual.

The purpose of troubleshooting is to establish the nature and extent of repair required to return the transmission to serviceable condition. Thorough troubleshooting before the transmission is removed from the vehicle may reveal malfunctions external to the transmission. Correction of such external malfunctions may prevent the unnecessary effort of removing the transmission.

Troubleshooting by a Direct Support shop is necessary to verify the diagnosis made before the transmission was removed. Such troubleshooting may be the only means of uncovering all defects in a transmission received in an unserviceable condition from another activity.

Troubleshooting may be necessary to determine the cause when a repaired transmission fails to perform properly.

Paragraph	Title	Page
2-1	Preliminary Inspection	2-1
2-2	Malfunction, Test or Inspection, and Corrective Action	2-2
2-3	Symptom Index	2-2
2-4	Malfunction, Test or Inspection, and Corrective Action Procedures	2-3
2-5	Solenoid Testing Procedures	2-15
2-6	Pressure Checking Procedures	2-17

#### 2-1. PRELIMINARY INSPECTION

##### CAUTION

Maintenance personnel must have a thorough knowledge of vehicle operation before attempting to troubleshoot an installed transmission. The purpose and use of all operator controls must be thoroughly understood. Refer to the technical manual for the vehicle, TM 9-1450-300-10 (M730A2 vehicle) or TM 9-2350-277-10 (M113A3 vehicle), for all procedures concerning the operation of the vehicle.

Verification of all preliminary checks at crew and organization level should be made.

If preliminary troubleshooting of the vehicle is not conclusive, refer to organizational manual TM 9-1450-300-20 (M730A2 vehicle) or TM 9-2350-277-20 (M113A3 vehicle) for preliminary inspections.

**2-2. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION**

Troubleshooting procedures are provided in Malfunction, Test, or Corrective Action. The most likely malfunction symptoms to be encountered have been listed, followed by tests and inspections to determine the probable cause and the recommended corrective action.

To use this information, first find the malfunction symptom that best describes the actual condition. Perform the tests and inspections to determine the probable cause and make the corrections indicated. If no cause is found or corrective action does not resolve the problem, proceed to the malfunction symptom that next best describes the condition.

**2-3. SYMPTOM INDEX**

Symptom Number	Description of Malfunction	Page
1	Vehicle Moves With Shift Lever At N	2-3
2	Vehicle Does Not Move With Shift Lever At R, Normal Operation In All Other Shift Lever Positions	2-5
3	Vehicle Does Not Move Forward In Any Shift Lever Forward Position, Normal Operation In All Other Shift Lever Positions	2-6
4	Vehicle Does Not Move In Any Shift Lever Position	2-7
5	Transmission Does Not Hold In 1st Range With Shift Lever At 1	2-8
6	Transmission Does Not Hold In 2nd Range With Shift Lever At 1-2	2-10
7	Transmission Does Not Hold In 3rd Range With Shift Lever At 1-3	2-11
8	Transmission Does Not Upshift	2-12
9	Transmission Does Not Downshift	2-12
10	Transmission Shifts Are Erratic	2-12
11	Vehicle Does Not Attain High Speed	2-13
12	Differential Pressure Light Is On	2-14

## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES

---

MALFUNCTION	
	TEST OR INSPECTION
	CORRECTIVE ACTION

---

## 1. VEHICLE MOVES WITH SHIFT LEVER AT N

PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:

- Shift tower circuit breaker tripped when vehicle harness connector at transmission was connected to transmission, or,
- Circuit breaker operation and voltages at vehicle harness connector at transmission were normal.

Step 1. With master switch at OFF, disconnect vehicle harness connector from transmission. Perform resistance checks to ground (Pin H) and solenoid pins B, D and E (Neutral Range). Pin designations match actuating solenoids B, D and E. Resistance reading must be 60-80 ohms.

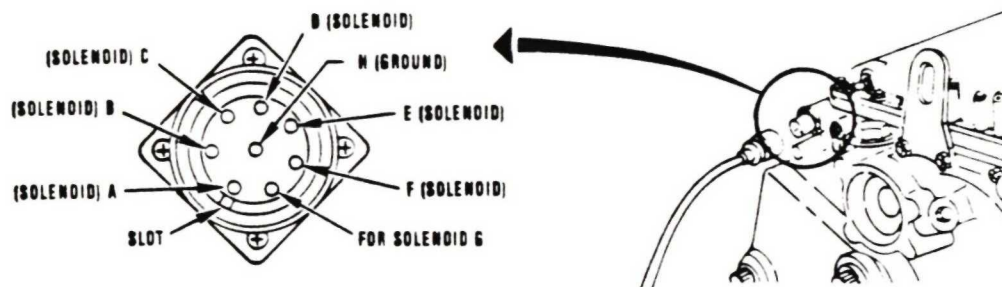


TABLE 3-1

- a. If solenoid resistances are normal, go to Step 3.
- b. If solenoid resistance at pin B, D or E is outside of specified limits, go to Step 2.



## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

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### 1. VEHICLE MOVES WITH SHIFT LEVER AT N (Continued)

- Step 2. Check transmission harness and solenoid assembly to determine location of defect. Remove top cover in accordance with para. 4-5.
- a. Check resistance of solenoids B, D and E in accordance with para. 2-5. Resistance reading must be 60-80 ohms.
  - b. If solenoid assembly(ies) is/are defective, replace solenoid assembly(ies) in accordance with para. 4-31 and go to Step 3.
  - c. If solenoid assembly(ies) check good, repair harness in accordance with para. 4-31 or replace harness in accordance with para. 4-5 and go to Step 3.
- Step 3. Check vehicle operation with engine speed at 1000 rpm and shift lever at N.
- a. If vehicle does not move with shift lever at N, return vehicle to service.
  - b. If vehicle moves with shift lever at N, replace lockup control valve assembly in accordance with para. 4-5 and go to Step 4.
- Step 4. Recheck vehicle operation.
- a. If vehicle does not move with shift lever at N, return vehicle to service.
  - b. If vehicle moves with shift lever at N, transmission is defective beyond the level of Direct Support Maintenance. Separate transmission from power pack in accordance with procedures in TM 9-1450-300-34 or TM 9-2350-277-34 and send to General Support.

GENERAL SUPPORT. The following maintenance action is indicated:

#### Repair Area:

A problem in the range clutch area of the transmission is indicated, with the probability that the forward (C-1) or the fourth-reverse (C-2) clutch in combination with the first (C-5) clutch and related components are affected.

#### Repair Procedure Reference:

Refer to para. 4-28 for all range clutch maintenance tasks.

## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

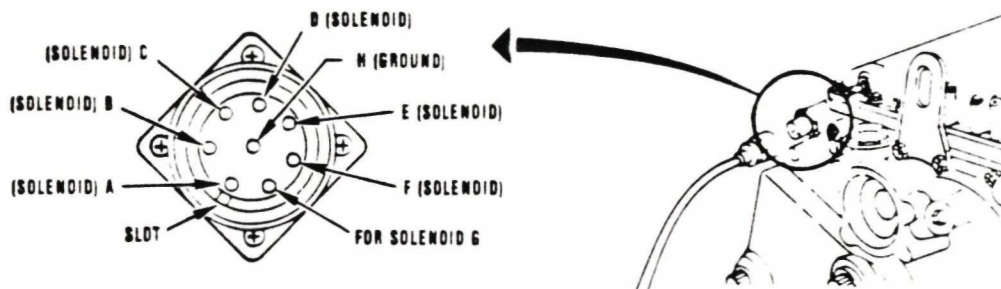
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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### 2. VEHICLE DOES NOT MOVE WITH SHIFT LEVER AT R, NORMAL OPERATION IN ALL OTHER SHIFT LEVER POSITIONS

PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:

- Proper voltages were present at vehicle harness connector at transmission.

Step 1. With master switch at OFF, disconnect vehicle harness connector from transmission. Perform resistance checks to ground (Pin H) and solenoid pins B, C and E (Reverse Range). Pin designations match actuating solenoids B, C and E. Resistance readings must be 60-80 ohms.



- If solenoid resistances are normal, replace control valve assembly in accordance with para. 4-5 and go to Step 3.
- If solenoid resistance at pin B, C, or E is outside of specified limits, go to Step 2.

Step 2. Troubleshoot transmission harness and solenoid assemblies to determine defect location. Remove control valve assembly cover in accordance with para. 4-5.

- Check resistance of solenoids B, C and E in accordance with para. 2-5. Resistance reading must be 60-80 ohms.
- If solenoid assembly(ies) is defective, replace solenoid assembly(ies) in accordance with para. 4-31 and go to Step 3.
- If solenoid assembly(ies) check good, repair harness in accordance with para. 4-31 or replace harness in accordance with para. 4-5 and go to Step 3.

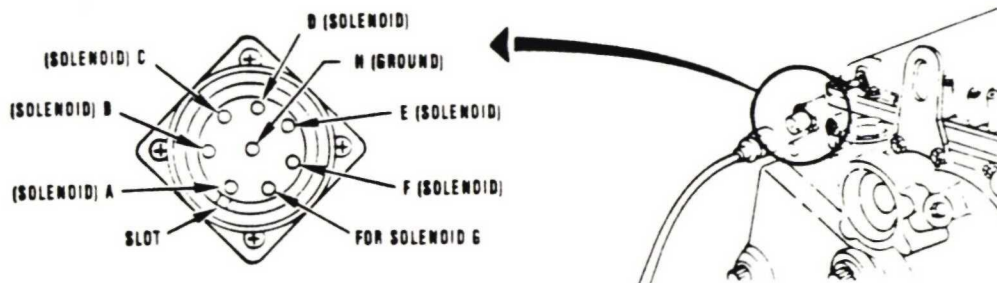
Step 3. Check vehicle operation.

## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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3. VEHICLE DOES NOT MOVE FORWARD IN ANY SHIFT LEVER FORWARD POSITION, NORMAL OPERATION IN ALL OTHER SHIFT LEVER POSITIONS  
PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:
  - Proper voltages were present at vehicle harness connector at transmission.

Step 1. With master switch at OFF, disconnect vehicle harness connector from transmission. Perform resistance checks to ground (Pin H) and solenoid A (Forward Range). Pin designation matches actuating solenoid A. Resistance reading must be 60-80 ohms.



- a. If solenoid resistance is normal, replace control valve assembly in accordance with para. 4-5 and go to Step 3.
- b. If solenoid resistance at pin A is outside of specified limits, go to Step 2.

- Step 2. Troubleshoot transmission harness and solenoid assembly to determine defect location. Remove top cover in accordance with para. 4-5.
- a. Check resistance of solenoid A in accordance with para. 2-5. Resistance reading must be 60-80 ohms.
  - b. If solenoid assembly is defective, replace solenoid assembly in accordance with para. 4-31 and go to Step 3.
  - c. If solenoid assembly checks good, repair harness in accordance with para. 4-31 or replace harness in accordance with para. 4-5 and go to Step 3.



## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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### 3. VEHICLE DOES NOT MOVE FORWARD IN ANY SHIFT LEVER FORWARD POSITION, NORMAL OPERATION IN ALL OTHER SHIFT LEVER POSITIONS (Continued)

Step 3. Check vehicle operation.

- If operation is normal, return vehicle to service.
- If original symptom is still present, transmission is defective beyond the level of Direct Support Maintenance. Separate transmission from power pack in accordance with TM 9-1450-300-34 or TM 9-2350-277-34 and send to General Support.

GENERAL SUPPORT. The following maintenance action is indicated:

#### Repair Area:

A problem in the range clutch area of the transmission is indicated, with the probability that the fourth-reverse (C-2) clutch and related components are affected.

#### Repair Procedure Reference:

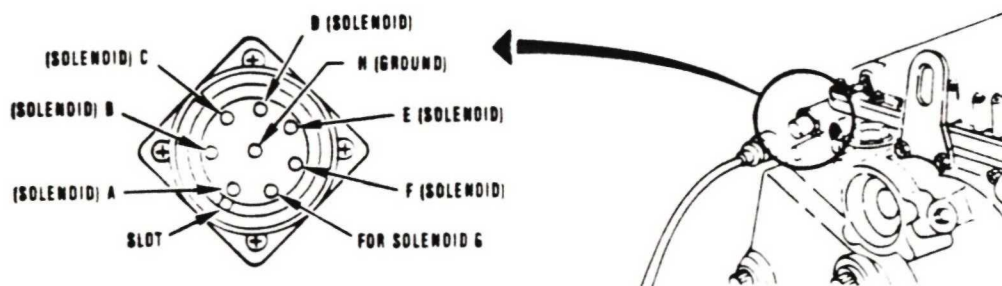
Refer to para. 4-28 for fourth-reverse (C-2) clutch maintenance tasks.

### 4. VEHICLE DOES NOT MOVE IN ANY SHIFT LEVER POSITION

PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:

- Shift tower circuit breaker tripped when vehicle harness connector at transmission was connected to transmission, or,
- Circuit breaker operation, voltages at vehicle harness connector at transmission, and main pressure were normal.

Step 1. With master switch at OFF, disconnect vehicle harness connector at transmission. Perform resistance checks to ground (Pin H) and solenoid pins B, C and E (Reverse Range) and A and C (Forward Range). Pin designations match actuating solenoids A, B, C and E. Resistance reading must be 60-80 ohms.



2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES  
(Continued)

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MALFUNCTION  
TEST OR INSPECTION  
CORRECTIVE ACTION

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4. VEHICLE DOES NOT MOVE IN ANY SHIFT LEVER POSITION (Continued)

- a. If solenoid resistances are normal, replace lockup control valve assembly in accordance with para. 4-5 and go to Step 3.
- b. If any solenoid resistance is outside of specified limits, go to Step 2.

Step 2. Troubleshoot transmission harness and solenoid assembly(ies) to determine defect location. Remove top cover in accordance with para. 4-5.

- a. Check resistance of solenoids B, C and E (Reverse) and A and C (Forward) in accordance with para. 2-5. Resistance reading must be 60-80 ohms.
- b. If solenoid assembly(ies) is defective, replace solenoid assembly(ies) in accordance with para. 4-31 and go to Step 3.
- c. If solenoid assembly(ies) check good, repair harness in accordance with para. 4-31 or replace harness in accordance with para. 4-5 and go to Step 3.

Step 3. Check vehicle operation.

- a. If vehicle operation is normal, return vehicle to service.
- b. If original symptom is still present, defect is beyond the level of Direct Support Maintenance. Separate transmission in accordance with TM 9-1450-300-34 or TM 9-2350-277-34 and send to General Support.

GENERAL SUPPORT. The following maintenance is indicated:

Repair Area:

A problem in the range clutch area of the transmission is indicated, with the probability that the forward (C-1) clutch and fourth-reverse (C-2) clutch and related components are affected.

Repair Procedure Reference:

Refer to para. 4-28 for clutch maintenance tasks.

5. TRANSMISSION DOES NOT HOLD IN 1ST RANGE WITH SHIFT LEVER AT 1

PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:

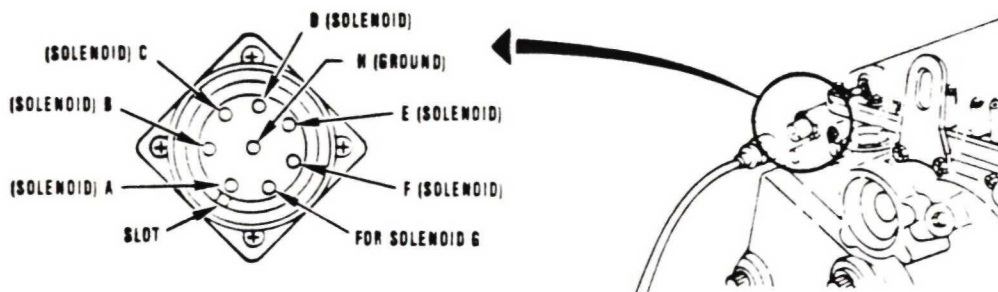
- Voltages at vehicle harness connector at transmission were normal, and/or,
- Original symptom still present after governor two (G2) assembly was replaced.

## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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### 5. TRANSMISSION DOES NOT HOLD IN 1ST RANGE WITH SHIFT LEVER AT 1 (Continued)

- Step 1. With master switch at OFF, disconnect vehicle harness connector from transmission. Perform resistance checks to ground (Pin H) and solenoid pin E (Hold 1st). Pin designation matches actuating solenoid E. Resistance reading must be 60-80 ohms.



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- a. If solenoid resistance is normal, replace control valve assembly in accordance with para. 4-5 and go to Step 3.
- b. If solenoid resistance is outside of specified limits, go to Step 2.

- Step 2. Troubleshoot transmission harness and solenoid assembly to determine defect location. Remove top cover in accordance with para. 4-5.
- a. Check resistance of solenoid E (Hold 1st) in accordance with para. 2-5. Resistance reading must be 60-80 ohms.
  - b. If solenoid assembly is defective, replace solenoid assembly in accordance with para. 4-31 and go to Step 3.
  - c. If solenoid assembly checks good, repair harness in accordance with para. 4-31 or replace harness in accordance with para. 4-5 and go to Step 3.

- Step 3. Check vehicle operation.

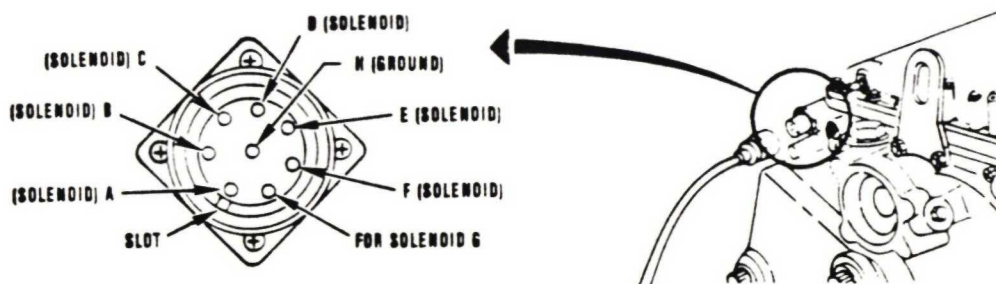


## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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6. TRANSMISSION DOES NOT HOLD IN 2ND RANGE WITH SHIFT LEVER AT 1-2  
PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:
- Voltage at vehicle harness connector at transmission is normal, and/or,
  - Original symptom still present after governor two (G2) assembly replaced.

Step 1. With master switch at OFF, disconnect vehicle harness connector from transmission. Perform resistance checks to ground (Pin H) and solenoid pins E and G (Hold 2nd). Pin designations match actuating solenoids E and G. Resistance reading must be 60-80 ohms.



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- If solenoid resistances are normal, replace control valve assembly in accordance with para. 4-5 and go to Step 3.
- If solenoid resistance is outside of specified limits, go to Step 2.

Step 2. Troubleshoot transmission harness and solenoid assembly to determine defect location. Remove top cover in accordance with para. 4-5.

- Check resistance of solenoids E and G (Hold 2nd) in accordance with para. 2-5. Resistance reading must be 60-80 ohms.
- If solenoid assembly(ies) is defective, replace solenoid(s) in accordance with para. 4-31 and go to Step 3.
- If solenoid assembly(ies) checks good, repair harness in accordance with para. 4-31 or replace harness in accordance with para. 4-5 and go to Step 3.

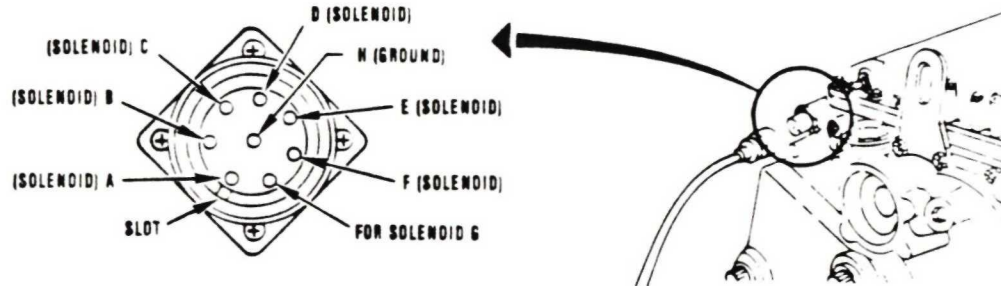
Step 3. Check vehicle operation.

## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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7. TRANSMISSION DOES NOT HOLD IN 3RD RANGE WITH SHIFT LEVER AT 1-3  
PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:
- Voltages at vehicle harness connector at transmission were normal, and/or,
  - Original symptom still present after governor two (G2) assembly replacement.

Step 1. With master switch at OFF, disconnect vehicle harness connector from transmission. Perform resistance checks to ground (Pin H) and solenoid pins E, G and F (Hold 3rd). Pin designations match actuating solenoids E, G and F. Resistance reading must be 60-80 ohms.



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- If solenoid resistances are normal, replace control valve assembly in accordance with para. 4-5 and go to Step 3.
- If any solenoid resistance is outside of specified limits, go to Step 2.

Step 2. Troubleshoot transmission harness and solenoid assembly to determine defect location. Remove top cover in accordance with para. 4-5.

- Check resistance of solenoids E, G and F (Hold 3rd) in accordance with para. 2-5. Resistance reading must be 60-80 ohms.
- If solenoid assembly(ies) is defective, replace solenoid(s) in accordance with para. 4-31 and go to Step 3.
- If solenoid assembly(ies) checks good, repair harness in accordance with para. 4-31 or replace harness in accordance with para. 4-5 and go to Step 3.

Step 3. Check vehicle operation.

## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

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### 8. TRANSMISSION DOES NOT UPSHIFT

PRELIMINARY TROUBLESHOOTING. Organization maintenance determined:

- Throttle modulator and associated linkage operated properly.
- Throttle valve (TV) pressure was outside of specified limit.

Step 1. Replace control valve assembly in accordance with para. 4-5 and check TV pressure in accordance with para. 2-6 with engine running at 2500 rpm and shift lever at N. TV pressure must be 91-97 psi (627-669 kPa).

- a. If TV pressure is within limits, go to Step 2.
- b. If TV pressure is outside of specified limits, replace separator plate and gasket in accordance with para. 4-5 and check TV pressure in accordance with para. 2-6 with engine running at 2500 rpm and shift lever at N. TV pressure must be 91-97 psi (627-669 kPa). Go to Step 2.

Step 2. Check vehicle operation.

### 9. TRANSMISSION DOES NOT DOWNSHIFT

PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:

- Governor two (G2) pressure was normal.

Step 1. Replace control valve assembly in accordance with para. 4-5.

Step 2. Check vehicle operation.

### 10. TRANSMISSION SHIFTS ARE ERRATIC

PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:

- With throttle modulator and associated linkage operating properly, TV pressure increased erratically as throttle was increased, or,
- Throttle modulator and associated linkage, TV pressure, and governor two (G2) pressure were normal with original symptom still present.

Step 1. Replace control valve assembly in accordance with para. 4-5.

Step 2. Check vehicle operation.

- a. If vehicle operation is normal, return vehicle to service.
- b. If vehicle shifts remain erratic, transmission is defective beyond the level of Direct Support Maintenance. Separate transmission in accordance with TM 9-1450-300-34 or TM 9-2350-277-34 and send to General Support.



## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

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### MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

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#### 10. TRANSMISSION SHIFTS ARE ERRATIC (Continued)

GENERAL SUPPORT. The following maintenance action is indicated:

**Repair Area:**

A problem in the range clutch area of the transmission is indicated, with the probability that the forward (C-1) clutch and related components are affected.

**Repair Procedure Reference:**

Refer to para. 4-28 for forward (C-1) clutch maintenance tasks.

#### 11. VEHICLE DOES NOT ATTAIN HIGH SPEED

PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:

- Brake release was normal and complete.
- Lockup pressure was outside of specified limits.

Step 1. Replace lockup control valve assembly in accordance with para. 4-5 and check lockup pressure in accordance with para. 2-6 while operating vehicle on level, flat terrain with engine speed at 2500 rpm and shift lever at 1-4 position. Lockup pressure must be 140-160 psi (965-1103 kPa).

- a. If lockup pressure is normal, go to Step 5.
- b. If lockup pressure is outside of specified limits, replace control valve assembly in accordance with para. 4-5 and go to Step 2.

Step 2. Recheck lockup pressure.

- a. If lockup pressure is normal, go to Step 5.
- b. If lockup pressure is outside of specified limits, go to Step 3.

Step 3. Check governor one (G1) pressure in accordance with para. 2-6 with engine speed at 2000 rpm and shift lever at 1-4 position. Operate vehicle over level, flat terrain. G1 pressure must be 72-84 psi (496-579 kPa).

- a. If G1 pressure is normal, go to Step 4.
- b. If G1 is outside of specified limits, transmission is defective beyond the level of Direct Support Maintenance. Separate transmission from power pack in accordance with TM 9-1450-300-34 or TM 9-2350-277-34 and send to General Support.

2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES  
(Continued)

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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

11. VEHICLE DOES NOT ATTAIN HIGH SPEED (Continued)

- Step 4. Check pitot signal tubes and O-rings.  
Clean tubes and replace O-rings in accordance with para. 4-28. Recheck lockup pressure. (Follow task procedures in Step 1.)
- If lockup pressure is normal, go to Step 5.
  - If lockup pressure is outside of specified limits, transmission is defective beyond the level of Direct Support Maintenance. Separate transmission from power pack in accordance with TM 9-1450-300-34 or TM 9-2350-277-34 and send to General Support.
- Step 5. Check vehicle operation.
- If vehicle operation is normal, return vehicle to service.
  - If original symptom is still present, transmission is defective beyond the level of Direct Support Maintenance. Separate transmission from power pack in accordance with TM 9-1450-300-34 or TM 9-2350-277-34 and send to General Support.

GENERAL SUPPORT. The following maintenance action is indicated:

Repair Area:

A problem in the torque converter area of the transmission is indicated, with the probability that the lockup clutch and related components are affected.

A problem in the range clutch area of the transmission is indicated, with the probability that the fourth-reverse (C-2) clutch and related components are affected.

Repair Procedure Reference:

Refer to para. 4-9 for lockup clutch maintenance tasks. Refer to para. 4-28 for fourth-reverse (C-2) clutch maintenance tasks.

12. DIFFERENTIAL PRESSURE LIGHT IS ON

PRELIMINARY TROUBLESHOOTING. Organizational maintenance determined:

- Removed oil filter element. Element had large quantity of debris.

Step 1. Remove valve body cover in accordance with para. 4-5 and examine area under the cover.

- If noticeable amounts of debris are present in and about valve bodies, reinstall cover. Separate transmission from power pack in accordance with TM 9-1450-300-34 or TM 9-2350-277-34 and send to General Support.

## 2-4. MALFUNCTION, TEST OR INSPECTION, AND CORRECTIVE ACTION PROCEDURES (Continued)

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

### 12. DIFFERENTIAL PRESSURE LIGHT IS ON (Continued)

GENERAL SUPPORT. The following maintenance action is indicated:

Repair Area:

A problem in the range clutch area of the transmission is indicated, with the probability that the forward (C-1) through first (C-5) clutch and related components are affected. Complete tear-down of the transmission is required.

### 2-5. SOLENOID TESTING PROCEDURES

#### NOTE

Solenoid test procedures are identical for all troubleshooting symptoms.  
Solenoid designations will vary between malfunctions.

#### COMMON TOOLS:

Multimeter

#### Troubleshooting References

Malfunction 1, Step 2  
Malfunction 2, Step 2  
Malfunction 3, Step 2  
Malfunction 4, Step 2  
Malfunction 5, Step 2  
Malfunction 6, Step 2  
Malfunction 7, Step 2

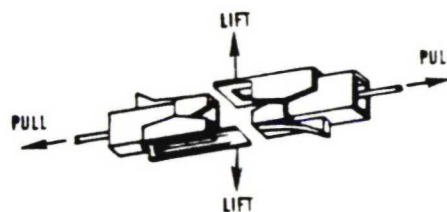
PRELIMINARY PROCEDURE: Top cover is removed. Refer to para. 4-5.



## 2-5. SOLENOID TESTING PROCEDURES (Continued)

Location/Item	Action
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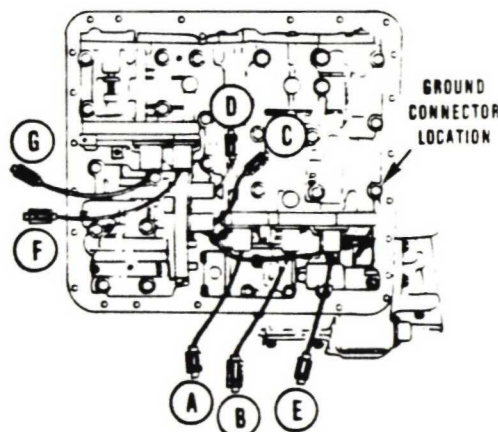
1. Disconnect solenoid wire leads of solenoid(s) to be checked from subject symptom. Solenoid identification is stamped on the harness lead connector.



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2. Measure resistance through each subject solenoid wire connector to ground connector location

60-80 ohms means solenoid is good. If solenoid resistance is not within limits, replace solenoid in accordance with para. 4-31.



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3. After checking solenoid(s) identified in troubleshooting step, use test results in the next block of instruction in the troubleshooting malfunction sequence

## 2-6. PRESSURE CHECKING PROCEDURES

### INITIAL SETUP

#### COMMON TOOLS:

- Wrench, combination, 9/16 inch
- Wrench, combination, 7/16 inch

#### Troubleshooting References

- Malfunction 8, Step 1
- Malfunction 11, Step 1
- Malfunction 11, Step 3

#### SPECIAL TOOLS:

- Pressure gage set, 0-300 psig
- Tester, oil pressure (19207) 11650182

#### EQUIPMENT CONDITION:

- Covers open for access to transmission.
- Engine stopped to install gages.
- Engine running for pressure checks.

#### SPECIAL ENVIRONMENTAL CONDITIONS:

- Perform tests outdoors or in a well-ventilated area.

#### GENERAL SAFETY INSTRUCTIONS:

#### WARNING

- Stop engine before installing or removing pressure gages.
- Use extreme care when making pressure checks with vehicle in motion. Watch for pivot steer.
- Perform tests outdoors or in a well-ventilated area to avoid illness or death caused by inhalation of carbon monoxide from the engine exhaust.

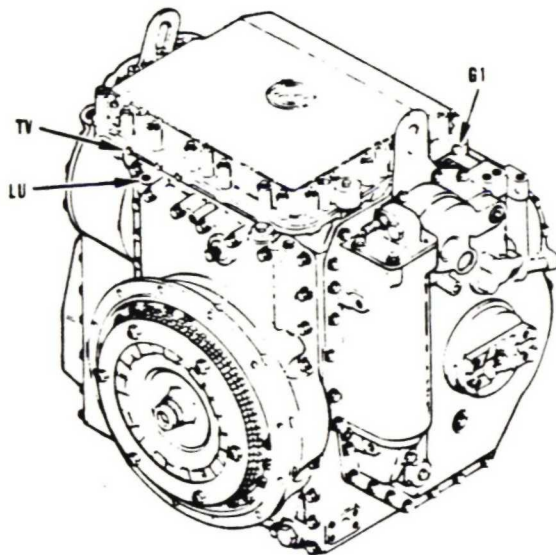
#### NOTE

Perform all pressure checks in accordance with instructions in subject malfunction.

## 2-6. PRESSURE CHECKING PROCEDURES (Continued)

## PRESSURE TEST

- 1 Locate desired pressure tap.
- 2 Remove plug. Screw gage connector into port.
- 3 Start engine. Select range and conditions (see chart). Record readings.



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Port Name	Plug Size (inch)
TV	7/16 hex
LU	9/16 hex
GI	7/16 hex

Plug torque values		
Plug size	lb-in.	N·m
7/16	50-60	6-7
9/16	96-100	11-14

Port	Shift Lever	Engine Speed	Minimum Pressure	
			psi	kPa
TV	N	2500	91-97	627-669
LU	1-4*	2500	140-160	965-1103
GI	1-4*	2000	72-84	496-579

\*Vehicle operating on level, flat terrain.

4. After checking pressure identified in troubleshooting step, use test results in the next block of instruction in the troubleshooting malfunction sequence.



## CHAPTER 3

## GENERAL MAINTENANCE INSTRUCTIONS

## OVERVIEW

The maintenance practices in this chapter must be followed when working on the transmission. The maintenance procedures in this manual cover normal maintenance situations. You may find a situation where the procedure will not work because of contamination, overheating, or excessive wear. For example, a bearing may have to be pressed out instead of lifted out as instructed in the procedure.

When a maintenance practice or procedure does not seem to be working for you, talk to your maintenance officer before trying any other method of doing the task. A bad method could damage good parts or cause unnecessary damage to the transmission.

Paragraph	Title	Page
3-1	Care in Handling	3-1
3-2	Cleaning	3-2
3-3	Inspection	3-4
3-4	Lubrication	3-6
3-5	Torque Specifications and Tightening Sequence	3-7
3-6	Removing or Installing Connectors	3-7
3-7	Removing or Installing Bearings	3-7
3-8	Mandatory Replacement Parts	3-8
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3-15	Supplemental Maintenance Instructions	3-9

## 3-1. CARE IN HANDLING

**CAUTION**

Protective covers on threads, pilot diameters, or splines must be of such configuration as to prevent further assembly unless the covers are first removed. If protective covers are left in the transmission, the transmission may not operate properly.

Protect all threads, splines, and pilot diameters. Parts must be handled carefully to prevent nicking, scratching, or denting. Parts that operate with close tolerances will not function properly, even if slightly damaged. Parts requiring smooth sealing surfaces may leak if scratched; such parts should be carefully handled and protected. Use suitable containers and parts receptacles for storage.

### 3-2. CLEANING

#### WARNING

- Dry cleaning solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 138°F (50°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.
- Compressed air used for cleaning purposes must not exceed 30 pounds of pressure per square inch. Use only with effective chip guards and protective personal equipment including goggles or face shield and gloves. Never blow compressed air toward another person.
- Hot equipment, hot parts, and steam can burn you. To avoid injury, use with effective personal protective equipment (goggles, face shield gloves, etc.). Always wear leather gloves when working with steam equipment to protect you from parts that are or might be hot. Never point a steam hose toward another person.
- Tribasic sodium phosphate can burn eyes and cause skin irritation. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Flush skin with water. Wash clothing before reuse.

#### CAUTION

- Rags used for cleaning external surfaces of the transmission must not be used on internal parts and surfaces. Ordinary wiping rags leave lint deposits. Lint or dirt in a transmission can cause the transmission to malfunction. Only clean, lint-free cloths can be used on internal parts and surfaces.
- A transmission should not be steam cleaned unless all ports are plugged. Water can be introduced into the transmission through steam cleaning. Water should never be permitted to enter the transmission, even when the transmission is to be disassembled. Moisture within the transmission can cause it to fail.

### 3-2. CLEANING (Continued)

Removing Dirt, Grease, or Oil. All parts must be thoroughly cleaned with dry cleaning solvent, P-D-680 (Item 8, Appendix C), and kept clean during all maintenance procedures. Use one of the following methods to remove dirt, grease, or oil from all metal surfaces or parts:

- Dip tank: Stir or shake parts fast for one minute in each tank.
- Brush or scraper: Clean hard-to-get-at areas with a stiff-bristled brush or scraper.
- Wipe with rags dipped in dry cleaning solvent.

Removing Gasket Material. Remove gasket material with a putty knife. Put a lint-free cloth over open cavities to keep out gasket pieces.

Cleaning Bearings. Refer to TM 9-214.

Cleaning Oil Passages. Flush with dry cleaning solvent.

Removing Metal Particles. Flush all parts with dry cleaning solvent. Blow parts dry with compressed air. Also blow compressed air into all pockets, cavities, and passages to get rid of trapped metal particles.

Cleaning Transmission Exterior. The exterior of the transmission must be thoroughly cleaned before disassembly is started. Use one of the following methods to remove dirt, oil, grease, or sludge from the exterior surface of the transmission.

- To clean a slightly dirty transmission, wash with dry cleaning solvent and blow dry with compressed air.
- To clean an excessively dirty transmission, prepare an alkaline steam cleaning solution as follows:

10 pounds (4.536 kg) of tribasic sodium phosphate (Item 19, Appendix C)  
50 gallons (189 liters) of water

Apply this solution with forced steam pressure at 50 psi (345 kPa).

Degree of Cleanliness. All parts must be clean enough to permit effective inspection. Minute particles left on close tolerance parts, such as valves, can cause transmission failure. Reclean parts as necessary.



### 3-3. INSPECTION

#### NOTE

Refer to paragraph 3-8 for mandatory replacement parts.

All parts should be inspected when they are removed from the transmission.

- Look for metal particle contamination. This may appear as obvious metal particles, or it may appear as dust-like metallic particles, even similar to small deposits of grayish sludge. When this condition is found and it is determined that repair can make the transmission serviceable, the hydrostatic pump and motor assembly valve bodies and oil pumps must all be replaced. In addition, all parts must be cleaned and inspected.
- Look for unusual wear or damage. The condition of parts removed can identify a problem within the transmission, often before the problem becomes obvious in operation.
- Parts that are to go back in the transmission must be thoroughly inspected to determine that they are satisfactory for continued use.

Parts must be clean enough to permit proper inspection. Refer to paragraph 3-2 CLEANING.

Castings and Machined Surfaces. Look at housings, covers, pistons, and castings for breaks, cracks, deep scoring, or excessive wear that should prevent continued use. Remove nicks, burrs, or scratches with crocus cloth or whetstone.

Look at mounting surfaces on housings, valve bodies, and covers for nicks, scratches, or scoring. Remove minor defects with crocus cloth or whetstone.

Look at threaded holes for damaged threads. Repair damaged threads with correct size tap or by replacing threaded insert. New inserts must be screwed into the housing one turn below the surface. Refer to TM 9-243 for use of taps and dies.

Look at oil passages for obstructions or dirt. Reclean passages if necessary.

Roller, Ball and Sleeve Bearings.

#### CAUTION

Any bearing that has been subjected to metal contamination must be closely inspected for metal particles. Metal particles will cause bearing failure.

Refer to TM 9-214 for inspection procedures applying to roller and ball bearings.

Look at sleeve bearings and bushings for scoring, burrs, sharp edges, or scuffing. Remove minor scoring, sharp edges, or scuffing with crocus cloth. Remove burrs with whetstone.

**3-3. INSPECTION (Continued)**

Plain Encased Seals, Step-type Seal Rings, Metal Seal Rings. Look at plain encased seals for cracks, cuts, or wear. If not like new in appearance, get rid of seals.

Look at composition seal rings (step-type) for cuts, cracks, or wear. If not like new in appearance, get rid of seal rings.

Look at hook-type metal seal rings for cracks, bends, or broken hooks. If not like new in appearance, get rid of seal rings.

Gears and Splined Parts. Look at gears for burrs, cracks, chipped or broken teeth, or pitting at tooth contact areas. Remove burrs with whetstone. Get rid of gears that are excessively pitted, cracked, or have chipped or broken teeth.

Look at splined parts for twisted or broken splines, burrs, or excessive wear. Remove burrs with whetstone. Get rid of parts that have twisted or broken splines or excessive wear.

Shafts and Thrust Washers. Look at shafts for scoring, burrs, bends, blue discoloring, or clogged oil passages. Remove burrs and minor scoring with crocus cloth or whetstone. Clear oil passages with soft wire or compressed air. Get rid of shafts that are bent, cracked, or deeply scored.

Look at thrust washers for cracks, bends, scoring, discoloring, or burrs. Remove burrs with whetstone. Get rid of thrust washers that are cracked, bent, scored, or discolored.

Clutch Disks and Plates. Look at friction-faced, internal-splined clutch disks for cracks, burrs, chipped or broken spline teeth, or severely pitted faces. Remove burrs with whetstone. If any one disk is cracked, severely pitted, or has chipped or broken spline teeth, GET RID OF COMPLETE PACK OF CLUTCH DISKS.

Look at steel external-tanged clutch disks or plates for cracks, breaks, burrs, galling, embedded metal, scoring, or chipped or broken tangs. Remove minor scoring and burrs with crocus cloth or whetstone. If any one disk or plate is cracked, severely pitted or scored, or has chipped or broken tangs, GET RID OF COMPLETE PACK OF CLUTCH DISKS AND PLATES.

Clutch disks and plates must be assembled in the same order and facing the same way as when disassembled. Heat and pressure can cause steel clutch disks or plates to "cone", or take on a slight conical shape. Fiber-coated clutch disks and plates may warp.

Springs. Look at springs for wear or breaks. If bad, get rid of springs.

Retaining Rings (Snaprings). Look at retaining rings for cracks, bends, burrs, or nicks. Remove burrs and nicks with whetstone. If rings are cracked or bent, get rid of rings. Snaprings must be tight in grooves.

Threaded Parts. Inspect all threaded parts for stripped or damaged threads and burrs.

Replace all parts which have stripped threads or damage which cannot be repaired by chasing the threads with a tap or die of the proper size, or by installing threaded inserts.



### 3-4. LUBRICATION

Refer to Vehicle Lubrication Order, LO 9-1450-300-12 (M730A2) or LO 9-2350-277-12 (M113A3), for general lubrication information for the transmission.

When repairing, assembling, or installing transmission components, make sure all moving parts are well oiled with lubricating oil (Item 10, Appendix C). This oil will protect parts during the first few moments after engine start-up.

Put lubricating oil (Item 10, Appendix C) on all moving parts such as gears, shafts, and bearings. Also put oil on mating surfaces of valve bodies and housings that mate with moving parts. Put oil or petrolatum (Item 10 or 14, Appendix C) on all preformed packings, O-rings, seals, and seal rings as required in the task. Put oil on parts with hand oiler or dip parts in a container of clean oil.

Put high-temperature grease (Item 9, Appendix C) on the inside lip of all plain encased seals.

Use petrolatum (Item 14, Appendix C) when required to hold gaskets, thrust washers, bushings, or other parts in place during assembly.

The combined application of petrolatum (Item 14, Appendix C) and lubricating oil (Item 10, Appendix C) on journals makes bearings or races slide on and off the journals more easily.

Immerse all used disks and plates in clean lubricating oil (Item 10, Appendix C) one at a time before assembly. Keep all plates and disks in the same order and facing the same way as when disassembled. Soak plates and disks for a minimum of two minutes.

Soak each new friction-faced disk for a minimum of two minutes in clean lubricating oil (Item 10, Appendix C).

Put lubricating oil (Item 10, Appendix C) on walls and hubs that seal rings will contact.

#### NOTE

New plugs with precoated threads, such as Teflon-coated threads, need no lubrication or sealant before they are installed.

Put a small amount of nonhardening sealing compound (Item 17, Appendix C) on the first three threads of all reused or uncoated external pipe plugs and hydraulic fittings.



### 3-5. TORQUE SPECIFICATIONS AND TIGHTENING SEQUENCE

All nuts, bolts, and screws in the transmission are tightened to a torque value in either pound feet or pound inches. These torque values are provided in assembly procedures.

The first torque value shown for tightening bolts, nuts, screws, plugs, etc., is in terms of pound feet or pound inches. Following the torque values for pound feet or pound inches is another set of figures in parenthesis for Newton meters. Example:

Tighten bolt to 12-13 lb-ft (16-18 N·m)

Use the figures in parentheses only when the torque wrench is marked for Newton meters.

When bolts, nuts, or screws are in a circular pattern, alternately tighten those located 180 degrees apart to half of minimum torque. Repeat the process, tightening to specified torque.

### 3-6. REMOVING OR INSTALLING CONNECTORS

Look at part or wire to see if it has numbers or letters. Write numbers or letters on tags with pencil. Fasten tags on wires or parts by twisting wire ends of tags. Remove tags after wire or part is installed.

If connectors cannot be removed by hand, use conduit style slip-joint pliers with plastic jaw inserts to loosen them. Finish removal by hand. Straighten any bent contacts with long round nose pliers. Make sure that contacts and keyways line up. Tighten twist-snap-type connectors by hand only until click is heard. Tighten screw-on-type connectors by hand only.

Put a protective cap or plug over any electrical connector that is disconnected. Cover connectors on all cables moved to or from the transmission. Take off covers when connectors are installed.

Look at connectors for broken, missing, or pushed in contacts before making any connections.

Tighten connectors by hand whenever tools are not called out.

### 3-7. REMOVING OR INSTALLING BEARINGS

The methods and tools used in maintenance procedures for replacing bearings are for normal situations. Unless otherwise specified, bearings are installed with manufacturer's identification (numbered side) out. Bearing identification is legible after bearing is installed.

### 3-8. MANDATORY REPLACEMENT PARTS

Replace parts that may be deformed during use or damaged during removal. SUCH ITEMS SHOULD BE DISCARDED WHEN THEY ARE REMOVED. Replacement items used in reassembly must be new.

The following parts will be replaced each time they are removed in transmission disassembly:

- Gaskets
- Preformed packings
- Oil seals
- Lockstrips
- Tab washers
- Locknuts

Mandatory Replacement Parts in Event of Metal Contamination. In addition to standard replacement parts listed above, the following MINIMUM repair and replacement must be performed in all cases of metal contamination:

- Replace the hydrostatic pump and motor.
- Replace the control valve assemblies.
- Replace the bevel gear assembly, including all oil pumps.
- CLEAN AND INSPECT ALL PARTS; replace parts as necessary.

### 3-9. PARTS REQUIREMENTS FOR PRELIMINARY PROCEDURES

The headings of maintenance tasks contain the reference PRELIMINARY PROCEDURE. The PRELIMINARY PROCEDURE provides names and locations of other procedures to be completed before you can start work on your assigned task.

When preliminary procedures are needed only to gain access to a work area, examine the items in REPAIR PARTS and SUPPLIES of the preliminary procedure. Select only the supplies and parts needed to complete your work requirement.

### 3-10. LOCALLY FABRICATED SHOP AIDS

When a maintenance task includes an item to be fabricated, the item is listed under the heading FABRICATED TOOLS. These fabricated shop aids are listed in Appendix D by the paragraph number in which they are used.

### 3-11. REPAIR PARTS

Repair parts are listed and illustrated in Appendix B of this manual.

### 3-12. COMMON TOOLS

#### CAUTION

Use heat guns to heat parts for disassembly or assembly of close fit parts. To prevent damage, do not use open flame to heat any parts in this transmission.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) for the maintenance activity.

All required tools and equipment must be available within the maintenance shop before repair of a transmission is started. The use of improper tools and equipment may damage parts and may result in unsatisfactory performance or failure of the transmission after repairs are completed.

### 3-13. SPECIAL TOOLS

Special tools are listed and illustrated in Appendix B of this manual.

### 3-14. OIL ANALYSIS PROGRAM FOR TRANSMISSION

Refer to the appropriate Lube Order LO 9-1450-300-12 (M730A2) or LO 9-2350-277-12 (M113A3) for oil changes and to TB 43-0210 (Army Oil Analysis Program) and TB 43-0211 (Oil Analysis Program User's Guide) for oil sampling procedures.

### 3-15. SUPPLEMENTAL MAINTENANCE INSTRUCTIONS

Many maintenance procedures have been standardized and printed in U.S. Army publications. The following publications supplement the maintenance instructions in this manual:

TM 9-214 - Inspection, Care and Maintenance of Antifriction Bearings

TM 9-243 - Use and Care of Hand Tools and Measuring Tools

TM 38-230-1 - Preservation, Packaging, and Packing of Military Supplies and Equipment: Preservation and Packaging (Volume I)

TM 38-230-2 - Preservation, Packaging, and Packing of Military Supplies and Equipment: Packing (Volume II)

DA PAM 730 - The Army Maintenance Management System (TAMMS)



## CHAPTER 4

## TRANSMISSION MAINTENANCE PROCEDURES

## Section I. ORGANIZATION AND SCOPE

Paragraph	Title	Page
4-1	Organization of Maintenance Procedures	4-1
4-2	Equipment Items Covered	4-1

**4-1. ORGANIZATION OF MAINTENANCE PROCEDURES**

This chapter tells you how to disassemble, repair and assemble the transmission. The chapter is divided into three maintenance sections:

- Removing major assemblies
- Installing major assemblies
- Disassembling, repairing, and assembling major assemblies

These sections are divided into paragraphs which cover specific assemblies or groups of parts. Paragraph numbers have two parts such as 4-6. In this case, the first number (4) tells the chapter; the second number (6) tells the paragraph.

Each paragraph is further broken down into numbered and named tasks explaining how to remove, disassemble, repair, assemble, or install parts or assemblies. These tasks are to be used for unscheduled transmission maintenance at direct and general support levels.

All parts will be inspected as they are removed according to inspection instructions in Chapter 3, General Maintenance Instructions, page 3-1. When a part needs to be inspected by a special method, that inspection method is explained in the maintenance procedures. Good parts will be reused and bad parts will be replaced.

Mandatory replacement parts are thrown away and are replaced by new parts every time the transmission is disassembled to where these parts are located. You will find these mandatory replacement parts described in Chapter 3, General Maintenance Instructions, page 3-1.

To help you find the information you need in this chapter, the chapter, paragraph, and task numbers are located at the bottom of each page.

**4-2. EQUIPMENT ITEMS COVERED**

Each paragraph, starting with paragraph 4-5, lists tasks which take parts off the transmission, repair parts, or put them back on the transmission. The tasks within each paragraph are listed in an index at the beginning of the paragraph.

## Section II. TRANSMISSION DISASSEMBLY INTO MAJOR ASSEMBLIES

Paragraph	Title	Page
4-3	Service Upon Receipt	4-2
4-4	Remove Transmission from Container	4-3
4-5	Remove Transmission Top Components	4-5
4-6	Install Transmission on Maintenance Stand	4-13
4-7	Remove Right End Cover Assembly	4-20
4-8	Remove Left End Cover Assembly	4-27
4-9	Remove Converter Element Components	4-35
4-10	Remove Input Housing Assembly	4-40
4-11	Remove Bevel Gear Assembly	4-42

## 4-3. SERVICE UPON RECEIPT

Transmission Received in Container. Repairable transmissions received at a Direct or General Support Maintenance activity will usually be packaged in a special reusable shipping and storage container.

Transmissions received in containers should remain packaged until maintenance work is scheduled to begin. Paragraph 4-4 provides procedures for removal of transmission from container. Avoid damaging the container during the unpacking operation.

Check unpacked equipment in the following manner:

- Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report.
- Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.
- Check to see whether the equipment has been modified.

Other Access to Transmission. Maintenance procedures have been prepared on the basis that transmissions will be received at General Support packaged in a shipping and storage container. However, Direct Support may have access to the transmission while it is still connected to the engine. Direct Support personnel are responsible for verification of organization troubleshooting procedures and for separation of transmission from engine (TM 9-1450-300-34 or TM 9-2315-277-34).

#### 4-4. REMOVE TRANSMISSION FROM CONTAINER (SHEET 1 OF 2)

Task	Title	Page
1	Remove Transmission from Container	4-3

#### TASK 1. REMOVE TRANSMISSION FROM CONTAINER

##### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Handle, socket wrench, 1/2 inch square drive  
 Hoist, 2-ton minimum capacity  
 Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Universal Joint, socket wrench, 1/2 inch square drive  
 Wrench, combination, 3/4 inch  
 Wrench, combination, 9/16 inch

##### SPECIAL TOOLS:

Lifting Sling, two-leg (19207) 12668037

##### SUPPLIES:

Rags, wiping (Item 15, Appendix C)

#### WARNING

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Transmission and container weigh about 1500 pounds (680 kg). To avoid injury or death, keep out from under and clear of transmission at all times. Do not let transmission swing freely during hoisting.
- Container will normally have up to one psi internal differential pressure, but high ambient temperature and check valve malfunction may cause increased pressure within the container. Opening a pressurized container may cause bodily injury. To avoid injury, be sure internal and external pressures have been equalized. Refer to step 1.

Go to Sheet 2



#### 4-4. REMOVE TRANSMISSION FROM CONTAINER (SHEET 2 OF 2)

- 1 Push in and hold air release button (1) until air flow stops.
- 2 Using 3/4 inch socket and 3/4 inch combination wrench, remove 22 nuts (2) and bolts (3) holding container top (4) and bottom (5) together.
- 3 Using hoist and sling, attach sling hooks to two brackets located diagonally opposite each other on container top (4).
- 4 Remove container top (4) from container bottom (5).
- 5 Remove sling hooks from container top (4).
- 6 Using 3/4 inch socket, remove four bolts (6) and washers (7) holding two caps (8) to pillow blocks (9).
- 7 Remove two caps (8) from pillow blocks (9).
- 8 Using 3/4 inch socket, remove two bolts (10) and washers (11) from mounting brackets (12).
- 9 Using hoist and sling, attach sling hooks to two lifting brackets (13) located on top of transmission.

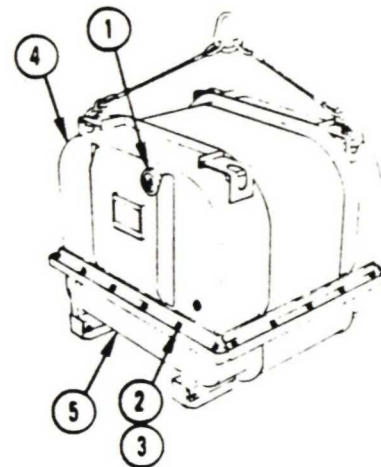
#### NOTE

Mounting brackets (12) will come out of container attached to transmission.

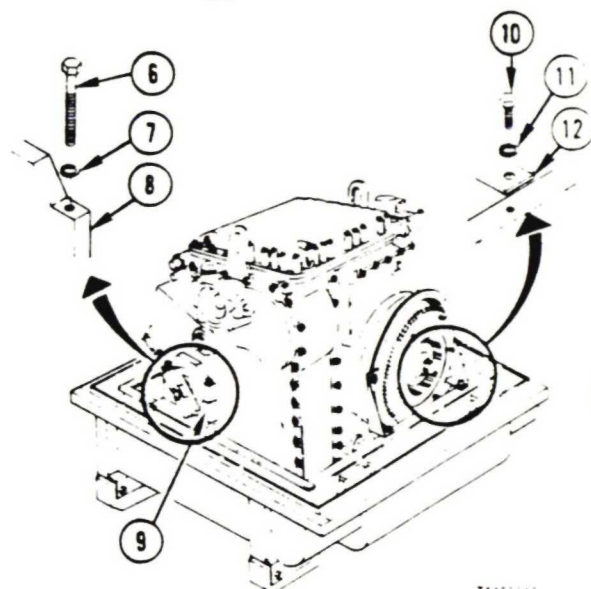
- 10 Remove transmission from container bottom (5).
- 11 Using 9/16 inch socket and 9/16 inch combination wrench, remove six bolts (14), washers (15), and nuts (16) from mounting brackets (12).
- 12 Remove mounting brackets (12) from transmission. Remove the sling hooks.

#### NOTE

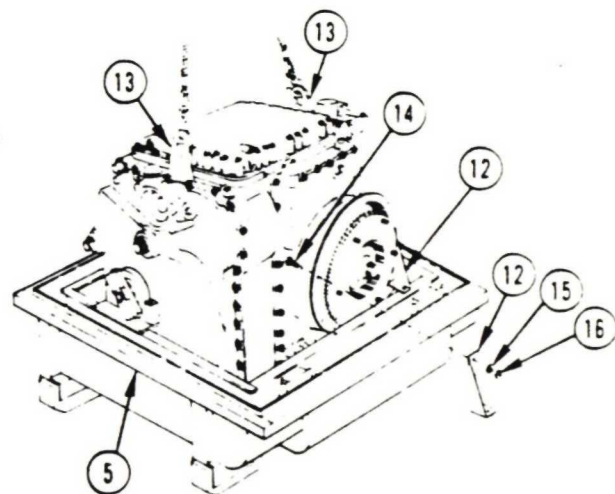
All bolts, washers, nuts, and brackets should be stored with container for use when installing transmission in container.



TA4853-1



TA4853-2



TA4853-3

End of Task 1

## 4-5. REMOVE TRANSMISSION TOP COMPONENTS (SHEET 1 OF 8)

### OVERVIEW

Components on top of the transmission must be removed when maintenance actions are required in the following areas of the transmission:

- Maintenance on parts or assemblies which are located on top of the transmission.
- Maintenance on the range pack which is located in the left side of the transmission. Each time any range pack item is to be removed, all components on top of the transmission must be removed. Pitot tubes and bolts going into the range pack are accessed from beneath top components on the transmission.
- Service to the governor screen assembly. The governor screen assembly is located beneath top components on the transmission.

Task	Title	Page
1	Remove Transmission Top Cover Assembly	4-5
2	Remove Wiring Harness Assembly	4-7
3	Remove Main Control Valve Assembly	4-8
4	Remove Lockup Control Valve Assembly	4-9
5	Remove Priority Valve Assembly	4-10
6	Remove G2 Backup Valve Assembly	4-10
7	Remove Separator Plate, Oil Transfer Plate Assembly and Governor Screen Assembly	4-11

### TASK 1. REMOVE TRANSMISSION TOP COVER ASSEMBLY

#### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Handle, socket wrench, 1/2 inch square drive  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Socket, socket wrench, 1/2 inch square drive, 5/8 inch  
 Wrench, combination, 3/4 inch  
 Wrench, combination, 9/16 inch

#### SUPPLIES:

Rag, wiping (Item 15, Appendix B)

**PRELIMINARY PROCEDURE:** Transmission removed from shipping container. Refer to paragraph 4-4.

Go to Sheet 2

4-5. REMOVE TRANSMISSION TOP COMPONENTS  
(SHEET 2 OF 8)

CAUTION

Care should be taken not to let dirt get into control valve assemblies when top cover is removed. Contamination of control valves can cause transmission failure.

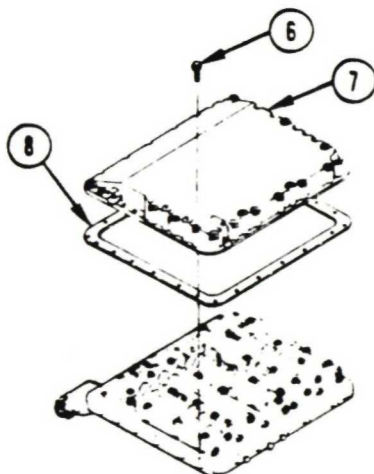
NOTE

Transmission upright on floor or work table.

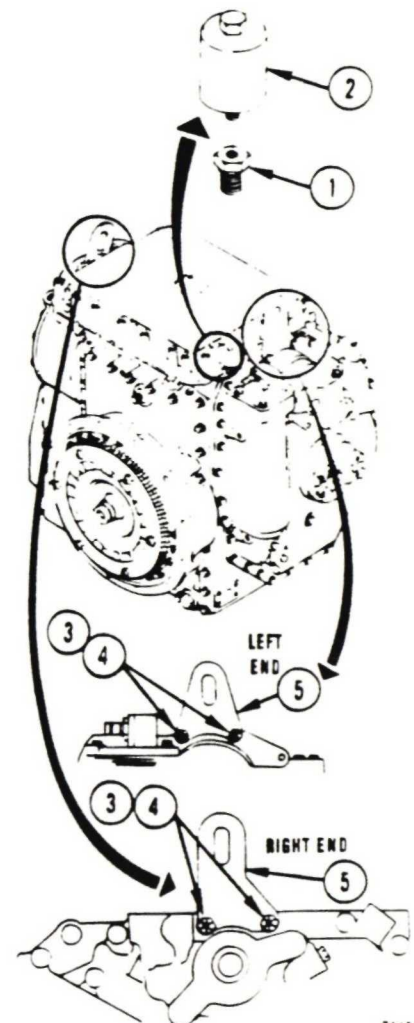
- 1 Using open end of 3/4 inch combination wrench, hold reducer (1) located under breather (2).
- 2 Using 5/8 inch socket on nut at top of breather (2), unscrew breather from reducer (1).
- 3 Using combination wrench, remove reducer (1) from transmission.
- 4 Using open end of 9/16 inch combination wrench, remove two bolts (3) and washers (4) from each lifting bracket (5).
- 5 Remove left and right lifting brackets (5).
- 6 Using 1/2 inch socket, remove 26 flanged-head bolts (6) from top cover (7).
- 7 Remove transmission top cover (7) and gasket (8) from transmission. If necessary, tap cover (7) with plastic faced hammer to loosen.

REPAIR: Refer to paragraph 4-31 for repair of transmission top cover.

FOLLOW-ON PROCEDURE: Install transmission top cover assembly. Refer to paragraph 4-18.



TAMBS319



TAMBS319

End of Task 1  
Go to Sheet 3



#### 4-5. REMOVE TRANSMISSION TOP COMPONENTS (SHEET 3 OF 8)

##### TASK 2. REMOVE WIRING HARNESS ASSEMBLY

##### COMMON TOOLS:

Handle, socket wrench, 1/2 inch square drive  
 Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Screwdriver, cross-tip, No. 1 tip  
 Screwdriver, flat tip  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch

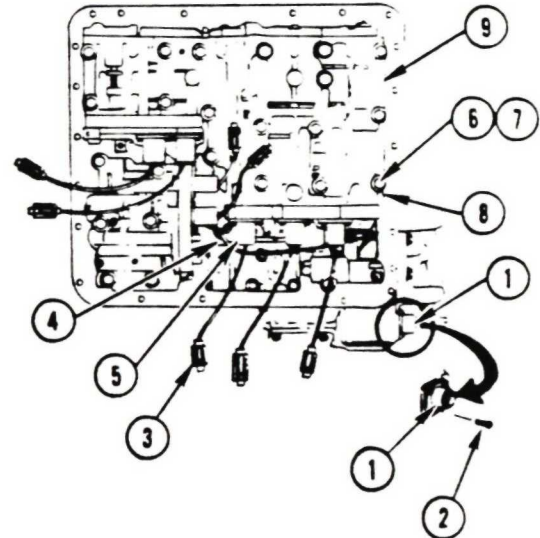
##### SUPPLIES:

Cloth, lint-free (Item 6, Appendix C)  
 Twine, cotton, 6 ply, 30 inches (Item 21, Appendix C)

##### NOTE

- Top cover assembly is removed from transmission.
- Wiring harness can be removed without removal of solenoids or control valve assemblies.
- Wiring harness does not have to be removed to remove control valve assemblies.

- 1 Clean wiring harness connector body (1) and transmission area around connector.
- 2 Using cross-tip screwdriver, remove four screws (2) holding harness connector body (1) to transmission.
- 3 Using flat tip screwdriver, unfasten seven plastic connectors (3) that attach harness (4) to solenoids (5).
- 4 Using socket, remove bolt (6) and washer (7) holding harness ground connector (8) to main control valve assembly (9).



Go to Sheet 4

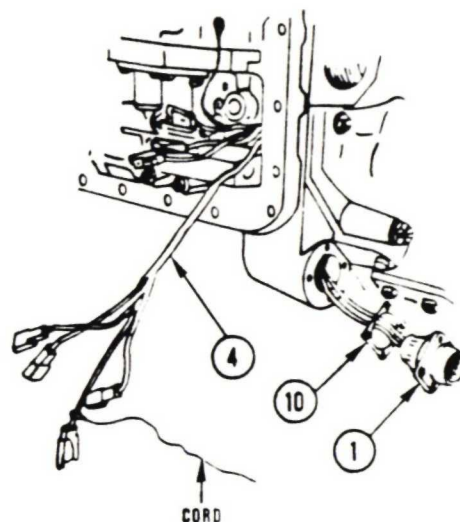
TAM 81001

4-5. REMOVE TRANSMISSION TOP COMPONENTS  
(SHEET 4 OF 8)

NOTE

Connectors on wiring harness are identified by stamped letters on connectors. Each connector will have one of the letters A through G.

- 5 Tie a cord to harness connector F or G. When the harness is out of the transmission, cut the cord off the connector, leaving the cord installed through the harness bore. When installing or replacing the harness, tie the outside end of the cord to connector F or G and use inside end of cord to pull harness through.
- 6 Pulling on harness connector body (1) with one hand and feeding harness (4) through transmission with other hand, remove harness and gasket (10) from transmission.



REPAIR: Refer to paragraph 4-31 for repair of wiring harness assembly.

FOLLOW-ON PROCEDURE: Install wiring harness. Refer to paragraph 4-18.

End of Task 2

TASK 3. REMOVE MAIN CONTROL VALVE ASSEMBLY

COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch

NOTE

- Top cover assembly is removed from transmission.
- Control valve assemblies are removed with solenoids attached.
- Wiring harness does not have to be removed to remove control valve assemblies.
- One bolt and washer were removed from control valve assembly when harness ground connector was removed.

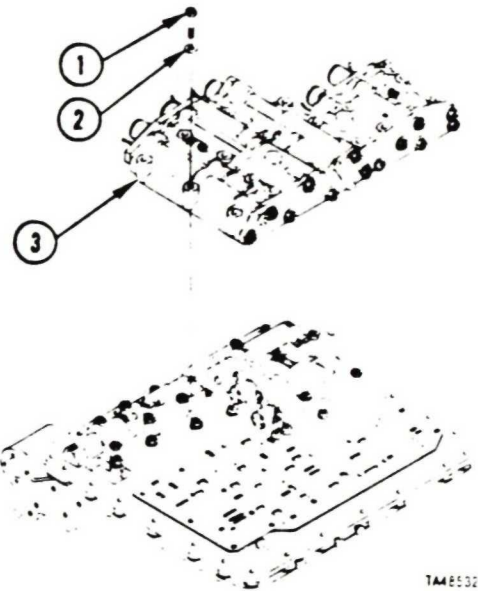
Go to Sheet 5

#### 4-5. REMOVE TRANSMISSION TOP COMPONENTS (SHEET 5 OF 8)

- 1 Using socket, remove the remaining 16 bolts (1) and washers (2) from main control valve assembly (3).
- 2 Remove main control valve assembly (3).

##### NOTE

- No solenoid should be removed from control valve assemblies unless procedures have established that solenoid malfunction exists.
- When necessary to replace a solenoid, or to repair solenoid connector, refer to paragraph 4-31.



**FOLLOW-ON PROCEDURE:** Install main control valve assembly. Refer to paragraph 4-18.  
End of Task 3

#### TASK 4. REMOVE LOCKUP CONTROL VALVE ASSEMBLY

##### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch

##### NOTE

- Transmission top cover is removed.
- Wiring harness does not have to be removed to remove control valve assemblies.
- Control valve assemblies are removed with solenoids attached.

- 1 Using socket, remove six bolts (1) and washers (2).
- 2 Remove lockup control valve assembly (3).

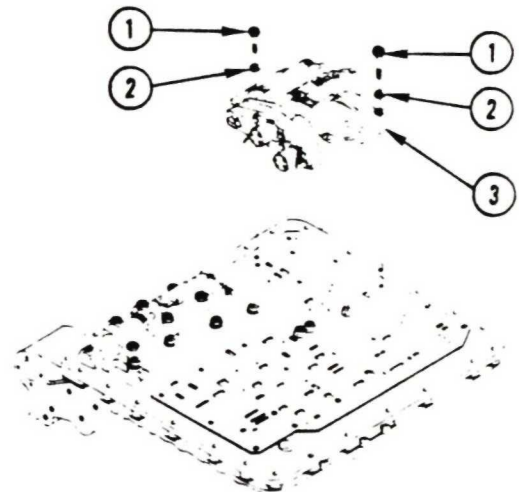
##### NOTE

- No solenoid should be removed from control valve assemblies unless procedures have established that solenoid malfunction exists.
- When necessary to replace a solenoid, or to repair solenoid connector, refer to paragraph 4-31.

**FOLLOW-ON PROCEDURE:** Install lockup control valve assembly. Refer to paragraph 4-18.

End of Task 4

Go to Sheet 6





4-5. REMOVE TRANSMISSION TOP COMPONENTS  
(SHEET 6 OF 8)

TASK 5. REMOVE PRIORITY VALVE ASSEMBLY

COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 7/16 inch

NOTE

- Transmission top cover is removed.
- Wiring harness does not have to be removed to remove control valve assemblies.

- 1 Using socket, remove three bolts (1) and washers (2) from priority valve assembly (3).
- 2 Remove priority valve assembly (3).

FOLLOW-ON PROCEDURE: Install priority valve assembly. Refer to paragraph 4-18.

End of Task 5

TASK 6. REMOVE G2 BACKUP VALVE ASSEMBLY

COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 7/16 inch

NOTE

- Transmission top cover is removed.
- Wiring harness does not have to be removed to remove control valve assemblies.

- 1 Using socket, remove four bolts (1) and washers (2) from G2 backup valve assembly (3).
- 2 Remove G2 backup valve assembly (3).

FOLLOW-ON PROCEDURE: Install G2 backup valve assembly. Refer to paragraph 4-18.

End of Task 6

Go to Sheet 7

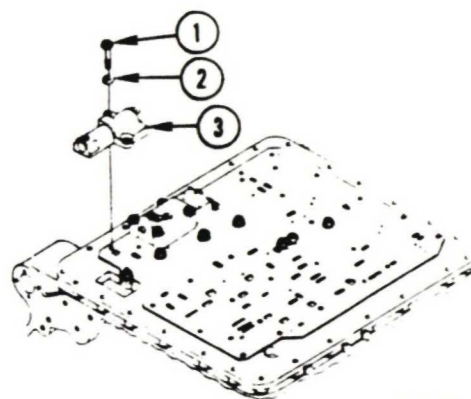


TABLE 1004

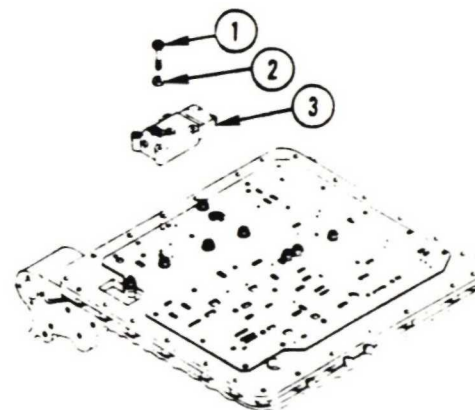


TABLE 1005

#### 4-5. REMOVE TRANSMISSION TOP COMPONENTS (SHEET 7 OF 8)

#### TASK 7. REMOVE SEPARATOR PLATE, OIL TRANSFER PLATE ASSEMBLY AND GOVERNOR SCREEN ASSEMBLY

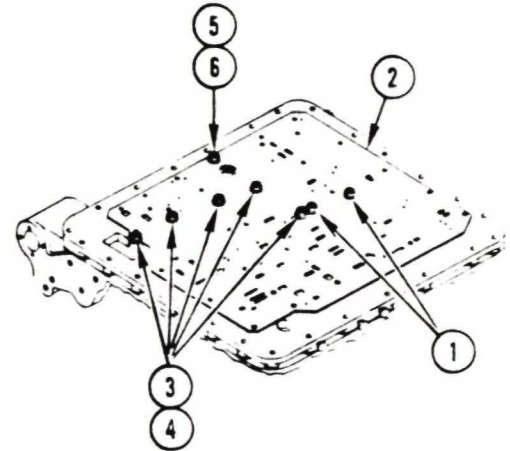
##### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Pliers, long round nose  
Socket, socket wrench, 1/2 inch square drive, 3/8 inch  
Socket, socket wrench, 1/2 inch square drive, 7/16 inch  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch

##### PRELIMINARY PROCEDURES:

- Wiring harness assembly is removed.
- All control valve assemblies are removed.

- 1 Using 3/8 inch socket, remove two flanged-head bolts (1) from separator plate (2).
- 2 Using 1/2 inch socket, remove 5 bolts (3) and washers (4) from separator plate (2).
- 3 Using 7/16 inch socket, remove bolt (5) and washer (6) from separator plate (2).
- 4 Remove separator plate (2).



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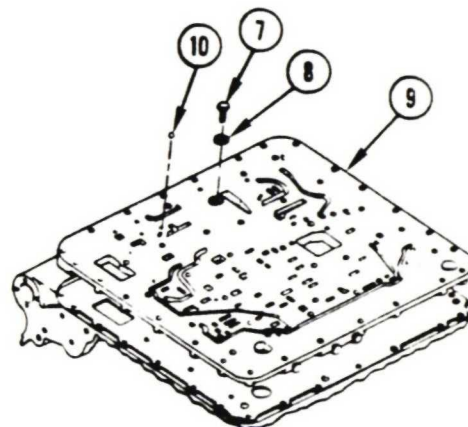
Go to Sheet 8

4-5. REMOVE TRANSMISSION TOP COMPONENTS  
(SHEET 8 OF 8)

- 5 Using 1/2 inch socket, remove bolt (7) and washer (8) from oil transfer plate assembly (9).

**CAUTION**

A 5/16-inch diameter check ball (10) is located in a bore on the top side of the oil transfer plate, beneath the location of the G2 backup valve. Care should be taken not to turn the oil transfer plate over and drop the ball into the transmission. The ball could damage the transmission if it drops into transmission and is not removed.

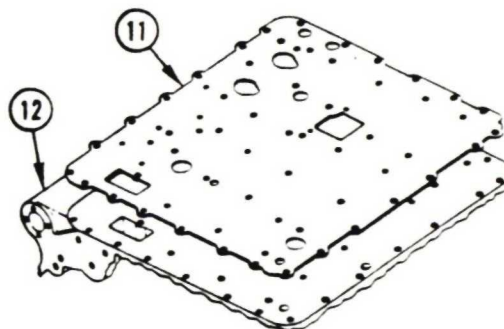


- 6 Remove oil transfer plate assembly (9).

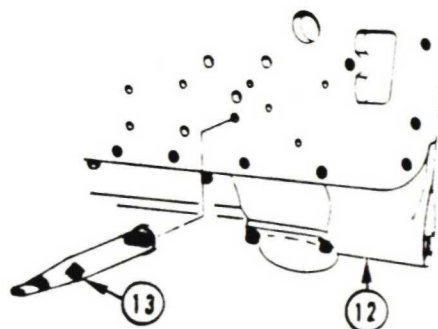
**REPAIR:** Refer to paragraph 4-31 for repair of the oil transfer plate assembly.

- 7 After oil transfer plate (9) has been moved away from transmission, remove check ball (10) from transfer plate and put ball in a secure location.

- 8 Remove oil transfer plate gasket (11) from top of center housing (12).



- 9 Using pliers, remove governor screen assembly (13) from port in top of center housing (12).



**FOLLOW-ON PROCEDURE:** Install governor screen assembly, oil transfer plate gasket, oil transfer plate, and separator plate. Refer to paragraph 4-18.

End of Task 7



#### 4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND (SHEET 1 OF 7)

Task	Title	Page
1	Install Adapter Plate on Maintenance Stand	4-13
2	Install Transmission on Adapter Plate	4-14

#### TASK 1. INSTALL ADAPTER PLATE ON MAINTENANCE STAND

##### COMMON TOOLS:

Handle, socket wrench, 1/2 inch square drive  
 Hoist, 1 ton  
 Maintenance Stand, turnover, transmission  
 Socket, socket wrench, 1/2 inch square drive, 15/16 inch  
 Wrench, torque, 1-175 lb-ft

##### SPECIAL TOOLS:

Lifting Sling, two-leg (19207) 12268037  
 Adapter Plate Kit (73342) 11650180

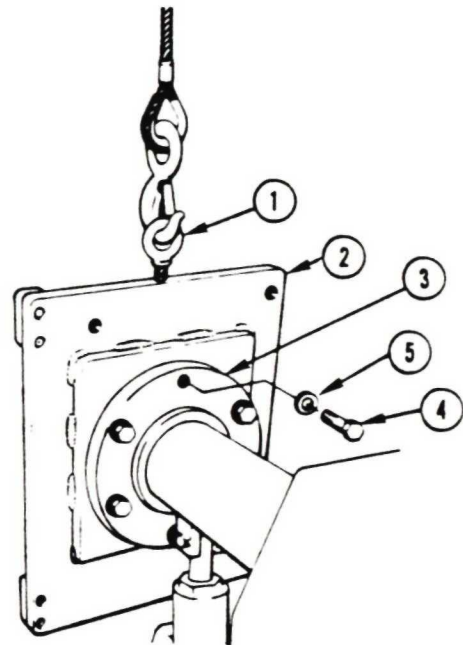
##### PERSONNEL REQUIRED: Two

- One soldier to operate hoist.
- One soldier to align adapter plate with maintenance stand.

- 1 Install and securely tighten eyebolt (1) in end of adapter plate (2).

##### WARNING

Adapter plate weighs 127 pounds. Lift plate with hoist to avoid injury.



TAM9500

- 2 Using sling, position adapter plate (2) so that six holes in adapter plate are aligned with six holes in head of maintenance stand (3).
- 3 Install two 5/8-11 x 3 inch bolts (4) and washers (5) through opposite sides of maintenance stand head (3) and into adapter plate (2) to hold alignment.
- 4 Using socket, install the four remaining bolts (4) and washers (5) holding adapter plate (2) to maintenance stand (3). Tighten all six bolts.
- 5 Using torque wrench, tighten six bolts (4) to 160-175 lb-ft (217-237 N·m).
- 6 Remove sling.

**FOLLOW-ON PROCEDURE:** Remove adapter plate from maintenance stand. Refer to paragraph 4-17.

End of Task 1

Go to Sheet 2

4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND  
(SHEET 2 OF 7)

TASK 2. INSTALL TRANSMISSION ON ADAPTER PLATE

COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Hoist, 1 ton (2 required)  
Punch, aligning, 3/8 inch dia. point  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
Wrench, combination, 9/16 inch  
Wrench, torque, 0-175 ft-lb

SPECIAL TOOLS:

Lifting Sling, three-leg (19207) 12268036  
Lifting Sling, two-leg (19207) 12268037  
Adapter Plate Kit (73342) 11650180  
Bolt, 1/2-32 x 2 inches (96906) MS35764-271 (3 required)  
Washer, 1/2 inch (96906) MS27183-18 (3 required)

SUPPLIES:

Bolt, 3/8-16 x 1-3/4 inches (3 required)  
Washer, flat, 3/8 inch (6 required)  
Rag, wiping (Item 15, Appendix C)

PRELIMINARY PROCEDURE: Transmission removed from shipping container. Refer to paragraph 4-4.

PERSONNEL REQUIRED: Two

- One soldier to operate each hoist when rotating transmission from vertical to horizontal position.
- One soldier to operate hoist, other soldier to bolt transmission to adapter plate when installing transmission on maintenance stand.

WARNING

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Transmission will tilt suddenly when weight shifts from one sling to the other. Stay clear of slings and transmission to avoid injury.
- Transmission weighs about 910 pounds. To avoid injury or death; keep out from under and clear of transmission at all times. Do not let transmission swing freely during hoisting.

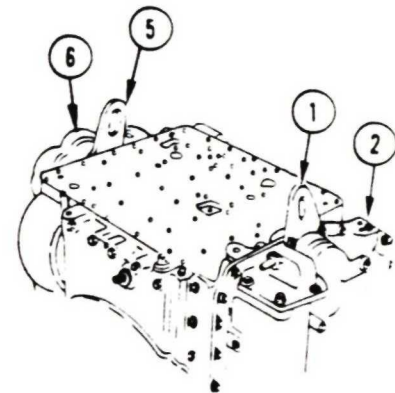
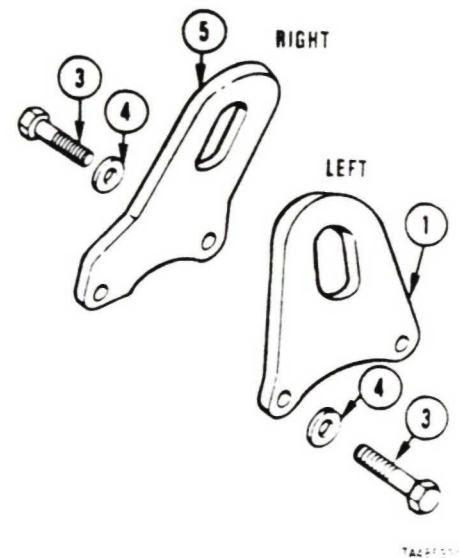
Go to Sheet 3

# 4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND (SHEET 3 OF 7)

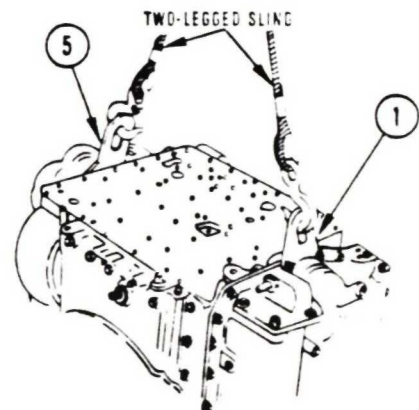
## NOTE

- If lifting brackets must be reinstalled on transmission, go to Step 1.
- If lifting brackets have not been removed from transmission, go to Step 5.

- 1 Hold left lifting bracket (1) over bracket bolt holes in left end cover (2), with bracket leaning toward center of transmission.
- 2 Using combination wrench, install two 3/8-16 x 1-1/2 inch bolts (3) and washers (4), to attach bracket (1) to left end cover (2).
- 3 Repeat above Steps 1 through 2 to install right lifting bracket (5) onto right end cover (6).



- 4 Using hoist and two-legged sling, attach sling hooks into left lifting bracket (1) and right lifting bracket (5).

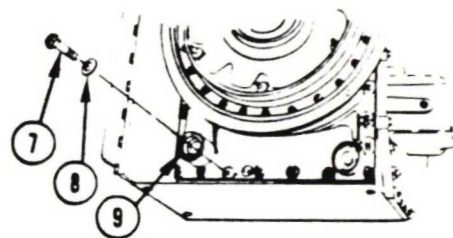


Go to Sheet 4



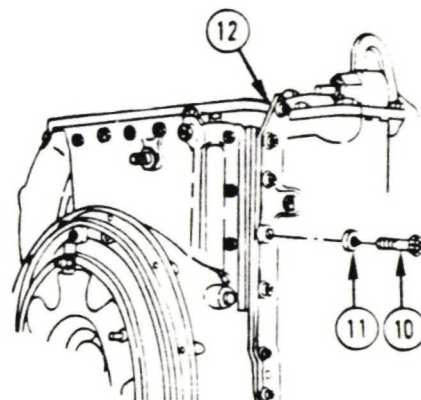
4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND  
(SHEET 4 OF 7)

- 5 Using 9/16 inch socket, remove bolt (7) and washer (8) from input housing (9).



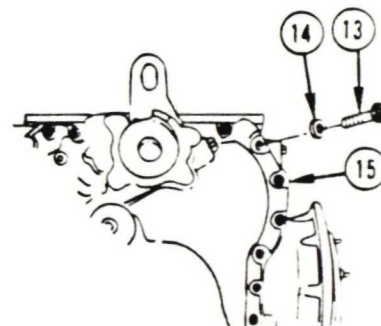
TAA85034

- 6 Using 9/16 inch socket, remove bolt (10) and washer (11) from left end cover (12).



TAA85035

- 7 Using 9/16 inch socket, remove bolt (13) and washer (14) from right end cover (15).



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Go to Sheet 5

**4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND  
(SHEET 5 OF 7)**

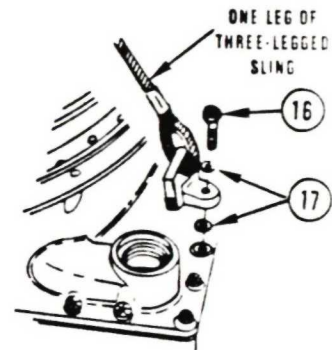
- 8 Using 9/16 inch socket, attach three-legged sling to transmission where bolts were removed in Steps 5, 6 and 7. Install 3/8-16 x 1-3/4 inch bolt (16) through each sling lug, with one washer (17) under each bolt head and one washer (17) under each lug. Tighten bolts until snug.

**CAUTION**

When raising three-legged sling, also raise two-legged sling as necessary to maintain minimum clearance of one foot (0.305 m) between transmission and floor. Inadequate clearance could cause transmission to be damaged by hitting floor.

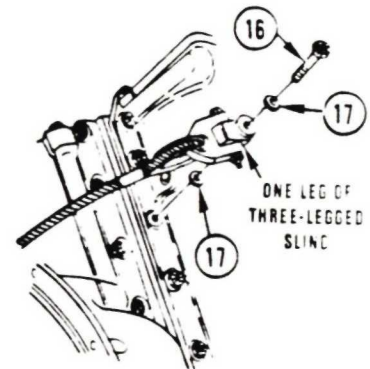
- 9 Raise two-legged sling attached to lifting brackets until bottom of transmission is approximately one foot (0.305 m) above floor.

Go to Sheet 6



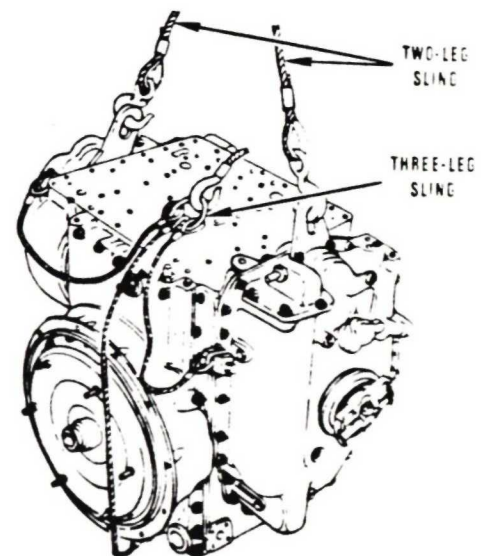
INSTALLATION OF SLING  
AT INPUT HOUSING

T4455000



TYPICAL INSTALLATION OF  
SLING AT LEFT AND  
RIGHT END COVERS

T4455000



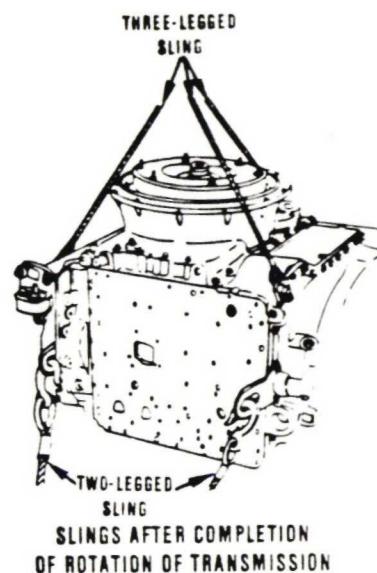
SLINGS AT BEGINNING  
OF ROTATION OF  
TRANSMISSION

T4455000

4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND  
(SHEET 6 OF 7)

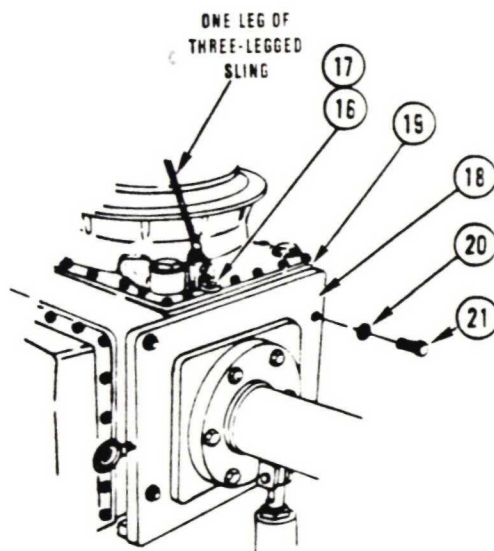
**WARNING**

When rotating transmission vertical to horizontal position, weight of transmission is transferred from one sling to the other. When the center of gravity shifts, transmission may suddenly tilt, thrusting heavy momentary stress on sling and hoist. To avoid injury or death, keep out from under and clear of transmission at all times.



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- 10 Raise two-legged sling as necessary to maintain proper clearance between transmission and floor
- 11 Slowly raise three-legged sling until weight of transmission is entirely on three-legged sling.
- 12 Remove two-legged sling.
- 13 Rotate adapter plate (18) on maintenance stand to match hole pattern in plate with holes on bottom of transmission (19).
- 14 Using aligning punch, hoist, and rotational control on maintenance stand, align holes in bottom of transmission (19) with holes in adapter plate (18).
- 15 Install washers (20) under heads of three 1/2-32 x 2 inch bolts (21). Using 3/4 inch socket, install bolts through three holes in adapter plate (18). Screw bolts into holes on bottom of transmission (19).
- 16 Using torque wrench, tighten bolts (21) to 80-95 lb-ft (108-129 N·m).
- 17 Using 9/16 socket, remove three 3/8-16 x 1-3/4 inch bolts (16) and six washers (17) holding three-legged sling.
- 18 Remove three-legged sling.



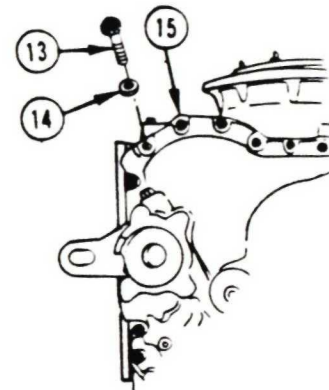
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Go to Sheet 7



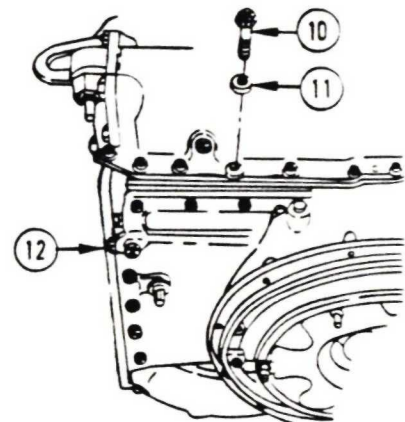
**4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND  
(SHEET 7 OF 7)**

19 Using fingers, install bolt (13) and washer (14) in right end cover (15).



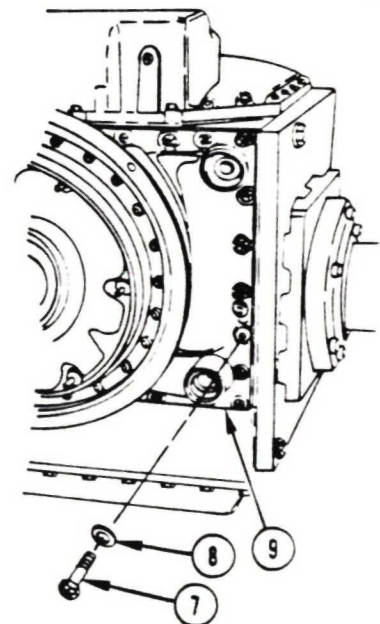
TAA85341

20 Using fingers, install bolt (10) and washer (11) in left end cover (12).



TAA85341

21 Using fingers, install bolt (7) and washer (8) in input housing (9).



TAA85341

**FOLLOW-ON PROCEDURE:** Remove transmission from maintenance stand. Refer to paragraph 4-17.

End of Task 2

**4-7. REMOVE RIGHT END COVER ASSEMBLY**  
(SHEET 1 OF 7)

**OVERVIEW**

It is necessary to remove the right end cover assembly to perform the following maintenance:

- Remove components from under the right end cover assembly.
- Remove components from within the right end cover assembly.
- Remove the bevel gear assembly. The sump communication tube, lube tube, oil transfer tube and scavenge tube must be removed before the bevel gear assembly can be pulled from the transmission. Access to these tubes is gained by removing the right end cover assembly. (The left end cover must also be removed to allow removal of other tubes that go into the bevel gear assembly.)
- Remove the range pack (located under the left end cover) including the range input shaft. When the shaft and bushing assembly are pulled out the left side of the transmission with the range input shaft, the range output gear spacer and the governor drive gear will lay loose in the right end of the transmission. Upon assembly, it will be impossible to get this spacer and gear back on the shaft without removing the right end cover.

Task	Title	Page
1	Remove Right End Cover Assembly	4-20
2	Remove Right End Tubes and Loose Components	4-23

**TASK 1. REMOVE RIGHT END COVER ASSEMBLY**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 10 inch  
 Hammer, hand, rubber  
 Handle, socket wrench, 1/2 inch square drive  
 Hoist, 200-pound minimum capacity  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch

**SPECIAL TOOLS:**

Lifting Sling, three-legged (19207) 1 2268036

**SUPPLIES:**

Bolt, 3/8-16 x 2 inch (2 required)  
 Rag, wiping (Item 15, Appendix C)  
 Washer, flat, 3/8 inch (2 required)

**NOTE**

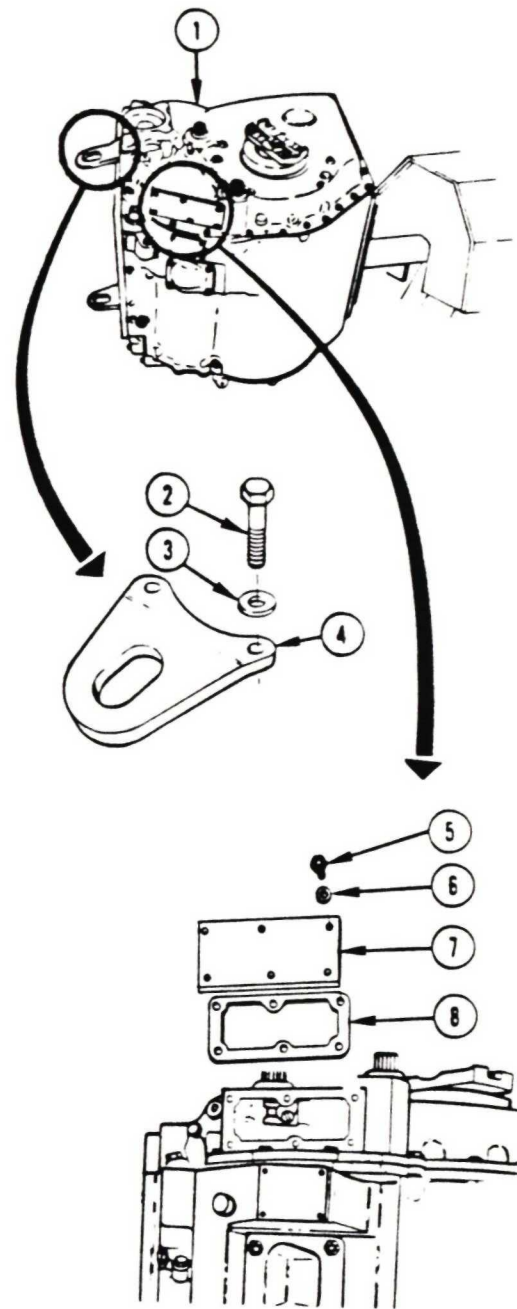
Transmission mounted on maintenance stand, right end turned up.

Go to Sheet 2

# 4-7. REMOVE RIGHT END COVER ASSEMBLY (SHEET 2 OF 7)

- 1 Using wiping rags, clean right end cover (1).
- 2 Using 9/16 inch socket, remove two bolts (2) and washers (3) from right lifting bracket (4). Remove bracket.
- 3 Using 1/2 inch socket, remove six bolts (5) and washers (6) from right brake adjusting cover (7).
- 4 Remove brake adjusting cover (7).
- 5 Remove brake adjusting cover gasket (8).

Go to Sheet 3



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4-7. REMOVE RIGHT END COVER ASSEMBLY  
(SHEET 3 OF 7)

- 6 Using 9/16 inch socket, remove 27 remaining bolts (9) and washers (10) from right end cover (1).

**NOTE**

Two legs of three-legged sling are used in this task. When sling bolts are tightened, they jack end cover from transmission.

- 7 Install washers (11) on two 3/8-16 x 2 inch bolts (12) and install bolts through sling lugs.
- 8 Using 9/16 inch socket, install one bolt (12) in each jack hole (13) on right end cover (1).
- 9 Alternately tighten two bolts (12) until end cover (1) loosens.
- 10 Using hammer, strike against elbow (14) to loosen end cover (1).
- 11 Using hoist and sling, remove end cover (1).

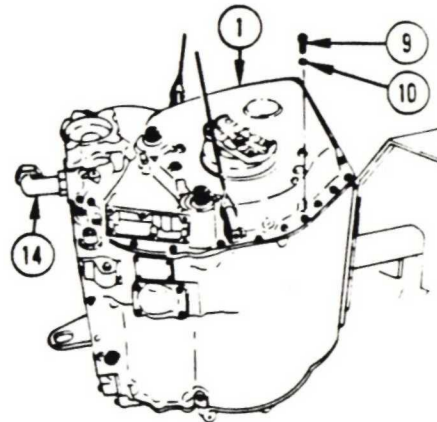
**NOTE**

Outer steer shaft (refer to this paragraph, TASK 2) may be lifted out when end cover (1) is removed.

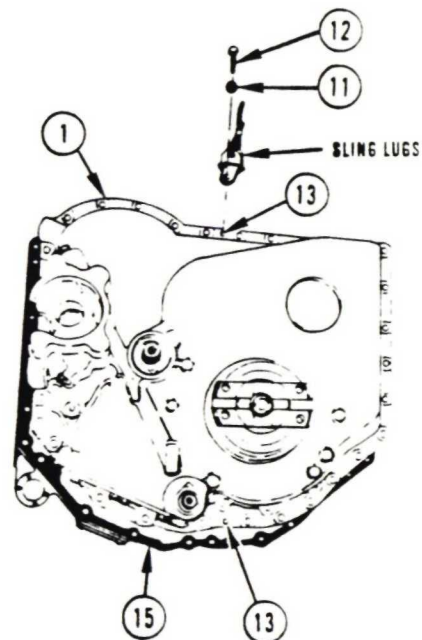
- 12 Using 9/16 inch socket, remove two jack bolts (12), washers (11) and sling from end cover (1).
- 13 Remove right end cover gasket (15).

**REPAIR:** Refer to paragraph 4-20 to repair right end cover assembly.

**FOLLOW-ON PROCEDURE:** Install right end cover assembly. Refer to paragraph 4-16.



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End of Task 1

Go to Sheet 4

## 4-7. REMOVE RIGHT END COVER ASSEMBLY (SHEET 4 OF 7)

### OVERVIEW

The purposes of this task are to remove loose components that will drop out of the transmission when the right side is lowered, and to remove tubes, including the tubes that must be removed before the bevel gear assembly can be removed.

### TASK 2. REMOVE RIGHT END TUBES AND LOOSE COMPONENTS

#### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Hammer, hand, machinist's  
 Handle, socket wrench, 1/2 inch square drive  
 Pliers, retaining ring, external  
 Pliers, slip-joint  
 Puller, mechanical, gear and bearing, three-jaw  
 Punch, center, tapered end  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch

#### SUPPLIES:

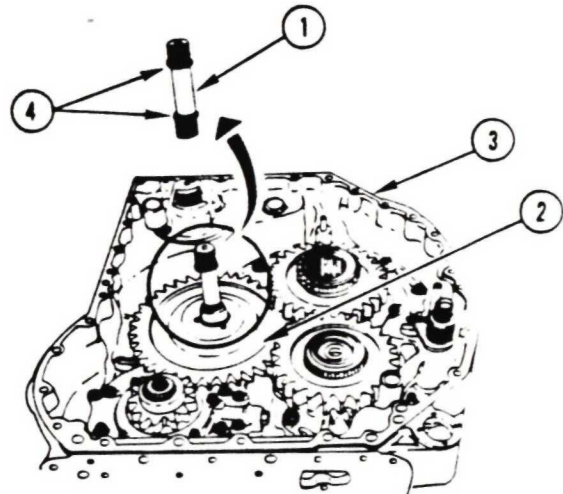
Rag, wiping (Item 15, Appendix C)

#### Remove Outer Steer Shaft

#### NOTE

- Wiggle shaft to remove, if necessary.
- Retaining rings on steer shafts function as stops. They should not be removed unless defective.

- 1 Remove outer steer shaft (1) from steer shaft drive gear (2) in transmission (3).
- 2 Using retaining ring pliers, remove retaining rings (4) from shaft (1) if out of round, bent, or if tension is lost.



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Go to Sheet 5

# 4-7. REMOVE RIGHT END COVER ASSEMBLY (SHEET 5 OF 7)

Remove Range Output Gears, Steer Shaft Drive Gear and Replace Bearings

## NOTE

- Bearings are not to be replaced unless defective. Refer to TM 9-214 for inspection of bearings.
- The outer races for bearings on top of gears (2, 5, 6) remain in the right end cover. Refer to paragraph 4-20 to replace these races.
- Outer races for bearings under gears (2, 5, 6) remain in the center housing. Refer to paragraph 4-29 to replace these races.

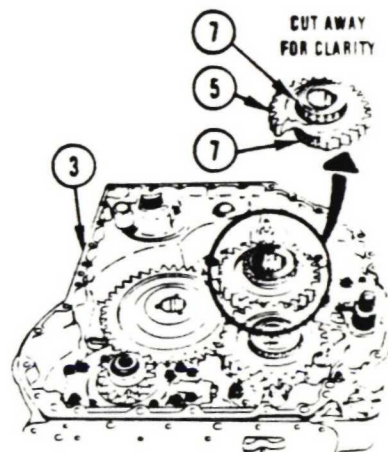
- 3 Remove range output driven gear (5) from transmission (3).
- 4 Remove range output drive gear (6) from transmission (3).
- 5 Remove steer shaft drive gear (2) from transmission (3).

## NOTE

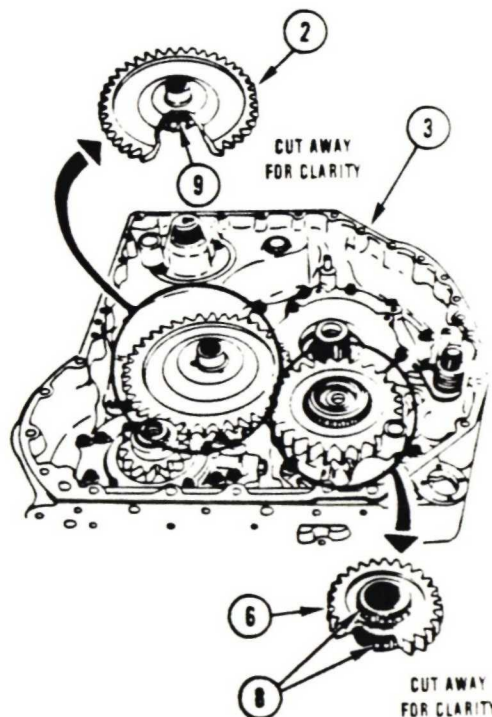
- If bearings (7 or 8) require replacement, go to Step 6 or 7. If bearings are serviceable, go to Step 9.
- If bearing (9) requires replacement, go to Step 8. If bearing is serviceable, go to Step 9.

- 6 Using bearing puller, remove two bearings (7) from output driven gear (5).
- 7 Using bearing puller, remove two bearings (8) from output drive gear (6).
- 8 Using punch and hammer, remove bearing (9) from steer shaft drive gear (2).

Go to Sheet 6



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# 4-7. REMOVE RIGHT END COVER ASSEMBLY (SHEET 6 OF 7)

Remove Inner Steer Shaft, Range Output Gear Spacer, Tubes

## NOTE

It may be necessary to wiggle steer shaft to remove it from transmission.

- 9 Remove inner steer shaft (10).
- 10 Using retaining ring pliers, remove retaining rings (11) if out of round, bent, or if tension is lost.
- 11 Remove range output gear spacer (12).
- 12 Remove lube tube (13) and two packings (14).
- 13 Remove packings (14).

## NOTE

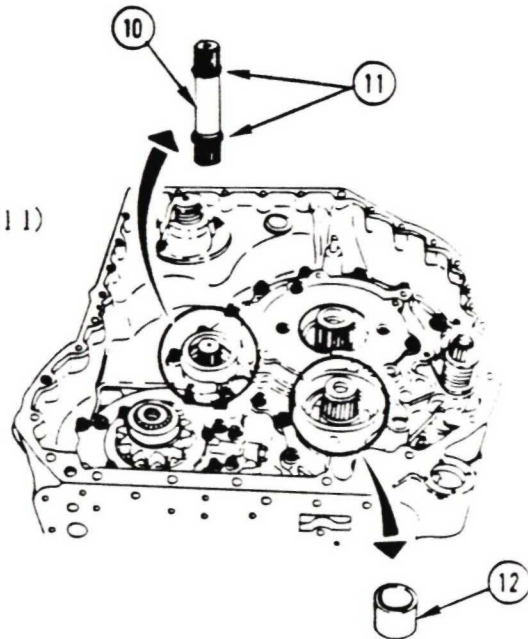
Brake apply tube (15) may remain in right end cover assembly, or it may remain in center housing.

- 14 Remove brake apply tube (15) and two packings (16).
- 15 Remove packings (16).
- 16 Remove brake coolant tube (17) and two packings (18).
- 17 Remove packings (18).
- 18 Using slip-joint pliers, remove sump communication tube (19).

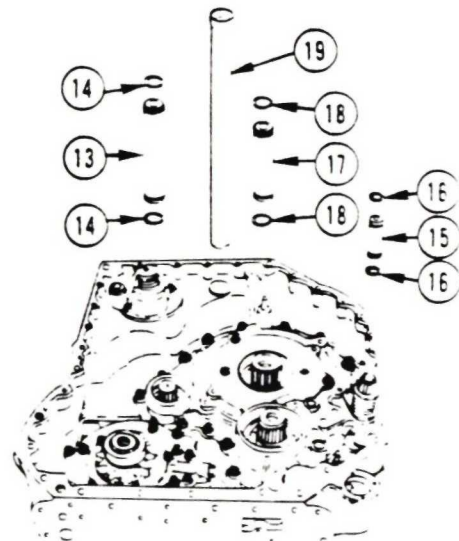
## NOTE

If tube (19) does not lift out easily, leave it in place.

Go to Sheet 7



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**4-7. REMOVE RIGHT END COVER ASSEMBLY  
(SHEET 7 OF 7)**

**Remove Reverse Equalizer Valve Components**

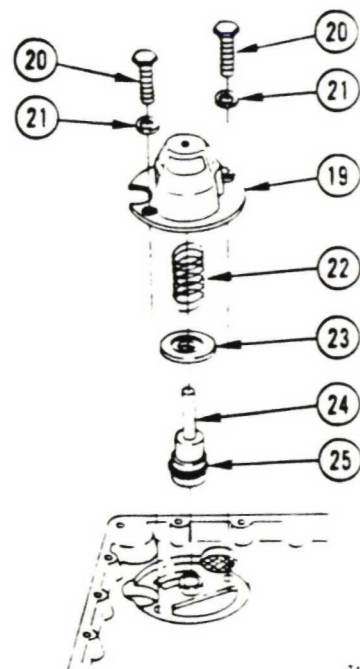
**WARNING**

Spring-loaded parts can fly and injure you. Always follow specified instructions when removing bolts from covers that are attached to valve assemblies.

**NOTE**

Scavenge tube and oil transfer tube, extending into the bevel gear assembly, cannot be removed until equalizer valve housing (19) has been removed.

- 18 Use one hand to hold spring-loaded equalizer valve housing (19) down when housing is being removed.
- 19 Using socket in other hand, remove two bolts (20) and washers (21) holding equalizer valve housing (19) to transmission. Carefully release housing, easing spring pressure before lifting housing completely off. Remove housing.
- 20 Remove spring (22).
- 21 Remove reverse equalizer valve (23).
- 22 Remove reverse equalizer piston assembly (24) with seal ring (25).
- 23 Remove seal ring (25).



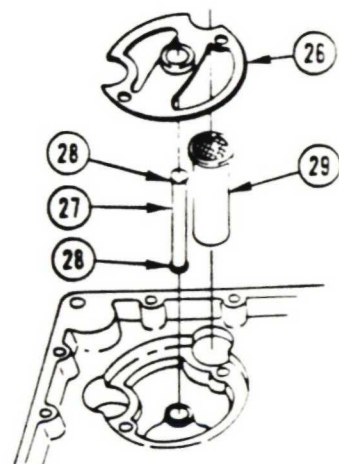
**NOTE**

Oil transfer tube (27) may remain in transmission (bevel gear assembly), or it may come out attached to under side of diaphragm.

- 24 Remove equalizer valve diaphragm (26).
- 25 Remove equalizer valve oil transfer tube (27) with two packings (28).
- 26 Remove packings (28).
- 27 Remove scavenge tube assembly (29).

**FOLLOW-ON PROCEDURE:** Install right end tubes and loose components. Refer to paragraph 4-16.

End of Task 2



## 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 1 OF 8)

### OVERVIEW

Oil filter cover prevents access to two bolts holding left end cover to transmission.

Task	Title	Page
1	Remove Oil Filter Head Assembly	4-27
2	Remove Left End Cover Assembly	4-28
3	Remove Loose Components, Left End of Transmission	4-30

### TASK 1. REMOVE OIL FILTER HEAD ASSEMBLY

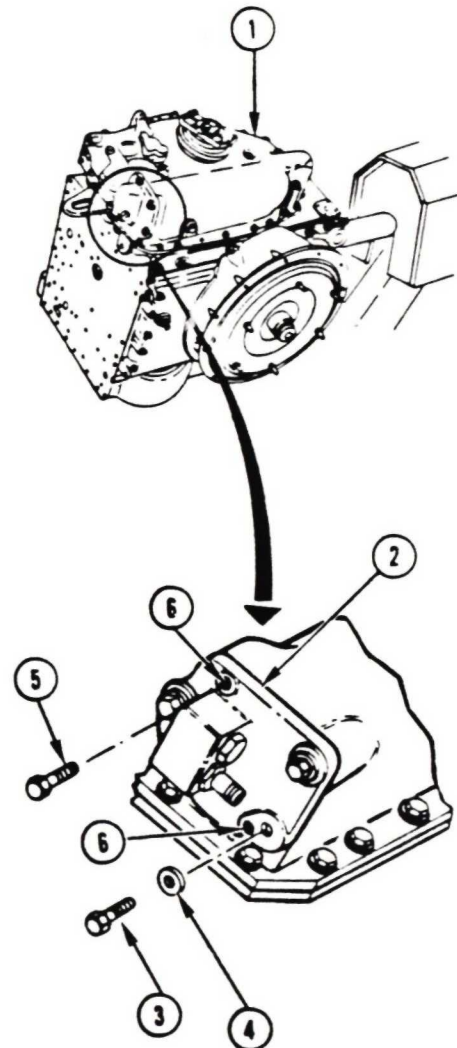
#### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 10 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch

#### SUPPLIES:

Bolt, 3/8-16 x 1-1/4 inch (2 required)  
Rag, wiping (Item 15, Appendix C)

- 1 Using rotary control handle on maintenance stand, rotate transmission so that left end cover assembly (1) is up.
- 2 Using wiping rag, clean oil filter head (2).
- 3 Using socket, remove three bolts (3) and washers (4) from filter head (2).
- 4 Using socket, install two 3/8-16 x 1-1/4 inch bolts (5) in jack holes (6) on filter head (2).
- 5 Equally tighten bolts (5) until oil filter head (2) becomes loose.
- 6 Remove two bolts (5) from jack holes (6).



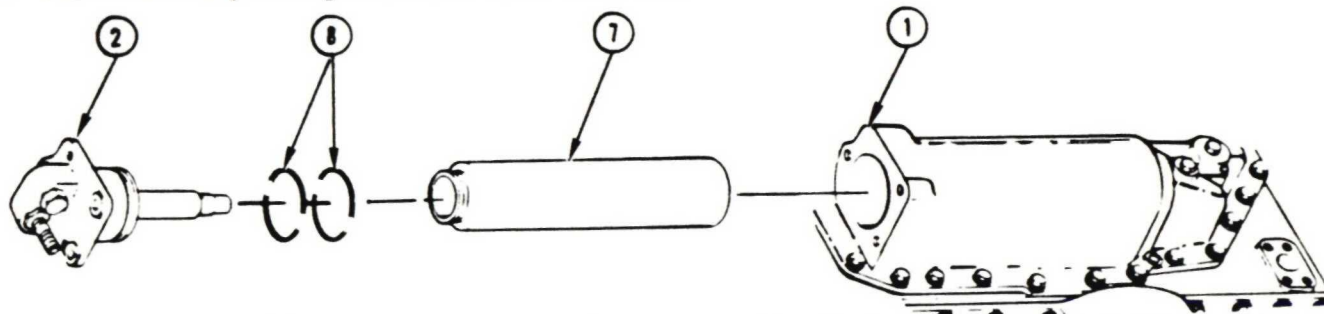
TM 9-2520-272-34&amp;P

Go to Sheet 2



4-8. REMOVE LEFT END COVER ASSEMBLY  
(SHEET 2 OF 8)

- 7 Pull filter head (2) and filter (7) from filter cavity on left end cover assembly (1).
- 8 Pull filter head (2) and filter (7) apart.
- 9 Remove two packings (8) from filter head (2).



FOLLOW-ON PROCEDURE: Install filter head assembly. Refer to paragraph 4-15.

End of Task 1

TASK 2. REMOVE LEFT END COVER ASSEMBLY

COMMON TOOLS:

- Extension, socket wrench, 1/2 inch square drive, 10 inch
- Handle, socket wrench, 1/2 inch square drive
- Hoist, 200-pound minimum capacity
- Screwdriver flat tip
- Socket, socket wrench, 1/2 inch square drive, 9/16 inch

SPECIAL TOOLS:

- Lifting sling, three-leg (19207) 12268036

SUPPLIES:

- Bolt, 3/8-16 x 2 inch (2 required)
- Rag, wiping (Item 15, Appendix C)
- Washer, flat, 3/8 inch (2 required)

**WARNING**

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Left end cover assembly must be lifted using sling and hoist. To avoid injury, keep clear of end cover at all times. Do not let left end cover assembly swing freely during hoisting.

Go to Sheet 3

**4-8. REMOVE LEFT END COVER ASSEMBLY  
(SHEET 3 OF 8)**

- 1 Using socket, remove two bolts (1) and washers (2) from left lifting bracket (3). Remove bracket from left end cover assembly (4).
- 2 Using socket, remove the remaining 29 bolts (5) and washers (6) from left end cover assembly (4).

**NOTE**

Two legs of three-legged sling are used in this task. When sling bolts are tightened, they jack end cover from transmission.

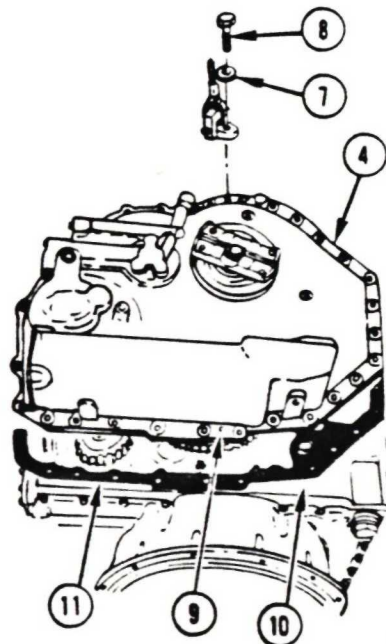
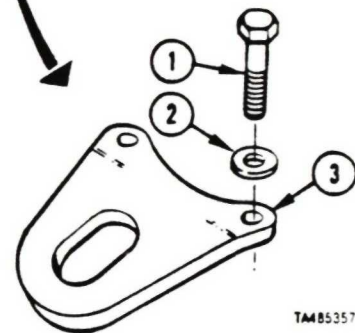
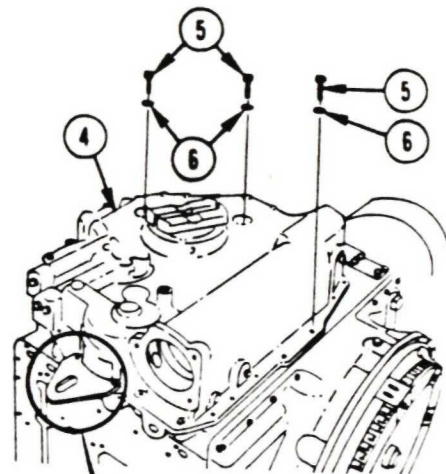
- 3 Install washers (7) on two 3/8-16 x 2 inch bolts (8) and install bolts through sling lugs.
- 4 Using socket, install two bolts (8) in jack holes (9) on left end cover assembly (4).
- 5 Alternately tighten two bolts (8) until end cover (4) loosens.
- 6 Using screwdriver, insert tip in crack between end cover (4) and center housing (10). Pry cover loose.
- 7 Using hoist and sling, remove end cover (4).
- 8 Using socket, remove jack bolts (8), washers (7) and sling from end cover (4).
- 9 Remove left end cover gasket (11).

**REPAIR:** Refer to paragraph 4-23 to repair left end cover assembly.

**FOLLOW-ON PROCEDURE:** Install left end cover assembly. Refer to paragraph 4-15.

End of Task 2

Go to Sheet 4



4-8. REMOVE LEFT END COVER ASSEMBLY  
(SHEET 4 OF 8)

OVERVIEW

This task includes removal of loose components remaining in the center housing after the left end cover has been removed. If not removed, most of these components will drop out of the transmission when the uncovered left side is rotated down.

TASK 3. REMOVE LOOSE COMPONENTS, LEFT END OF TRANSMISSION

COMMON TOOLS:

Gloves, leather  
Grinder, rotary  
Hammer, hand, machinist's  
Hammer, hand, plastic face  
Handle, socket wrench, 1/2 inch square drive  
Heat Gun (2 required)  
Pliers, slip joint, straight nose  
Pry Bar, roller head (2 required)  
Puller, mechanical, gear and bearing, three-jaw  
Punch, center, tapered point  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Wrench, torque, 0-175 ft-lb

FABRICATED TOOLS:

Fixture, range pack retaining (Appendix D)

SUPPLIES:

Bolt, 3/8-16 x 3/4 inch  
Rag, wiping (Item 15, Appendix C)  
Washer, flat, 3/8 inch

PERSONNEL REQUIRED: 2

- One soldier holds gear steady.
- One soldier removes bearing race.

CAUTION

After left end cover has been removed, do not rotate transmission more than 90 degrees until fabricated range pack retaining fixture has been installed. Two pitot tubes and two bolts extending into the range pack from center housing help to hold range pack in place, but these tubes and bolts are not adequate support for the range pack when the transmission is turned over. If the uncovered left end of the transmission is rotated more than 90 degrees (1/4 turn) from top without the range pack retaining fixture in place, parts in range pack may fall out and be damaged.

Go to Sheet 5



# 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 5 OF 8)

Remove Range Input Gears, Hydrostatic Drive Gear,  
Bevel Gear Driven Shaft and Filter Tubes

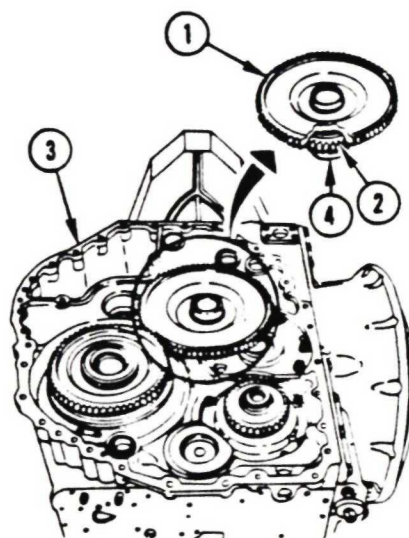
## NOTE

Bearings are not to be replaced unless defective. Refer to TM 9-214 for inspection of bearings.

- 1 Remove range input drive gear (1) and hydrostatic drive gear (2), together, from center housing (3).

## NOTE

- Range input drive gear and hydrostatic drive gear should not be separated unless one of these gears or inner race (4) must be replaced.
- When hydrostatic drive gear is removed, inner race (4) is also removed.
- Bearing outer race and rollers that match race (4) remain in the center housing. Refer to paragraph 4-29 to replace outer race and rollers.



- 2 Using bearing puller, remove race (4) and hydrostatic drive gear (2) from range input drive gear (1).

Go to Sheet 6

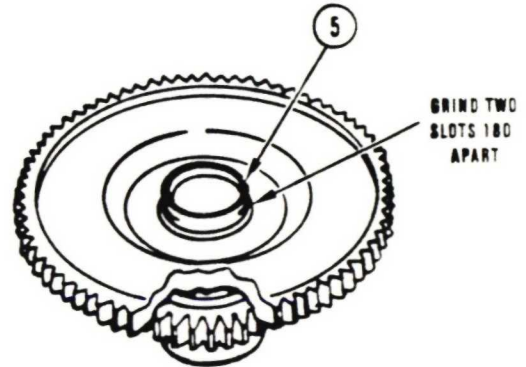
4-8. REMOVE LEFT END COVER ASSEMBLY  
(SHEET 6 OF 8)

WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or could be hot.

CAUTION

Use care not to cut into gear hub when using grinder to cut slots in bearing race.



TAM85360

- 3 Using grinder, cut two slots 180° apart at base of bearing race (5). Cut slots deep enough to catch the lip of the pry bar, but not deep enough to cut through bearing race into gear hub.
- 4 Using two heat guns, heat bearing race (5) for 15 minutes.
- 5 Using two pry bars in slots, lift up bearing race (5).

CAUTION

Use care not to damage gear hub when using pry bars to remove race.

- 6 After lifting bearing race, reposition two pry bars under bearing race (5) and remove race.

NOTE

Bearing outer race and rollers that match race (5) remain in the left end cover assembly. Refer to paragraph 4-23 to replace the outer race and rollers.

Go to Sheet 7

4-8. REMOVE LEFT END COVER ASSEMBLY  
(SHEET 7 OF 8)

NOTE

Range input driven gear (6) has bearing rollers and inner race on top. Outer race remains in left end cover assembly. Refer to paragraph 4-23 to replace outer race.

- 7 Remove range input driven gear (6). If bearing (7) is defective, go to Step 6. If bearing is not defective, go to Step 7.
- 8 Using machinist's hammer and punch, remove bearing (7) from gear (6).

NOTE

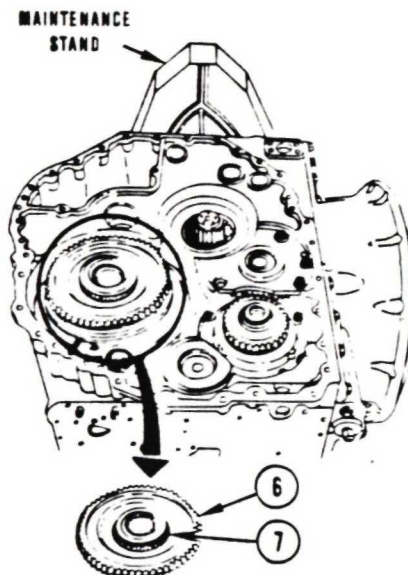
It may be necessary to wiggle bevel gear drive shaft to remove it from transmission.

- 9 Remove bevel gear drive shaft (8).

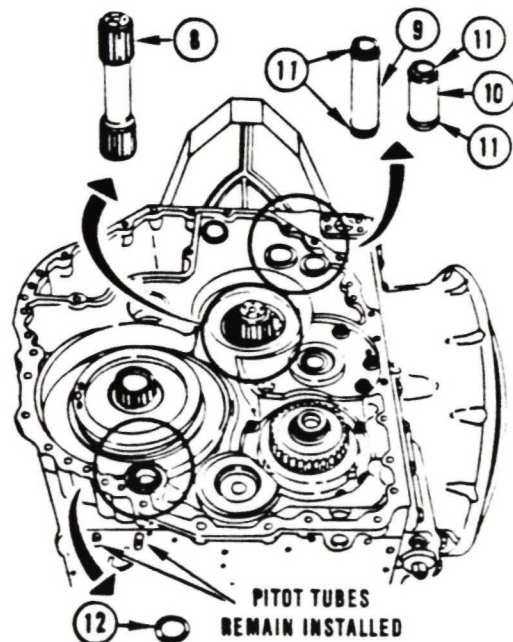
NOTE

The filter-in tube (9) is 3.60 inches (91.44 mm) long. The filter-out tube (10) is 2.25 inches (57.15 mm) long. The filter-out tube (shorter tube) is located closest to the input housing.

- 10 Using pliers, remove filter-in tube (9) and filter-out tube (10) from center housing or from end cover.
- 11 Remove four packings (11) from tubes (9, 10).
- 12 Remove packing (12) from end of jumper tube.



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Go to Sheet 8



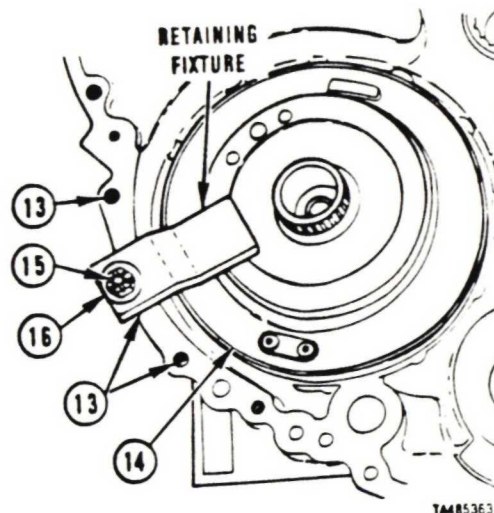
# 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 8 OF 8)

## Install Fabricated Range Pack Retaining Fixture

### NOTE

Retaining fixture is installed to prevent range pack from shifting when transmission is rotated.

- 13 Align hole in retaining fixture with one of three left end cover bolt holes (13) located nearest to forward clutch housing assembly (14).
- 14 Using socket, install 3/8-16 x 3/4 inch bolt (15) and washer (16) in selected bolt hole (13).
- 15 Using torque wrench, tighten bolt (15) to 27-32 lb-ft (37-43 N·m).

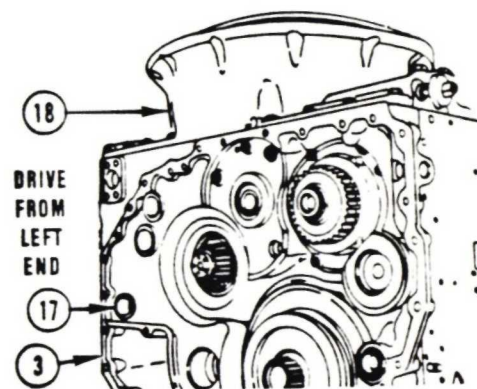


TA485363

## Remove Sump Communication Tube

### NOTE

- If tube (17) is in place, tube (17) does not need to be removed unless bevel gear assembly is to be removed, or tube is defective.
- If tube (17) must be removed, proceed with Steps 16, 17, and 18.

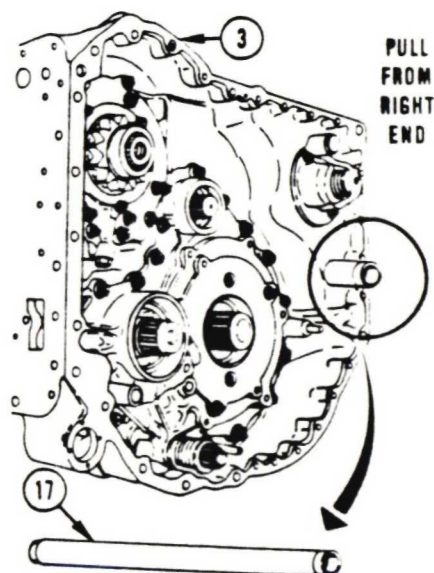


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- 16 Using rotary control handle on maintenance stand, rotate transmission so that input housing (18) is in up position.
- 17 Using plastic faced hammer, tap end of sump communication tube (17) at left end of center housing (3) until tube moves into center housing.
- 18 Using pliers, pull tube (17) from right end of center housing (3).

### FOLLOW-ON PROCEDURE:

- Install loose components, left end of transmission. Refer to paragraph 4-15.
- For removal of retaining fixture, refer to paragraph 4-28.



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End of Task 3

#### 4-9. REMOVE CONVERTER ELEMENT COMPONENTS (SHEET 1 OF 5)

Task	Title	Page
1	Remove Converter Element Group	4-35

#### TASK 1. REMOVE CONVERTER ELEMENT GROUP

##### COMMON TOOLS:

Bar, pry  
 Chisel, cold, 3/8 inch  
 Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Hammer, hand, ball peen  
 Hammer, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Hoist, 300-pound minimum capacity  
 Pliers, retaining ring, external  
 Screwdriver, flat tip  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch

##### SPECIAL TOOLS:

Lifting Sling, three-leg (19207) 12268036

##### SUPPLIES:

Bolt, 3/8-16 x 2 inch (2 required)  
 Nut, hex, 5/16-24 (3 required)  
 Washer, 3/8 inch (3 required)

##### PERSONNEL REQUIRED: 2

- One soldier holds pry bar.
- One soldier removes nuts.

Go to Sheet 2

# 4-9. REMOVE CONVERTER ELEMENT COMPONENTS (SHEET 2 OF 5)

## NOTE

- Transmission is on maintenance stand, input housing up.
- Procedure for removal of external ring gear is provided in event of ring gear failure. Unless ring gear or converter pump cover is to be replaced, ring gear should not be removed. If ring gear is to be removed, go to Step 1. If ring gear is not to be removed, go to Step 5.

- 1 If shipping brackets are not in place, place pry bar across two studs (1) to keep converter pump cover (2) from rotating when removing locknuts (3), if necessary.
- 2 Using 9/16 inch socket, remove six nuts (3) from ring gear (4). If present, remove shipping brackets.
- 3 Using 9/16 inch socket, install two 3/8-16 x 2 inch jack bolts (5) in jack holes (6) in ring gear (4).
- 4 Equally turn jack bolts (5) until ring gear (4) loosens from converter cover (2). Remove ring gear.
- 5 Place pry bar across two studs (1) to keep cover (2) from rotating when unscrewing nuts (7).
- 6 Using 1/2 inch socket, remove 24 nuts (7) holding converter pump cover (2).

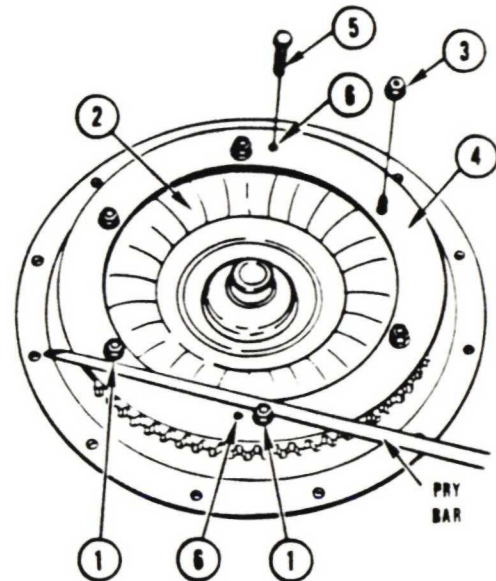
## NOTE

Tap cover with plastic-faced hammer to loosen, if necessary.

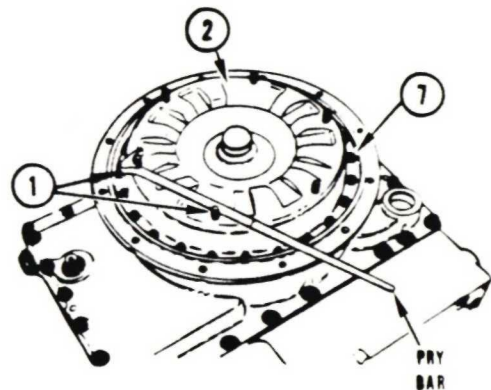
- 7 Using fingers, pull up on two studs (1) located opposite each other and pull converter pump cover (2) from transmission.

**REPAIR:** Refer to paragraph 4-32 for repair of converter pump cover assembly.

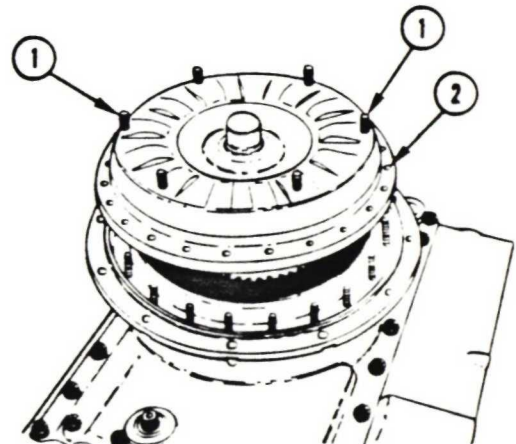
Go to Sheet 3



TAM8536E



TAM8536E

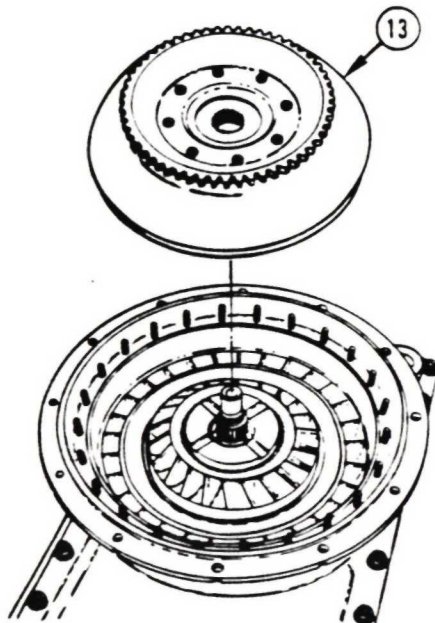


TAM8536E

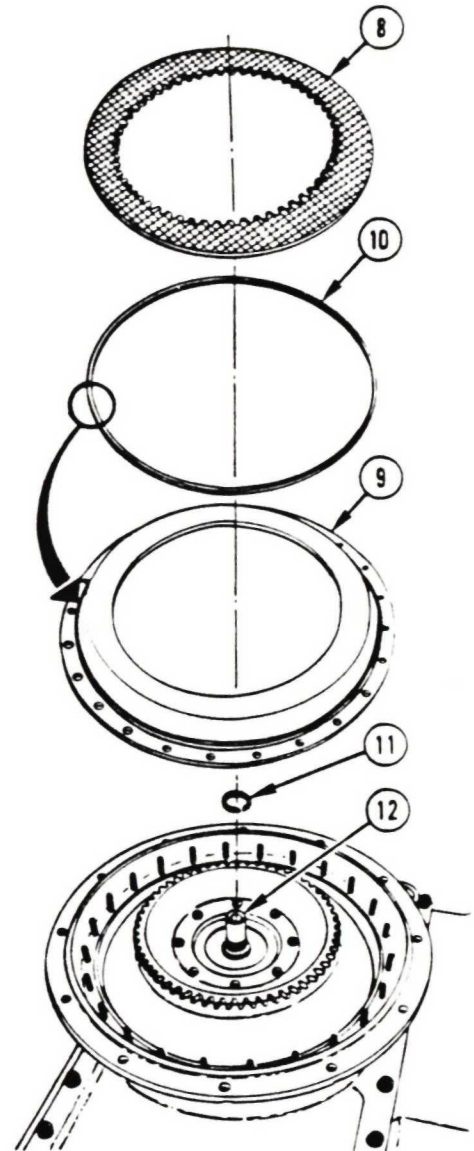


**4-9. REMOVE CONVERTER ELEMENT COMPONENTS  
(SHEET 3 OF 5)**

- 8 Lift clutch plate (8) from converter assembly.
- 9 Using screwdriver, pry clutch backing plate (9) off converter assembly.
- 10 Remove seal ring (10) from clutch backing plate (9) and check for sections missing or stretching out of shape.
- 11 Using external retaining ring pliers, remove retaining ring (11) from turbine shaft (12).
- 12 Remove torque converter turbine assembly (13) from transmission.



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TM 85365

Go to Sheet 4

4-9. REMOVE CONVERTER ELEMENT COMPONENTS  
(SHEET 4 OF 5)

**NOTE**

Stator is removed from transmission with assembled parts inside retained by two retaining rings.

- 13 Remove stator (14) from transmission.

REPAIR: Refer to paragraph 4-32 to disassemble the stator group of components.

- 14 Remove seal ring (15) from converter pump assembly (16).

- 15 Using chisel and ball peen hammer, bend tabs on ends of four locking strips (17) away from heads of eight bolts (18).

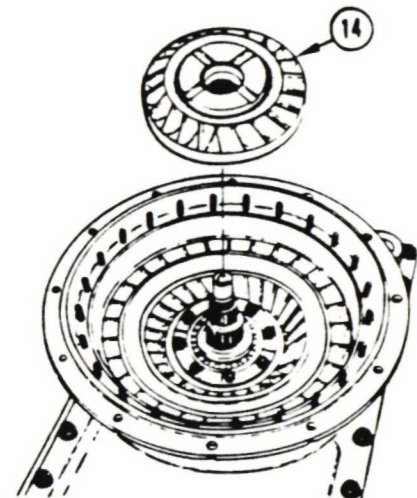
**CAUTION**

When holding pry bar between stud (19) and input housing wall, use only enough force to keep pump from rotating while removing bolts. Too much force on pry bar can damage input housing wall or bend a stud.

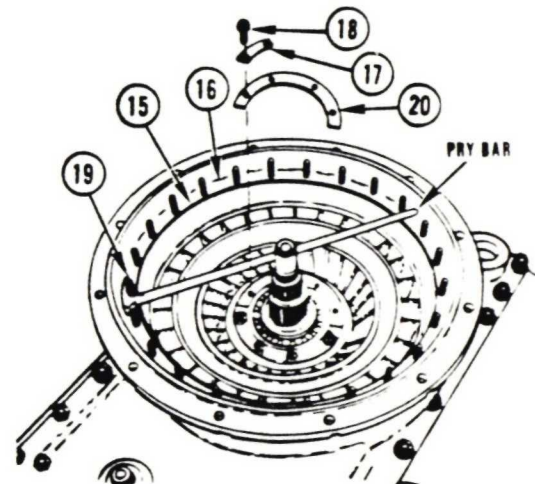
- 16 Using end of pry bar between a stud (19) and the input housing wall, hold pump (16) so that it cannot turn.

- 17 Using a 1/2 inch socket, remove eight bolts (18) that hold locking strips (17) and retainers (20) to pump (16).

- 18 Remove four locking strips (17) and two retainers (20).



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Go to Sheet 5

#### 4-9. REMOVE CONVERTER ELEMENT COMPONENTS (SHEET 5 OF 5)

##### NOTE

When sling is attached to three studs at approximately equal distances apart, there will be seven studs between sling lugs in two places and eight studs between sling lugs in one place.

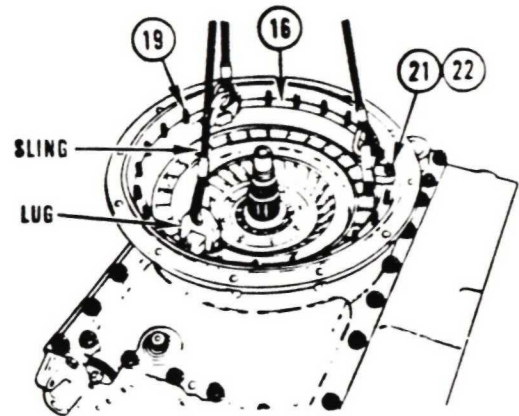
19 Place three sling lugs over studs (19) located equal distances apart on the pump (16) and install three 5/16-24 hex nuts (21) and washers (22) finger tight.

20 Using plastic faced hammer, tap on pump assembly (16) while pulling up on pump with sling. Remove pump assembly (16).

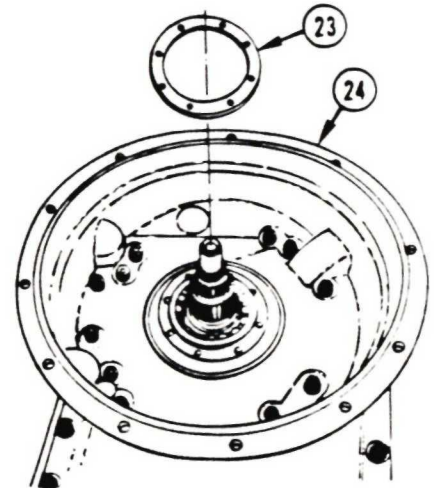
21 Remove three nuts (21) and washers (22) and sling from pump (16).

22 Remove converter pump gasket (23) from inside input housing assembly (24).

**FOLLOW-ON PROCEDURE:** Install converter element components. Refer to paragraph 4-14.



TM85373



TM85374

End of Task 1



4-10. REMOVE INPUT HOUSING ASSEMBLY  
(SHEET 1 OF 2)

Task	Title	Page
1	Remove Input Housing Assembly	4-40

**TASK 1. REMOVE INPUT HOUSING ASSEMBLY**

**COMMON TOOLS:**

Extension, socket wrench, 3/8 inch square drive, 6 inch  
Hammer, hand, ball peen  
Handle, socket wrench, 3/8 inch square drive  
Punch, center  
Socket, socket wrench, 3/8 inch square drive, 9/16 inch  
Universal Joint, socket wrench, 3/8 inch square drive

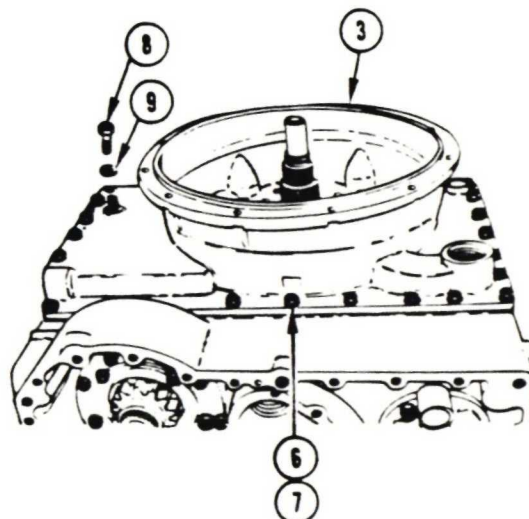
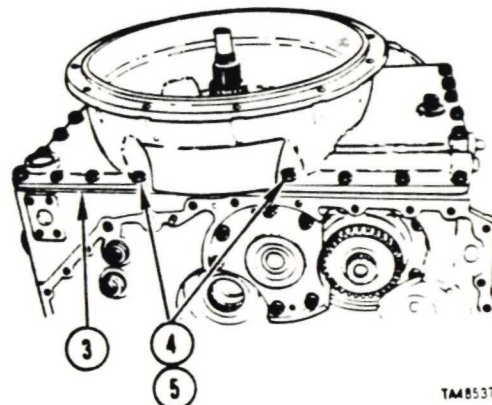
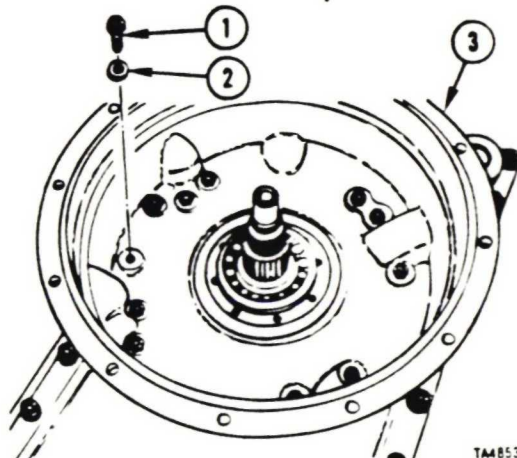
**SUPPLIES:**

Bolt, hex head, 3/8-16 x 1-1/4 inch  
Bolt, hex head, 3/8-16 x 2-3/4 inch, full thread

**NOTE**

Transmission on maintenance stand, input housing turned up.

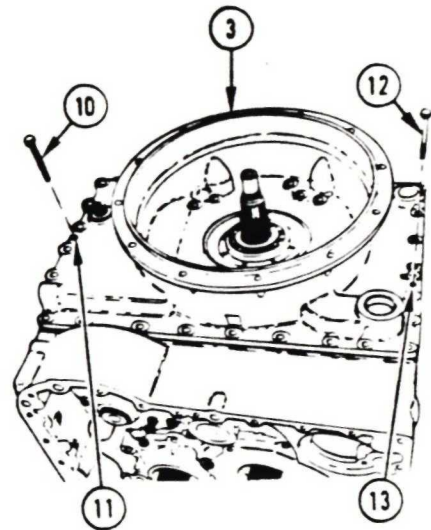
- 1 Using socket, remove 11 bolts (1) and washers (2) from inside the input housing (3).
- 2 Using socket, extension, and universal joint, remove two bolts (4) and washers (5) from left side of input housing (3).
- 3 Using socket, extension, and universal joint, remove bolt (6) and washer (7).
- 4 Using socket, remove the remaining 24 bolts (8) and washers (9) that hold the input housing (3) to the transmission.



Go to Sheet 2

# **4-10 REMOVE INPUT HOUSING ASSEMBLY** (SHEET 2 OF 2)

- 5 Using socket, install 3/8-16 x 2-3/4 inch bolt (10) in jack hole (11) located near center at top end of input housing (3).
- 6 Using socket, install 3/8-16 x 1-1/4 inch bolt (12) in jack hole (13) located near center at bottom end of input housing (3).
- 7 Using socket, equally tighten jack bolts (10, 12) until input housing (3) loosens from transmission.
- 8 Using socket, remove jack bolts (10, 12) from input housing (3).
- 9 Remove input housing (3) from transmission.

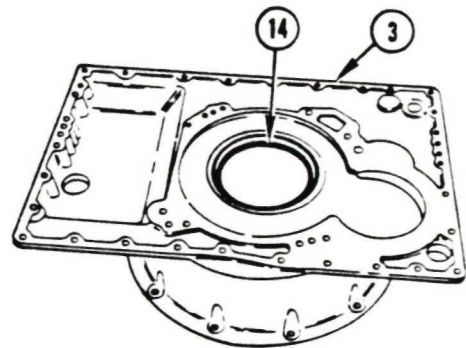


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## **NOTE**

Check input housing seal. It is not necessary to remove seal unless defective. If seal is defective, go to Steps 10 and 11. If seal is serviceable, go to Step 12.

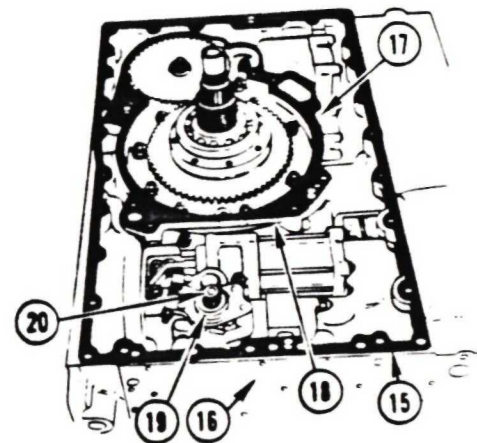
- 10 Turn input housing (3) over, bell housing down.
- 11 Using hammer and center punch, drive against wall of seal (14) two places about 180 degrees apart; drive seal down into bell housing area.



TA485379

**REPAIR:** Refer to paragraph 4-25 for repair of input housing assembly.

- 12 Remove input housing gasket (15) from transmission center housing (16).
- 13 Remove bevel gear gasket (17) from bevel gear assembly (18).
- 14 Remove seal (19) from steer shaft (20) on transmission center housing (16).



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**FOLLOW-ON PROCEDURE:** Install input housing assembly. Refer to paragraph 4-13.

End of Task 1

4-11. REMOVE BEVEL GEAR ASSEMBLY  
(SHEET 1 OF 2)

Task	Title	Page
1	Remove Bevel Gear Assembly	4-42

**TASK 1. REMOVE BEVEL GEAR ASSEMBLY**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 10 inch  
Handle, socket wrench, 1/2 inch square drive  
Hoist, 300-pound minimum capacity  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch

**SPECIAL TOOLS:**

Lifting Sling, three-leg (19207) 12268036

**SUPPLIES:**

Blocks, wooden, 2 x 4 inches x 16 inches long (Item 2, Appendix C)  
Bolt, hex head, 3/8-16 x 1-1/4 inch (3 required)  
Washer, flat, 3/8 inch (3 required)

**PRELIMINARY PROCEDURE:**

- Input housing assembly is removed. Refer to paragraph 4-10.
- Right end cover is removed along with lube tube, equalizer valve housing, and scavenge tube. Refer to paragraph 4-7.
- Left end cover is removed along with filter-in tube, filter-out tube, sump communication tube, and bevel gear driven shaft. Refer to paragraph 4-8.

**WARNING**

- Check slings and lifting devices for cuts, breaks, or wear before hoisting transmission and during hoisting. Slings and lifting devices can break and cause injury or death.
- Bevel gear assembly must be lifted using sling and hoist. To avoid injury, keep clear of bevel gear assembly at all times. Do not let bevel gear assembly swing freely during hoisting.

Go to Sheet 2



#### 4-11. REMOVE BEVEL GEAR ASSEMBLY (SHEET 2 OF 2)

- 1 Using socket, attach three 3/8-16 x 1-1/4 inch bolts (1) and washers (2) until snug through sling lugs and into holes (3) in bevel gear assembly (4).
- 2 Using sling, lift bevel gear assembly (4) out of transmission center housing (5).

##### CAUTION

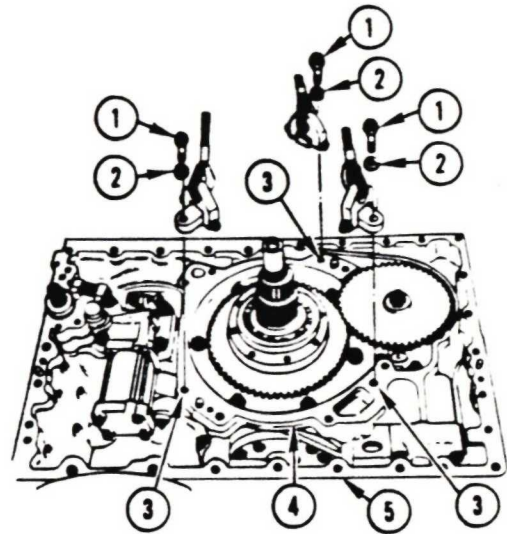
When lowering bevel gear assembly onto work table, be careful not to bend or break tubes. Bent or broken tubes must be replaced because:

- They may interfere with function of bevel gear assembly.
- They may interfere with clearances when bevel gear assembly is installed.

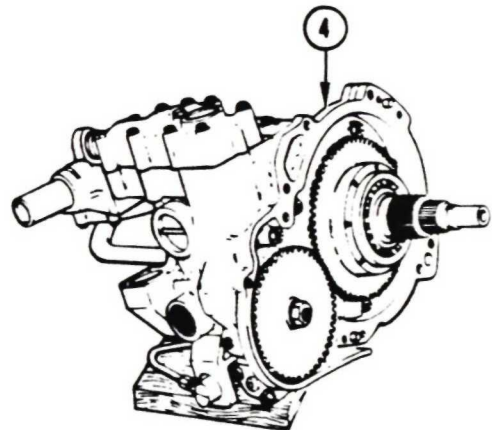
- 3 Using sling, carefully lower bevel gear assembly (4) over work table. While lowering, turn assembly so that it is supported by 2 x 4 x 16 inch wood blocks.
- 4 Remove sling.

**REPAIR:** Refer to paragraphs 4-26 and 4-27 for repair of bevel gear assembly.

**FOLLOW-ON PROCEDURE:** Install bevel gear assembly. Refer to paragraph 4-12.



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End of Task 1

## Section III. TRANSMISSION ASSEMBLY FROM MAJOR ASSEMBLIES

Paragraph	Title	Page
4-12	Install Bevel Gear Assembly	4-44
4-13	Install Input Housing Assembly	4-46
4-14	Install Converter Element Components	4-49
4-15	Install Left End Cover Assembly	4-56
4-16	Install Right End Cover Assembly	4-64
4-17	Remove Transmission from Maintenance Stand	4-73
4-18	Install Transmission Top Components	4-80

#### 4-12. INSTALL BEVEL GEAR ASSEMBLY (SHEET 1 OF 2)

Task	Title	Page
1	Install Bevel Gear Assembly	4-44

#### TASK 1. INSTALL BEVEL GEAR ASSEMBLY

##### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 10 inch  
 Handle, socket wrench, 1/2 inch square drive  
 Hoist, 300-pound minimum capacity  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch

##### SPECIAL TOOLS:

Lifting Sling, three-leg (19207) 12268036

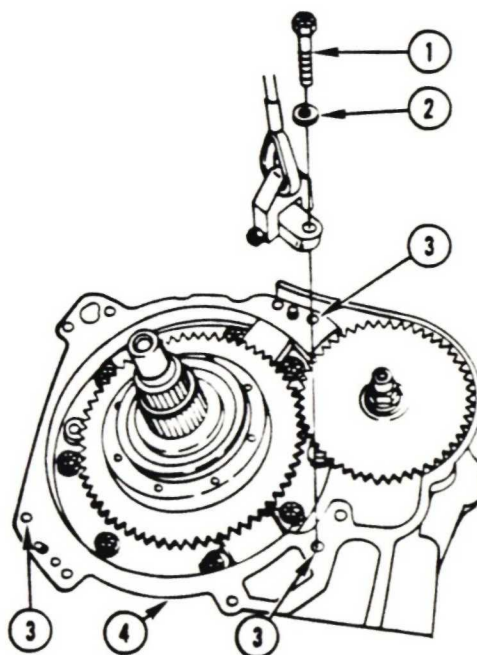
##### SUPPLIES:

Bolt, hex head, 3/8-16 x 1-1/4 inch (3 required)  
 Washer, flat, 3/8 inch (3 required)

##### NOTE

Transmission on maintenance stand, input  
 side turned up.

- Using socket, attach three 3/8-16 x 1-1/4 inch bolts (1) and washers (2) through sling lugs and into three bolt holes (3) in bevel gear assembly (4).



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Go to Sheet 2

# 4-12. INSTALL BEVEL GEAR ASSEMBLY (SHEET 2 OF 2)

## WARNING

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Bevel gear assembly must be lifted using sling and hoist. To avoid injury, keep out from under and clear of bevel gear assembly at all times. Do not let bevel gear assembly swing freely during hoisting.

## CAUTION

Do not bend or mash tubes when lifting bevel gear assembly. Closed tube will cause transmission malfunction.

## NOTE

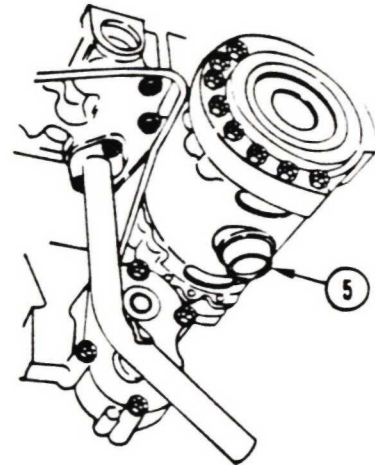
Machined boss (5) on down side of bevel gear assembly must seat in pedestal (6) on center housing before bevel gear assembly will go all the way into transmission.

- 2 Hoist bevel gear assembly (4) into transmission.
- 3 Using socket, remove three 3/8-16 x 1-1/4 inch bolts (1) and washers (2) from sling lugs. Remove sling.

## WARNING

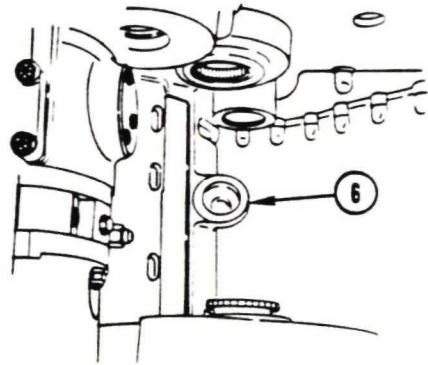
Do not turn transmission over. If transmission is rotated on maintenance stand before input housing is installed, bevel gear assembly will fall and could cause injury.

End of Task 1



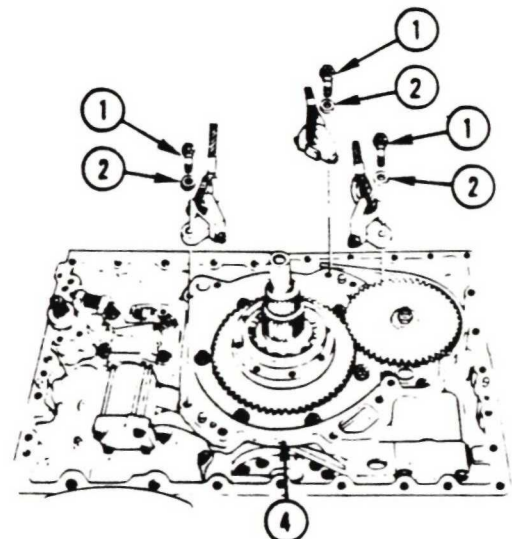
DOWN SIDE OF BEVEL  
GEAR ASSEMBLY WHEN  
ON HOIST

TA485384



LOOKING INTO BEVEL GEAR  
OPENING IN CENTER HOUSING

TA485385



TA485386



4-13. INSTALL INPUT HOUSING ASSEMBLY  
(SHEET 1 OF 3)

Task	Title	Page
1	Install Input Housing Assembly	4-46

**TASK 1. INSTALL INPUT HOUSING ASSEMBLY**

**COMMON TOOLS:**

Adapter, socket wrench, 1/2 to 3/8 inch square drive  
 Extension, socket wrench, 3/8 inch square drive, 10 inch  
 Handle, socket wrench, 3/8 inch square drive  
 Press, arbor, hand operated  
 Punch, aligning, tapered, 1/4 inch diameter point  
 Screwdriver, flat tip, 1/4 inch wide tip  
 Socket, socket wrench, 3/8 inch square drive, 9/16 inch  
 Universal Joint, socket wrench, 3/8 inch square drive  
 Wrench, torque, 0-175 lb-ft

**REPAIR PARTS:**

Seal, V-ring (steer shaft) (73342) 23018034

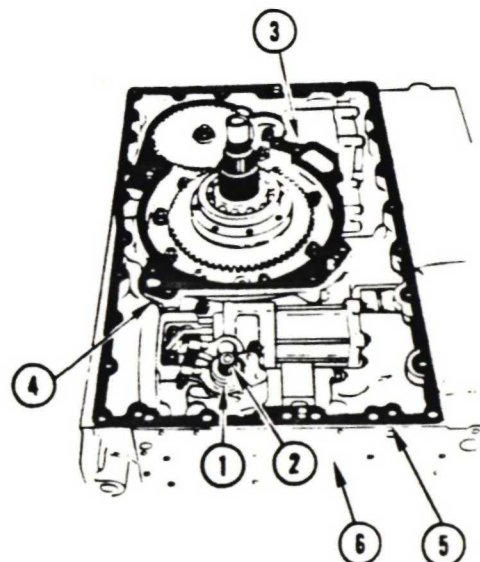
**SUPPLIES:**

Petrolatum (Item 14, Appendix C)

**NOTE**

Transmission on maintenance stand, input side turned up.

- 1 Apply petrolatum to seal (1).
- 2 Install new seal (1) on steer shaft (2) with thin lip of seal out.
- 3 Install bevel gear gasket (3) on bevel gear assembly (4).
- 4 Install input housing gasket (5) on center housing (6).



Go to Sheet 2

TM 85387

# 4-13. INSTALL INPUT HOUSING ASSEMBLY (SHEET 2 OF 3)

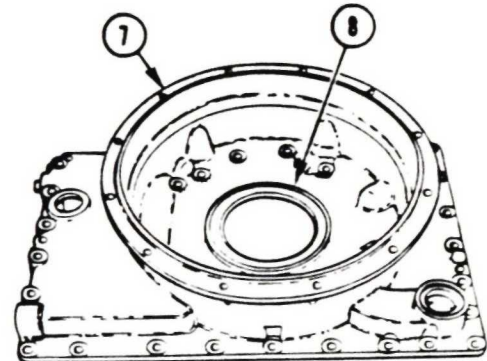
## NOTE

If seal was removed, go to Steps 5 and 6. If seal was not removed, go to Step 7.

- 5 Turn input housing assembly (7) over, bell housing up.
- 6 Using arbor press, install seal (8) in input housing (7). Press numbered side of seal to 0.020-0.030 inches (0.508-0.762 mm) above surface of input housing.
- 7 Apply petrolatum to seal (8).
- 8 Install input housing (7) on center housing (6).
- 9 Using small screwdriver, run tip of screwdriver between seal (8) and shoulder of input pump drive gear (9) to keep lip of seal turned in proper direction.

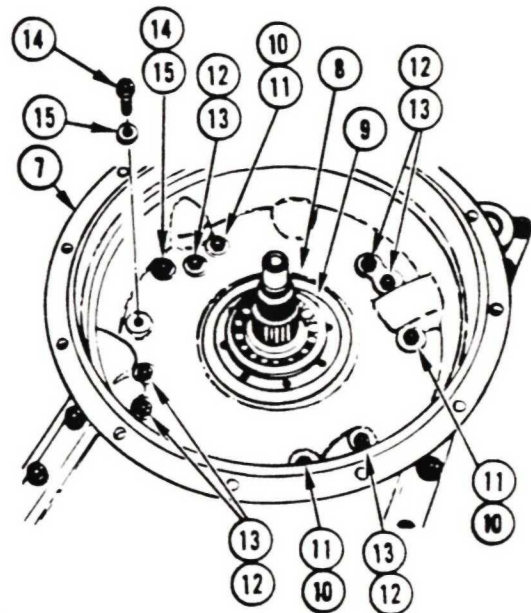
## CAUTION

Do not attempt to pull bevel gear assembly and input housing together with only one bolt. Weight of bevel gear assembly will strip threads off bolt.

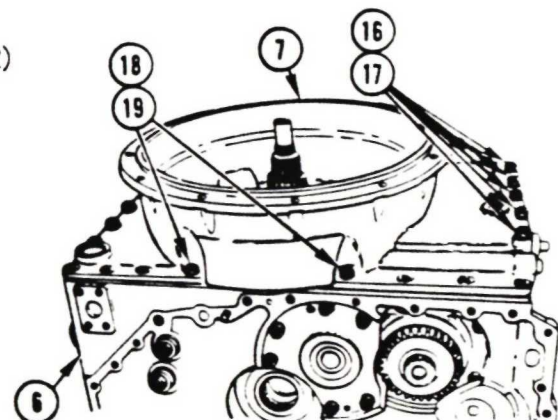


TA485388

- 10 Using aligning punch, align one bolt (10) hole. Using fingers, start one plain 3/8-16 x 1-1/4 inch bolt (10) and washer (11). Start two other bolts (10) and washers (11), aligning holes as necessary.
- 11 Using fingers, start six remaining plain 3/8-16 x 1-1/4 inch bolts (12) and washers (13) in input housing (7).
- 12 Using socket, screw nine bolts (10, 12) into input housing (7) until snug.
- 13 Using torque wrench and adapter, tighten bolts (10, 12) to 36-43 lb-ft (48-58 N·m).
- 14 Using socket, install two zinc-plated 3/8-16 x 1-1/4 inch bolts (14) and washers (15) in input housing (7).
- 15 Using socket, install five zinc-plated 3/8-16 x 2-3/4 inch bolts (16) and washers (17) in input housing (7).
- 16 Using socket, extension, and universal joint, install two zinc-plated 3/8-16 x 1-1/4 inch bolts (18) and washers (19) in input housing (7).



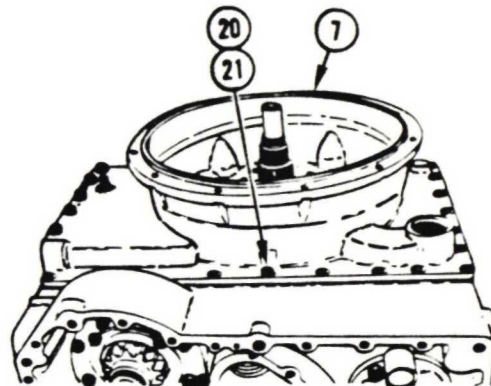
TA485389



Go to Sheet 3

4-13. INSTALL INPUT HOUSING ASSEMBLY  
(SHEET 3 OF 3)

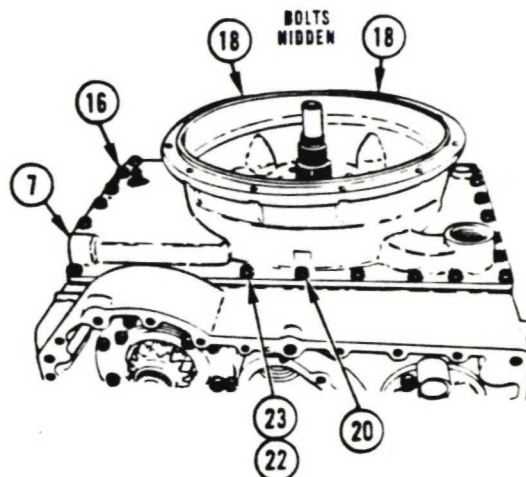
- 13 Using socket, extension and universal joint, install zinc-plated 3/8-16 x 1-1/4 inch bolt (20) and washer (21) in input housing (7).



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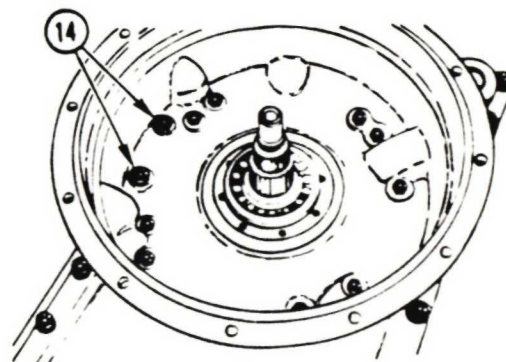
- 14 Using socket, install 19 remaining zinc-plated 3/8-16 x 1-1/4 inch bolts (22) and washers (23) in input housing (7).

- 15 Using torque wrench and adapter or using torque wrench, adapter, extension, and universal joint (as required), tighten bolts (16, 18, 20, 22) all around perimeter of input housing (7) to 27-32 lb-ft (37-43 N·m).



TM85392

- 16 Using torque wrench and adapter, tighten two bolts (14) to 27-32 lb-ft (37-43 N·m).



TM85393

End of Task 1



#### 4-14. INSTALL CONVERTER ELEMENT COMPONENTS (SHEET 1 OF 7)

Task	Title	Page
1	Install Converter Element Group	4-49

#### TASK 1. INSTALL CONVERTER ELEMENT GROUP

##### COMMON TOOLS:

Adapter, 1/2 to 3/8 inch square drive  
 Bar, pry  
 Chisel, cold, 3 1/8 inch  
 Extension, socket wrench, 1/2 inch square drive  
 Gun, heat  
 Hammer, hand, ball peen  
 Hammer, hand, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Pliers, retaining ring, external  
 Screwdriver, flat tip  
 Socket, socket wrench, 3/8 inch square drive, 1/2 inch, deep well  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Socket, socket wrench, 1/2 inch square drive, 5/8 inch  
 Wrench, torque, 0-175 lb-ft

##### FABRICATED TOOLS:

Guide Pins, 5/16-24 x 3 inch (2 required) (refer to Appendix D)

##### REPAIR PARTS:

Gasket (2 required) (73342) 23016564  
 Gasket (73342) 23018191  
 Locking Plate, nut (4 required) (73342) 23018194  
 Nut, self-locking hexagon, 5/16-24 (24 required) (24617) 190139

##### SUPPLIES:

Lubricating Oil (transmission oil) (Item 10, Appendix C)  
 Marker, tube type, black (Item 13, Appendix C)  
 Petrolatum (Item 14, Appendix C)  
 Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURE:** Input housing assembly is installed. Refer to paragraph 4-13.

Go to Sheet 2

#### 4-14. INSTALL CONVERTER ELEMENT COMPONENTS (SHEET 2 OF 7)

- 1 Using screwdriver, install two 5/16-24 x 3 inch guide pins (1) 180 degrees apart in shoulder of input pump drive gear (2).
- 2 Install converter pump gasket (3) over guide pins (1) and onto shoulder of input pump drive gear (2).
- 3 Install rotary pump (4) over guide pins (1).

#### NOTE

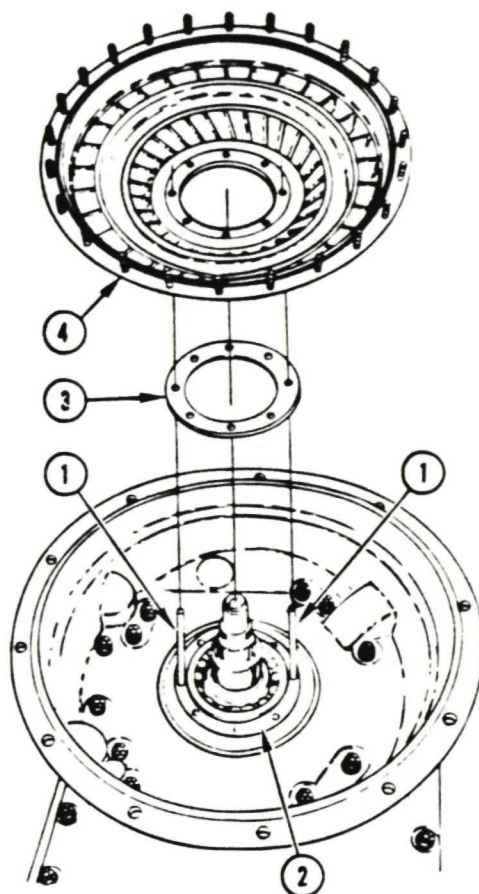
Be sure pump (4) is down far enough to allow inner lips on retainers (5) to seat in groove on bearing (6).

- 4 Using plastic faced hammer, tap pump (4) to seat pump on gasket (3).
- 5 Using screwdriver, remove two guide pins (1).
- 6 Put two converter bearing retainer plates (5) over eight bolt holes in converter pump (4).

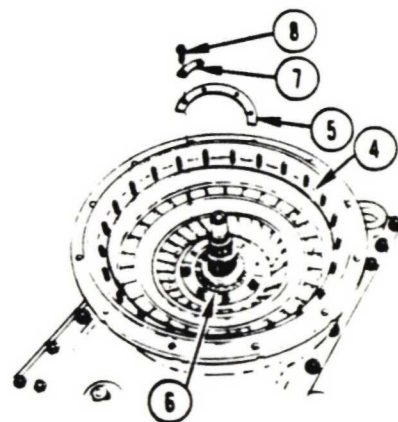
#### NOTE

Each locking plate goes over two bolt holes on retainers.

- 7 Place four new locking strips (7) on retainers, bent tabs up.
- 8 Using 1/2 inch socket, install eight cap screws (8) in locking strips (7) and retainers (5).
- 9 Use pry bar to prevent rotation of pump (4). Using torque wrench, tighten eight cap screws (8) to 19-23 lb-ft (25-31 N·m). Remove pry bar.



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TM 85395

Go to Sheet 3

**4-14. INSTALL CONVERTER ELEMENT COMPONENTS  
(SHEET 3 OF 7)**

- 10 Using chisel and ball peen hammer, bend all eight tabs (9) at ends of four locking plates (7) so that tabs are up against flats of screws (8).

**NOTE**

No lubricant is used on the 13.750 inch ID gasket installed in the next step.

- 11 Install gasket (10) in groove near pump studs (11).

**NOTE**

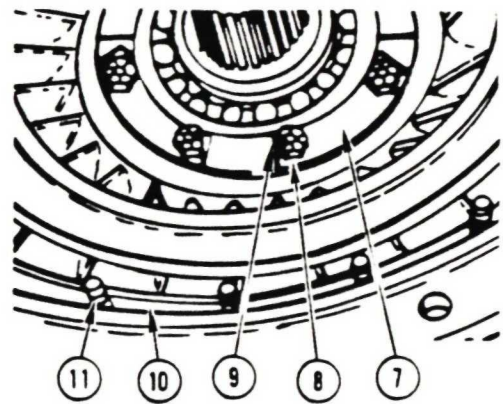
Stator, as used in the following procedures, refers to the stator and all of the assembled parts retained in the stator by two retaining rings. For access to parts within the stator group, refer to paragraph 4-32.

- 12 Install stator (12) over turbine shaft (13) with clutch disk (14) side of stator up.

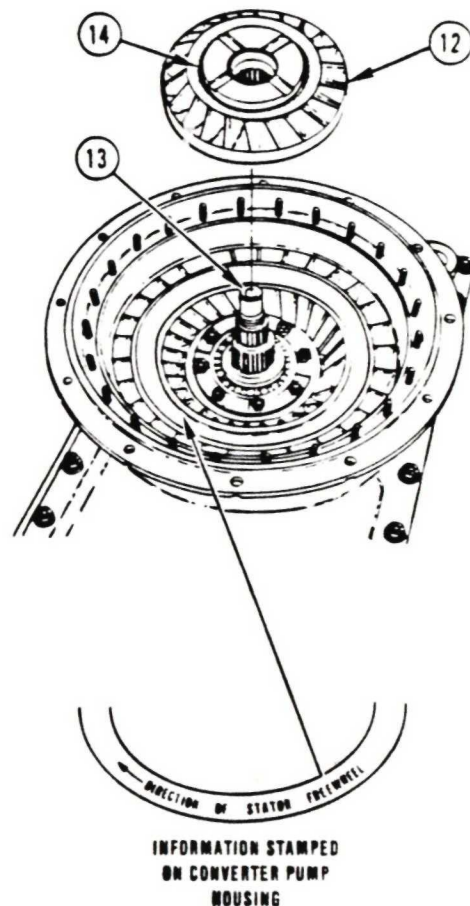
**NOTE**

- The following procedure is a check on assembly of stator components. If stator rotates when turned to the right (clockwise), but locks up when turned to the left (counterclockwise), rollers and springs were properly installed in stator group.
- If stator locks up when turned to the right (clockwise), freewheel roller springs and rollers have been improperly installed. Refer to paragraph 4-32.

- 13 With stator (12) on turbine shaft (13), turn stator to the right (clockwise), the stator will not turn to the left (counterclockwise).



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TA485397

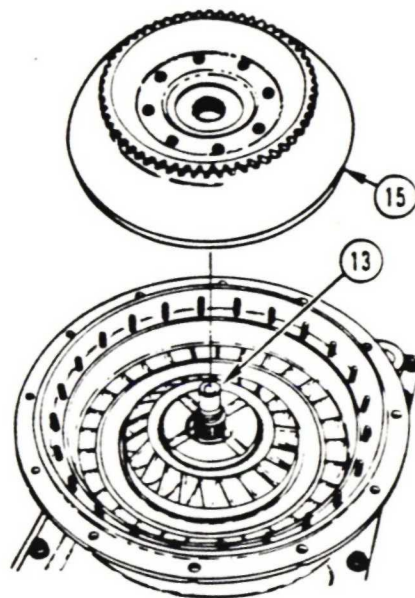
Go to Sheet 4



4-14. INSTALL CONVERTER ELEMENT COMPONENTS  
(SHEET 4 OF 7)

14 Install torque converter turbine assembly (15) on  
turbine shaft (13).

15 Using retaining ring pliers, install retaining ring (16)  
on turbine shaft (13) to retain turbine (15).

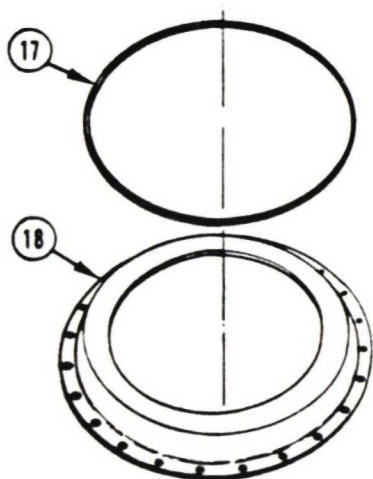


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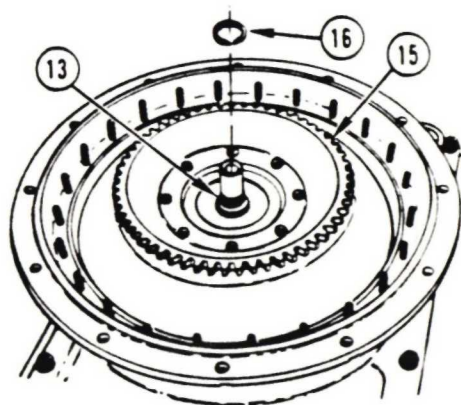
NOTE

Gasket (17) is not to be lubricated.

16 Install gasket (17) in clutch lockup plate (18).



TAM85400



TAM85399

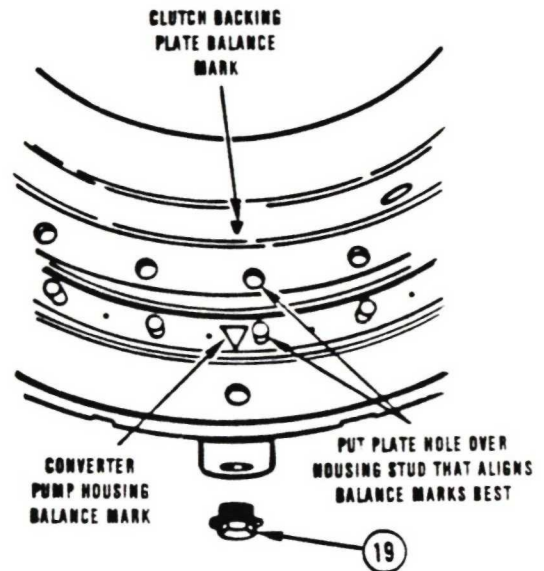
Go to Sheet 5

# 4-14. INSTALL CONVERTER ELEMENT COMPONENTS (SHEET 5 OF 7)

## NOTE

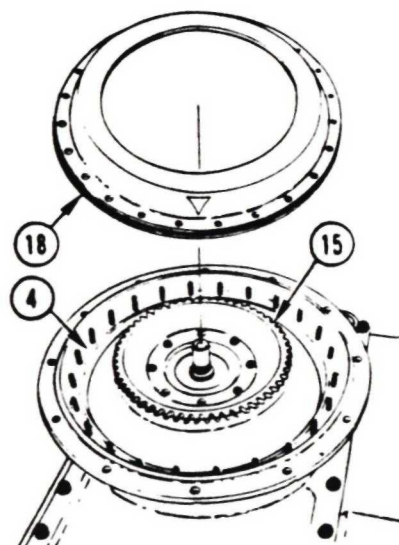
Balance marks are used on the clutch lockup plate and on the converter pump housing. The clutch lockup plate must be mounted so that these two balance marks are aligned as shown at the right.

- 17 Using 5/8 inch socket, remove plug (19) from hole at side of converter housing. Rotate converter pump housing until balance mark is visible through hole. Using marker, mark top edge of pump above balance mark for reference.

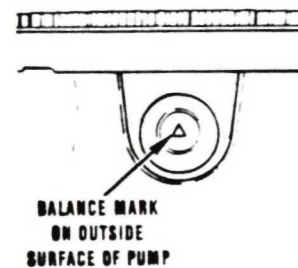


TM85401

- 18 Install clutch lockup plate (18) on turbine (15) and on converter pump (4) studs so that balance marks are aligned.



TM85403



TM85402

Go to Sheet 6

4-14. **INSTALL CONVERTER ELEMENT COMPONENTS**  
(SHEET 6 OF 7)

**NOTE**

Clutch disk should be immersed in lubricating oil for a minimum of two minutes before plate is installed.

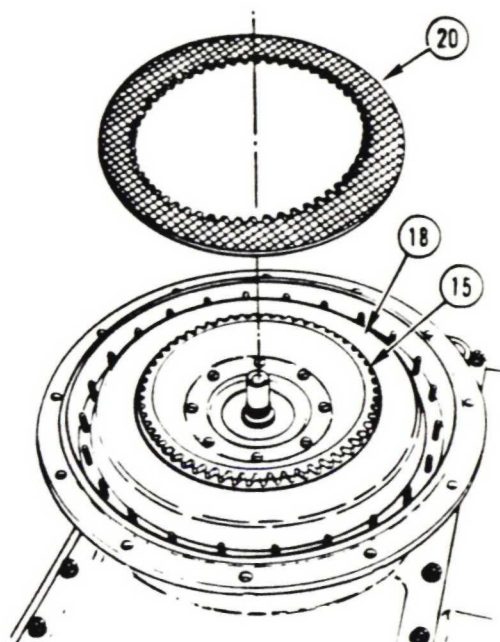
- 19 Soak clutch disk (20) in lubricating oil.
- 20 Install clutch disk (20) on clutch lockup plate (18) so that inside of clutch disk engages splined area of turbine (15).

**NOTE**

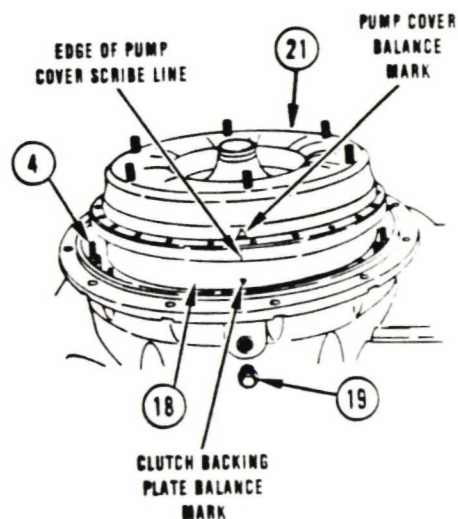
Converter pump cover assembly has a balance mark. This balance mark must line up with the balance mark on the clutch lockup plate. Align pump cover holes with pump housing studs so that clutch lockup plate balance mark will be at nearest point under pump cover balance mark.

- 21 Using wiping rag, wipe edge of converter pump cover assembly (21) nearest balance mark until edge is dry.
- 22 Using felt tip marker, scribe a line across edge of pump cover assembly (21) at point nearest pump cover balance mark.
- 23 Lifting pump cover assembly (21) by two studs on top, hold pump cover over clutch lockup plate (18) so that scribed line on edge of pump cover lines up with balance mark on clutch lockup plate.
- 24 Put pump cover assembly (21) on pump (4) studs so that balance mark and scribe line on pump cover assembly are at nearest point to balance mark on clutch lockup plate (18).
- 25 Using plastic faced hammer, tap pump cover assembly (21) to seat cover on pump (4) studs.
- 26 Using 5/8 inch socket, install plug (19). Tighten plug (19) to 16-20 lb-ft (22-27 N·m).

Go to Sheet 7



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TA485405



#### 4-14. INSTALL CONVERTER ELEMENT COMPONENTS (SHEET 7 OF 7)

- 27 Install pry bar across two studs on top of converter pump cover assembly (21) to keep cover from turning when installing self-locking nuts (22), if necessary.
- 28 Using 1/2 inch socket, install 24 self-locking nuts (22) on converter pump housing studs (4) holding converter pump cover (21).
- 29 Using torque wrench, tighten 24 nuts (22) to 19-23 lb-ft (26-31 N·m).

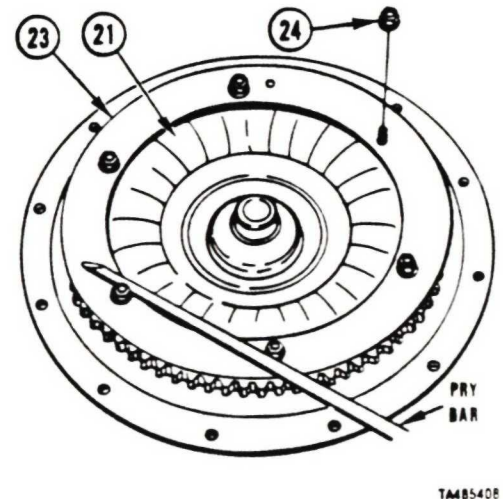
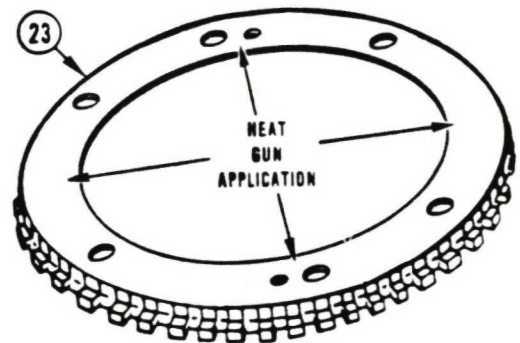
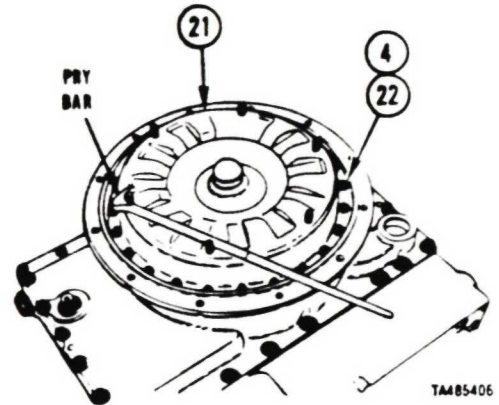
#### WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

#### NOTE

The external-splined ring (23) should be removed and installed only when ring fails, or when converter pump cover is to be replaced.

- 30 If necessary, use heat gun in a circular motion all around inside area of external ring (23) for approximately 30 minutes or until ring reaches a temperature of 150-200°F (66-93°C).
- 31 Install ring (23) over six studs located on top of converter pump cover (21).
- 32 Using plastic faced hammer, tap ring (23) until seated on pump cover (21).
- 33 Use pry bar across two studs on top of converter pump cover (21) to keep cover and ring (23) from turning, if necessary.
- 34 Using 9/16 inch socket, install six new flex disk nuts (24) on studs holding ring (23) to pump cover (21).
- 35 Using torque wrench, tighten six nuts (24) to 46-49 lb-ft (62-66 N·m).



End of Task 1

**4-15. INSTALL LEFT END COVER ASSEMBLY  
(SHEET 1 OF 8)**

Task	Title	Page
1	Install Loose Components, Left End of Transmission	4-56
2	Install Left End Cover Assembly	4-60
3	Install Oil Filter Head Assembly	4-62

**TASK 1. INSTALL LOOSE COMPONENTS, LEFT END OF TRANSMISSION**

**COMMON TOOLS:**

Hammer, hand, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Press, arbor, hand operated  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch

**REPAIR PARTS:**

Packing, preformed (filter-in and filter-out tubes) (4 required) (73342) 23040581  
 Packing, preformed (jumper tube) (73342) 6832517

**SUPPLIES:**

Petrolatum (Item 14, Appendix C)  
 Lubricating Oil (Item 10, Appendix C)  
 Rag, wiping (Item 15, Appendix C)

**NOTE**

- Transmission mounted on maintenance stand, input end turned up.
- When sump communication tube has been removed, right end cover assembly must remain off transmission until sump communication tube has been installed.

Go to Sheet 2

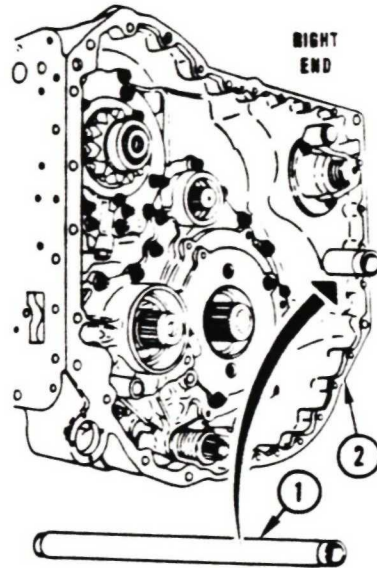
# 4-15. INSTALL LEFT END COVER ASSEMBLY (SHEET 2 OF 8)

## Install Sump Communication Tube

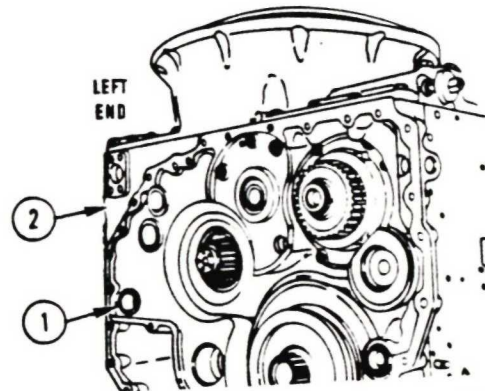
### NOTE

Sump communication tube is not installed until after bevel gear assembly has been installed.

- 1 Apply petrolatum to machined end (smaller end) of sump communication tube (1).
- 2 Install sump communication tube (1), small end first, through tube bore in right end of transmission center housing (2).
- 3 Looking through tube (1) sight tube bore in left end of center housing (2). Push small end of tube into left end bore.
- 4 Using plastic faced hammer, tap end of tube (1) at right end until small end of tube is seated in left end bore and large end of tube is flush at right end bore.



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## Remove Fabricated Range Pack Retaining Fixture

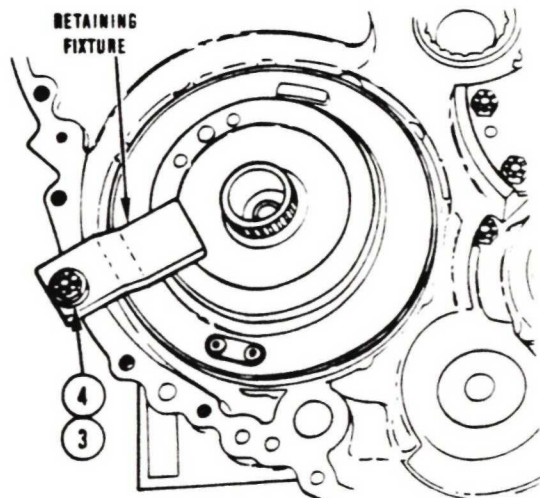
- 5 Using stand rotary control handle, turn transmission to left end up.

### NOTE

Retaining fixture was installed (paragraph 4-8 to prevent range pack from shifting when transmission was rotated.

- 6 Using socket, remove bolt (3) and washer (4) from retaining fixture. Remove fixture.

Go to Sheet 3



TA485411



4-15. INSTALL LEFT END COVER ASSEMBLY  
(SHEET 3 OF 8)

Install Range Input Gears, Hydrostatic Drive Gear, Bevel Gear Driven Shaft and Filter Tubes

- 7 Install new packing (5) on end of jumper tube (6).
- 8 Apply petrolatum to new packing (5).
- 9 Install four new packings (7), two packings on filter-in tube (8) and two packings on filter-out tube (9).
- 10 Apply petrolatum to new packings (7).

NOTE

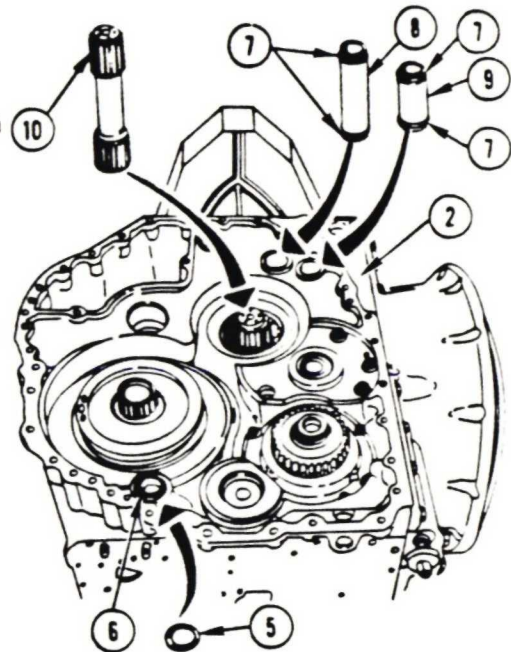
The filter-in tube (8) is 3.60 inches (91.44 mm) long. The filter-out tube (9) is 2.25 inches (57.15 mm) long. The filter-out tube (shorter tube) is located closest to the input housing.

- 11 Install filter-out tube (9) in center housing (2), either end of tube in first.
- 12 Install filter-in tube (8) in center housing (2), either end of tube in first.
- 13 Install bevel gear driven shaft (10) in center housing (2), either end of shaft first.
- 14 Apply lubricating oil and petrolatum to bearing journal of range input driven gear (11) if old bearing was removed.

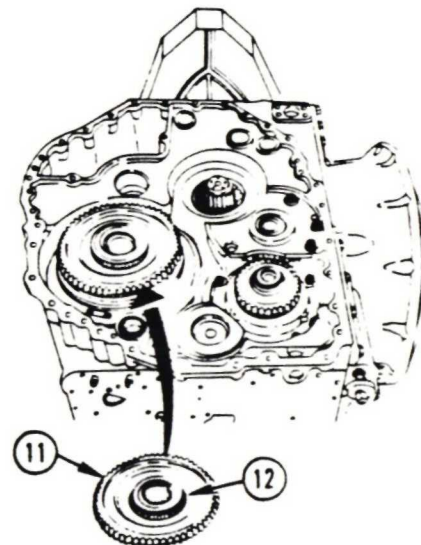
NOTE

Bearing (12) consists of cage and inner race. Check that outer race is in left end cover assembly.

- 15 Using arbor press, install new bearing (12) on range input driven gear (11). Press bearing to shoulder.
- 16 Apply lubricating oil to bearing (12).
- 17 Install range input driven gear (11) over range input shaft on forward clutch housing, bearing (12) up.



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Go to Sheet 4

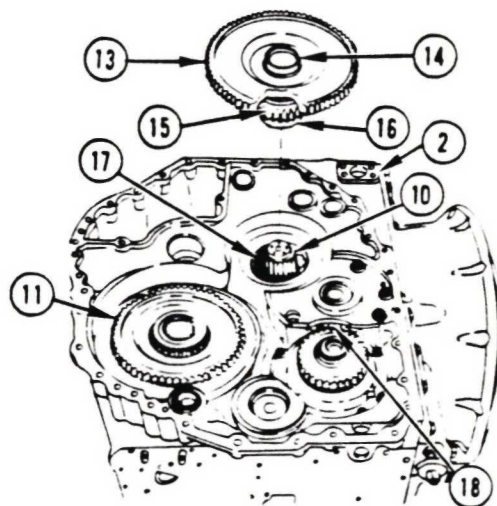
# 4-15. INSTALL LEFT END COVER ASSEMBLY (SHEET 4 OF 8)

- 18 Check bearing journal on range input drive gear (13) hub for damage. Smooth out scratches with crocus cloth. If grinding damage is present, replace gear (13).
- 19 Apply lubricating oil and petrolatum to bearing journals on each side of gear (13) if old bearings were removed.
- 20 Using arbor press, install new inner race (14). Press to shoulder.

## NOTE

Hydrostatic drive gear (15) may be installed either side first.

- 21 Using arbor press, install hydrostatic drive gear (15) on shaft of range input drive gear (13) if gears were separated. Press to shoulder.
- 22 Using arbor press, install new inner race (16) on journal adjacent to hydrostatic drive gear (15) if old bearing was removed.
- 23 Check that cage and outer race (17) for inner race (16) is in the left end of center housing (2). Also check that cage and outer race for inner race (14) is in the left end cover.



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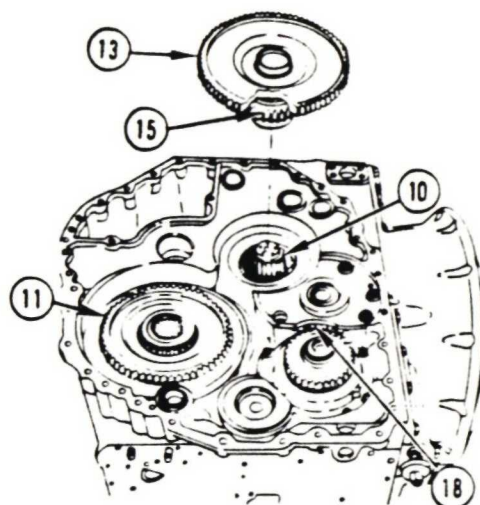
- 24 Install gear assembly (13, 15) on bevel gear driven shaft (10) with hydrostatic drive gear (15) down.
- 25 Work gear assembly (13, 15) left and right until inner splines on hydrostatic drive gear (15) mate with splines on bevel gear driven shaft (10) and teeth on hydrostatic drive gear (15) mate with teeth on hydrostatic idler gear (18).
- 26 Continue to work gears (13, 15) left and right until teeth on range input drive gear (13) mate with teeth on range input driven gear (11).

Go to Sheet 5

4-15. **INSTALL LEFT END COVER ASSEMBLY**  
(SHEET 5 OF 8)

27 Push down on range input drive gear (13) to seat gear assembly (13, 15) in operating position.

28 Check that teeth on range input drive gear (13) and teeth on range input driven gear (11) fully mesh and that outer surfaces of gears are on the same plane. If gears are not even, continue to work gears (13, 15) until shaft (10) and gears (11, 13, 15, 18) are all synchronized.



TA485415

End of Task 1

**TASK 2. INSTALL LEFT END COVER ASSEMBLY**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 10 inch  
Hammer, hand, plastic faced  
Handle, socket wrench, 1/2 inch square drive  
Hoist, 200-pound minimum capacity  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Wrench, torque, 0-175 lb-ft

**SPECIAL TOOLS:**

Sling, three-leg (19207) 12268036

**FABRICATED TOOLS:**

Guide Bolt, 3/8-16 x 4 inches (2 required) (refer to Appendix D)

**SUPPLIES:**

Bolt, 3/8-16 x 2 inch (2 required)  
Rag, wiping (Item 15, Appendix C)  
Washer, flat, 3/8 inch (4 required)

**PRELIMINARY PROCEDURE:** Install loose components in left end of transmission. Refer to this paragraph, TASK 1.

**NOTE**

- Transmission is on maintenance stand, left end turned up.
- Only two legs of three-leg sling are used in this task.

Go to Sheet 6



#### 4-15. INSTALL LEFT END COVER ASSEMBLY (SHEET 6 OF 8)

- 1 Install two 3/8-16 x 4 inch guide bolts into center housing.
- 2 Install left end cover gasket (1) on transmission (2) over guide bolts.
- 3 Install 3/8 inch flat washer (3) on each of two 3/8-16 x 2 inch bolts (4) and install bolts through two sling lugs.

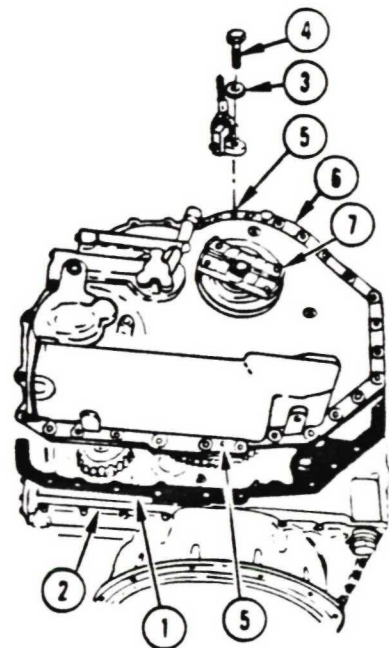
#### NOTE

Bolts should not extend beyond the inside surface of end cover. If tips of bolts extend beyond surface of end cover, end cover will not seat on gasket.

- 4 Using socket, install two bolts (4) in two jack holes (5) in left end cover assembly (6).

#### WARNING

- Check slings and lifting devices for cuts, breaks, and wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Weight of left end cover assembly exceeds safe limits for lifting without a sling and hoist. Lift end cover with sling and hoist to avoid bodily injury.



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- 5 Hoist left end cover assembly (6) over transmission (2).
- 6 Lower left end cover (6) so that it is resting lightly on transmission (2).

#### NOTE

Output flange must be rotated left and right repeatedly while lowering cover to line up splines of output shafts and output pump drive gear.

- 7 Using one hand on hoist control and other hand on output flange (7), rotate flange back and forth while lowering end cover (6).
- 8 Using socket, remove bolts (4), washers (3) and sling from left end cover (6). Remove guide bolts.

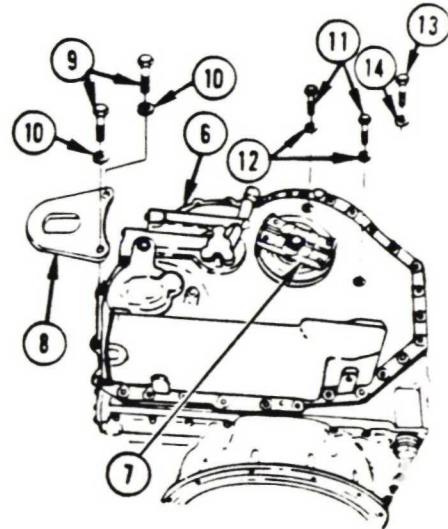
Go to Sheet 7.

**4-15. INSTALL LEFT END COVER ASSEMBLY**  
(SHEET 7 OF 8)

- 9 Using socket, install left lifting bracket (8), angled inward, and two 3/8-16 x 1-1/2 inch bolts (9) and washers (10) on left end cover assembly (6). Do not tighten bolts (9).
- 10 Using socket, loosely install two 3/8-16 x 1-1/4 inch bolts (11) and washers (12) in body of left end cover (6).
- 11 Using socket, loosely install the 27 remaining 3/8-16 x 1-1/4 inch bolts (13) and washers (14) around perimeter of left end cover (6).
- 12 Using plastic faced hammer, tap cover (6) to seat cover against gasket on center housing.
- 13 Using torque wrench, tighten all bolts (9, 11, 13) to 27-32 lb-ft (37-43 N·m).

**NOTE**

Output shaft drag check is performed after transmission has been assembled. Refer to paragraph 5-2.



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End of Task 2

**TASK 3. INSTALL OIL FILTER HEAD ASSEMBLY**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Wrench, torque, 0-175 lb-ft

**REPAIR PARTS:**

Kit, fluid pressure filter (19207) 5703232

**SUPPLIES:**

Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURE:** Left end cover assembly is installed. Refer to this paragraph,  
TASK 2

Go to Sheet 8

# 4-15. INSTALL LEFT END COVER ASSEMBLY (SHEET 8 OF 8)

## NOTE

Transmission does not have to be mounted on maintenance stand to install oil filter head assembly. Oil filter head may be removed or installed with transmission in upright position.

- 1 Install two new packings (1) on filter head (2).
- 2 Put petrolatum on new packings (1).

## NOTE

Filter element contains packing in each end. Check that packings are in place before installing filter.

- 3 Install new filter element (3) on oil filter head assembly (2). Push filter element into recess under filter head until filter element locks to filter head.

## NOTE

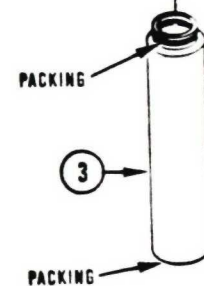
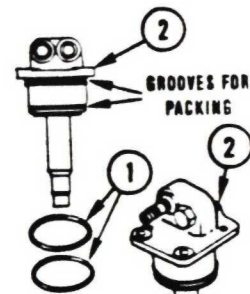
Hole in bottom of filter element goes over an oil tube rising up from the bottom of the filter cavity in the left end cover.

- 4 Install filter head (2) with new filter element (3) in filter cavity on left end cover assembly (4).

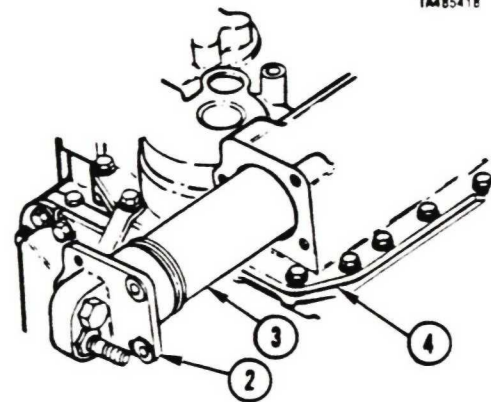
- 5 Using socket, install three bolts (5) and washers (6) in filter head (2).

- 6 Using torque wrench, tighten bolts (5) to 27-32 lb-ft (37-43 N·m).

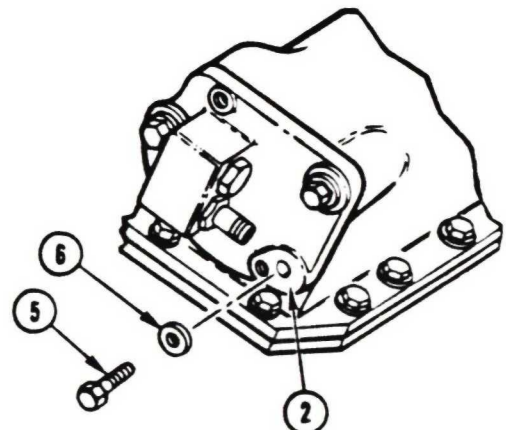
End of Task 3



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4-16. **INSTALL RIGHT END COVER ASSEMBLY**  
(SHEET 1 OF 9)

Task	Title	Page
1	Install Loose Components, Right End of Transmission	4-64
2	Install Right End Cover Assembly	4-70

**TASK 1. INSTALL LOOSE COMPONENTS, RIGHT END OF TRANSMISSION**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Handle, socket wrench, 1/2 inch square drive  
 Press, arbor, hand  
 Screwdriver, flat tip  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Wrench, torque, 0-175 lb-ft

**REPAIR PARTS:**

Packing, preformed (lube tube) (2 required) (73342) 23040582  
 Packing, preformed (equalizer oil transfer tube) (2 required) (73342) 23040579  
 Packing, preformed (brake apply tube) (2 required) (73342) 23018753  
 Packing, preformed (brake coolant tube) (2 required) (73342) 23040580  
 Seal ring (equalizer valve piston assembly) (73342) 23018234

**SUPPLIES:**

Petrolatum (Item 14, Appendix C)  
 Lubricating Oil (Item 10, Appendix C)

**NOTE**

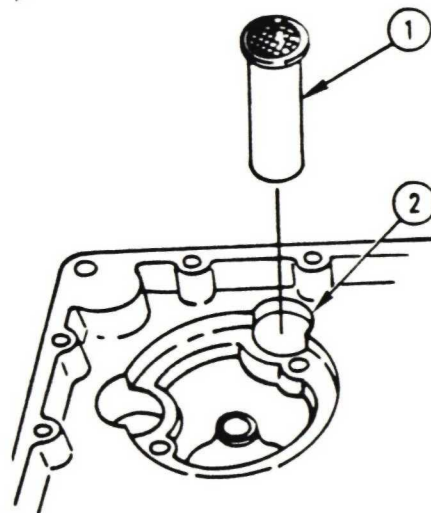
Transmission on maintenance stand, right end turned up.

**Install Reverse Equalizer Valve Components**

**NOTE**

End of scavenge tube opposite screened end seats in bevel gear assembly.

- 1 Install scavenge tube assembly (1), screen end out, in center housing bore (2).

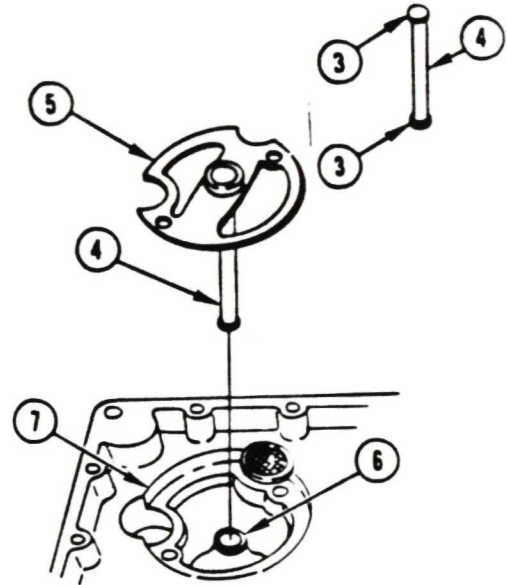


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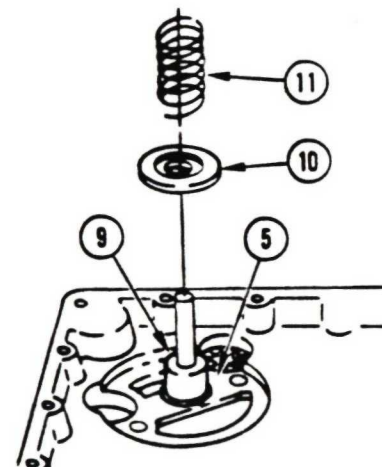
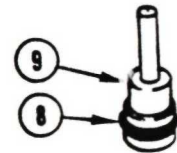
Go to Sheet 2

# **4-16. INSTALL RIGHT END COVER ASSEMBLY (SHEET 2 OF 9)**

- 2 Install two new packings (3) on oil transfer tube (4).
- 3 Apply petrolatum to packings (3).
- 4 Push oil transfer tube (4), either end, into center hole in bottom of diaphragm (5).
- 5 Install diaphragm (5) so that end of oil transfer tube (4) enters hole (6) in bevel gear assembly.
- 6 Push on diaphragm (5) to seat oil transfer tube (4) in bevel gear assembly and allow diaphragm to seat in center housing bore (7).
- 7 Install new seal ring (8) on large end of piston assembly (9).
- 8 Push large end of piston assembly (9) into center hole on top of diaphragm (5).
- 9 Install equalizer valve (10), cutaway side out, over piston (9).
- 10 Install spring (11) on equalizer valve (10).



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Go to Sheet 3

4-16. INSTALL RIGHT END COVER ASSEMBLY  
(SHEET 3 OF 9)

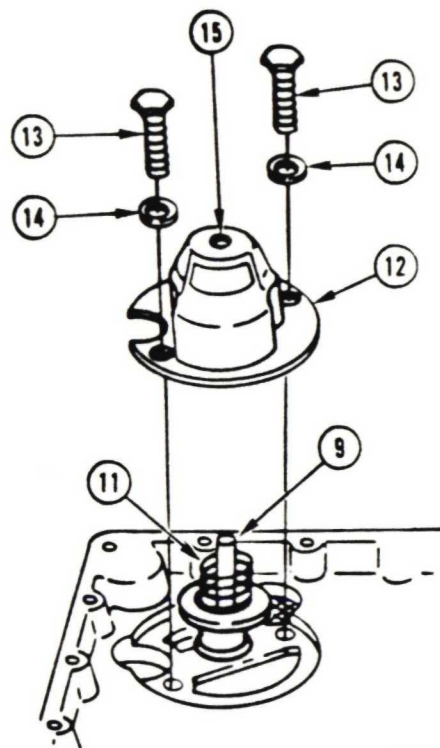
**WARNING**

Spring-loaded parts can fly and injure you. Always follow specified instructions when installing bolts in covers that are attached to valve assemblies.

- 11 Install equalizer valve housing (12) over spring (11) so that bolt holes and recesses for tubes are aligned.
- 12 Use one hand to push housing (12) down on spring (11), and use other hand to install two bolts (13) and washers (14). Turn bolts a few turns to hold housing.

**NOTE**

If end of piston (9) does not go through housing hole (15), bolts may be loosened and piston moved by screwdriver through side of housing.



- 13 Using socket, carefully tighten bolts (13). End of piston (9) must come through hole (15) in top center of housing (12) when bolts are tightened.
- 14 Using torque wrench, tighten bolts (13) to 36-43 lb-ft (48-58 N·m).

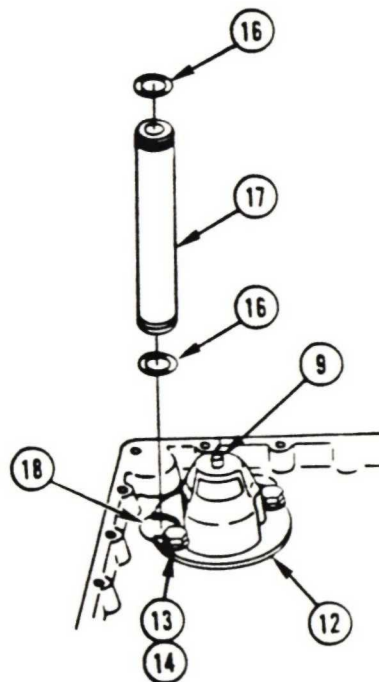
Install Tubes, Range Output Gear Spacer, Inner Steer Shaft

- 15 Install two new packings (16) on lube tube (17).
- 16 Apply petrolatum to packings (16).

**NOTE**

End of lube tube inserted into center housing seats in bevel gear assembly. Outer end of tube does not go down flush with surface of center housing.

- 17 Install lube tube (17), either end first, in center housing bore (18) adjacent to equalizer housing (12).



Go to Sheet 4



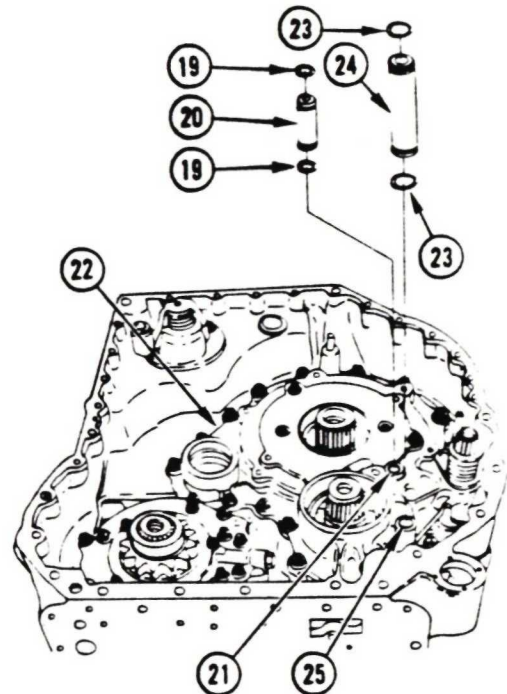
# 4-16. INSTALL RIGHT END COVER ASSEMBLY (SHEET 4 OF 9)

- 18 Install two new packings (19) on brake apply tube (20).
- 19 Apply petrolatum to packings (19).
- 20 Install brake apply tube, either end first, in bore (21) in left brake support (22).
- 21 Install two new packings (23) on brake coolant tube (24).
- 22 Apply petrolatum to packings (23).
- 23 Install brake coolant tube (24), either end first, in bore (25) in left brake support (22).

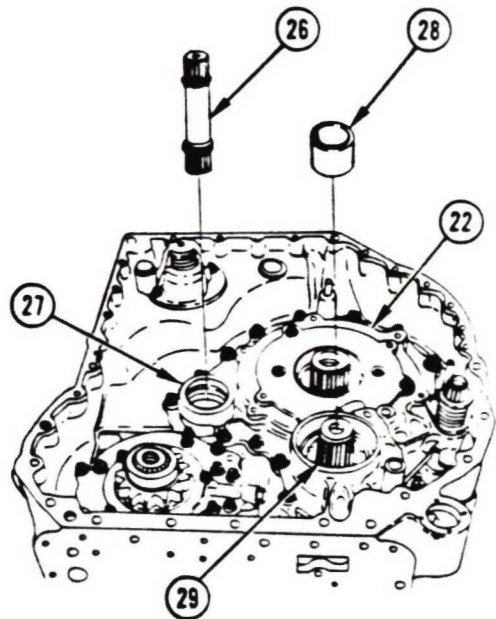
## NOTE

- Retaining ring on each end of steer shaft serves as a stop. It is not necessary to replace retaining rings that are in good condition.
- Retaining rings may be removed with flat tip screwdriver.
- Steer shafts may be installed either end first. Steer shafts are interchangeable.

- 24 Install inner steer shaft (26) in bore (27) in left brake support (22).
- 25 Install range output gear spacer (28) on shaft and bushing assembly (29).



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Go to Sheet 5

4-16. INSTALL RIGHT END COVER ASSEMBLY  
(SHEET 5 OF 9)

Install Steer Shaft Drive Gear, Range Output Gears and Bearings, Outer Steer Shaft

- 26 If old bearing was removed, lubricate journal (30) located under steer shaft drive gear (31) with petrolatum and lubricating oil.

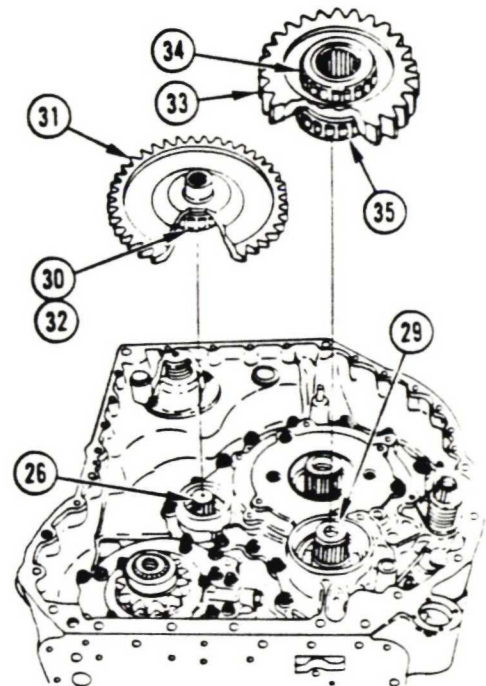
NOTE

Bearing (32) consists of cage and inner race. Check that outer race is in left brake support assembly.

- 27 Using arbor press, install new bearing (32) on journal (30) of steer shaft drive gear (31). Press bearing to shoulder.
- 28 Apply lubricating oil to bearing (32).
- 29 Install steer shaft drive gear (31) on end of steer shaft (26) with bearing side of gear down.
- 30 If old bearings were removed, lubricate journals on both sides of range output drive gear (33) with lubricating oil and petrolatum.

NOTE

Bearings (34, 35) consist of cages and inner races. Check that outer race beneath gear (33) is in left brake support assembly and outer race above gear (33) is in right end cover.



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- 31 Using arbor press, install new bearings (34, 35) on range output drive gear (33). Press bearings to shoulder.
- 32 Apply lubricating oil to bearings (34, 35).
- 33 Install range output drive gear (33) on shaft and bushing assembly (29), with either side of gear down.

Go to Sheet 6

#### 4-16. INSTALL RIGHT END COVER ASSEMBLY (SHEET 6 OF 9)

- 34 If old bearings were removed, lubricate journals on both sides of range output driven gear (36) with lubricating oil and petrolatum.

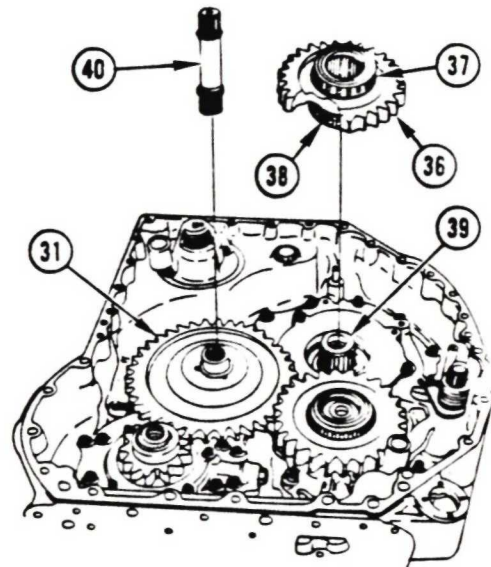
#### NOTE

Bearings (37, 38) consist of cages and inner races. Check that outer race beneath gear (36) is in left brake support assembly and outer race above gear (36) is in right end cover.

- 35 Using arbor press, install new bearings (37, 38) on range output driven gear (36). Press bearings to shoulder.
- 36 Apply lubricating oil to bearings (37, 38).
- 37 Install range output driven gear (36) on steer ring gear assembly (39) (located on LH output shaft), with longer internal spline of gear (36) down.

#### NOTE

- Retaining ring on each end of steer shaft serves as stop. It is not necessary to replace retaining rings that are in good condition.
- Retaining rings may be removed with flat tip screwdriver.
- Steer shaft may be installed either end first.



TAM85429

- 38 Install outer steer shaft (40) in steer shaft drive gear (31).

End of Task 1

Go to Sheet 7



4-16. **INSTALL RIGHT END COVER ASSEMBLY**  
(SHEET 7 OF 9)

**TASK 2. INSTALL RIGHT END COVER ASSEMBLY**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 10 inch  
Hammer, hand, plastic faced  
Handle, socket wrench, 1/2 inch square drive  
Hoist, 200-pound minimum capacity  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Wrench, torque, 0-175 lb-ft

**SPECIAL TOOLS:**

Adapter, brake adjust (19207) 8355595  
Sling, three-leg (19207) 12268036

**SUPPLIES:**

Bolt, 3/8-16 x 3-1/2 inches (2 required)  
Rag, wiping (Item 15, Appendix C)  
Washer, flat, 3/8 inch (4 required)

**PRELIMINARY PROCEDURE:** Loose components installed in right end of transmission.  
Refer to this paragraph, TASK 1.

**NOTE**

- Right brake adjusting cover removed. Brake adjusting cover restricts access to right end cover bolt when removing/installing end cover.
- Only two legs of three-leg sling used in this task.

Go to Sheet 8

# **4-16. INSTALL RIGHT END COVER ASSEMBLY (SHEET 8 OF 9)**

- 1 Install right end cover gasket (1) on transmission (2).
- 2 Install 3/8 inch flat washers (3) on each of two 3/8-16 x 3-1/2 inch bolts (4) and put bolts through sling lugs.

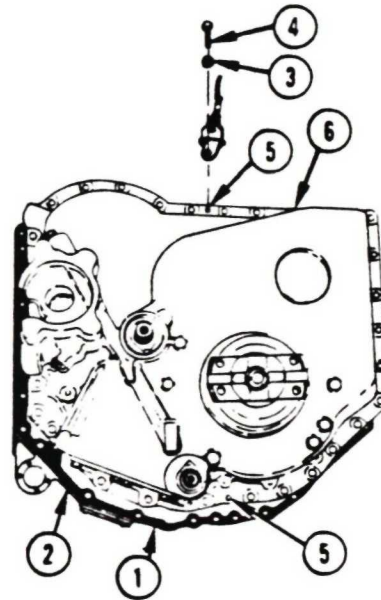
## **NOTE**

Bolts (4) should not extend beyond the inside surface of the end cover. If tips of bolts extend beyond surface of end cover, end cover will not seat on gasket.

- 3 Using 9/16 inch socket, install two bolts (4) in two jack holes (5) in right end cover assembly (6).

## **WARNING**

- Check slings and lifting devices for cuts, breaks, and wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Weight of end cover assembly exceeds safe limits for lifting without sling and hoist. Lift end cover with sling and hoist to avoid bodily injury.



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- 4 Hoist right end cover assembly (6) over transmission (2).
- 5 Lower end cover (6) so that it is resting lightly on transmission (2).

## **NOTE**

- Output flange must be rotated left and right repeatedly, while lowering end cover, to line up gear and shaft splines.
- Use brake adjust adapter on left and right brake adjust shafts to rotate shafts as necessary to line up splines at hidden ends of shafts.
- It may be necessary to slightly turn and twist end cover assembly while being lowered.
- It may be necessary to use plastic faced hammer to help seat end cover on transmission.
- When properly aligned, end cover will drop nearer transmission. Cover may not seat completely until it is bolted.

Go to Sheet 9

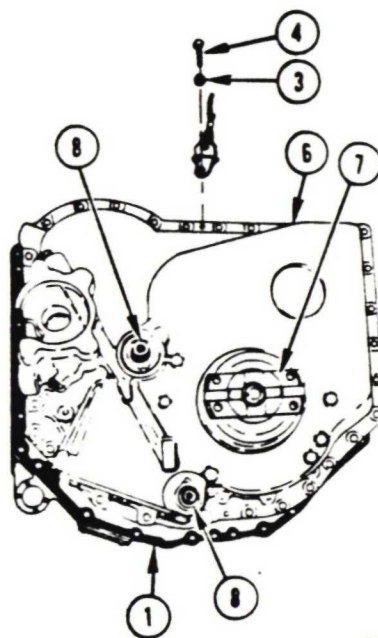
4-16. INSTALL RIGHT END COVER ASSEMBLY  
(SHEET 9 OF 9)

- 6 Using hoist control, rotating output flange (7), using adapter tool on brake shafts (8), moving cover (6), lower end cover until it is seated near gasket (1).
- 7 Using 9/16 inch socket, remove two bolts (4), washers (3) and sling from end cover (6).
- 8 Using 9/16 inch socket and two 3/8-16 x 1-1/2 inch bolts (9) and washers (10), install right lifting bracket (11) on right end cover assembly (6).
- 9 Using 9/16 inch socket, install 3/8-16 x 3-1/2 inch bolt (12) and washer (13) in right end cover (6).
- 10 Using 9/16 inch socket, install the 26 remaining 3/8-16 x 1-1/4 inch bolts (14) and washers (15) around perimeter of right end cover (6).
- 11 Using torque wrench, tighten all bolts (9, 12, 14) to 27-32 lb-ft (37-43 N·m).
- 12 Install right brake adjusting cover gasket (16) and brake adjusting cover (17) on right end cover (6).
- 13 Using 1/2 inch socket, install six bolts (18) and washers (19) in brake adjusting cover (17).
- 14 Using torque wrench, tighten six bolts (18) to 13-15 lb-ft (17-20 N·m).

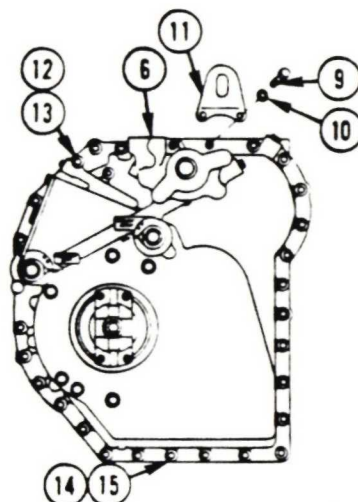
NOTE

- Output shaft drag check is performed after transmission has been assembled. Refer to paragraph 5-2.
- Brake adjustment is performed after transmission has been assembled. Refer to paragraph 5-3.

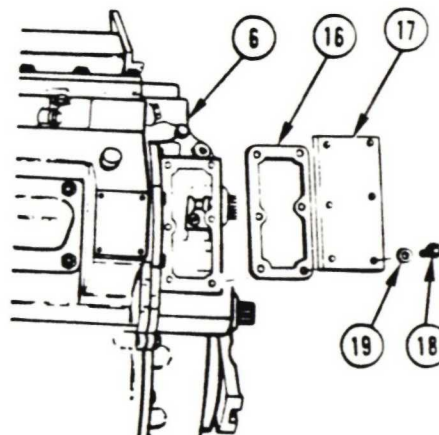
End of Task 2



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TM 85433



# 4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND (SHEET 1 OF 7)

Task	Title	Page
1	Remove Transmission from Adapter Plate	4-73
2	Remove Adapter Plate from Maintenance Stand	4-79

## TASK 1. REMOVE TRANSMISSION FROM ADAPTER PLATE

### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Handle, socket wrench, 1/2 inch square drive  
 Hoist, 1 ton capacity (2 required)  
 Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Wrench, torque, 0-175 ft-lb

### SPECIAL TOOLS:

Sling, three-leg (19207) 12268036  
 Sling, two-leg (19207) 12268037

### SUPPLIES:

Bolt, 3/8-16 x 1-3/4 inches (3 required)  
 Washer, flat, 3/8 inch (6 required)

### PERSONNEL REQUIRED: 2

- One soldier operates hoist and other soldier unbolts transmission from adapter plate when removing transmission from maintenance stand.
- One soldier operates each hoist when turning transmission from horizontal to vertical position.

### WARNING

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Transmission weighs about 910 pounds. To avoid injury or death, keep out from under and clear of transmission at all times. Do not let transmission swing freely during hoisting. Transmission will tilt suddenly when weight shifts from one sling to the other.

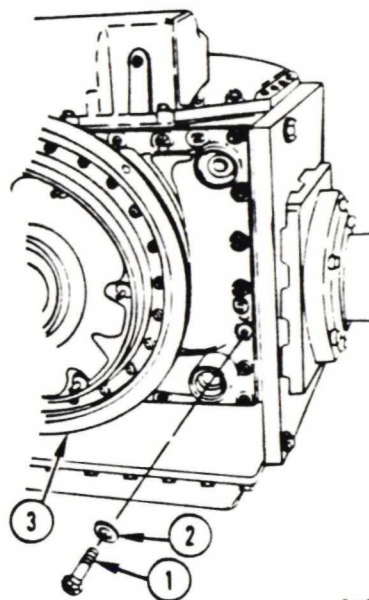
Go to Sheet 2

4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND  
(SHEET 2 OF 7)

NOTE

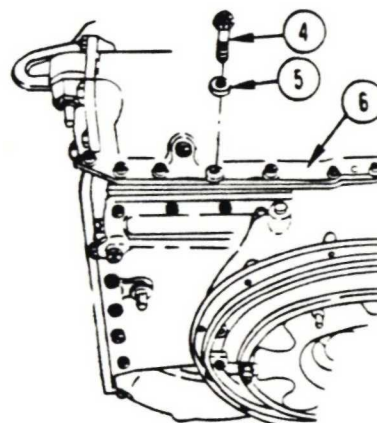
Left and right lifting brackets are installed.

- 1 Using 9/16 inch socket, remove bolt (1) and washer (2) from input housing (3). Save bolt and washer.



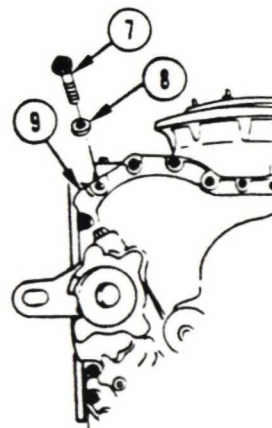
TAM85474

- 2 Using 9/16 inch socket, remove bolt (4) and washer (5) from left end cover (6). Save bolt and washer.



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- 3 Using 9/16 inch socket, remove bolt (7) and washer (8) from right end cover (9). Save bolt and washer.

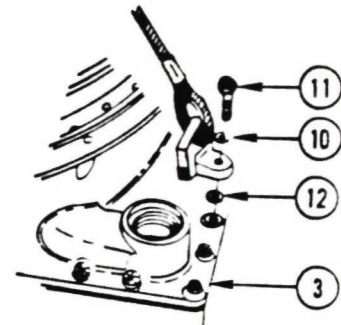


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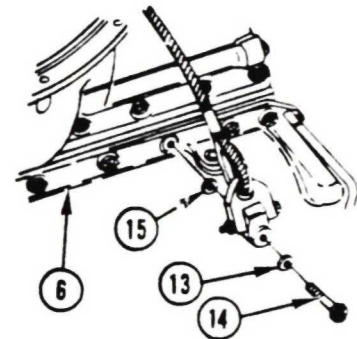
Go to Sheet 3

# **4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND (SHEET 3 OF 7)**

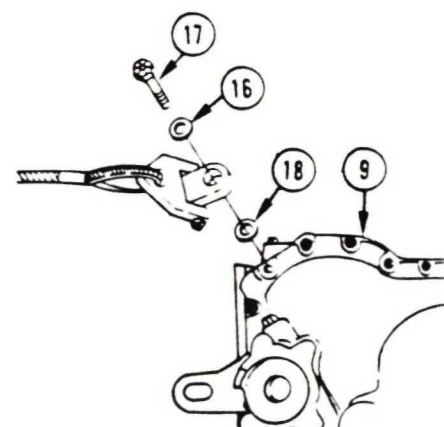
- 4 Install 3/8 inch flat washer (10) under head of 3/8-16 x 1-3/4 inch bolt (11), put bolt through sling lug and install another 3/8 inch flat washer (12) on bolt.
- 5 Using 9/16 inch socket, install bolt (11) attaching three-leg sling to input housing (3). Tighten bolt to snug.
- 6 Install 3/8 inch flat washer (13) under head of 3/8-16 x 1-3/4 inch bolt (14). Put bolt through sling and lug and install another 3/8 inch flat washer (15) on bolt.
- 7 Using 9/16 inch socket, install bolt (14) attaching three-leg sling to left end cover (6). Tighten bolt to snug.
- 8 Install 3/8 inch flat washer (16) under head of 3/8-16 x 1-3/4 inch bolt (17), put bolt through sling lug and install another 3/8 inch flat washer (18) on bolt.
- 9 Using 9/16 inch socket, install bolt (17) attaching three-leg sling to right end cover (9). Tighten bolt to snug.



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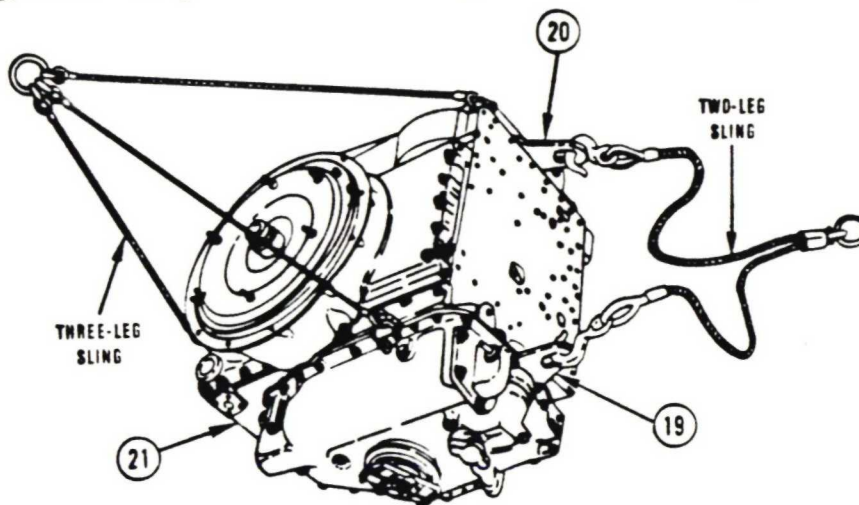
TAM85439

Go to Sheet 4



4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND  
(SHEET 4 OF 7)

- 10 Using two-leg sling, attach sling hooks to left lifting bracket (19) and right lifting bracket (20).



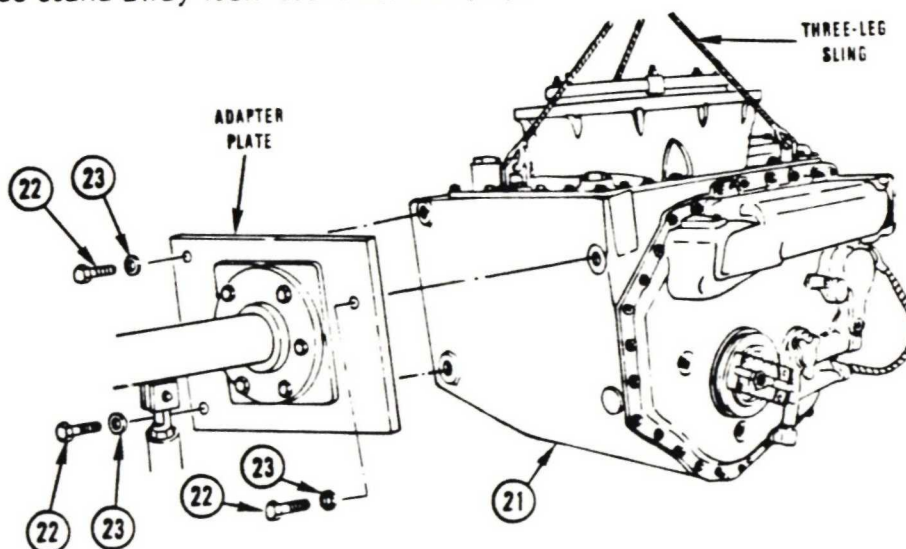
TM48544

- 11 Rotate transmission, input housing upward.
- 12 Using hoist, one soldier raise three-leg sling until cables are tight. Maneuver hoist and maintenance stand until all three cables are uniformly tight, ready to receive full weight of transmission (21).

NOTE

When removing bolts (22), use hoist as necessary to take tension off bolts.

- 13 Using 3/4 inch socket, other soldier remove three 1/2-32 x 2 inch bolts (22) and washers (23) holding bottom of transmission (21) to adapter plate.
- 14 Move maintenance stand away from transmission (21).



Go to Sheet 5

TM48544

#### 4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND (SHEET 5 OF 7)

##### WARNING

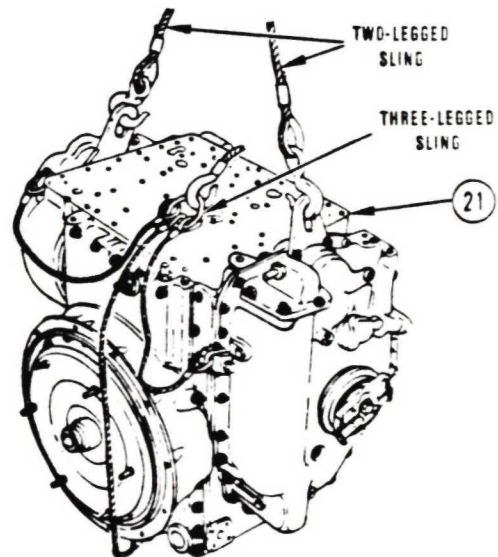
When rotating transmission from horizontal to vertical position, weight of transmission is transferred from three-leg sling to two-leg sling. When transmission center of gravity shifts, transmission may suddenly tilt, thrusting heavy momentary stress on two-leg sling and hoist. To avoid bodily injury or death:

- Check condition of slings; replace as necessary.
- Stay clear of slings.
- Do not get under transmission.

##### CAUTION

Either sling, or both slings, should be raised as necessary to maintain at least one-foot clearance between transmission and floor. Transmission will be damaged if it hits the floor when weight shifts from one sling to the other.

- 15 One soldier slowly raise two-leg sling. Other soldier raise three-leg sling as necessary to maintain proper clearance between transmission (21) and floor.
- 16 Slowly raise two-leg sling until entire weight of transmission (21) is on two-leg sling.
- 17 Using 9/16 inch socket, remove three-leg sling from transmission (21).
- 18 Using two-leg sling, slowly lower transmission (21) to work table or floor. Remove hooks of two-leg sling from transmission.

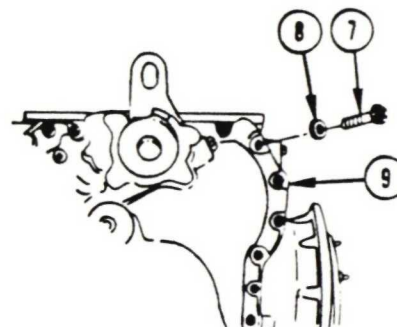


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Go to Sheet 6

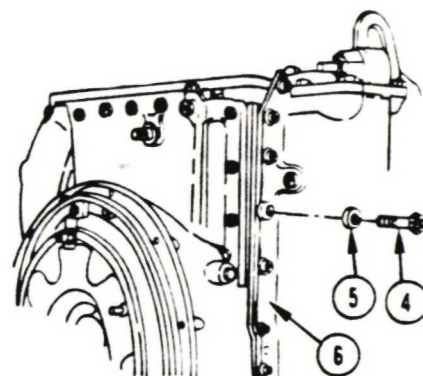
4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND  
(SHEET 6 OF 7)

- 19 Using 9/16 inch socket, reinstall bolt (7) and washer (8) in right end cover (9).



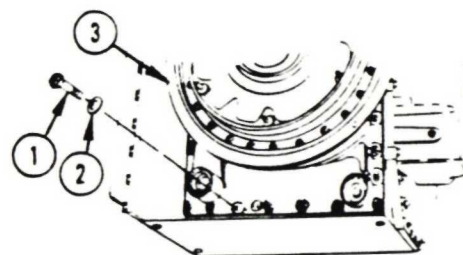
T44B5443

- 20 Using 9/16 inch socket, reinstall bolt (4) and washer (5) in left end cover (6).



T44B5444

- 21 Using 9/16 inch socket, reinstall bolt (1) and washer (2) in input housing (3).
- 22 Using torque wrench, tighten bolts (1, 4, 7) to 27-32 lb-ft (37-43 N·m).



T44B5445

**FOLLOW-ON PROCEDURE:** Remove adapter plate tool from maintenance stand. Refer to this paragraph, TASK 2.

End of Task 1

Go to Sheet 7



#### 4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND (SHEET 7 OF 7)

##### TASK 2. REMOVE ADAPTER PLATE FROM MAINTENANCE STAND

###### COMMON TOOLS:

- Handle, socket wrench, 1/2 inch square drive
- Hoist, 200-pound minimum capacity
- Socket, socket wrench, 1/2 inch square drive, 7/8 inch

###### SPECIAL TOOLS:

- Eyebolt, (73342) MS 51937-5, from Adapter Plate Kit (73342) 11650180
- Sling, two-leg (19207) 12268037

**PRELIMINARY PROCEDURE:** Transmission is removed from adapter plate. Refer to this paragraph, TASK 1.

###### WARNING

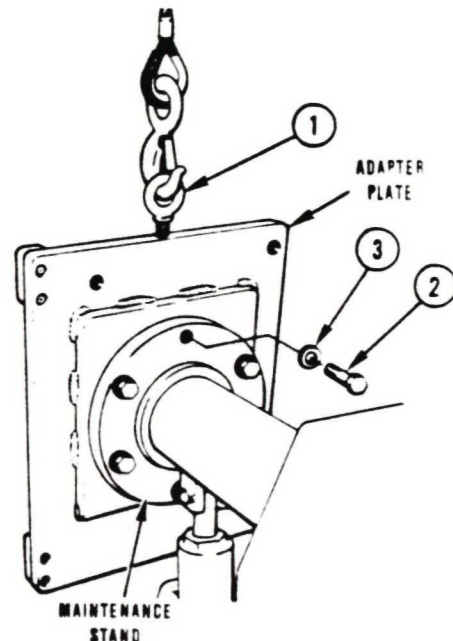
- Check slings and lifting devices for cuts, breaks, or wear before hoisting adapter plate and during hoisting. Slings and lifting devices can break and cause injury or death.
- Adapter plate weighs 127 pounds. Lift adapter plate with hoist to avoid bodily injury.

- 1 Install eyebolt (1) in threaded hole at end of adapter plate.

###### NOTE

Only one leg of two-leg sling is used in this task.

- 2 Attach sling hook in eyebolt (1) and raise sling until cable is tight.
- 3 Using socket, remove six 5/8-11 x 3 inch bolts (2) and washers (3) from maintenance stand.
- 4 Remove adapter plate.
- 5 Remove sling.
- 6 Remove eyebolt (1).



TAMBS446

End of Task 2

# 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 1 OF 16)

## OVERVIEW

Components cannot be installed on top of the transmission until the following parts have been installed in the top of the center housing:

- Bolts holding second and third clutch housings (in the range pack) to the center housing.
- Pitot signal tubes extending into the third clutch backing plate (in the range pack) from top of center housing.
- Governor screen assembly.

The above bolts and pitot tubes are installed in paragraph 4-30.

The governor screen assembly is installed in this paragraph, TASK 1.

The wiring harness may be installed at any time the transmission top cover is off. It is easier to install the harness before control valve assemblies are installed. A second wiring harness task is required to hook up harness and solenoid connectors after control valve assemblies have been installed.

Task	Title	Page
1	Install Governor Screen Assembly, Oil Transfer Plate Assembly and Separator Plate	4-81
2	Install Wiring Harness Assembly	4-84
3	Install G2 Backup Valve Assembly	4-86
4	Install Priority Valve Assembly	4-87
5	Install Lockup Control Valve Assembly	4-88
6	Install Main Control Valve Assembly	4-89
7	Connect Wiring Harness to Solenoids and Ground	4-91
8	Install Transmission Top Cover Assembly, Breather and Lifting Brackets	4-93

Go to Sheet 2

#### 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 2 OF 16)

##### TASK 1. INSTALL GOVERNOR SCREEN ASSEMBLY, OIL TRANSFER PLATE ASSEMBLY AND SEPARATOR PLATE

###### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Screwdriver, flat tip  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Socket, socket wrench, 1/2 inch square drive, 7/16 inch  
Socket, socket wrench, 1/2 inch square drive, 3/8 inch  
Wrench, torque, 0-175 ft-lb

###### FABRICATED TOOLS:

Guide pin, 5/16-18 x 3 inch (4 required) (refer to Appendix D)

###### REPAIR PARTS:

Gasket (oil transfer plate) (73342) 23018717

###### SUPPLIES:

Petrolatum (Item 14, Appendix C)  
Cloth, batiste, lint-free (Item 6, Appendix C)

###### CAUTION

- Transmission must be in upright position when oil transfer gasket, oil transfer plate, separator plate and control valve assemblies are installed. If transmission is not in vertical position when these items are installed, misalignment of holes can block oil flow, causing malfunction of transmission.
- Care should be taken not to let dust get into control valve assemblies. Keep top of transmission center housing clean. Keep all parts clean. Wipe with lint-free cloth. Contamination of control valves can cause transmission failure.
- Before installing oil transfer plate gasket, check to make sure that two bolts holding second and third clutch housings to transmission, two pitot signal tubes extending into third clutch backing plate, and governor screen assembly have all been installed. Refer to OVERVIEW. These parts cannot be installed after top components are on the transmission.

Go to Sheet 3

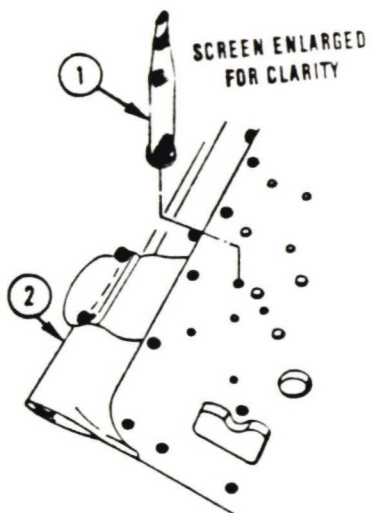


4-18. INSTALL TRANSMISSION TOP COMPONENTS  
(SHEET 3 OF 16)

NOTE

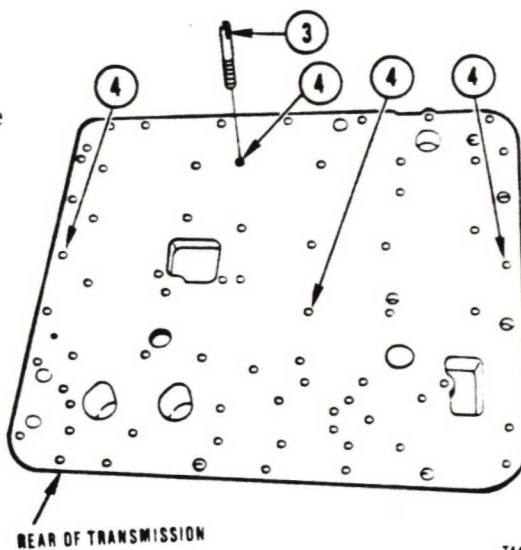
Lifting brackets must be removed from transmission.

- 1 Install clean governor screen assembly (1), open end first, into bore in top of center housing (2).



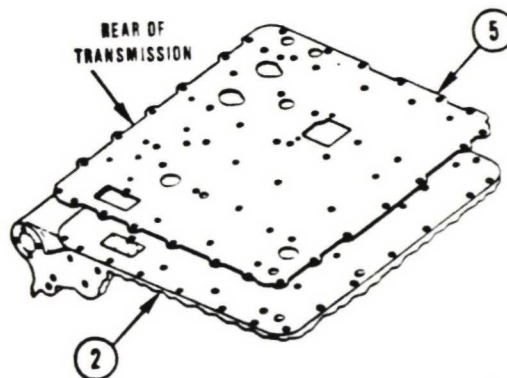
TA48-447

- 2 Using screwdriver, install four 5/16-18 x 3 inch guide pins (3) in four bolt holes (4).



TA48-448

- 3 Install oil transfer plate gasket (5) on center housing (2) over four guide pins (3).



TA48-449

Go to Sheet 4

# 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 4 OF 16)

4 Align oil transfer plate (6) with four guide pins (3) and install oil transfer plate on oil transfer plate gasket (5).

5 Using 1/2 inch socket, install 5/16-18 x 1-1/4 inch bolt (7) and washer (8) in oil transfer plate (6).

6 Using torque wrench, tighten bolt (7) to 17-20 lb-ft (23-27 N·m).

7 Install 5/16 inch diameter check ball (9) in check ball hole on oil transfer plate (6).

8 Install separator plate (10) over four guide pins (3) and on oil transfer plate (6).

9 Using 1/2 inch socket, install five 5/16-18 x 1-1/2 inch bolts (11) and washers (12) holding separator plate (10), oil transfer plate (6), and gasket (5) to transmission.

10 Using torque wrench, tighten bolts (11) to 17-20 lb-ft (23-27 N·m).

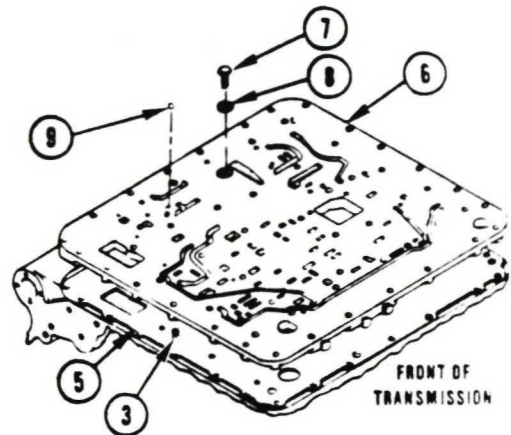
11 Using 3/8 inch socket, install two 1/4-18 x 1-1/4 inch flanged-head bolts (13) holding separator plate (10), oil transfer plate (6) and gasket (5) to transmission.

12 Using torque wrench, tighten bolts (13) to 9-11 lb-ft (12-15 N·m).

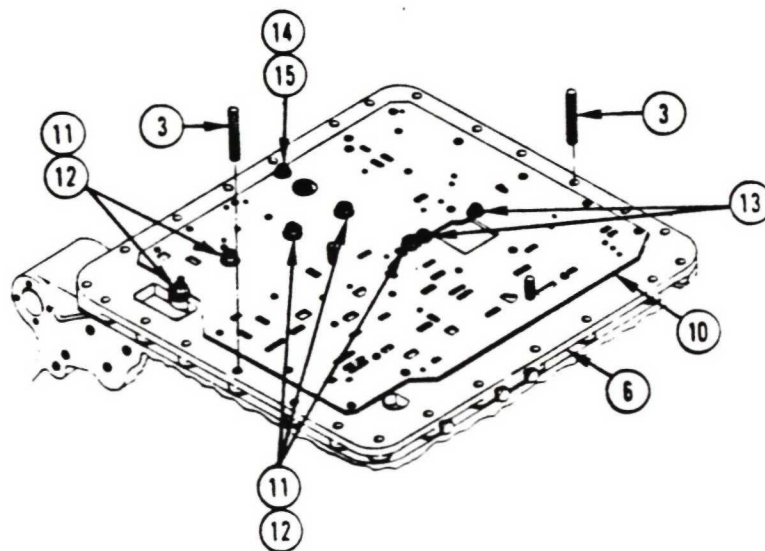
13 Using 7/16 inch socket, install 1/4-18 x 1-1/2 inch bolt (14) and washer (15) holding separator plate (10), oil transfer plate (6), and gasket (5) to transmission.

14 Using torque wrench, tighten bolt (14) to 9-11 lb-ft (12-15 N·m).

15 Using screwdriver, remove two 5/16-18 x 3 inch guide pins (3) located at edge of separator plate (10).



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End of Task 1

Go to Sheet 5

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4-18. **INSTALL TRANSMISSION TOP COMPONENTS**  
(SHEET 5 OF 16)

**TASK 2. INSTALL WIRING HARNESS ASSEMBLY**

**COMMON TOOLS:**

- Adapter, 3/8 to 1/4 inch square drive
- Screwdriver, phillips cross-tip, No. 1
- Socket, socket wrench, 1/4 inch square drive, screwdriver bit, cross-tip, No. 1
- Wrench, torque, 0-200 in-lb

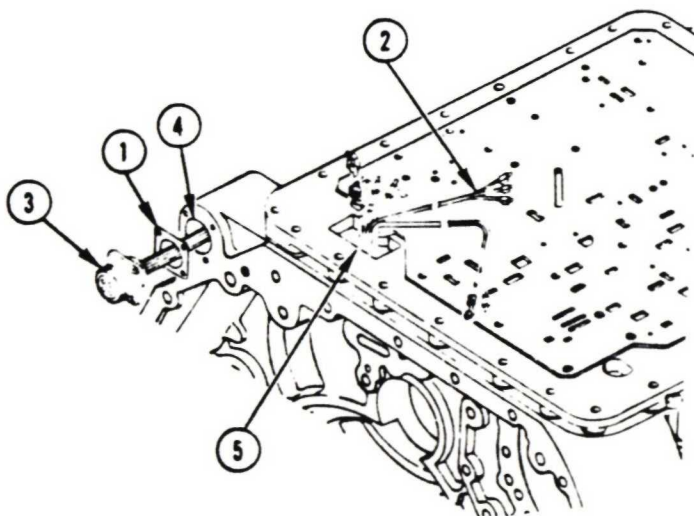
**REPAIR PARTS:**

- Gasket (harness connector) (73342) 6832550
- Screws, No. 4-40 x 7/16 inch (4 required) (24617) 159184

**PRELIMINARY PROCEDURE:** Separator plate is installed. Refer to this paragraph, TASK 1.

**NOTE**

- Wiring harness may be removed/installed any time that the top cover is off. However, when top components of transmission have all been removed, install the wiring harness after the separator plate has been installed and before the valve bodies have been installed, for ease of installation.
  - Harness is connected to solenoids and ground after valve assemblies have been installed. Refer to this paragraph, TASK 7.
- 1 Install new gasket (1) on wiring harness (2). Pull wiring through gasket until gasket is under harness connector (3).
  - 2 Feed wiring harness (2) into center housing opening (4) and pull wiring through oil transfer plate opening (5).



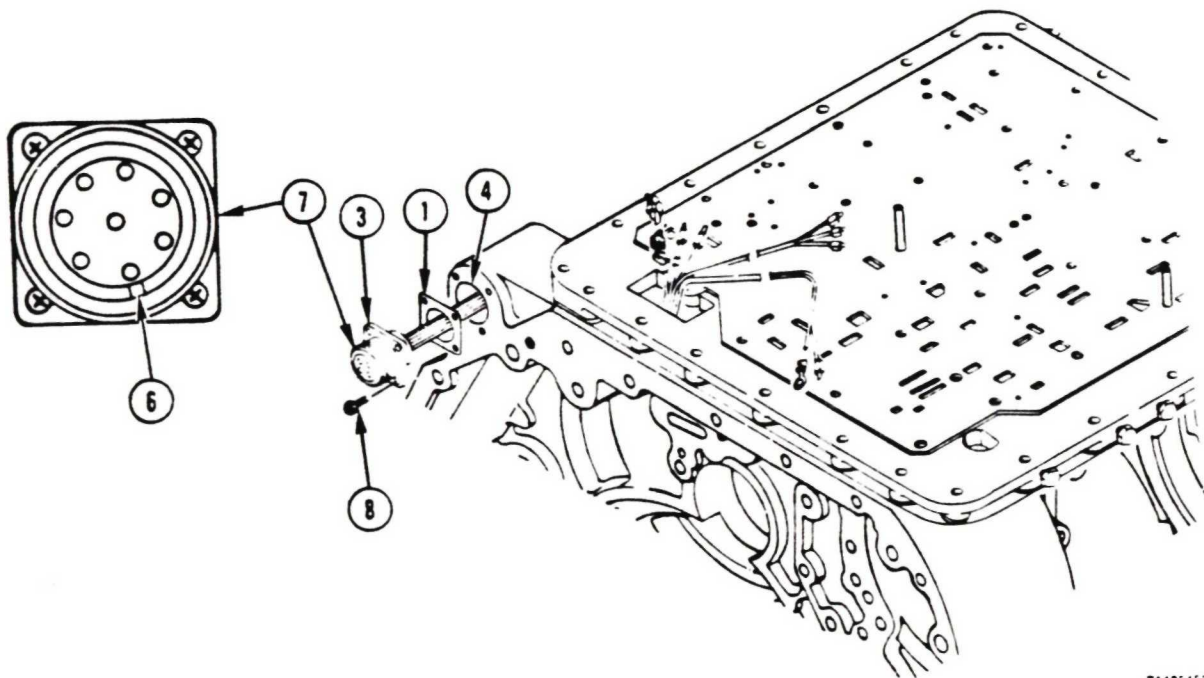
Go to Sheet 6

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**4-18. INSTALL TRANSMISSION TOP COMPONENTS  
(SHEET 6 OF 16)**

- 3 Install harness connector body (3) into transmission center housing hole (4) with key (6) in receptacle (7) located at bottom.
- 4 Using screwdriver, install four No. 4-40 x 7/16 inch screws (8) holding harness connector body (3) and gasket (1) to transmission. Do not tighten screws.
- 5 Using socket, adapter and torque wrench, tighten screws (8) to 3-5 lb-in (0.3-0.6 N\*m).



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**FOLLOW-ON PROCEDURE:** Connect harness to solenoids and attach harness ground connector. Refer to this paragraph, TASK 7.

End of Task 2

Go to Sheet 7

4-18. INSTALL TRANSMISSION TOP COMPONENTS  
(SHEET 7 OF 16)

TASK 3. INSTALL G2 BACKUP VALVE ASSEMBLY

COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 7/16 inch  
Wrench, torque, 0-175 ft-lb

SUPPLIES:

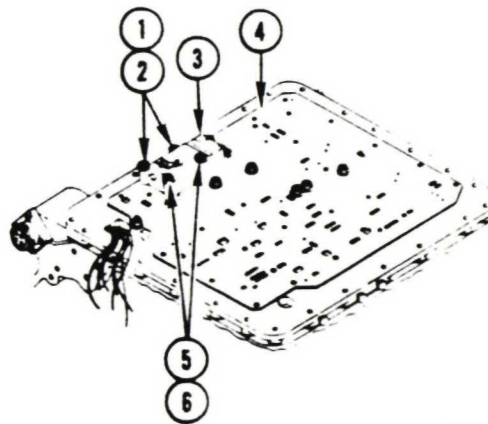
Cloth, batiste, lint-free (Item 6, Appendix C)

PRELIMINARY PROCEDURE: Separator plate is installed. Refer to this paragraph,  
TASK 1.

CAUTION

- Transmission must be in upright position when oil transfer gasket, oil transfer plate, separator plate and control valve assemblies are installed. If transmission is not in vertical position when these items are installed, misalignment of holes can block oil flow, causing malfunction of transmission.
- Care should be taken not to let dust get into control valve assemblies. Keep top of transmission center housing clean. Keep all parts clean. Wipe with lint-free cloth. Contamination of control valves can cause transmission failure.

- 1 Using socket, install two 1/4-18 x 2-1/4 inch bolts (1) and washers (2) holding G2 backup valve (3) to separator plate (4).
- 2 Using socket, install two 1/4-18 x 1-3/4 inch bolts (5) and washers (6) holding G2 backup valve (3) to separator plate (4).
- 3 Using torque wrench, tighten bolts (1, 5) to 9-11 lb-ft (12-15 N·m).



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End of Task 3

Go to Sheet 8

# 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 8 OF 16)

## TASK 4. INSTALL PRIORITY VALVE ASSEMBLY

### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 7/16 inch  
Wrench, torque, 0-175 ft-lb

### SUPPLIES:

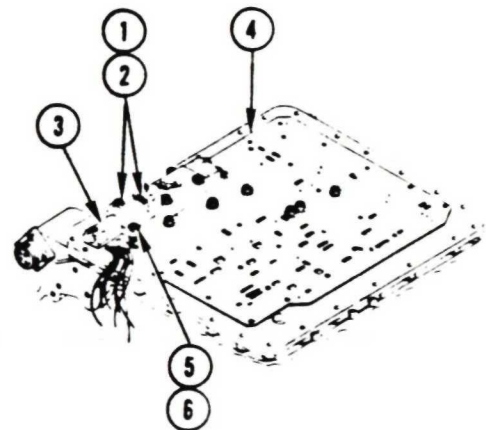
Cloth, batiste, lint-free (Item 6, Appendix C)

**PRELIMINARY PROCEDURE:** Separator plate is installed on transmission. Refer to this paragraph, TASK 1.

### CAUTION

- Transmission must be in upright position when oil transfer gasket, oil transfer plate, separator plate, and control valve assemblies are installed. If transmission is not in vertical position when these items are installed, misalignment of holes can block oil flow, causing malfunction of transmission.
- Care should be taken not to let dust get into control valve assemblies. Keep top of transmission center housing clean. Keep all parts clean. Wipe with lint-free cloth. Contamination of control valves can cause transmission failure.

- 1 Using socket, install two 1/4-18 x 2-1/8 inch bolts (1) and washers (2) holding priority valve (3) to separator plate (4).
- 2 Using socket, install 1/4-18 x 1-3/4 inch bolt (5) and washers (6) holding priority valve (3) to separator plate (4).
- 3 Using torque wrench, tighten bolts (1, 5) to 9-11 lb-ft (12-15 N·m).



End of Task 4

Go to Sheet 9

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4-18. INSTALL TRANSMISSION TOP COMPONENTS  
(SHEET 9 OF 16)

TASK 5. INSTALL LOCKUP CONTROL VALVE ASSEMBLY

COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Wrench, torque, 0-175 ft-lb

SUPPLIES:

Cloth, batiste, lint-free (Item 6, Appendix C)

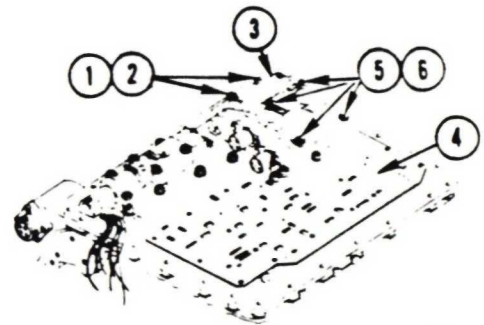
PRELIMINARY PROCEDURE:

- Separator plate is installed on transmission. Refer to this paragraph, TASK 1.
- Solenoids C and D installed on lockup control valve assembly. Refer to paragraph 4-31.

CAUTION

- Transmission must be in upright position when oil transfer gasket, oil transfer plate, separator plate, and control valve assemblies are installed. If transmission is not in vertical position when these items are installed, misalignment of holes can block oil flow, causing malfunction of transmission.
- Care should be taken not to let dust get into control valve assemblies. Keep top of transmission center housing clean. Keep all parts clean. Wipe with lint-free cloth. Contamination of control valves can cause transmission failure.

- 1 Using socket, install two 5/16-20 x 2-1/4 inch bolts (1) and washers (2) holding lockup control valve (3) to separator plate (4).
- 2 Using socket, install four 5/16-18 x 2-3/4 inch bolts (5) and washers (6) holding lockup control valve (3) to separator plate (4).
- 3 Using torque wrench, tighten bolts (1, 5) to 17-20 lb-ft (23-27 N·m).



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End of Task 5

Go to Sheet 10

4-18. INSTALL TRANSMISSION TOP COMPONENTS  
(SHEET 10 OF 16)

**TASK 6. INSTALL MAIN CONTROL VALVE ASSEMBLY**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Wrench, torque, 0-175 ft-lb

**SUPPLIES:**

Cloth, batiste, lint-free (Item 6, Appendix C)

**PRELIMINARY PROCEDURE:**

- Separator plate is installed on transmission. Refer to this paragraph, TASK 1.
- Solenoids A, B, E, F and G installed on main control valve assembly. Refer to paragraph 4-31.

**CAUTION**

- Transmission must be in upright position when oil transfer gasket, oil transfer plate, separator plate, and control valve assemblies are installed. If transmission is not in vertical position when these items are installed, misalignment of holes can block oil flow, causing malfunction of transmission.
- Care should be taken not to let dust get into control valve assemblies. Keep top of transmission center housing clean. Keep all parts clean. Wipe with lint-free cloth. Contamination of control valves can cause transmission failure.

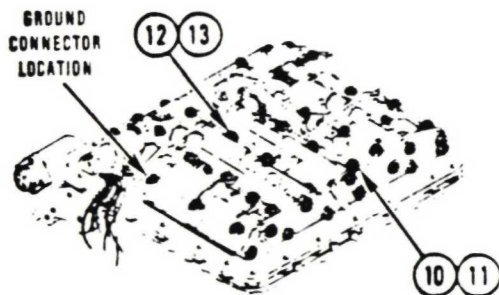
**NOTE**

One 5/16-18 x 2-3/4 inch bolt and washer at wiring harness ground connector location are not installed until after wiring harness has been installed. (Refer to this paragraph, TASK 7.)

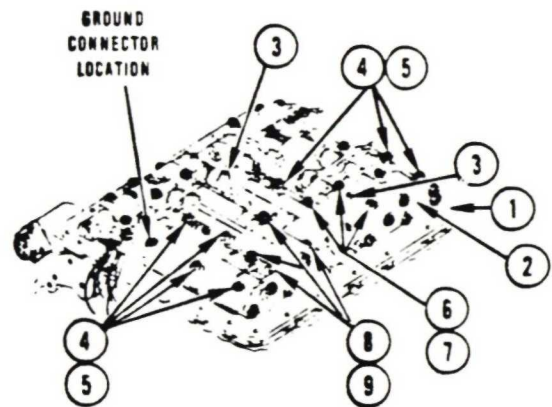
Go to Sheet 11

**4-18. INSTALL TRANSMISSION TOP COMPONENTS**  
(SHEET 11 OF 16)

- 1 Using lint-free cloth, clean separator plate (1) and main control valve assembly (2) as necessary.
- 2 Install main control valve assembly (2) over two guide pins (3) and onto separator plate.
- 3 Using socket, install seven 5/16-18 x 2-3/4 inch bolts (4) and washers (5) holding main control valve (2) to transmission.
- 4 Using socket, install three 5/16-18 x 3 inch bolts (6) and washers (7) holding main control valve (2) to transmission.
- 5 Using socket, install four 5/16-18 x 3-1/4 inch bolts (8) and washers (9) holding main control valve (2) to transmission.
- 6 Using torque wrench, tighten all bolts (4, 6, 8) to 17-20 lb-ft (23-27 N·m).
- 7 Remove two guide pins (3).
- 8 Using socket, install 5/16-18 x 3 inch bolt (10) and washer (11).
- 9 Using socket, install 5/16-18 x 3-1/4 inch bolt (12) and washer (13).
- 10 Using torque wrench, tighten bolts (10, 12) to 17-20 lb-ft (23-27 N·m).



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**FOLLOW-ON PROCEDURE:** The last retaining bolt for main control valve assembly is installed with wiring harness ground connector. Refer to this paragraph, TASK 7.

End of Task 6

Go to Sheet 12



4-18. INSTALL TRANSMISSION TOP COMPONENTS  
(SHEET 12 OF 16)

**TASK 7. CONNECT WIRING HARNESS TO SOLENOIDS AND GROUND**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Wrench, torque, 0-175 ft-lb

**PRELIMINARY PROCEDURE:**

- Wiring harness is pulled through center housing port; harness connector body is installed. Refer to this paragraph, TASK 2.
- Solenoids A through G are installed on lockup control valve and main control valve assemblies. Refer to paragraph 4-31.
- Lockup control valve and main control valve assemblies are installed. Refer to this paragraph, TASKS 5 and 6.

**NOTE**

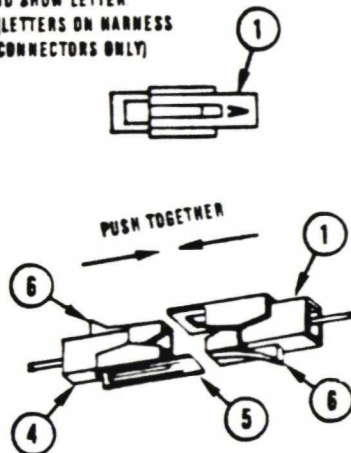
- Connectors on solenoids and connectors on wiring harness look the same except for color. Connectors are mated by pushing them together with connector loops over bayonets. Connectors are locked in place when ends of loops are down behind bayonets.
- All solenoids are the same and they are interchangeable; for that reason, solenoid connectors are not marked with solenoid identification. However, each lead of the wiring harness must go to a specific solenoid location. Letter stamped on wiring harness connector indicates location of solenoid to be connected.
- Locations of solenoids A through G are provided by art in this procedure.

Go to Sheet 13

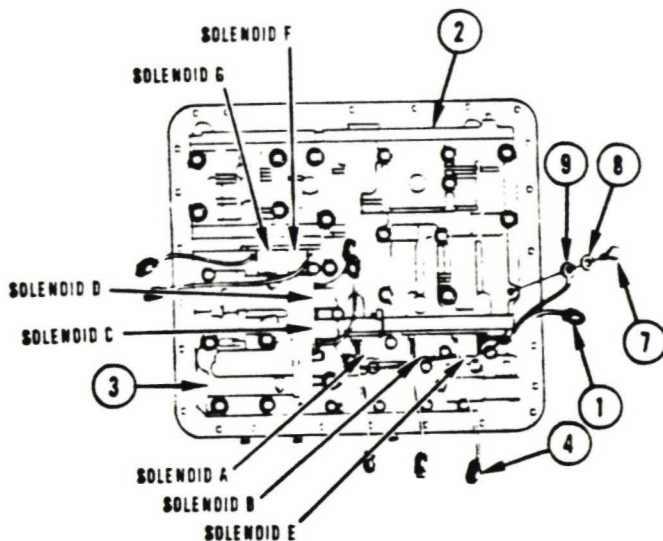
# 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 13 OF 16)

- 1 Look for letters A, B, C, D, E, F and G stamped on wiring harness connectors (1).
- 2 Locate solenoids A, B, E, F and G on main control valve assembly (2) and locate solenoids C and D on lockup control valve assembly (3).
- 3 Match wiring harness connectors (1) with solenoid connectors (4).
- 4 Hold harness connector (1) and solenoid connector (4) with ends of connectors facing each other.
- 5 Rotate connectors (1, 4) so that connector loops (5) will fit over bayonets (6).
- 6 Push connectors (1, 4) together until ends of connector loops (5) are down behind ends of bayonets (6).

CONNECTOR ROTATED  
TO SHOW LETTER  
(LETTERS ON HARNESS  
CONNECTORS ONLY)



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- 7 Install 5/16-18 x 2-3/4 inch bolt (7) through washer (8) and through eye of harness ground connector (9).
- 8 Using socket, install bolt (7) through main control valve assembly (2).
- 9 Using torque wrench, tighten bolt (7) to 17-20 lb-ft (23-27 N·m).

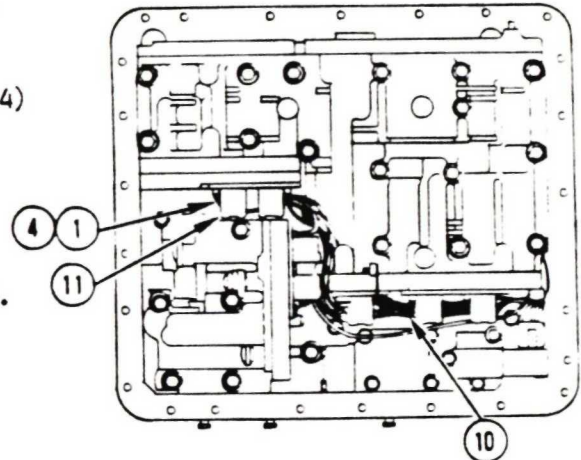
Go to Sheet 14

#### 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 14 OF 16)

- 10 Arrange wiring harness (10) and connector wires (1, 4) so that all wiring is tucked neatly under or between solenoids (11).

**FOLLOW-ON PROCEDURE:** Install transmission top cover assembly. Refer to this paragraph, TASK 8.

End of Task 7



#### TASK 8. INSTALL TRANSMISSION TOP COVER ASSEMBLY, BREATHER AND LIFTING BRACKETS

##### COMMON TOOLS:

- Extension, socket wrench, 1/2 inch square drive, 6 inch
- Handle, socket wrench, 1/2 inch square drive
- Socket, socket wrench, 1/2 inch square drive, 1/2 inch
- Socket, socket wrench, 1/2 inch square drive, 9/16 inch
- Socket, socket wrench, 1/2 inch square drive, 5/8 inch
- Socket, socket wrench, 1/2 inch square drive, 3/4 inch
- Wrench, torque, 0-175 ft-lb

##### REPAIR PARTS:

- Gasket (transmission top cover) (73342) 23045129

##### SUPPLIES:

- Bolt, 3/8-16 x 1-1/2 inch (4 required)
- Cloth, batiste, lint-free (Item 6, Appendix C)

##### PRELIMINARY PROCEDURE:

- Control valve assemblies are installed. Refer to this paragraph, TASKS 3, 4, 5 and 6.
- Wiring harness assembly is installed. Refer to this paragraph, TASK 2 and 7.

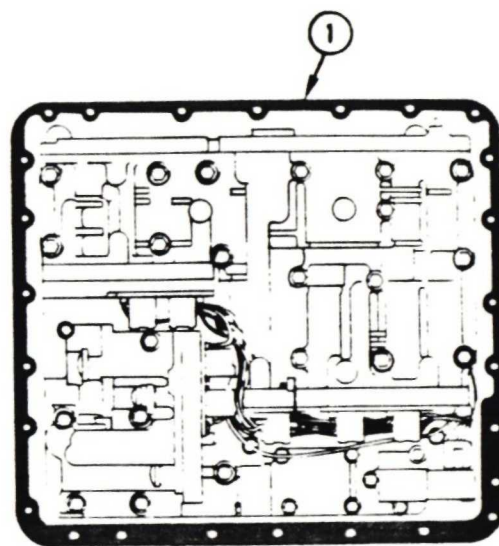
Go to Sheet 15



# 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 15 OF 16)

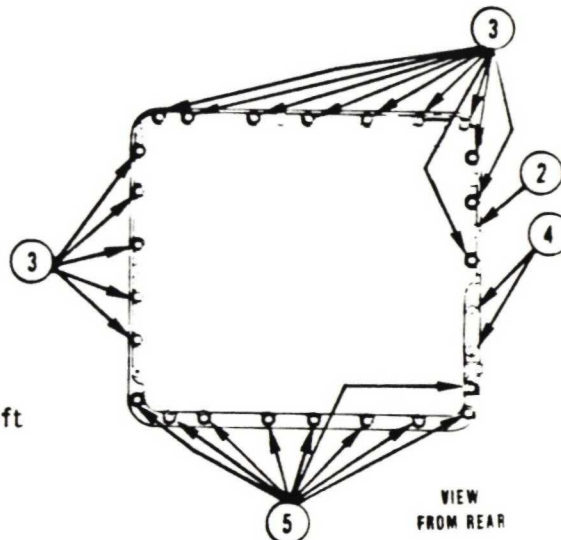
- 1 Install new transmission top cover gasket (1) on transmission.
- 2 Put transmission top cover (2) on transmission.
- 3 Using 1/2 inch socket, install fifteen 5/16-18 x 3-1/2 inch flanged-head bolts (3) holding top cover (2) to transmission.
- 4 Using 1/2 inch socket, install two 5/16-18 x 1-3/4 inch flanged-head bolts (4) holding top cover (2) to transmission.
- 5 Using 1/2 inch socket, install nine 5/16-18 x 2 inch flanged-head bolts (5) holding top cover (2) to transmission.
- 6 Using torque wrench, tighten bolts (3, 4, 5) to 13-15 lb-ft (18-20 N·m).
- 7 Using 3/4 inch socket, install bushing (6) in transmission breather port.
- 8 Using torque wrench, tighten bushing (6) to 12-16 lb-ft (16-22 N·m).
- 9 Using 5/8 inch socket on nut at top of breather (7), screw bottom of breather into bushing (6).
- 10 Using torque wrench, tighten breather (7) to 14-16 lb-ft (19-22 N·m).

Go to Sheet 16



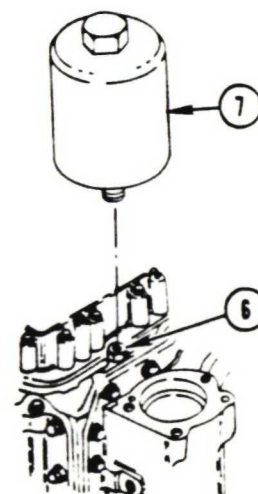
VIEW FROM REAR

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VIEW FROM REAR

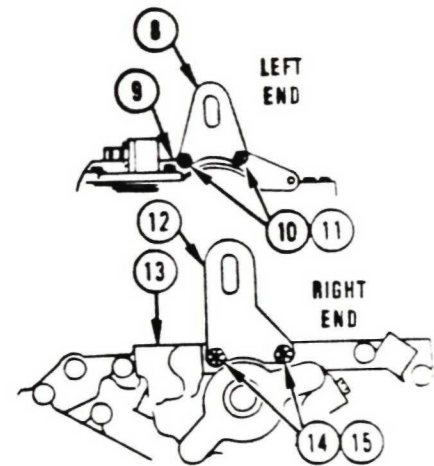
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#### 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 16 OF 16)

- 11 Hold left lifting bracket (8) on left end cover (9) with top of bracket leaning toward center of transmission.
- 12 Using 9/16 inch socket, install two 3/8-16 x 1-1/2 inch bolts (10) and washers (11) holding bracket to end cover (9).
- 13 Hold right lifting bracket (12) on right end cover (13) with top of bracket leaning toward center of transmission.
- 14 Using 9/16 inch socket, install two 3/8-16 x 1-1/2 inch bolts (14) and washers (15) holding bracket to end cover (13).
- 15 Using torque wrench, tighten four bolts (10, 14) to 13-15 lb-ft (18-20 N·m).



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End of Task 8

## Section IV. DISASSEMBLY, REPAIR AND ASSEMBLY OF MAJOR ASSEMBLIES

Paragraph	Title	Page
4-19	Disassemble Right End Cover Assembly	4-96
4-20	Repair Right End Cover Components	4-112
4-21	Assemble Right End Cover Assembly	4-126
4-22	Disassemble Left End Cover Assembly	4-148
4-23	Repair Left End Cover Components	4-152
4-24	Assemble Left End Cover Assembly	4-155
4-25	Repair Input Housing Assembly	4-160
4-26	Disassemble Bevel Gear Assembly	4-163
4-27	Assemble Bevel Gear Assembly	4-167
4-28	Disassemble Center Housing	4-172
4-29	Repair Center Housing Components	4-191
4-30	Assemble Center Housing	4-222
4-31	Repair Transmission Top Components	4-243
4-32	Repair Converter Element Components	4-250

#### 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 1 OF 16)

##### OVERVIEW

Brake apply shafts may be removed in different task order than shown in this procedure. The left brake apply shaft may be removed in any task sequence. The right brake apply cam shaft may be removed in any task order after removal of the right brake support assembly in this paragraph, TASK 5.

Brake coolant valve components and brake apply regulator valve components may be removed in any task sequence.

Task	Title	Page
1	Remove RH Output Flange	4-97
2	Remove Brake Apply Regulator Valve Components	4-98
3	Remove Brake Coolant Valve Components	4-99
4	Remove Brake Apply Indicators and Left Brake Apply Shaft	4-100
5	Remove Right Brake Support Assembly	4-102
6	Remove Brake Apply Cam, Brake Adjusting Links, and Right Brake Assembly	4-104
7	Remove Steer Gears	4-108
8	Remove Right Brake Apply Cam Shaft	4-109
9	Remove RH Output Shaft and Seal	4-111

Go to Sheet 2



# 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 2 OF 16)

## **WARNING**

- Check slings and lifting devices for cuts, breaks, or wear before hoisting end cover assembly and during hoisting. Slings and lifting devices can break and cause injury or death.
- Right end cover weighs approximately 125 pounds (57.1 kg). When lifting end cover, a hoist must be used to avoid bodily injury.

## **TASK 1. REMOVE RH OUTPUT FLANGE**

### **COMMON TOOLS:**

Bar, pry  
Chisel, cold  
Hammer, hand, ball peen  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 3/4 inch

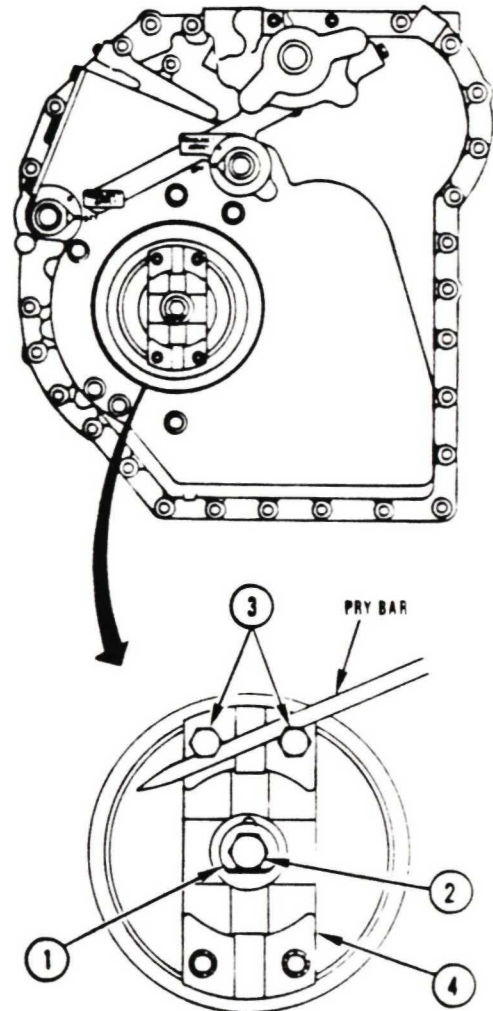
### **SUPPLIES:**

Bolt, 1/2-20 x 3 inch (2 required)  
Rag, wiping (Item 15, Appendix C)

### **NOTE**

Right end cover assembly turned outside up.

- 1 Using chisel and hammer, straighten bent tab of washer (1). Bend tab away from bolt (2).
- 2 Using 3/4 inch socket, install two 1/2-20 x 3 inch bolts (3) in tapped holes at either end of output flange (4).
- 3 Using one hand, hold pry bar between two bolts (3) to prevent flange (4) from turning.

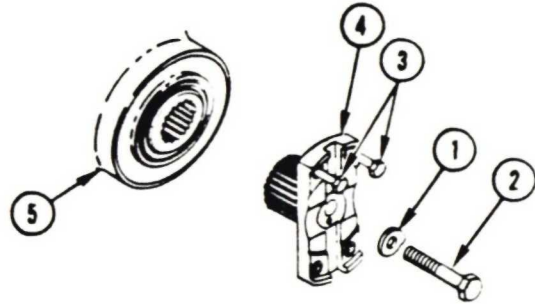


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Go to Sheet 3

4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 3 OF 16)

- 4 Using 3/4 inch socket, with other hand, remove bolt (2) and washer (1) from output flange (4).
- 5 Remove output flange (4) from right end cover assembly (5).
- 6 Using 3/4 inch socket, remove two bolts (3) from output flange (4).



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**FOLLOW-ON PROCEDURE:** Install output flange.  
Refer to paragraph 4-21.

End of Task 1

**TASK 2. REMOVE BRAKE APPLY REGULATOR VALVE COMPONENTS**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 10 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch

**SUPPLIES:**

Rag, wiping (Item 15, Appendix C)  
Shim Stock, 1/32 inch thick by 1/2 inch wide by 4 inches long (Item 18, Appendix C)

**NOTE**

Right end cover is turned inside up.

**WARNING**

Spring-loaded parts can fly and injure you. Always follow specified instructions when removing bolts from covers that are attached to valve assemblies.

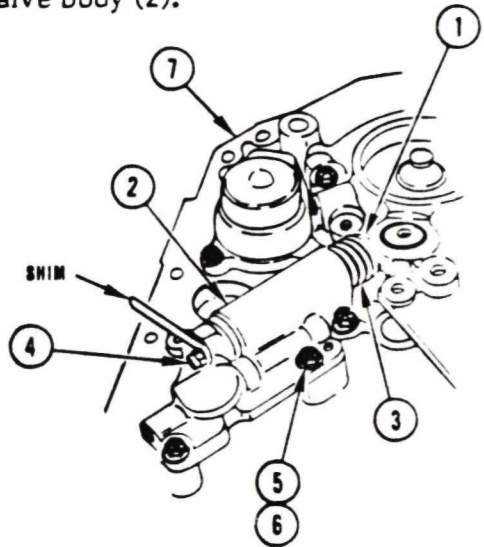
Go to Sheet 4

#### 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 4 OF 16)

- 1 Pushing on valve (1) head, move valve toward brake apply valve body (2) to compress spring (3) and use one hand to hold valve in.
- 2 Using other hand, insert 1/32 inch shim stock behind nut (4) to retain valve (1). Release valve.
- 3 Using socket, remove five bolts (5) and washers (6) from valve body (2).
- 4 Remove valve body (2) from right end cover (7).
- 5 Push on valve (1) head to compress spring (3) and remove shim stock from behind nut (4). Release valve slowly.
- 6 Remove valve (1) and spring (3) from valve body (2).

**REPAIR:** Refer to paragraph 4-20 for repair of brake apply regulator valve body assembly.

**FOLLOW-ON PROCEDURE:** Install brake apply regulator valve components. Refer to paragraph 4-21.



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End of Task 2

#### TASK 3. REMOVE BRAKE COOLANT VALVE COMPONENTS

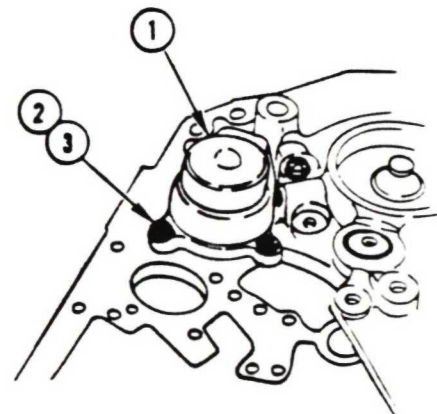
##### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 2 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch

##### WARNING

Spring-loaded parts can fly and injure you.  
Always follow specified instructions when  
removing bolts from covers that are  
attached to valve assemblies.

- 1 Using one hand, push firmly down on brake coolant valve body (1).
- 2 Using socket with other hand, remove three bolts (2) and washers (3) from brake coolant valve body (1).
- 3 Release valve body (1) slowly. Remove valve body.



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Go to Sheet 5



**4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 5 OF 16)**

- 4 Remove large spring (4).
- 5 Remove brake coolant valve stem (5) with coolant valve (6) and seal ring (7) attached.
- 6 Remove coolant valve (6) from valve stem (5).
- 7 Remove seal ring (7) from stem (5).

**FOLLOW-ON PROCEDURE:** Install brake coolant valve components. Refer to paragraph 4-21.

End of Task 3

**TASK 4. REMOVE BRAKE APPLY INDICATORS AND  
LEFT BRAKE APPLY SHAFT**

**COMMON TOOLS:**

Pliers, retaining ring, internal  
Screwdriver, flat tip

**SUPPLIES:**

Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)  
Tape, masking (Item 20, Appendix C)  
Wooden Blocks, 2 x 4 x 18 inches (2 required) (Item 2, Appendix C)

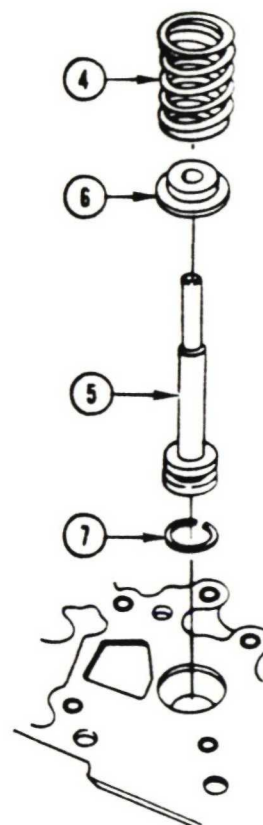
**PRELIMINARY PROCEDURE:**

- No preliminary procedure is required for removal of indicators at this level of maintenance.
- Right end cover removal provides access to left brake apply shaft. Refer to paragraph 4-7.

**NOTE**

- Right end cover is turned outside up.
- Outer retaining ring may or may not be on left brake apply shaft and right brake apply cam shaft. These retaining rings are supplied to retain external brake linkage.
- Left brake apply shaft must be held in place by a wood block or by hand to keep it from falling out of the end cover after removal of retaining rings and indicator.

Go to Sheet 6



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#### 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 6 OF 16)

- 1 Put a wood block under right end cover assembly (1) and under left brake apply shaft (2).
- 2 Using retaining ring pliers, remove four retaining rings (3); two from left brake apply shaft (2) and two from right brake apply cam shaft (4).
- 3 Using screwdriver, remove two indicators (5); one from shaft (2) and one from shaft (4).

#### CAUTION

Protective material, such as packaging tape, must cover splines unless seal is to be replaced. If shaft goes through seal without such protection, splines on shaft will damage seal.

- 3 Clean left and right shafts (2, 4).
- 4 Install tape over splines and ends of shafts (2, 4).
- 5 Put petrolatum over tape on shafts (2, 4).
- 6 Using one hand, raise end cover (1) at left brake apply shaft (2) location.
- 7 Using other hand, reach under end cover (1); turn shaft (2) to left or right while pulling on it.
- 8 Remove shaft (2) from end cover (1).
- 9 Remove washer (6) from shaft (2) or end cover (1).

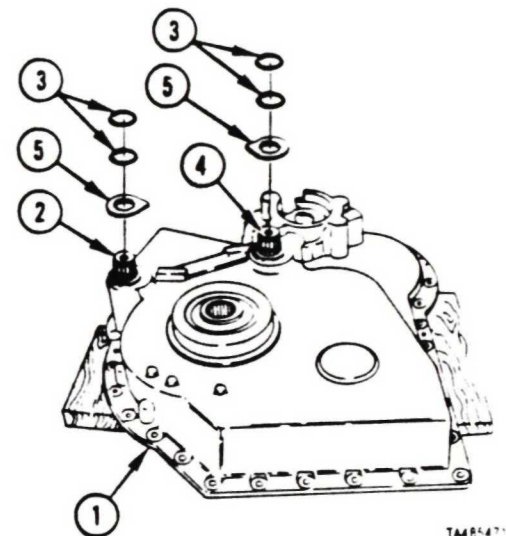
**REPAIR:** Refer to paragraph 4-20 for repair of left brake apply shaft assembly.

- 10 Turn end cover (1) over, inside up, on wood blocks.

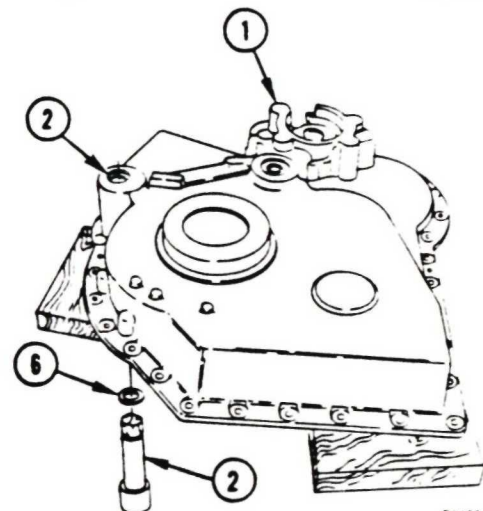
**FOLLOW-ON PROCEDURE:** Install brake apply indicators and left brake apply shaft. Refer to paragraph 4-21.

End of Task 4

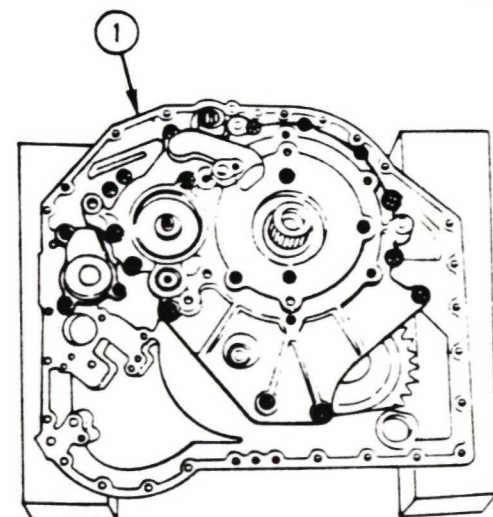
Go to Sheet 7



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# 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 7 OF 16)

## TASK 5. REMOVE RIGHT BRAKE SUPPORT ASSEMBLY

### COMMON TOOLS:

- Bar, pry (2 required)
- Extension, socket wrench, 1/2 inch square drive, 10 inch
- Hammer, hand, plastic faced
- Handle, socket wrench, 1/2 inch square drive
- Socket, socket wrench, 1/2 inch square drive, 7/16 inch
- Socket, socket wrench, 1/2 inch square drive, 5/8 inch
- Socket, socket wrench, 1/2 inch square drive, 1/2 inch

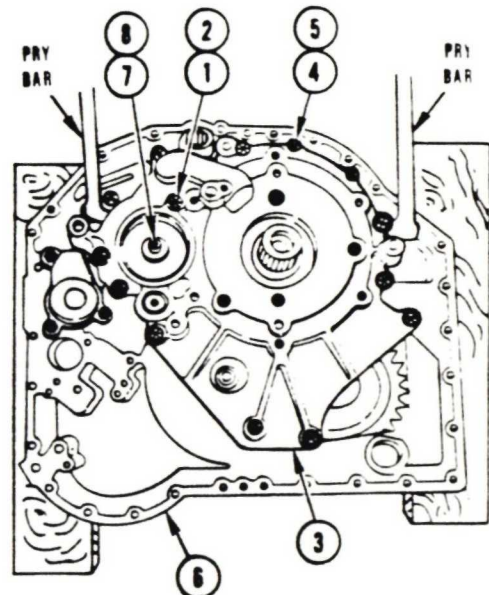
### SUPPLIES:

- Blocks, wooden, 4 x 4 inches x 16 inches long (2 required) (Item 3, Appendix C)
- Blocks, wooden, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)
- Rag, wiping (Item 15, Appendix C)

### NOTE

- Right end cover turned inside up.
- When brake support assembly is removed, the following parts may come out with the support, or they may remain in the right end cover:  
Rotating cam, eight balls, brake adjusting links, cam seal rings, right brake apply cam shaft.
- Two bearing races and a needle bearing will remain in support assembly after completion of this task. The races require application of heat for removal. Refer to procedure 4-20 for removal of races and needle bearing.

- 1 Using 5/8 inch socket, remove bolt (1) and washer (2) from right brake support assembly (3).
- 2 Using 5/8 inch socket, remove 13 remaining bolts (4) and washers (5) from around perimeter of support assembly (3).
- 3 Using two pry bars positioned approximately 180 degrees apart, pry support (3) off right end cover (6).
- 4 Remove support assembly (3) from end cover (6).
- 5 Remove preformed packing (7) from oil transfer (lube) tube (8).



Go to Sheet 8

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#### 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 8 OF 16)

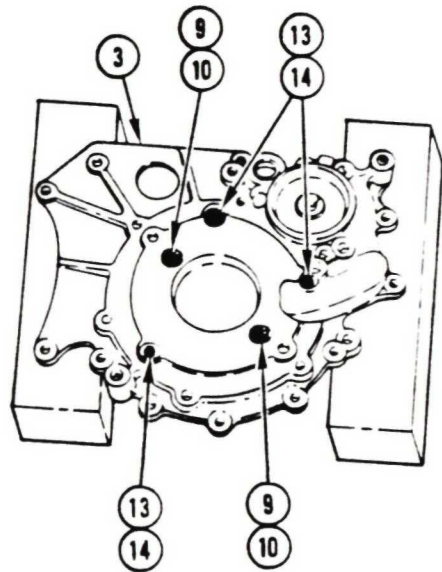
- 6 Place support assembly (3) on two wooden blocks with outside of support up.
- 7 Using 7/16 inch socket, unscrew two bolts (9) until bolt heads are approximately 1/4 inch above surface of support (3).
- 8 Using plastic faced hammer, tap bolt heads (9) down to touch surface of support (3).
- 9 Using 7/16 inch socket, remove two bolts (9) and washers (10) from support (3).
- 10 Turn support (3) over, inside up.
- 11 Remove seal retainer (11) and seal ring (12) from support (3).
- 12 Remove seal ring (12) from retainer (11).

#### NOTE

Stationary cam is not to be removed unless:

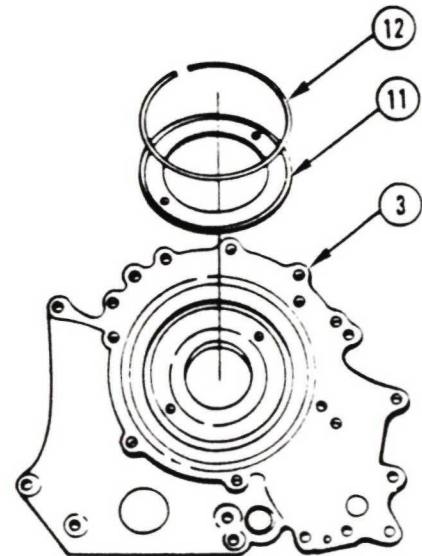
- Cam or support is to be replaced.
- Support is to be repaired.

If stationary cam is to be removed, go to Step 13.



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- 13 Turn support (3) over, outside up, on wooden blocks.
- 14 Using 1/2 inch socket, unscrew three bolts (13) until bolt heads are approximately 1/4 inch above surface of support (3).
- 15 Using plastic faced hammer, tap bolt heads (13) down to touch surface of support (3).
- 16 Using 1/2 inch socket, remove three bolts (13) and washers (14) from support (3).



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Go to Sheet 9

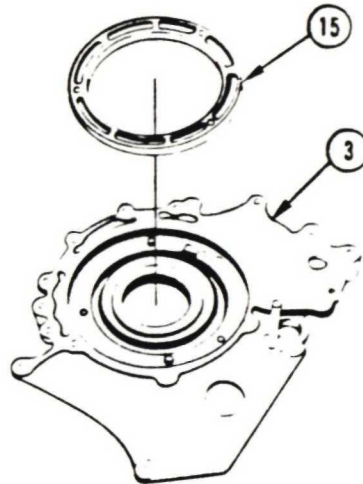
4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 9 OF 16)

17 Turn support (3) over, inside up.

18 Remove stationary cam (15) from support (3).

**REPAIR:** Refer to paragraph 4-20 for repair of right brake support assembly.

**FOLLOW-ON PROCEDURE:** Install right brake support assembly. Refer to paragraph 4-21.



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End of Task 5

**TASK 6. REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS AND RIGHT BRAKE ASSEMBLY**

**COMMON TOOLS:**

- Bar, pry (2 required)
- Extension, socket wrench, 1/2 inch square drive, 10 inch
- Hammer, hand, plastic faced
- Handle, socket wrench, 1/2 inch square drive
- Pliers, retaining ring, internal
- Screwdriver, flat tip, small
- Socket, socket wrench, 1/2 inch square drive, 7/16 inch
- Socket, socket wrench, 1/2 inch square drive, 9/16 inch

**SUPPLIES:**

- Rag, wiping (Item 15, Appendix C)

**NOTE**

- Right end cover on work table is turned inside up.
- Brake apply (rotating) cam, eight balls and brake adjust linkage may come out with right brake support assembly, or these parts may remain with the right end cover assembly.
- External seal rings (inner and outer) may come out attached to the stationary cam, or they may remain in the brake apply cam.
- Procedures in TASK 6 are based upon above components remaining with right end cover.

Go to Sheet 10

# 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 10 OF 16)

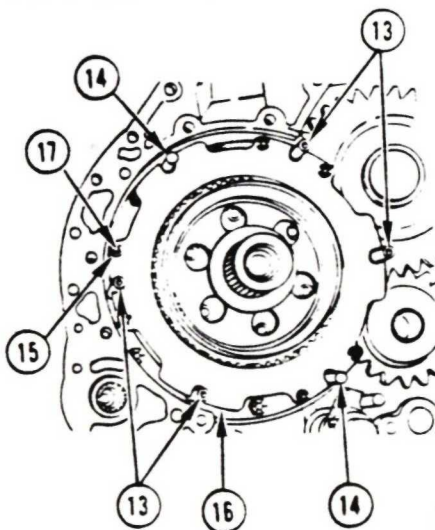
- 1 Remove brake apply cam (1), eight balls (2) and brake adjusting linkage (3) from right end cover (4). Place balls (2) in a container.
- 2 Using screwdriver, remove seals (5, 6) from brake cam (1).
- 3 Using screwdriver, remove preformed packings (7, 8) from face of brake cam (1).
- 4 Using 7/16 inch socket, remove bolt (9) and two spring tension clips (10) from brake cam (1).
- 5 Remove brake adjusting linkage (3) from brake cam (1).
- 6 Unscrew inner brake adjusting link (11) from outer brake adjusting link (12).

**REPAIR:** Refer to paragraph 4-20, TASK 2, for replacement of pin in inner brake adjusting link (11).

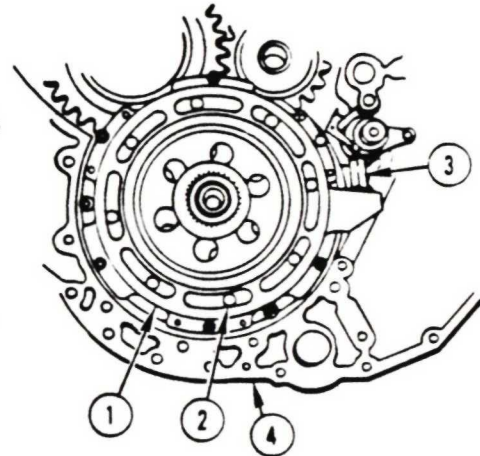
## NOTE

Four brake reaction pins (13) can be removed at this time. Pins (14) cannot be removed.

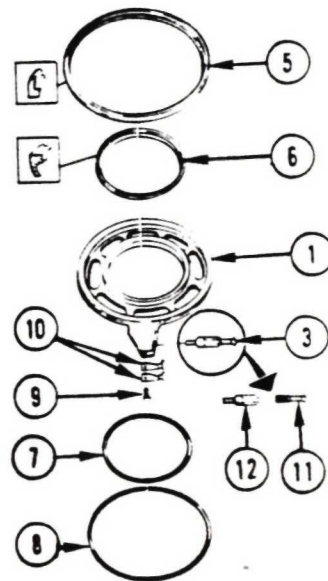
- 7 Remove four brake reaction pins (13).
- 8 Using finger of one hand, trap retaining ring (15) against clutch reaction plate (16).
- 9 Using screwdriver in other hand, pry six retaining rings (15) away from spring guide pins (17).



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Go to Sheet 11



4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 11 OF 16)

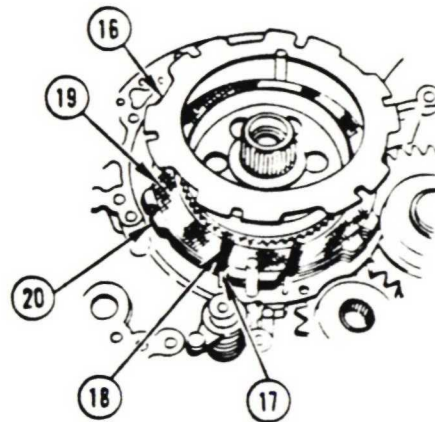
10 Remove clutch reaction plate (16) from spring guide pins (17).

11 Remove six springs (18) from spring guide pins (17).

**CAUTION**

Keep all clutch and reaction plates in the same order and facing the same way. When one plate is to be replaced, replace the entire clutch pack. Each used plate has established its own contour and wear pattern. The clutch assembly may not operate effectively because plates in the pack may have poor surface contact when:

- A plate is facing opposite direction.
- A plate position in pack is changed.
- A new plate is inserted in pack.



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12 Remove right brake pack consisting of six internal splined clutch (friction) plates (19) and five clutch reaction (steel) plates (20).

13 Remove steer ring gear assembly (21) from output carrier assembly (22) and brake clutch drum (23).

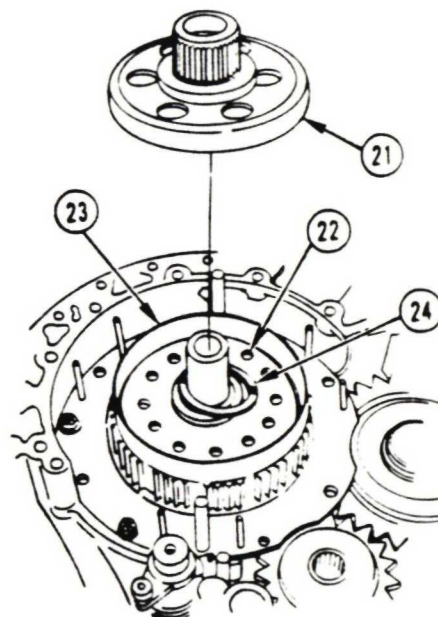
**NOTE**

Thrust washer may come out with steering gear assembly, or it may remain on output carrier assembly.

14 Remove thrust washer (24) from output carrier (22).

**NOTE**

Output carrier and brake clutch drum are removed as one unit, held together by retaining ring.



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15 Remove output carrier assembly (22) and brake clutch drum (23).

Go to Sheet 12

#### 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 12 OF 16)

16 Turn output carrier (22) and drum (23) upside down.

##### NOTE

Thrust washer (25) usually comes off end cover (4) inside output carrier (22), but it may remain on RH steer driven gear (26).

17 Remove thrust washer (25) from output carrier (22).

18 Using screwdriver, remove snapring (27) from drum (23).

19 Remove carrier (22) from drum (23).

20 Remove brake coolant seal (28) from brake clutch backing plate (29).

21 Using 9/16 inch socket, remove four bolts (30) and washers (31) from brake clutch backing plate (29).

##### NOTE

Plate (29) may bind on two pins (28) during removal. It may be necessary to tap plate near pin, using plastic faced hammer, to help release plate.

22 Using two pry bars under inside edge of clutch backing plate (29), remove plate.

##### NOTE

Six spring guide pins (16) may come with plate (29), or pins may remain in end cover (4).

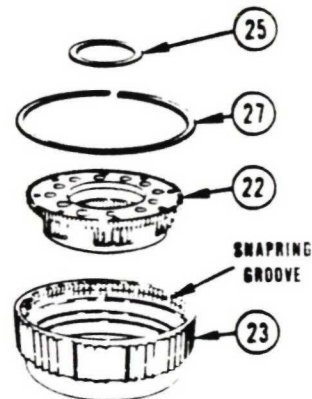
23 Remove six spring guide pins (16) from backing plate (29) or from right end cover (4).

##### FOLLOW-ON PROCEDURE:

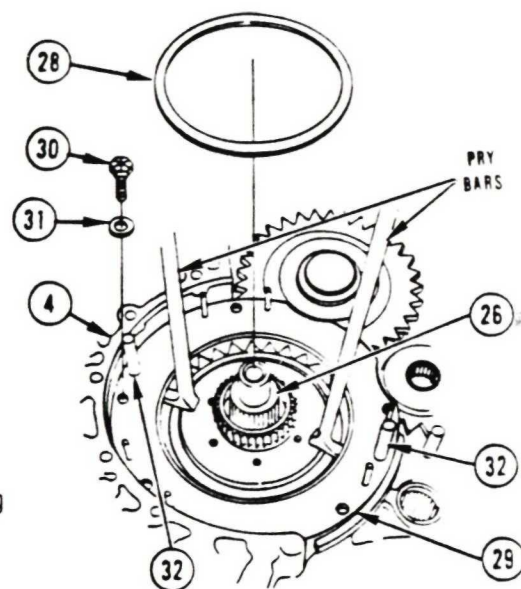
- Install right brake assembly. Refer to paragraph 4-21.
- Install brake apply cam and brake adjust linkage. Refer to paragraph 4-21.

End of Task 6

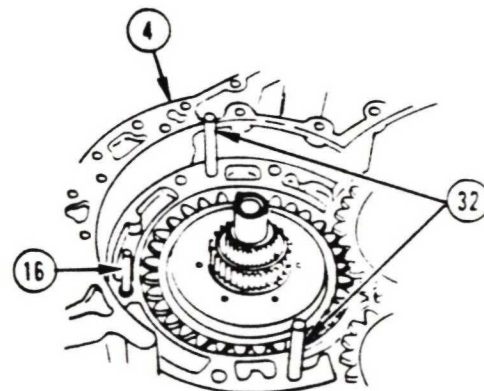
Go to Sheet 13



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4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 13 OF 16)

TASK 7. REMOVE STEER GEARS

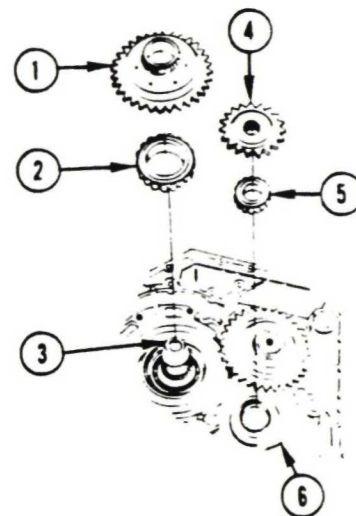
COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 10 inch  
Hammer, hand, ball peen  
Handle, socket wrench, 1/2 inch square drive  
Punch, straight, round nose  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch

NOTE

- It is not necessary to remove bearings during disassembly for inspection. Refer to TM 9-214.
- Bearings on under side of RH steer driven gear and range steer gear consist of cages and inner races. Outer races remain in right end cover housing.
- Bearings and races remaining in the right end cover, after gears have been removed in this task, require application of heat for removal. Refer to paragraph 4-20 for removal of these bearings and races.

- 1 Remove RH Steer driven gear (1) and bearing (2) from RH output shaft (3).
- 2 Inspect bearing (2) for serviceability. If bearing requires replacement, remove bearing from gear (1) using hammer and punch.
- 3 Remove range steer gear (4) and bearing (5) from right end cover (6).
- 4 Inspect bearing (5) for serviceability. If bearing requires replacement, remove bearing from gear (4) using hammer and punch.



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Go to Sheet 14



#### 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 14 OF 16)

- 5 Using socket, remove bolt (7) from steer idler retainer plate (8).
- 6 Remove steer idler retainer plate from steer idler gear (9).
- 7 Remove bronze thrust washer (10) from steer idler gear (9).

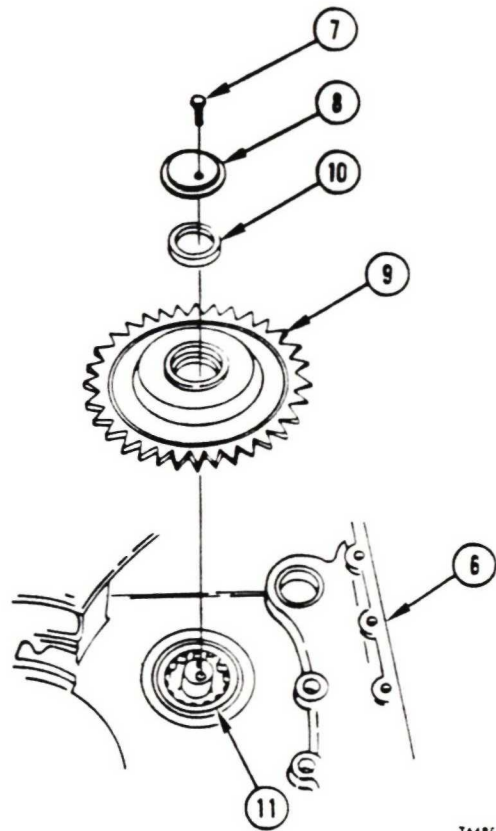
#### NOTE

Journal on bottom of steer idler gear rides in cylindrical roller bearing assembly (11) which remains in right end cover (6).

- 8 Remove steer idler gear (9) from right end cover (6).

**FOLLOW-ON PROCEDURE:** Install steer gears. Refer to paragraph 4-21.

End of Task 7



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#### TASK 8. REMOVE RIGHT BRAKE APPLY CAM SHAFT

##### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Hammer, hand, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Pliers, retaining ring, internal  
 Screwdriver, flat tip  
 Socket, socket wrench, 1/2 inch square drive, 7/16 inch

##### SUPPLIES:

Blocks, wooden, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)  
 Rag, wiping (Item 15, Appendix C)

#### NOTE

- Right end cover on two wooden blocks, inside turned up.
- Right brake apply cam shaft may have come out with right brake support (TASK 5), or it may be in right end cover. Tension between shaft and seal usually causes shaft to remain in end cover.
- Right brake apply cam shaft should come out of end cover when shaft is pulled. If shaft hangs up on seal, turn end cover over and tap on taped end of shaft with plastic faced hammer.

Go to Sheet 15

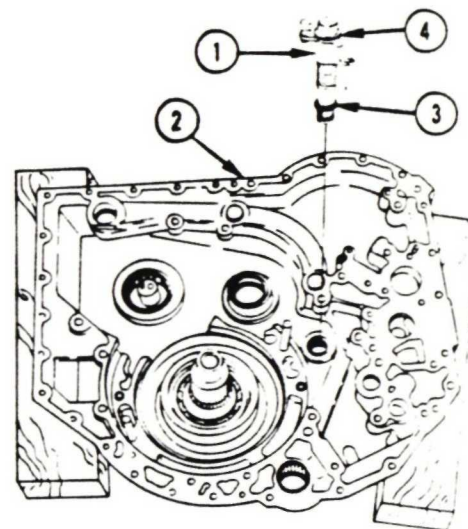
**4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 15 OF 16)**

- 1 Remove right brake apply cam shaft (1) from right end cover (2).

**NOTE**

- Washer (3) may remain with end cover (2), or it may come out with shaft (1).
- Thrust washer (4) may have remained with right brake support (TASK 5), or it may be on shaft (1).

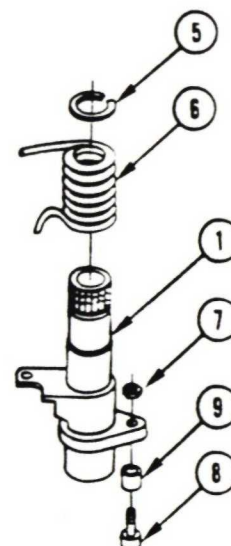
- 2 Remove washer (3) from shaft (1) or end cover (2).
- 3 Remove thrust washer (4) from shaft (1), if present.



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**Remove Right Brake Apply Cam Shaft Components**

- 4 Using retaining ring pliers, remove retaining ring (5) from right brake apply cam shaft (1).
- 5 Remove spring (6) from shaft (1).
- 6 Using socket and screwdriver, remove lock nut (7) from threaded end of cam follower (8).
- 7 Remove cam follower (8) from shaft (1).
- 8 Remove spacer (9) from cam follower (8).



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**FOLLOW-ON PROCEDURE:** Install right brake apply cam shaft. Refer to paragraph 4-21.

**End of Task 8**

**Go to Sheet 16**

# **4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 16 OF 16)**

## **TASK 9. REMOVE RH OUTPUT SHAFT AND SEAL**

### **COMMON TOOLS:**

Hammer, hand, ball peen  
 Hammer, hand, plastic faced  
 Pliers, retaining ring, internal  
 Press, arbor, hand  
 Punch, drive pin, straight

### **SUPPLIES:**

Blocks, wooden, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)  
 Rag, wiping (Item 15, Appendix C)

### **NOTE**

Right end cover turned inside up.

- 1 Using retaining ring pliers, remove retaining ring (1) retaining bearing assembly (2) on RH output shaft (3).
- 2 Turn right end cover (4) over, outside up, on two 2 x 4 inch wooden blocks.
- 3 Using plastic faced hammer, drive RH output shaft (3), bearing (2) and sleeve (5) from output shaft seal (6).
- 4 Using ball peen hammer and punch, drive output shaft seal (6) from right end cover (4).

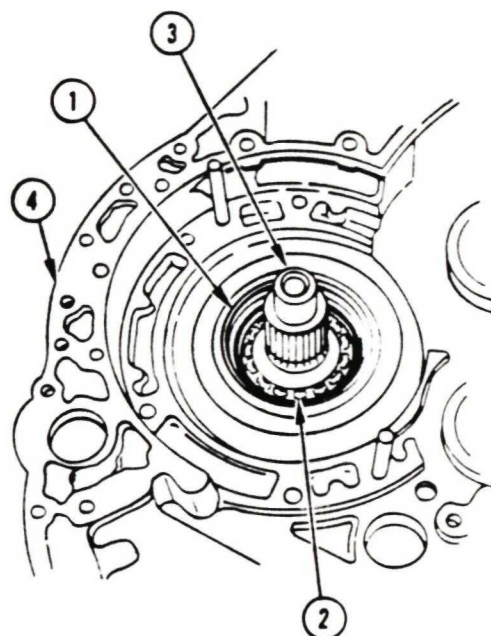
### **NOTE**

When bearing is removed from output shaft, sleeve is forced off ahead of bearing.

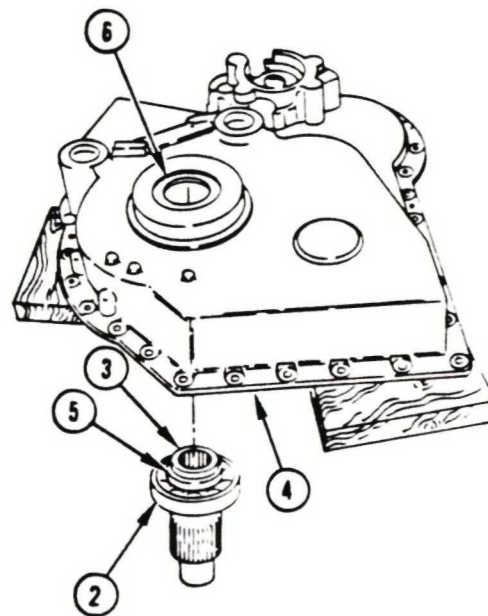
- 5 Inspect bearing (2) for serviceability. If bearing requires replacement, remove bearing (2) and sleeve (5) from output shaft (3), using arbor press.

**FOLLOW-ON PROCEDURE:** Install output shaft and seal. Refer to paragraph 4-21.

End of Task 9



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4-20. REPAIR RIGHT END COVER COMPONENTS  
(SHEET 1 OF 14)

Task	Title	Page
1	Repair Brake Apply Regulator Valve Body Assembly	4-112
2	Repair Inner Brake Adjusting Link Assembly	4-113
3	Repair Left Brake Apply Shaft Assembly	4-114
4	Repair Right Brake Support Assembly	4-115
5	Repair Right End Cover Assembly	4-119

**TASK 1. REPAIR BRAKE APPLY REGULATOR VALVE BODY ASSEMBLY**

**COMMON TOOLS:**

Hammer, hand, ball peen  
Punch, drive pin, straight, 1/16 inch diameter point  
Screwdriver, flat tip

**REPAIR PARTS:**

Packing, preformed (for plug) (73342) 23045126  
Pin, spring (retains plug) (24617) 455675

**SUPPLIES:**

Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURE:** Remove brake apply regulator valve components. Refer to paragraph 4-19.

**NOTE**

Valve body is turned outside up on work table.

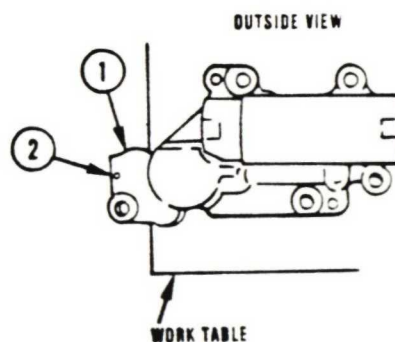
**Disassemble Brake Apply Regulator Valve Body**

- 1 Move valve body (1) to edge of table so that pin (2) is over edge of table.

**NOTE**

Pin may be driven in or out of body from either direction, but it is easier to work with flat inside surface of body down on table.

- 2 Using hammer and punch, drive pin (2) from body (1).

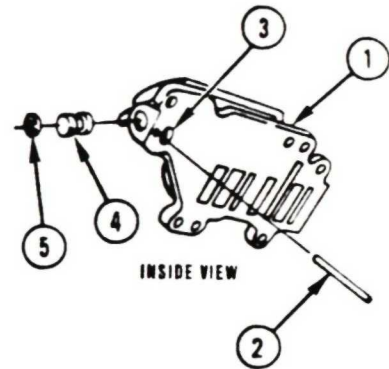


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Go to Sheet 2

# **4-20. REPAIR RIGHT END COVER COMPONENTS** (SHEET 2 OF 14)

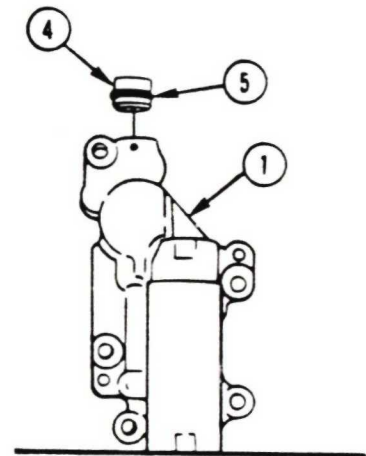
- 3 Turn valve body (1) over, inside up.
- 4 Insert tip of screwdriver in hole (3) and pry plug (4) from body.
- 5 Remove packing (5) from plug (4).



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## **Assemble Brake Apply Regulator Valve Body**

- 6 Install new packing (5) on plug (4).
- 7 Apply petrolatum to packing (5).
- 8 Place body (1) on table, plug port end up.
- 9 Place plug (4) over bore in body (1), chamfered end of plug in first.
- 10 Install plug (4) and packing (5) against seat in body (1). Tap plug lightly with hammer if necessary.
- 11 Place valve body (1) on table, outside up.
- 12 Using hammer and punch, install new pin (2) in body (1). Seat pin flush to 0.020 inch (0.508 mm) below flat inside surface of body.



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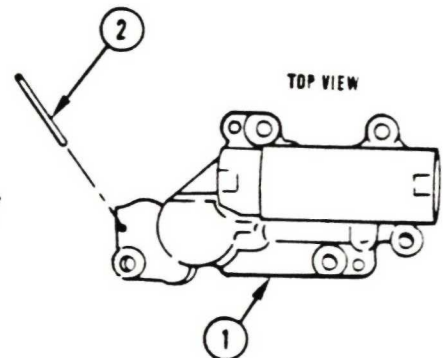
**FOLLOW-ON PROCEDURE:** Install brake apply regulator valve components. Refer to paragraph 4-21.

End of Task 1

## **TASK 2. REPAIR INNER BRAKE ADJUSTING LINK ASSEMBLY**

### **NOTE**

Do not remove inner brake adjusting link pin unless repair is necessary.



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### **COMMON TOOLS:**

Gage, vernier caliper  
Hammer, hand, ball peen  
Punch, center  
Vise, soft jaw

### **REPAIR PARTS:**

Pin, spring (24617) 455675

Go to Sheet 3

# 4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 3 OF 14)

## SUPPLIES:

Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURE:** Inner brake adjusting link is removed. Refer to paragraph 4-19.

## Remove Pin

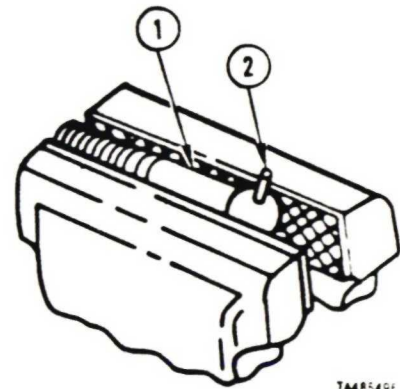
- 1 Place inner brake adjusting link (1) in vise.
- 2 Using hammer and punch, drive pin (2) from link (1).

## Install Pin

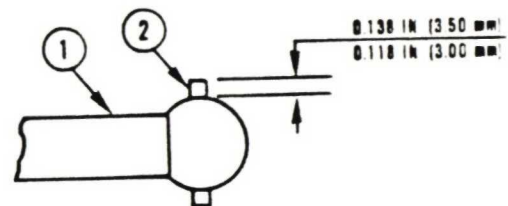
- 3 Using hammer and punch, install new pin (2) to a height of 0.118-0.138 inch (3.00-3.50 mm) above surface of link (1).
- 4 Remove link (1) from vise.

**FOLLOW-ON PROCEDURE:** Install inner brake adjusting link. Refer to paragraph 4-21.

End of Task 2



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## TASK. 3. REPAIR LEFT BRAKE APPLY SHAFT ASSEMBLY

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## COMMON TOOLS:

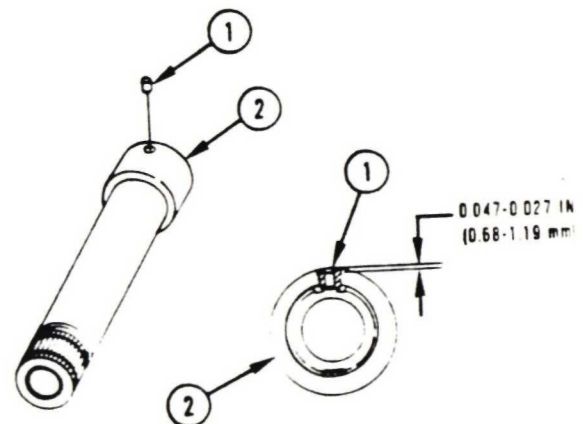
Gage, vernier caliper  
Hammer, hand, ball peen  
Punch, drive pin, 1/16 inch point

## REPAIR PARTS:

Pin, spring (24617) 9421003

**PRELIMINARY PROCEDURE:** Remove left brake apply shaft. Refer to paragraph 4-19.

- 1 Using punch and hammer, remove pin (1) from left brake apply shaft (2).
- 2 Using punch and hammer, install new pin (1) in shaft (2) to a depth of 0.027-0.047 inch (0.68-1.19 mm) below outside surface of shaft.



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Go to Sheet 4



# **4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 4 OF 14)**

**FOLLOW-ON PROCEDURE:** Install left brake apply shaft. Refer to paragraph 4-21.

End of Task 3

## **TASK 4. REPAIR RIGHT BRAKE SUPPORT ASSEMBLY**

### **COMMON TOOLS:**

Adapter, socket wrench, 1/2 to 3/8 inch square drive  
Chisel, cold  
Extension, socket wrench, 3/8 inch square drive, 6 inch  
Grinder, rotary  
Gun, heat (2 required)  
Hammer, hand, ball peen  
Handle, socket wrench, 3/8 inch square drive  
Leather Gloves  
Press, arbor, hand operated  
Pry Bar, roller head (2 required)  
Puller, mechanical, slide hammer type  
Socket Wrench Attachment, socket head screw, 3/8 inch square drive, 3/16 inch hex plug end  
Tap Set  
Wrench, torque, 0-175 ft-lb

### **SUPPLIES:**

Blocks, wooden, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)  
Carbon Dioxide, technical (dry ice) (Item 4, Appendix C)  
Lubricating Oil (Item 10, Appendix C)  
Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)  
Sealant, lubricating, thread locking (Item 16, Appendix C)

### **PERSONNEL REQUIRED: 2**

- One soldier holds brake support steady.
- One soldier removes bearing races.

Go to Sheet 5

4-20. REPAIR RIGHT END COVER COMPONENTS  
(SHEET 5 OF 14)

PRELIMINARY PROCEDURE: Right brake support assembly removed from right end cover.  
Refer to paragraph 4-19.

NOTE

- Right brake support assembly is mounted on two wooden blocks, outside up.
- Inspect right brake support assembly for serviceability. Replace defective pins, tubes, plugs, bearings or races. DO NOT REMOVE SERVICEABLE COMPONENTS.

Disassemble Right Brake Support Assembly

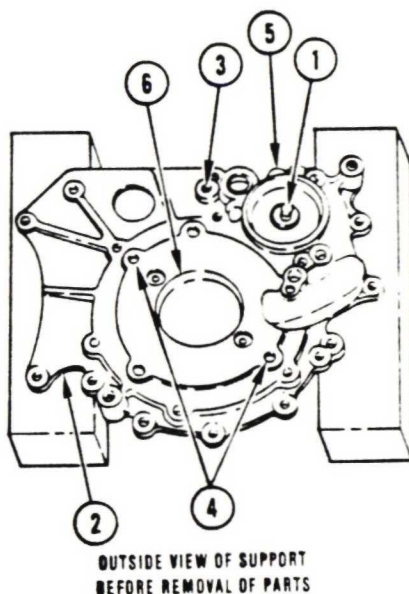
- 1 If removal of tube coupling (1) is necessary, tap the center hole with 3/8-16 tap to a depth of about 6-8 threads.
- 2 Install slide hammer into coupling (1) and knock upward to remove coupling (1).
- 3 Thoroughly clean out all metal shavings.
- 4 Using arbor press, remove long brake reaction pin (3) from support (2).
- 5 Using arbor press, remove two dowel pins (4) from support (2).

WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

CAUTION

Use care not to cut into support (2) when using grinder to cut slots in bearing race.



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Go to Sheet 6

#### 4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 6 OF 14)

- 6 Using grinder, cut two slots 180 degrees apart at base of bearing race (5). Offset slots slightly so that pry bars will overlap. Cut slots deep enough to catch the lip of the pry bar, but not deep enough to cut into support (2).
- 7 Using two heat guns, heat support around bearing race (5) for 15 minutes.
- 8 Using two pry bars in slots, lift up bearing race (5).

#### CAUTION

Use care not to damage support (2) when using pry bars to remove race.

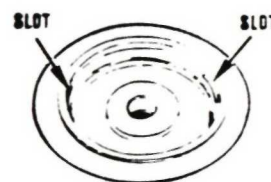
- 9 After lifting up bearing race, reposition two pry bars under bearing race (5) and remove race.
- 10 Using grinder, cut two slots 180 degrees apart at base of bearing race (6). Cut slots deep enough to catch the end of the chisel, but not deep enough to cut into support (2).
- 11 Using two heat guns, heat support (2) around bearing race (6) for 15 minutes.

#### CAUTION

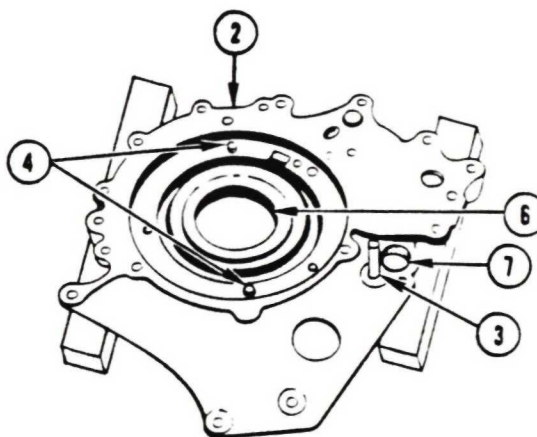
Use care not to damage support when using hammer and chisel to remove race.

- 12 Turn support (2) over. Using hammer and chisel, drive out bearing race (6).
- 13 Using arbor press, remove needle bearing (7) from support (2).

Go to Sheet 7



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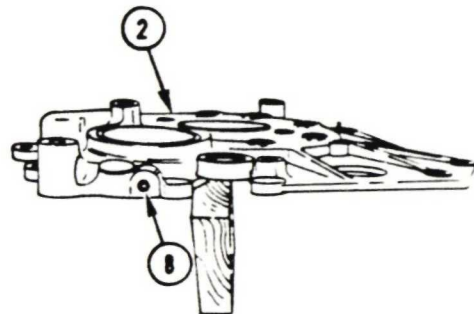
INSIDE VIEW OF SUPPORT  
BEFORE REMOVAL OF PARTS

TAM8550C



# 4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 7 OF 14)

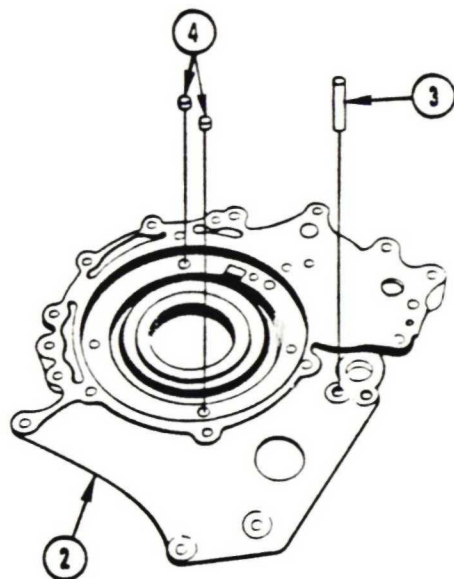
- 14 Turn support (2) over, outside up, and prop support with wooden block placed near pipe plug (8).
- 15 Using 3/16 inch hex plug end and socket handle, remove pipe plug (8) from support (2).
- 16 Check bearing bores in support for damage. Smooth out scratches with crocus cloth. If grinding damage is present, replace support.



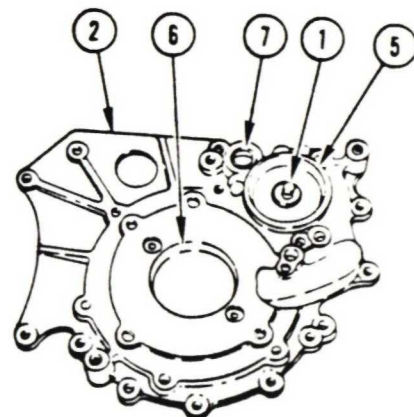
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## Assemble Right Brake Support Assembly

- 17 Apply thread locking compound to threads of pipe plug (8).
- 18 Using 3/16 inch hex plug end, install plug (8) in support (2).
- 19 Using torque wrench and adapter, tighten plug (8) to 5 lb ft (6-7 N·m).
- 20 Turn support over, inside up.
- 21 Using arbor press, install pin (3) in support (2). Press pin to a height of 3.511-3.531 inches (89.18-89.69 mm) above inner surface of support.
- 22 Using arbor press, install two pins (4) in support (2). Press pins to a height of 0.230-0.250 inch (5.84-6.35 mm) from shoulder.
- 23 Turn support (2) over, outside up.
- 24 Using arbor press, install needle bearing (7) with driver against numbered end of bearing case. Press bearing to 0.060-0.070 inch (1.52-1.78 mm) below surface of support (2).
- 25 Using arbor press, install tube coupling (1), grooved end out, into support (2). Press tube to a height of 0.620-0.660 inch (15.75-16.76 mm) above shoulder.
- 26 Apply lubricating oil and petrolatum to bearing journals for races (5, 6) on support (2).



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Go to Sheet 8

**4-20. REPAIR RIGHT END COVER COMPONENTS  
(SHEET 8 OF 14)**

**WARNING**

Frozen parts can stick to your fingers and cause serious injury. Always wear leather gloves when working with parts that have been frozen in dry ice.

27 Place bearing races (5, 6) in dry ice for 1 hour.

28 Using arbor press, install races (5, 6) in support (2). Press races to shoulder.

**FOLLOW-ON PROCEDURE:** Install right brake support. Refer to paragraph 4-21.

End of Task 4

**TASK 5. REPAIR RIGHT END COVER ASSEMBLY**

**COMMON TOOLS:**

Adapter, socket wrench, 1/2 inch to 3/8 inch square drive  
 Drill, electric, portable, 115 volt, 3/8 inch chuck  
 Drill, twist, 3/4 inch diameter flute, 3/8 inch diameter shank  
 Drill, twist, 1/4 inch diameter, straight shank (pilot drill for above)  
 Extension, socket wrench, 3/8 inch square drive, 6 inch  
 Gloves, leather  
 Grinder, rotary  
 Gun, heat (2 required)  
 Hammer, hand, ball peen  
 Handle, socket wrench, 3/8 inch square drive  
 Pliers, diagonal cutting  
 Pliers, wrench  
 Press, arbor, hand operated  
 Pry Bar, roller head (2 required)  
 Puller, bearing or gear, mechanical  
 Puller, mechanical, slide hammer type  
 Punch, center, tapered end  
 Punch, drive pin, straight  
 Socket, socket wrench, 3/8 inch square drive, 11/16 inch  
 Socket Wrench Attachment, socket head screw, 3/8 inch square drive, 3/16 inch hex plug end  
 Socket Wrench Attachment, socket head screw, 3/8 inch square drive, 5/16 inch hex plug end  
 Socket Wrench Attachment, socket head screw, 3/8 inch square drive, 1/4 inch hex plug end  
 Wrench, combination, 9/16 inch (two required)  
 Wrench, torque, 0-600 in. lb  
 Wrench, torque, 0-175 ft-lb

Go to Sheet 9

**4-20. REPAIR RIGHT END COVER COMPONENTS**  
(SHEET 9 OF 14)

**SPECIAL TOOLS:**

Installer, output and brake shaft seal (19207) 11650176

**FABRICATED TOOLS:**

Spacer, tapping insert remover, internal thread (refer to Appendix D)

**REPAIR PARTS:**

Seal, brake apply shaft (2 required) (73342) 6836137

**SUPPLIES:**

Bolt, 3/8-16 x 3 inches

Nut, 3/8-16

Washer, flat, 3/8 inch

Lubricating Oil (Item 10, Appendix C)

Petrolatum (Item 14, Appendix C)

Dry ice (Item 4, Appendix C)

Wooden Block, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)

Sealant, lubricating, thread locking (Item 16, Appendix C)

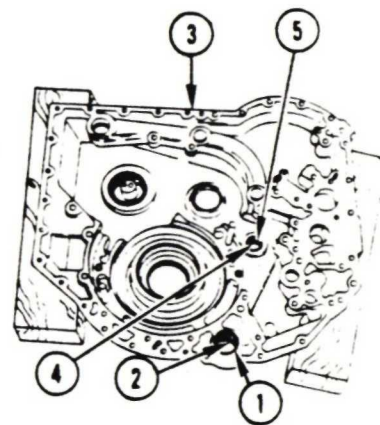
**PERSONNEL REQUIRED: 2**

- One soldier holds end cover steady.
- One soldier removes bearing race.

**PRELIMINARY PROCEDURE:** Right end cover is disassembled. Refer to paragraph 4-19.

**NOTE**

Right end cover is mounted on two wooden blocks, inside up.

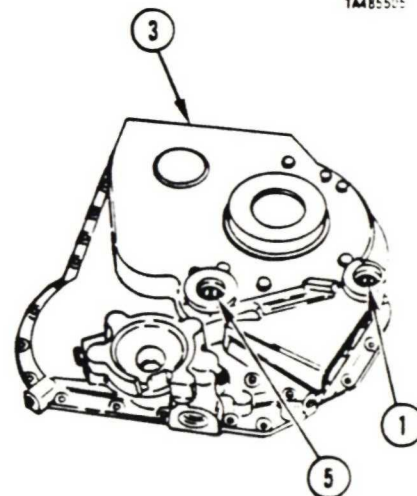


TM 85506

**Disassemble Right End Cover Assembly**

- 1 Insert pin punch in left brake apply shaft bore beyond bearing (1) so that edge of punch is seated behind edge of seal (2).
- 2 Using hammer and pin punch, drive seal (2) from bore in right end cover (3).
- 3 Using hammer and pin punch, drive seal (4) from beyond bearing (5) in right brake apply cam shaft bore.
- 4 Turn right end cover (3) over, outside up.
- 5 Using bearing puller, remove bearings (1, 5) from end cover (3).

Go to Sheet 10



TM 85506



#### 4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 10 OF 14)

- 6 Turn end cover (3) over, inside up, without wood blocks.

##### WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

##### NOTE

Steer idler gear bearing (6) consists of cage and outer race. Inner race remained on gear.

- 7 Using two heat guns, heat end cover (3) around bearing (6). Heat for one hour to approximately 300°F (149°C).  
8 Using bearing puller, remove bearing (6).

##### CAUTION

Use care not to cut into end cover when using grinder to cut slots into bearing race.

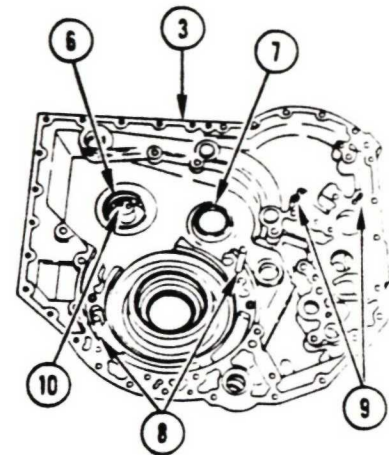
- 9 Using grinder, cut two slots 180 degrees apart at base of bearing race (7). Offset slots slightly so that pry bars will overlap. Cut slots deep enough to catch the lip of the pry bar, but not deep enough to cut into end cover.  
10 Using two heat guns, heat end cover around bearing race (7) for 15 minutes.  
11 Using two pry bars in slots, loosen bearing race (7).

##### CAUTION

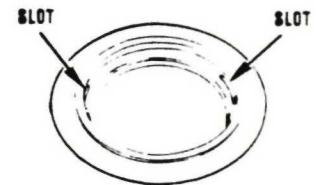
Use care not to damage end cover when using pry bars to remove race.

- 12 Reposition two pry bars under bearing race (7) and remove race.  
13 Using wrench pliers, remove two long brake reaction pins (8) from end cover (3).  
14 Using wrench pliers, remove two dowel pins (9) from end cover (3).  
15 Using diagonal cutting pliers, pinch spring pin (10) just enough to hold onto pin. Tilt tip of pliers onto boss and use leverage to extract pin.

Go to Sheet 11



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4-20. REPAIR RIGHT END COVER COMPONENTS  
(SHEET 11 OF 14)

- 16 Using center punch and hammer, punch a dimple in center of two plugs (11).

**CAUTION**

Carefully drill through plugs (11) and stop drilling when drill pierces plug. Clearance between bottom of plug and housing is approximately one inch.

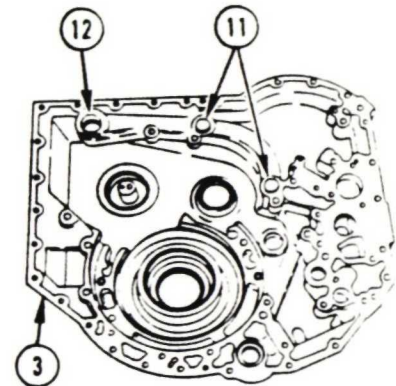
- 17 Using 1/4 inch drill, put hole through center of plugs (11).  
18 Using 3/4 inch drill, widen hole in center of plugs (11).  
19 Using slide hammer, remove plugs (11) from end cover (3).  
20 Tilt end cover (3) on edge with plugs (11) holes down.

**WARNING**

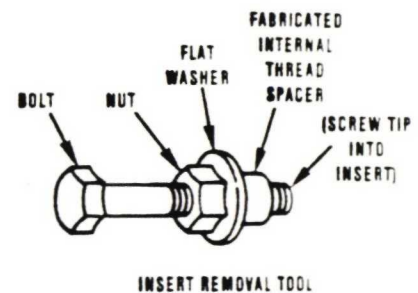
Compressed air used for cleaning purposes will not exceed 30 pounds per square inch in pressure. To avoid injury, use with effective chip-guarding and personal protective equipment (goggles, face shield, gloves, etc.). Never point a compressed air hose toward another person.

- 21 Using compressed air, put air hose at port (12) and then at plug (11) holes to blow out all aluminum particles.  
22 Position end cover on wooden blocks, inside up.  
23 Using 3/8-16 x 3 inch bolt, 3/8-16 nut, 3/8 inch flat washer and fabricated spacer, assemble tool to remove four inserts (13) from end cover (3).  
24 Screw tip of bolt into one insert (13) in end cover (3).  
25 Using one 9/16 inch combination wrench, lock nut against washer and hold nut so that insert (13) will turn with bolt.  
26 Using other 9/16 inch combination wrench, turn bolt to the left (counterclockwise) and remove insert (13).  
27 Remove three remaining inserts (13).

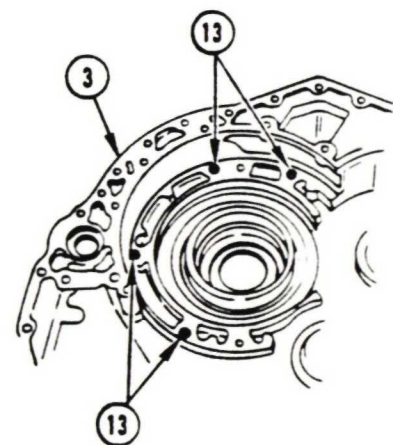
Go to Sheet 12



TAB5509



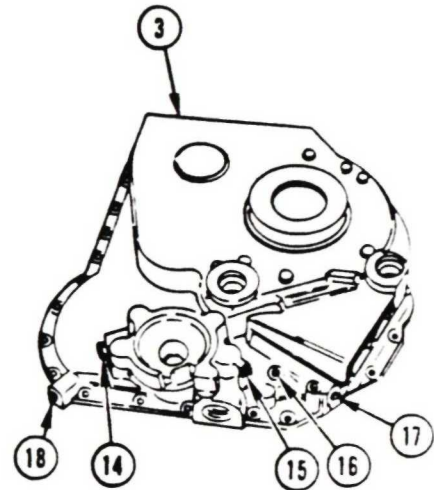
TAB5510



TAB5511

#### 4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 12 OF 14)

- 28 Turn end cover (3) over, outside up.
- 29 Using 11/16 inch socket, remove 3/8 inch pipe plug (14).
- 30 Using 3/16 inch hex plug socket attachment, remove three 1/8 inch pipe plugs (15, 16).
- 31 Using 1/4 inch hex plug socket attachment, remove 1/4 inch pipe plug (17).
- 32 Using 5/16 inch hex plug socket attachment, remove 3/8 inch pipe plug (18).
- 33 Check end cover bearing bore for damage. Smooth out scratches with crocus cloth. If grinding damage is present, replace end cover.



TAM85512

#### Assemble Right End Cover Assembly

- 34 Apply thread locking sealant to pipe plugs (14, 15, 16, 17, 18).
- 35 Using 5/16 inch hex plug socket attachment, install 3/8 inch pipe plug (18) in end cover (3).
- 36 Using torque wrench, tighten plug (18) to 12-16 lb ft (16-22 N·m).
- 37 Using 1/4 inch hex plug socket attachment, install 1/4 inch pipe plug (17).
- 38 Using torque wrench, tighten plug (17) to 96-120 lb in. (11-13 N·m).
- 39 Using 3/16 inch hex plug socket attachment, install pipe plugs (15, 16) in end cover (3).
- 40 Using torque wrench, tighten plugs (15, 16) to 50-60 lb in. (6-7 N·m).
- 41 Using 11/16 inch socket, install 3/8 inch pipe plugs (14) in end cover (3).
- 42 Using torque wrench, tighten plug (14) to 12-16 lb ft (16-22 N·m).

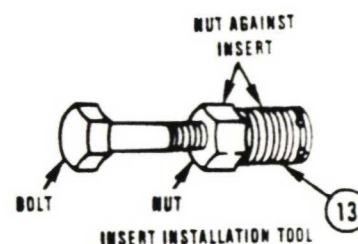
Go to Sheet 13



# 4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 13 OF 14)

43 Turn end cover (3) over, inside up.

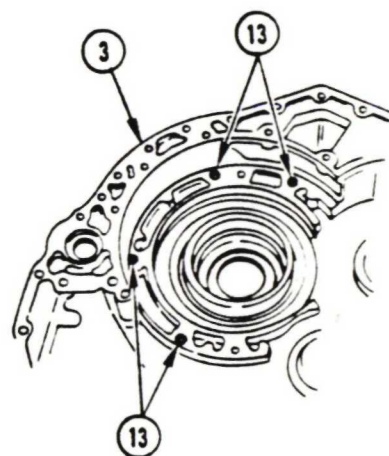
44 Using 3/8-16 x 3 inch bolt and 3/8-16 nut, assemble tool to install four inserts (13) in end cover (3).



TAM85513

45 Screw one insert (13) onto bolt until insert is against nut.

46 Using 9/16 inch combination wrench on bolt, install insert (13) in end cover (3) to 0.005-0.062 inch (0.127-0.157 mm) below surface of housing.



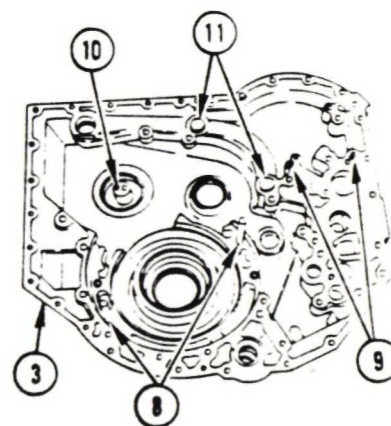
47 Using 9/16 inch combination wrench, install three remaining inserts (13) in end cover (3).

48 Using arbor press, install aluminum plugs (11) flush to 0.010 inch (0.254 mm) below surface of end cover (3).

TAM85514

49 Using hammer, install spring pin (10) in boss on end cover (3). Press to height of 0.100-0.140 inch (2.540-3.556 mm) above surface.

50 Using arbor press, install two dowel pins (9) in end cover (3). Press to height of 0.340 inch (8.636 mm) above surface.



TAM85515

51 Using arbor press, install two long brake reaction pins (8) in end cover. Press to height of 3.100-3.140 inches (78.740-79.756 mm) above surface.

Go to Sheet 14

#### 4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 14 OF 14)

##### WARNING

Frozen parts can stick to your fingers and cause serious injury. Always wear leather gloves when working with parts that have been frozen in dry ice.

- 52 Using dry ice, freeze bearing (6) and race (7).
- 53 Apply petrolatum and lubricating oil to bearing (6) housing in end cover (3).
- 54 Using arbor press, install bearing (6) in end cover (3). Press bearing to shoulder.
- 55 Apply petrolatum and lubricating oil to race (7) housing in end cover (3).
- 56 Using arbor press, install race (7) in end cover (3). Press race until seated in end cover.
- 57 Turn end cover (3) over, outside up.
- 58 Apply petrolatum and lubricating oil to outer diameter of two bearings (1, 5).

##### NOTE

Press bearings with driver against numbered side of bearings.

- 59 Using arbor press, install two brake apply shaft bearings (1, 5) in end cover (3). Press bearings 0.030-0.040 inch (0.762-1.016 mm) in from seal (2, 4) shoulder.

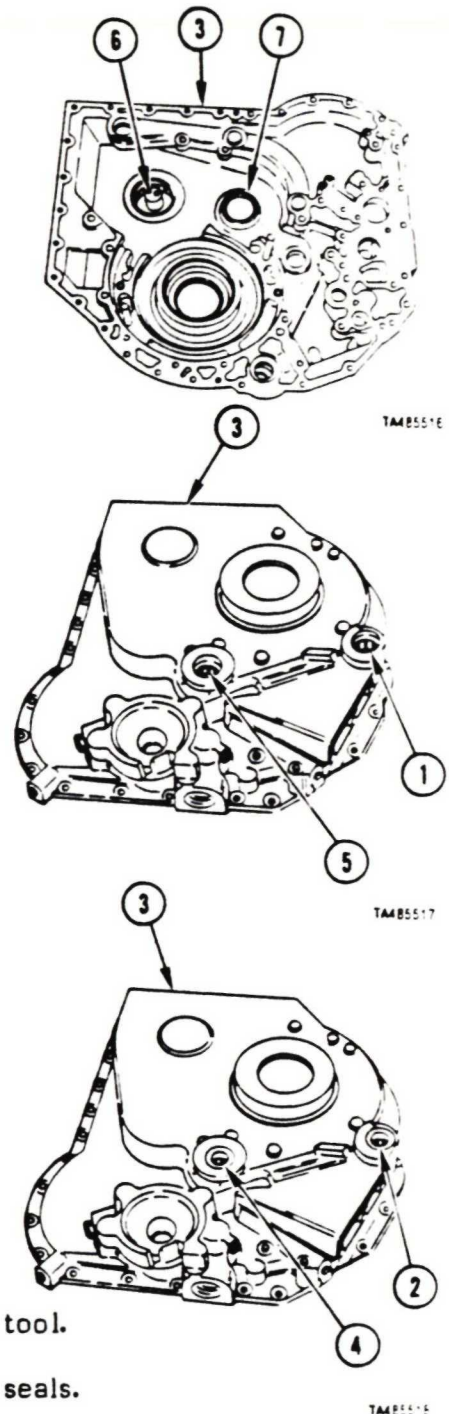
##### NOTE

- Install seal with numbered side of seal against installer tool.
- Small end of installer tool is used for brake apply shaft seals.
- Seal contains dry type sealer on outer edge.

- 60 Using seal installer tool and hammer, install seals (2, 4) in end cover (3). Drive seals to 0.080 inch (2.032 mm) below surface of end cover.

**FOLLOW-ON PROCEDURE:** Assemble right end cover. Refer to paragraph 4-21.

End of Task 5



4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 1 OF 22)

Task	Title	Page
1	Install RH Output Shaft and Seal	4-126
2	Install Steer Gears	4-129
3	Install Right Brake Assembly	4-130
4	Install Right Brake Support Assembly, Brake Apply Cam and Brake Adjusting Links	4-134
5	Install Brake Coolant Valve Components	4-142
6	Install Brake Apply Regulator Valve Components	4-143
7	Install Left Brake Apply Shaft, Right and Left Brake Apply Indicators	4-144
8	Install RH Output Flange	4-146

**WARNING**

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Right end cover weighs approximately 125 pounds (57 kg). When lifting end cover, a hoist must be used to avoid bodily injury.

**TASK 1. INSTALL RH OUTPUT SHAFT AND SEAL**

**COMMON TOOLS:**

Gun, heat  
Hammer, hand, ball peen  
Hammer, hand, plastic faced  
Press, arbor, hand operated  
Screwdriver, flat tip

**SPECIAL TOOLS:**

Installer, output and brake shaft seal (19207) 11650176

**SUPPLIES:**

Oil, lubricating (Item 10, Appendix C)  
Petrolatum (Item 14, Appendix C)  
Wooden Blocks, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)  
Rag, wiping (Item 15, Appendix C)  
Solvent, dry cleaning (Item 8, Appendix C)

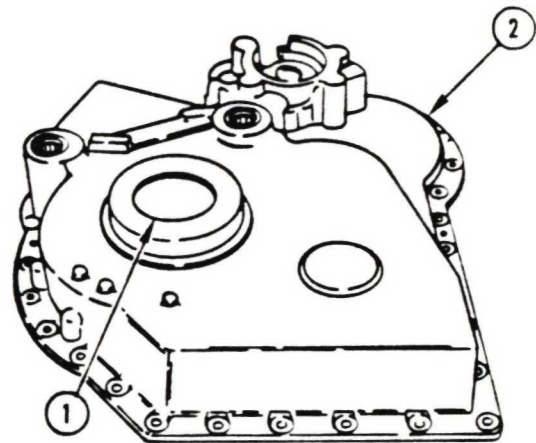
Go to Sheet 2



#### 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 2 OF 22)

##### **WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 138°F (50°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.



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#### Install Output Shaft Seal

- Using wiping rag and solvent, clean output shaft bore (1) in right end cover (2).

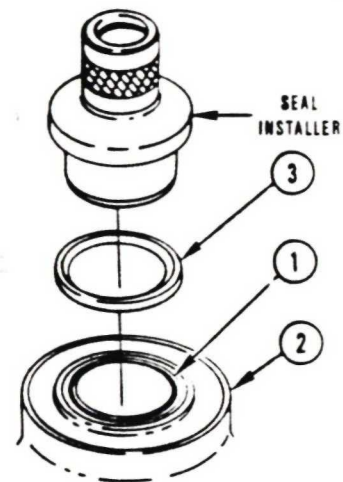
##### **CAUTION**

Do not reuse output shaft seal after it has been removed. Removal of seal destroys dry sealant on outer edge of seal.

##### **NOTE**

- Seal installed numbered side out.
- No lubricant to be added to outer edge of seal.

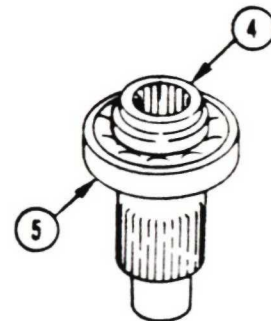
- Using seal installer and ball peen hammer, install seal (3) in bore (1). Seat seal flush to 0.010 inch (0.254 mm) below surface of end cover (2).



TAA85520

#### Install Bearing and Sleeve on RH Output Shaft

- Apply petrolatum and lubricating oil to bearing journal of RH output shaft (4).
- Using arbor press, install bearing (5), numbered end out, on output shaft (4). Press bearing to shoulder.



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Go to Sheet 3

4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 3 OF 22)

**WARNING**

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

- 5 Using heat gun, heat sleeve (6) for 30 minutes to approximately 250°F (121°C).
- 6 Using arbor press, install sleeve (6) on output shaft (4) with inside beveled edge on first. Press sleeve to bearing (5).
- 7 Turn right end cover (2) over, inside up, on wood blocks.
- 8 Apply a thin coat of petrolatum to inner surface of seal (3).

Install RH Output Shaft

- 9 Start short end of output shaft (4) into seal (3). Rotate shaft while pushing end of shaft through seal.
- 10 Turn housing over and check that seal (3) remains in position in end cover (2), and that lip on seal is not distorted when shaft (4) passes through seal.

**NOTE**

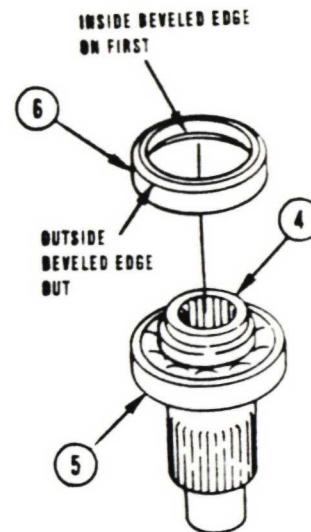
When output shaft and bearing are seated, retaining ring groove will be accessible in sleeve at outer edge of bearing.

- 11 Use plastic faced hammer on end of shaft (4) to seat bearing (5) in shoulder on end cover (2).
- 12 Using screwdriver, install retaining ring (7) in groove in sleeve above bearing (5).
- 13 Apply lubricating oil to bearing (5).

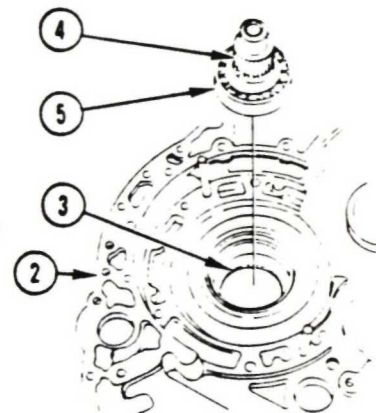
**FOLLOW-ON PROCEDURE:** Install steer gears. Refer to this paragraph, TASK 2.

End of Task 1

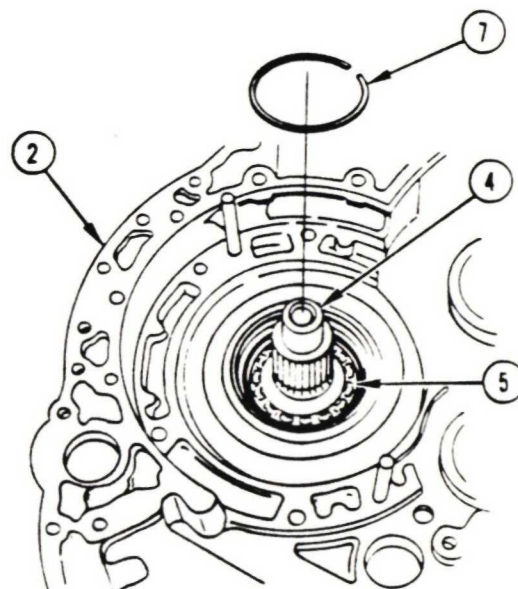
Go to Sheet 4



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## 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 4 OF 22)

### TASK 2. INSTALL STEER GEARS

#### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Press, arbor, hand operated  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Wrench, torque, 0-175 ft-lb

#### SUPPLIES:

Oil, lubricating (Item 10, Appendix C)  
Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURE:** Install RH output shaft  
and seal. Refer to this paragraph, TASK 1.

#### NOTE

Right end cover turned inside up.

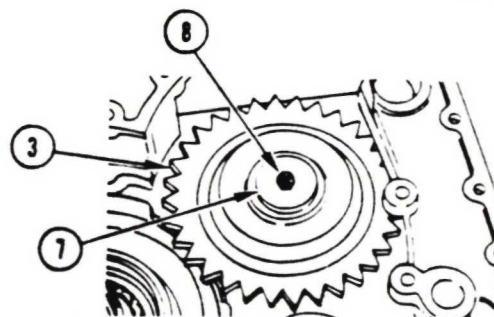
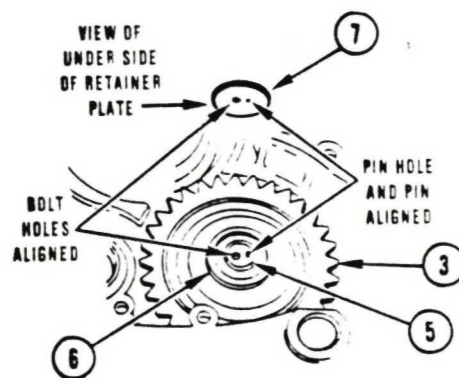
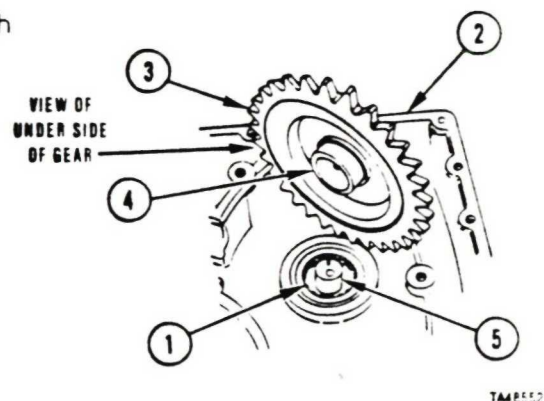
- 1 Apply lubricating oil to bearing (1) located in right end cover (2) beneath steer idler gear (3).
- 2 Install gear (3) with journal (4) around boss (5) and in bearing (1).
- 3 Install bronze thrust washer (6) in top center recess in gear (3).

#### NOTE

Bolt hole and pin hole in steer idler retainer plate are off center. Rotate plate to seat pin in pin hole before installing bolt.

- 4 Install steer idler retainer plate (7) on boss (5) in center of gear (3).
- 5 Using socket, install bolt (8) in plate (7).
- 6 Using torque wrench, tighten bolt (8) to 36-43 lb-ft (49-58 N·m).

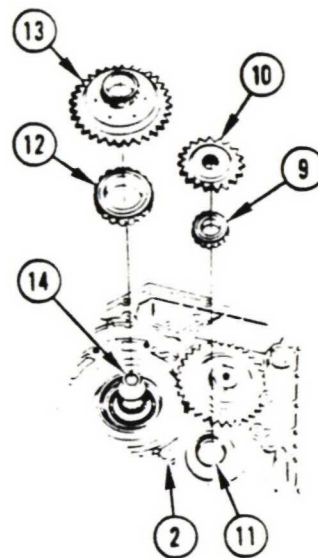
Go to Sheet 5





4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 5 OF 22)

- 7 If bearing (9) was removed, apply lubricating oil and petrolatum to bearing journal located on under side of range steer gear (10).
- 8 If bearing (9) was removed, install new bearing (9) on gear (10) using arbor press. Press bearing to shoulder.
- 9 Apply lubricating oil to bearing (9).
- 10 Install gear (10) in end cover (2) with bearing (9) in outer race (11).
- 11 If bearing (12) was removed, apply lubricating oil and petrolatum to bearing journal located on under side of RH steer driven gear (13).
- 12 If bearing (12) was removed, install new bearing (12) on gear (13). Press bearing to shoulder.
- 13 Apply lubricating oil to bearing (12).
- 14 Install gear (13) on RH output shaft (14), bearing (12) down.



TM 9-2520

**FOLLOW-ON PROCEDURE:** Install right brake assembly. Refer to this paragraph, TASK 3.

End of Task 2

**TASK 3. INSTALL RIGHT BRAKE ASSEMBLY**

**COMMON TOOLS:**

- Extension, socket wrench, 1/2 inch square drive, 10 inch
- Hammer, hand, plastic faced
- Handle, socket wrench, 1/2 inch square drive
- Screwdriver, small, flat tip
- Socket, socket wrench, 1/2 inch square drive, 9/16 inch
- Wrench, torque, 0-175 ft-lb

**SUPPLIES:**

- Bands, rubber (2 required) (Item 1, Appendix C)
- Oil, lubricating (Item 10, Appendix C)
- Petrolatum (Item 14, Appendix C)
- Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURE:** Steer gears installed. Refer to this paragraph, TASK 2.

Go to Sheet 6

#### 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 6 OF 22)

##### NOTE

- Right end cover turned inside up.
- Brake clutch backing plate is to be installed with part number, surface downward.

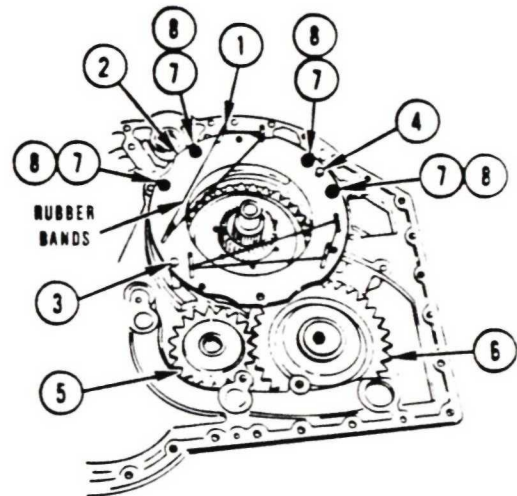
- 1 Install six spring retaining pins (1) in brake clutch backing plate (2).
- 2 Using rubber bands, fix pins (1) in position on plate (2).

##### NOTE

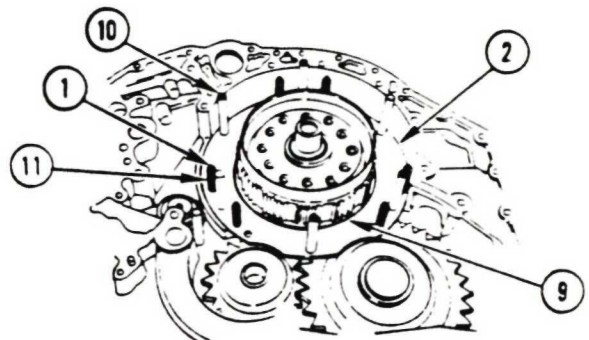
Plate (2) may be wiggled as necessary to move it down on pins (3, 4). Plate may be tapped with plastic faced hammer near pins to seat plate.

- 3 Install plate (2) on brake reaction pins (3, 4) so that recesses in edge of plate accommodate range steer gear (5) and steer idler gear (6).
- 4 Using 9/16 inch socket, install four bolts (7) and washers (8) on plate (2).
- 5 Using torque wrench, tighten bolts (7) to 36-43 lb-ft (49-58 N·m).
- 6 Install seal ring (9) on inside edge of plate (2).
- 7 Install four short brake reaction pins (10) in holes in plate (2).
- 8 Install six springs (11) on pins (1).

Go to Sheet 7



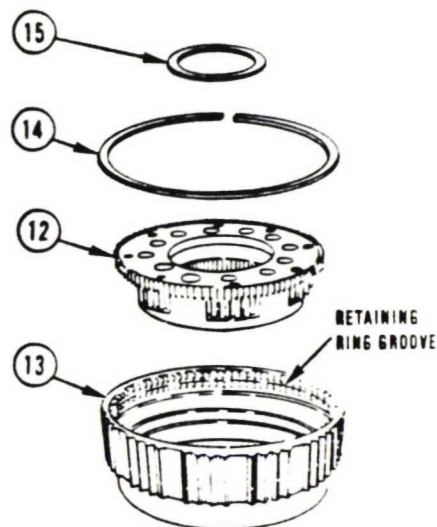
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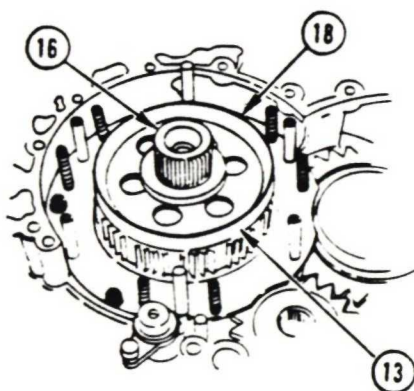
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4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 7 OF 22)

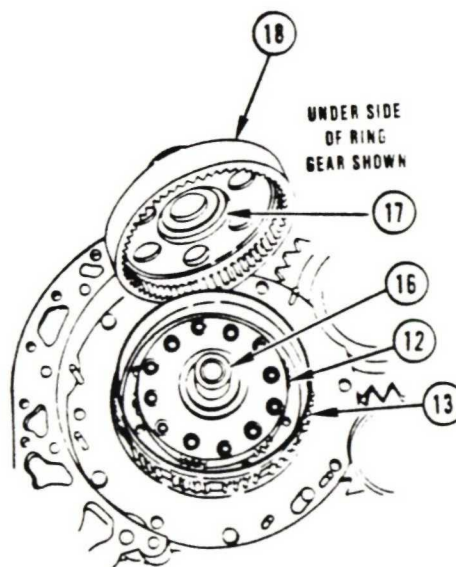
- 9 Install output carrier assembly (12) in brake clutch drum (13).
- 10 Using screwdriver, install retaining ring (14) in inside groove of drum (13) to hold carrier (12) in drum.
- 11 Apply petrolatum to thrust washer (15).
- 12 Install thrust washer (15) in center of carrier assembly (12).
- 13 Install carrier (12) and drum (13) assembly on output shaft (16).
- 14 Apply petrolatum to thrust washer (17).
- 15 Install thrust washer (17) in under side of steer ring gear assembly (18).
- 16 Install steer ring gear assembly (18) in drum (13) and over output shaft (16).



TAB 85531



TAB 85532



TAB 85533

Go to Sheet 8



#### 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 8 OF 22)

##### CAUTION

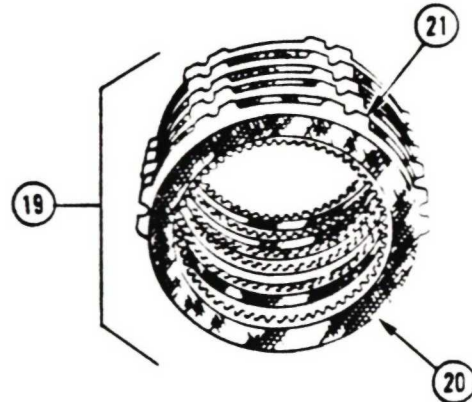
Unless the brake clutch pack is new, keep all clutch and reaction disks in the same order and facing the same way. When one disk is to be replaced, replace the entire clutch pack. Each used disk has established its own contour and wear pattern. The clutch assembly may not operate effectively because disks in the pack may have poor surface contact when:

- A disk is turned over.
- Disk positions in the pack are changed.
- A new disk is inserted.

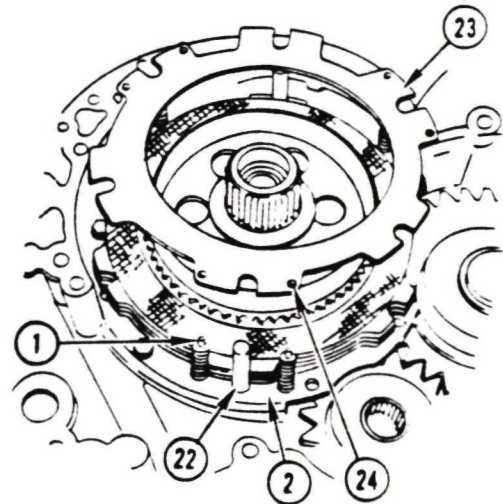
##### NOTE

Brake clutch pack (19) consisting of six internally splined clutch disks (20) and five clutch reaction disks (21) should be immersed in transmission oil for a minimum of two minutes before installing the pack.

- 17 Soak brake clutch pack (19) in transmission oil.
- 18 Install one internally splined clutch disk (20) on brake clutch backing plate (2).
- 19 Install one clutch reaction disk (21) with six notched external projections around six large pins (22).
- 20 Alternately install splined clutch disk (20) and clutch reaction disk (21) until six splined clutch disks and five clutch reaction disks have been installed.
- 21 Install end clutch reaction disk (23) so that ends of six spring retaining pins (1) are through six pin holes (24) in disk.



TAM85534



TAM85534

Go to Sheet 9

**4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 9 OF 22)**

- 22 Using one hand, press down on end of clutch reaction disk (23) near one of six spring retaining pins (1) so that grooved end of pin is above plate.
- 23 Using screwdriver in other hand, install an external retaining ring (24) on end of pin (1). Install retaining rings on five remaining pins.
- 24 Apply petrolatum to washer (25).
- 25 Install washer (25) on right end cover (26) over bearing (27).
- 26 Apply lubricating oil to bearings (27, 28).

**FOLLOW-ON PROCEDURE:** Install right brake support assembly. Refer to this paragraph, TASK 4.

End of Task 3

**TASK 4. INSTALL RIGHT BRAKE SUPPORT ASSEMBLY,  
BRAKE APPLY CAM AND BRAKE  
ADJUSTING LINKS**

**COMMON TOOLS:**

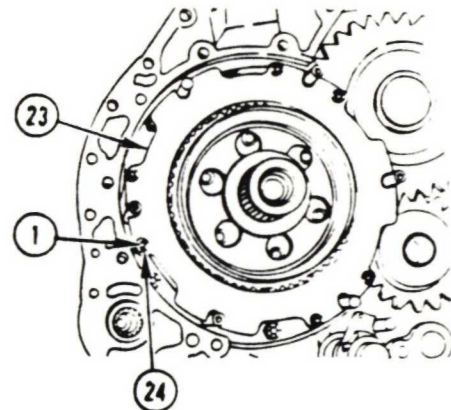
Extension, socket wrench, 1/2 inch square drive, 6 inch  
Hammer, hand, plastic faced  
Handle, socket wrench, 1/2 inch square drive  
Pliers, retaining ring, external  
Screwdriver, flat tip  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Socket, socket wrench, 1/2 inch square drive, 5/8 inch  
Socket, socket wrench, 1/2 inch square drive, 7/16 inch  
Vise, machinist's  
Wrench, torque, 0-175 ft-lb

**SUPPLIES:**

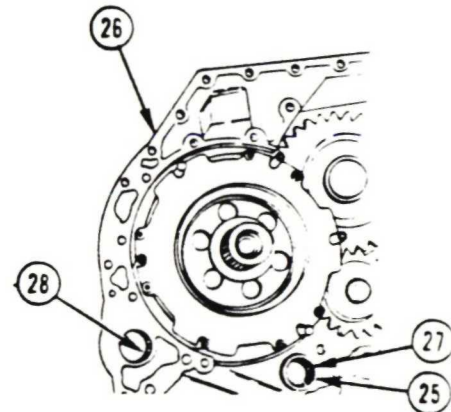
Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)  
Oil, lubricating (Item 10, Appendix C)  
Wooden Blocks, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)  
Tape, masking (Item 20, Appendix C)

**PRELIMINARY PROCEDURE:** Right brake assembly is installed. Refer to this paragraph, TASK 3.

Go to Sheet 10



TAM 85536

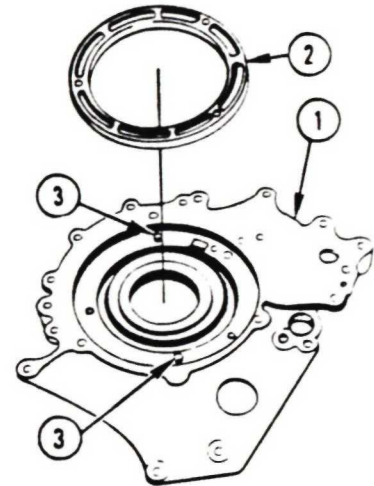


TAM 85537

#### 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 10 OF 22)

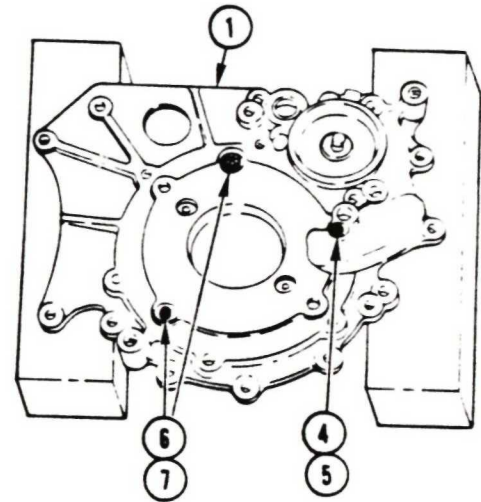
##### Install Stationary Cam and Seal Retainer

- 1 Turn right brake support assembly (1), inside upward.
- 2 Install brake stationary cam (2) on two pins (3) in brake support (1).
- 3 Using plastic faced hammer, tap stationary cam (2) onto pins (3) until cam is seated.



T4485536

- 4 Turn support (1) over, outside up and place on wooden blocks.
- 5 Using 1/2 inch socket, install one 5/16-18 x 2 inch bolt (4) and washer (5).
- 6 Using 1/2 inch socket, install two 5/16-18 x 1 inch bolts (6) and washers (7).
- 7 Using torque wrench, tighten three bolts (4, 6) to 17-20 lb-ft (23-27 N·m).



T4485539

Go to Sheet 11

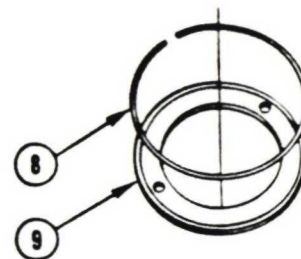
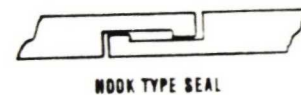


4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 11 OF 22)

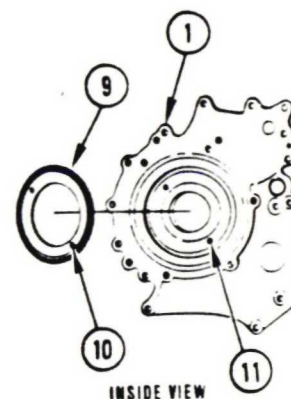
- 8 Turn support (1) over.
- 9 Install hook-type metal seal ring (8) onto retainer (9).

NOTE

Petrolatum applied to a hook type seal ring can reduce the possibility of breakage by helping the seal ring move into place with less friction.



TAM8554C



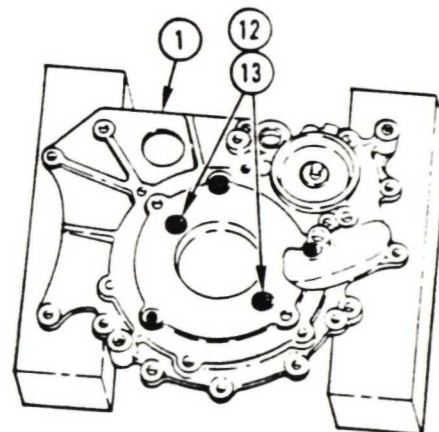
TAM8554C

- 12 Install retainer (9), flat side toward support (1) with retainer bolt holes (10) and support bolt holes (11) aligned.

- 13 Using fingers, start two washers (12) and bolts (13) into support (1).

- 14 Using 7/16 inch socket and torque wrench, tighten bolts (13) to 10-12 lb-ft (14-16 N·m).

- 15 Turn support (1) over and place on wooden blocks.



TAM8554C

Go to Sheet 12

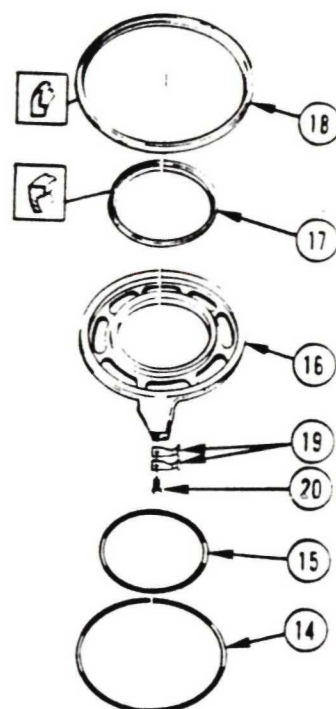
# 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 12 OF 22)

## Assemble Brake Apply Cam Components

- 16 Install preformed packings (14, 15) into face of cam (16).

### **CAUTION**

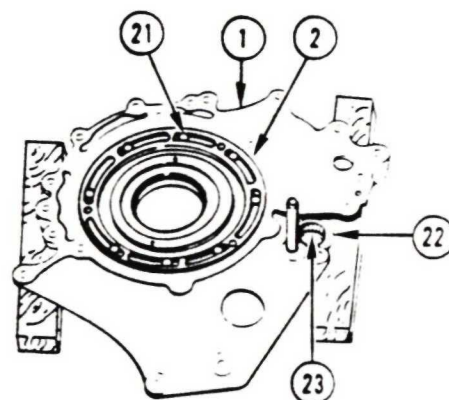
Be sure packings (17, 18) are installed with seal lips in direction shown in illustration. If packings are not installed properly, components will not function properly.



TAM85543

- 17 Install packing (17), seal lip downward, in cam (16).  
18 Install packing (18), seal lip upward, in cam (16).  
19 Coat packings (14, 15, 17, 18) with petrolatum.  
20 Hold two spring tension clips (19) in place on brake cam (16) in position shown in illustration.  
21 Using 7/16 inch socket, install bolt (20) to retain clips (19).  
22 Using torque wrench, tighten bolt (20) to 108-132 lb-in. (12-15 N·m).

## Assemble Brake Apply Cam on Support



TAM85544

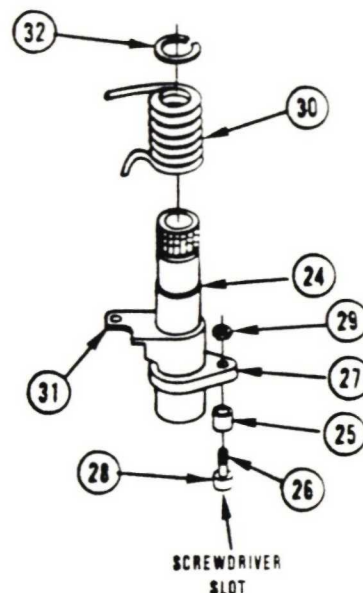
- 23 Place support assembly (1), inside surface upward, on wooden blocks.  
24 Install eight balls (21) in lowest areas of ramps on stationary cam (2).  
25 Apply petrolatum to balls (21) and in ramps around balls.  
26 Apply petrolatum to beveled thrust washer (22) and install washer on support (1) over bearing (23).  
27 Apply lubricating oil to bearing (23) and run finger over bearing until all rollers are wet.

Go to Sheet 13

# 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 13 OF 22)

## Assemble Right Brake Apply Cam Shaft Components

- 28 Install right brake apply cam shaft (24) in soft jaw vise.
- 29 Install spacer (25) on cam follower shaft (26).
- 30 Place threaded end of cam follower shaft (26) through lobe (27) with cam follower (28) on side of lobe opposite splined end of shaft (24).
- 31 Using fingers, install locknut (29) on cam follower shaft (26).
- 32 Hold screwdriver tip in slot at center of cam follower (28) to prevent cam follower shaft (26) from turning.



### NOTE

When installing nut (29) using torque wrench, look at prevailing torque (run-in torque) reading on torque wrench as nut turns.

- 33 Using torque wrench, install locknut (29) on cam follower shaft (26). Determine torque.

### CAUTION

Cam follower roller (28) must turn after final tightening of locknut. If roller locks, parts will wear rapidly and brake apply valve/ brake apply cam shaft action may be impaired.

- 34 Using torque wrench, tighten nut (29) to 8-10 lb-ft (11-14 N·m) plus prevailing torque (run-in torque).
- 35 Check cam follower roller (28) to be sure it turns.
- 36 Remove brake apply cam shaft (24) from vise.
- 37 Install spring (30) on brake apply cam shaft (24) with curved end of spring on first.
- 38 Install curved end of spring (30) in cam arm (31).
- 39 Using retaining ring pliers, install retaining ring (32) on shaft (24) to retain spring (30).

Go to Sheet 14



# 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 14 OF 22)

Install Right Brake Apply Cam Shaft in Support

## NOTE

End of brake apply cam shaft (24) opposite splined end goes into support (1).

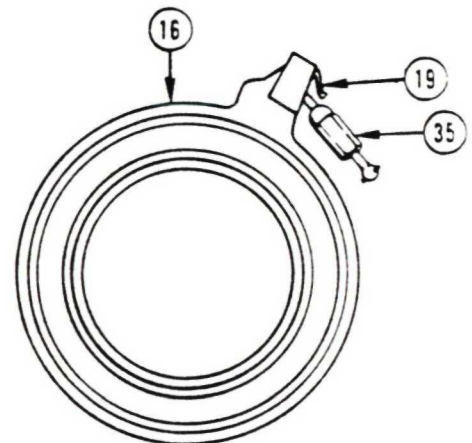
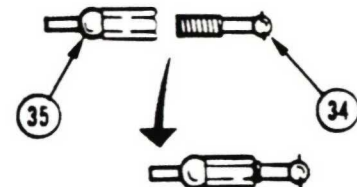
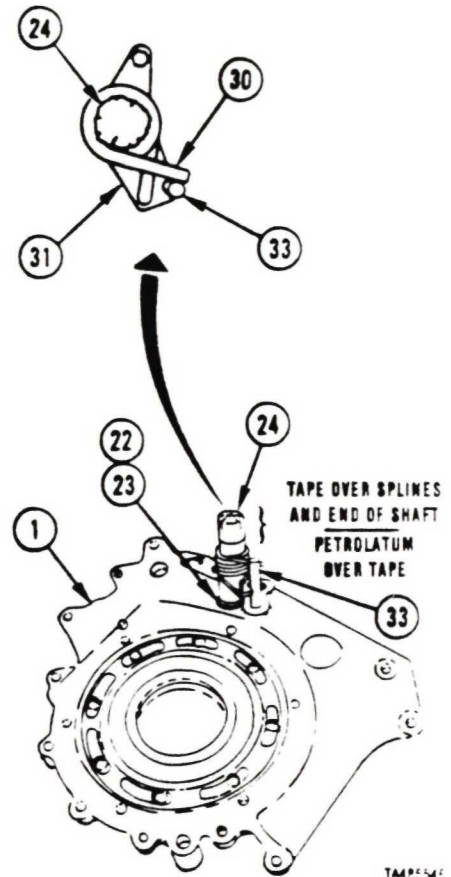
- 40 Install right brake apply cam shaft (24) through beveled thrust washer (22) and into needle bearing (23) so that straight end of spring (30) and cam arm (31) are on opposite sides of long brake reaction pin (33).
- 41 Using plastic faced hammer, tap end of shaft (24) as necessary to seat shaft in support (1).
- 42 Clean splined end of right brake apply cam shaft (24).

## CAUTION

Protective material, such as masking tape, must cover splines when shaft (24) goes through right end cover. If shaft goes through seal without protection, splines on shaft will damage seal.

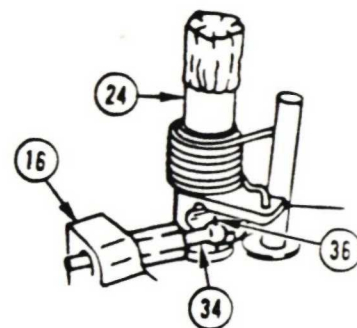
- 43 Wrap tape over splines and end of shaft (24).
- 44 Apply petrolatum over tape on shaft (24).
- 45 Install inner brake adjusting link (34) into outer brake adjusting link (35). Turn links until threads on inner link cannot be seen.
- 46 Install small end of outer brake adjusting link (35) in brake apply cam (16) so that flat on link body is against free end of spring tension clip (19).

Go to Sheet 15

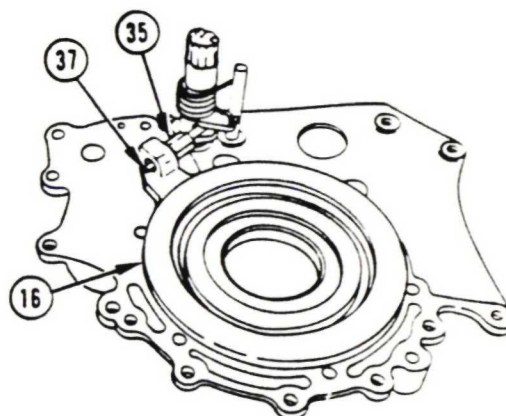


4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 15 OF 22)

- 47 Install apply cam (16) while installing ball end of inner brake adjust link (34) in pocket of right brake apply cam shaft (24) so that pin (36) is in retaining slot.
- 48 Push ball end of link (34) into cam shaft (24) pocket as far as ball will go.
- 49 Turn brake apply cam (16) to the right (clockwise) until the projection on the cam bottoms against the outer brake adjust link (35) and the cam will turn no further.
- 50 Place one hand on brake apply cam (16) and apply a small amount of downward force.
- 51 Using screwdriver in other hand, turn slotted tip (37) of outer brake adjust link (35) to the left (counter-clockwise) until tension is felt on the screwdriver, then continue to turn screwdriver 1/2 to 3/4 of a turn.
- 52 Place right end cover (38) on wooden blocks, inside of cover up.



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**CAUTION**

When pushing brake apply shaft through seal, be sure that spring in seal stays in place. Put one hand on outside of end cover, over the brake apply shaft bore, and run a finger around the spring in the seal to keep the spring in place while the end of the shaft comes through. If the spring does not remain in its proper position, the seal will leak.

**NOTE**

When installing support assembly on right end cover assembly, the following alignments should be checked:

- Splined (taped) end of right brake apply cam shaft goes through washer on right end cover and into needle bearing.
- Three long brake reaction pins go into pin holes in support.
- Four short brake reaction pins go into pin holes in support.

Go to Sheet 16

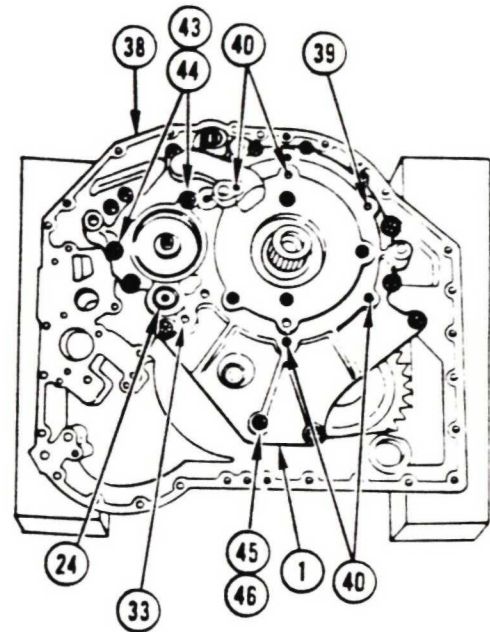
# 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 16 OF 22)

- 53 Turn support assembly (1) over, outside up, and position support on right end cover (38).
- 54 Check that long brake reaction pins (33, 39) and short brake reaction pins (40) are at pin holes.
- 55 Place one hand on outside of right end cover (38) over right brake apply cam shaft (24) bore and run finger around and over spring (41) in seal (42) until taped end of brake apply cam shaft (24) comes through seal.
- 56 While pushing down on brake support assembly (1), gently rock support until it slides down over pins (33, 39, 40). Support assembly (1) is properly installed when there is about 1/8 inch gap between support (1) and end cover (38).
- 57 Using 5/8 inch socket, install two 7/16-14 x 1-3/4 inch bolts (43) and washers (44) in support (1).
- 58 Using 5/8 inch socket, install twelve 7/16-14 x 1-1/2 inch bolts (45) and washers (46) around perimeter of support (1).
- 59 Using torque wrench, tighten bolts (43, 45) evenly to 54-65 lb-ft (73-88 N·m).

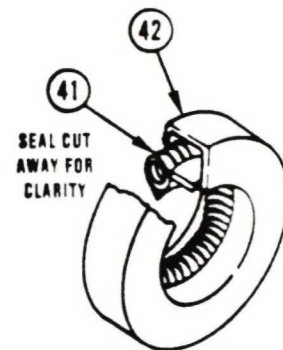
**FOLLOW-ON PROCEDURE:** Install brake coolant valve components. Refer to this paragraph, TASK 5.

End of Task 4

Go to Sheet 17



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TAM 8555



4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 17 OF 22)

TASK 5. INSTALL BRAKE COOLANT VALVE COMPONENTS

COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Wrench, torque, 0-175 ft-lb

SUPPLIES:

Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)

NOTE

Right end cover turned inside up.

- 1 Install seal ring (1) on brake coolant valve stem (2).
- 2 Apply petrolatum on seal ring (1).
- 3 Install valve stem (2) in bore of end cover (3) housing, large end first. Push stem until it bottoms in bore.
- 4 Install coolant valve (4) on valve stem (2) with small diameter or shoulder of valve out.
- 5 Install large spring (5) on valve stem (2).

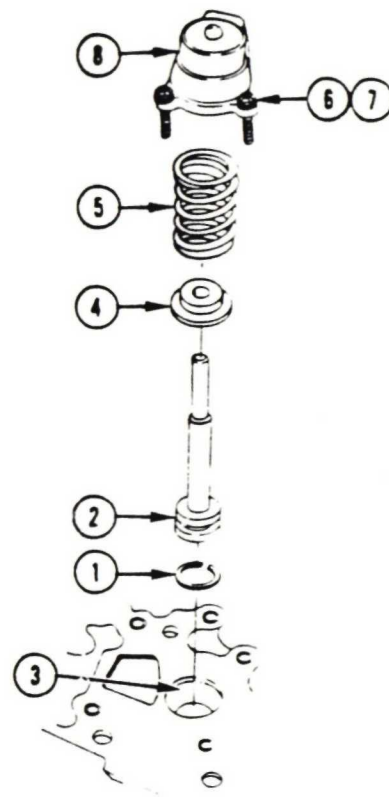
**WARNING**

Spring-loaded parts can fly and injure you.  
Always follow specified instructions when  
installing covers to valve assemblies.

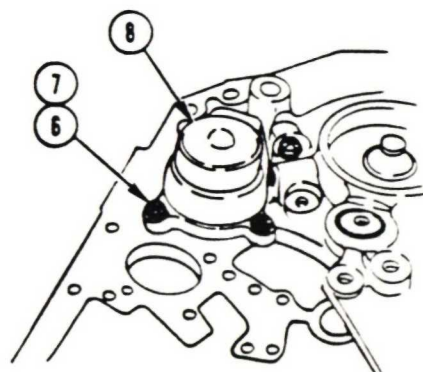
- 6 Install three bolts (6) and washers (7) on valve body (8).
- 7 Install body (8) on spring (5) and hold body firmly down while starting bolts (6) with fingers.
- 8 Using socket, tighten bolts (6) and washers (7) on body (8).
- 9 Using torque wrench, tighten bolts (6) to 17-20 lb-ft (23-27 N·m).

End of Task 5

Go to Sheet 18



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# 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 18 OF 22)

## TASK 6. INSTALL BRAKE APPLY REGULATOR VALVE COMPONENTS

### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Gage, thickness (containing one blade 0.025 inch thick)  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Wrench, torque, 0-175 ft-lb

### SUPPLIES:

Lubricating Oil (Item 10, Appendix C)  
Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURE:** Right brake support assembly is installed. Refer to procedure TASK 4.

### NOTE

Right end cover assembly is turned inside up.

- 1 Install spring (1) on brake apply regulator valve assembly (2).

### NOTE

Valve must move freely in body by its own weight.

- 2 Apply lubricating oil to valve assembly (2).
- 3 Install spring (1) and regulator valve assembly (2) in brake apply body assembly (3).

### WARNING

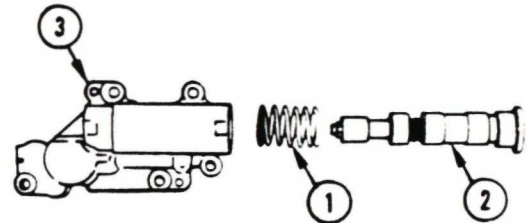
Spring-loaded parts can fly and injure you.  
Always follow specified instructions when installing covers to valve assemblies.

- 4 Push valve assembly (2) through body (3) so that nut (4) on end of valve assembly extends out of body.
- 5 Install 0.025 inch feeler gage behind nut (4) to retain valve (2) and spring (1) in body (3).
- 6 Install body (3) on two dowel pins (5) located on right end cover assembly (6) housing.
- 7 Using socket, install five bolts (7) and washers (8) in body assembly (3).
- 8 Using torque wrench, tighten bolts (7) to 17-20 lb-ft (23-27 N·m).
- 9 Remove feeler gage from nut (4).

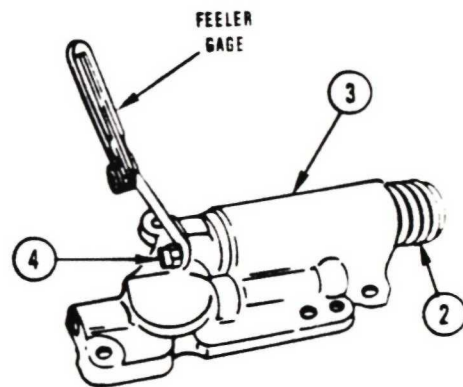
**FOLLOW-ON PROCEDURE:** Install left brake apply shaft. Refer to this paragraph, TASK 7.

End of Task 6

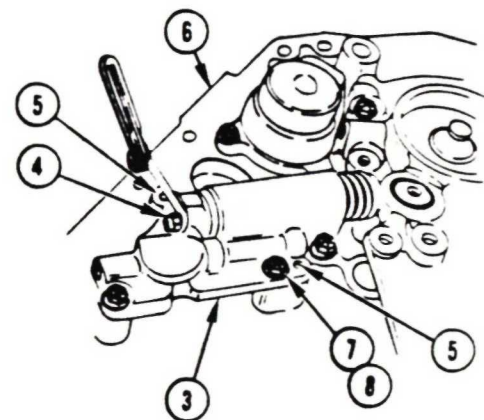
Go to Sheet 19



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TAM5555



TAM5555

4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 19 OF 22)

TASK 7. INSTALL LEFT BRAKE APPLY SHAFT, RIGHT AND LEFT  
BRAKE APPLY INDICATORS

COMMON TOOLS:

Pliers, retaining ring, internal

SUPPLIES:

Petrolatum (Item 14, Appendix C)

Tape, masking (Item 20, Appendix C)

Wooden Block, 2 x 4 inches (2 required) (Item 2, Appendix C)

PERSONNEL REQUIRED: 2

- One soldier hold brake apply shaft while end cover is being turned.
- One soldier turn end cover.

PRELIMINARY PROCEDURE: Right brake apply cam shaft installed. Refer to this paragraph, TASK 4

Install Left Brake Apply Shaft and Right Brake Apply  
Cam Shaft

NOTE

Right end cover on wooden blocks, cover  
turned inside up.

- 1 Apply petrolatum to washer (1).
- 2 Install washer (1) on left brake apply shaft (2).
- 3 Clean splined end of shaft (2).

**CAUTION**

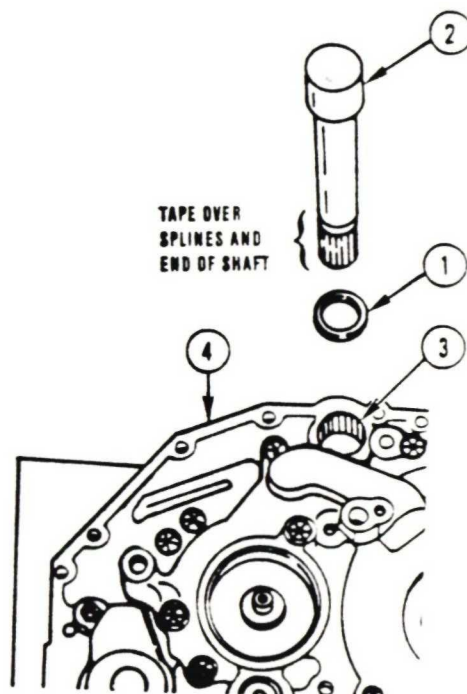
Protective material, such as masking tape,  
must cover splines. If shaft goes through  
seal without such protection, splines on  
shaft will damage seal.

NOTE

If splines were taped during shaft removal,  
petrolatum should be put on tape before  
installing shafts.

- 4 Wrap tape over spline and end of shaft (2).
- 5 Apply petrolatum over tape on shaft (2).
- 6 Position taped end of shaft (2) over bearing (3) in right  
end cover (4).

Go to Sheet 20



TAB 05555



# 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 20 OF 22)

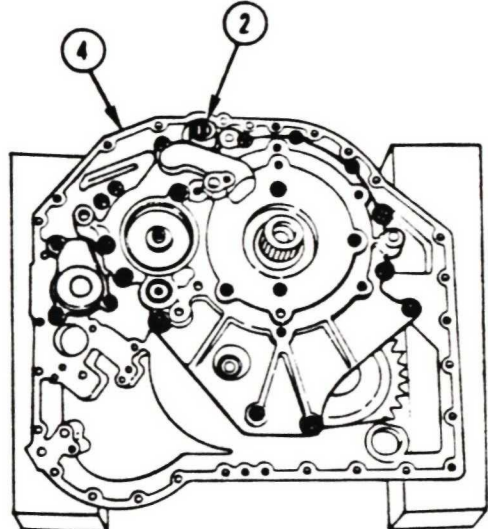
## CAUTION

When pushing brake apply shaft through seal, be sure that spring in seal stays in place. Put one hand on outside of end cover, over the brake apply shaft bore, and run a finger around the spring in the seal to keep the spring in place while the end of the shaft comes through. If the spring does not remain in its proper position, the seal will leak.

- 7 Put one hand on outside of right end cover (4) over left brake apply shaft (2) bore and run finger around spring (5) in seal (6) until taped end of brake apply shaft (2) comes through.
- 8 Turning shaft (2) to left or right while inserting it, carefully push shaft into bore until shaft is seated in end cover (4).

## NOTE

Left brake apply shaft must be held in place to keep it from falling out of end cover when end cover is turned over.

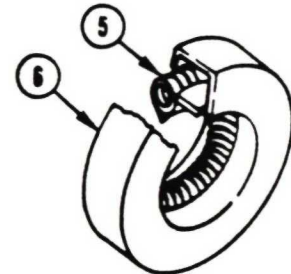


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- 9 Holding shaft (2) in place, turn end cover (4) over, outside up, then put a wooden block under end cover so that wooden block retains shaft.
- 10 Remove protective tape from end of left brake apply shaft (2) and right brake apply cam shaft (7).

## NOTE

- Indicator and shaft have one tooth missing from spline, providing point for alignment.
- Indicator is installed beveled side of pointer out.

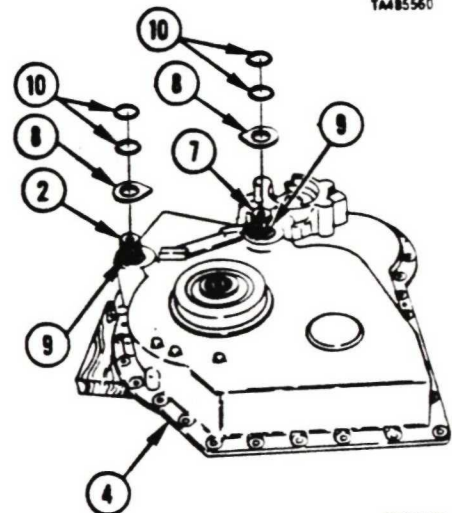


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- 11 Install indicators (8) on shafts (2, 7) so that indicators are beyond inner retaining ring groove (9).

## NOTE

Outer retaining rings may or may not be present. They are furnished to retain external brake linkage.



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- 12 Using retaining ring pliers, install four retaining rings (10).

End of Task 7

Go to Sheet 21

4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 21 OF 22)

TASK 8. INSTALL RH OUTPUT FLANGE

COMMON TOOLS:

Bar, pry  
Extension, socket wrench, 1/2 inch square drive, 10 inch  
Hammer, hand, ball penn  
Handle, socket wrench, 1/2 inch square drive  
Punch, center, tapered  
Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
Wrench, torque, 0-175 ft-lb

REPAIR PARTS:

Washer, tab type (73342) 6752556

SUPPLIES:

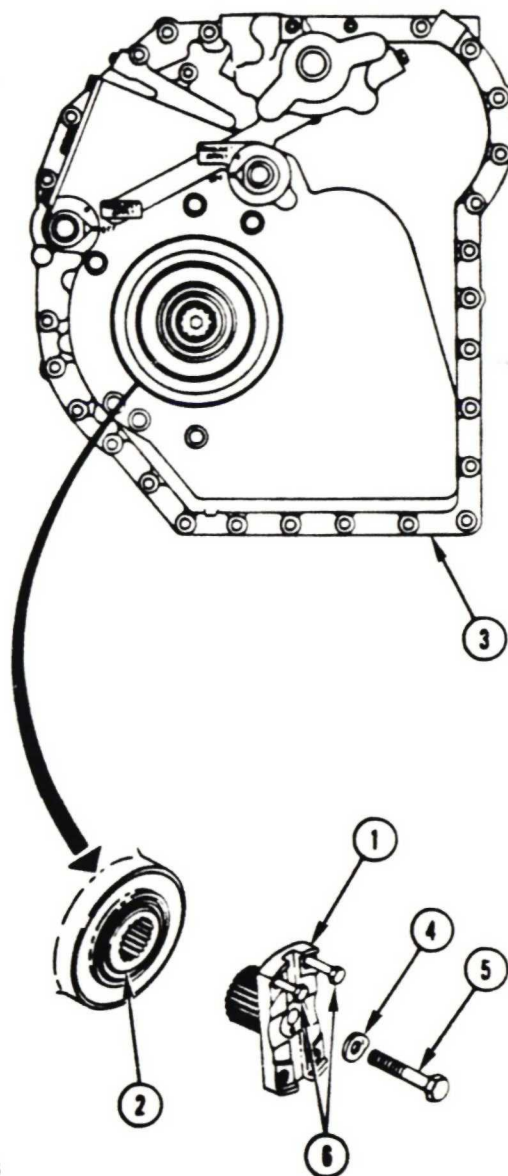
Bolt, 1/2-20 x 3 inch (2 required)  
Rag, wiping (Item 15, Appendix C)

PRELIMINARY PROCEDURE: RH output shaft and  
seal installed. Refer to this paragraph, TASK 1.

NOTE

Right end cover assembly turned outside up.

- 1 Install output flange (1) in output shaft (2) located in right end cover (3).
- 2 Install new tab washer (4) on 1/2-20 x 3-1/4 inch bolt (5) with bent tab on washer toward head of bolt.
- 3 Install bolt (5) through center of flange (1) and into center of output shaft (2). Install bolt finger tight.
- 4 Using 3/4 inch socket, install two 1/2-20 x 3 inch bolts (6) in tapped holes at either end of output flange (1) until bolts are flush with inner surface of flange.



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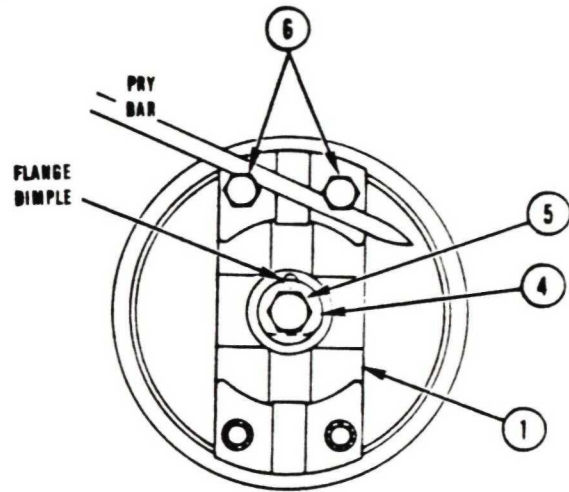
Go to Sheet 22

-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 22 OF 22)

- 5 Using one hand, hold pry bar between two bolts (6) to prevent flange (1) from turning.

**CAUTION**

Do not install washer so that tab is over dimple in flange. To prevent bolt from turning, tab must be against flat of bolt and washer must be dimpled into flange dimple hole. When tab of washer is at dimple hole, washer cannot be dimpled. Bolt retaining flange to output shaft may then loosen.



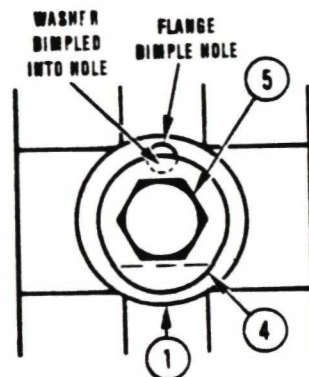
TM485563

- 6 Using 3/4 inch socket, tighten bolt (5).
- 7 Using torque wrench, tighten bolt (5) to 72-86 lb-ft (98-117 N·m).

- 8 Using 3/4 inch socket, remove two bolts (6) from flange (1).

**NOTE**

Do not bend the tab of washer (4) against flat of bolt (5) at this time.



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- 9 Using punch and hammer, punch dimple in washer (4). Dimple must depress washer into dimple hole in flange (1).

**FOLLOW-ON PROCEDURE:** Install right end cover assembly. Refer to paragraph 4-16.

End of Task 8



4-22. DISASSEMBLE LEFT END COVER ASSEMBLY  
(SHEET 1 OF 4)

Task	Title	Page
1	Remove LH Output Flange	4-148
2	Remove LH Output Shaft and Seal	4-149
3	Remove Range Input Driven Gear Race, Range Input Drive Gear Bearing and Oil Transfer Tube Seal Rings	4-151

**WARNING**

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Left end cover weighs approximately 90 pounds (41 kg). When lifting end cover, use hoist to avoid bodily injury.

**TASK 1. REMOVE LH OUTPUT FLANGE**

**COMMON TOOLS:**

Bar, pry  
Chisel, cold  
Extension, socket wrench, 1/2 inch square drive, 10 inch  
Hammer, hand, ball peen  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Socket, socket wrench, 1/2 inch square drive, 3/4 inch

**SUPPLIES:**

Bolt, 1/2-20 x 3 inch (2 required)  
Rag, wiping (Item 15, Appendix C)

**PERSONNEL REQUIRED: Two**

- One soldier to hold left end cover on end.
- One soldier to perform maintenance procedure.

**NOTE**

One soldier hold left end cover on edge.

Go to Sheet 2

## 4-22. DISASSEMBLE LEFT END COVER ASSEMBLY (SHEET 2 OF 4)

- 1 Using chisel and hammer, straighten bent tab of washer (1); bend tab away from bolt (2).
- 2 Using 9/16 inch socket, install two 1/2-20 x 3 inch bolts (3) in tapped holes at either end of output flange (4).
- 3 Using one hand, hold pry bar between two bolts (3) to prevent flange (4) from turning.
- 4 Using 3/4 inch socket with other hand, remove bolt (2) and washer (1) from output flange (4).
- 5 Remove output flange (4) from right end cover assembly (5).
- 6 Using 9/16 inch socket, remove two bolts (3) from output flange (4).

**FOLLOW-ON PROCEDURE:** Install output flange.  
Refer to paragraph 4-24.

End of Task 1

## TASK 2. REMOVE LH OUTPUT SHAFT AND SEAL

### COMMON TOOLS:

Drift, brass  
Hammer, hand, ball peen  
Press, arbor, hand operated  
Punch, drive pin, straight  
Screwdriver, flat tip (2 required)

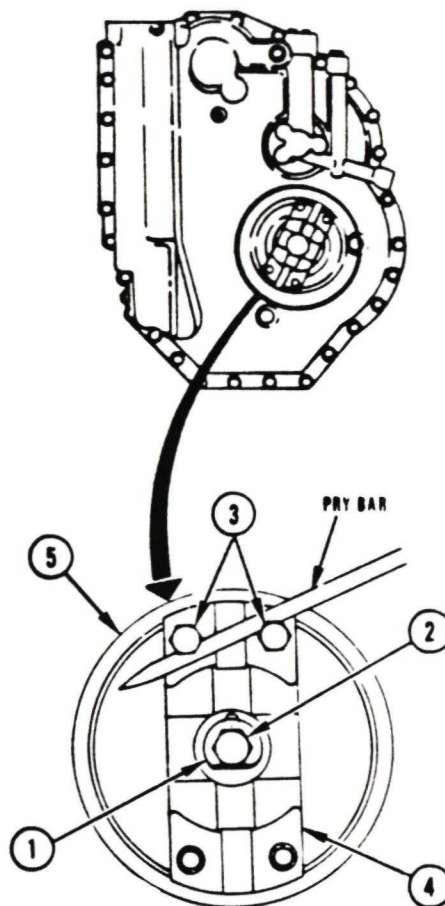
### SUPPLIES:

Rag, wiping (Item 15, Appendix C)  
Wooden Block, 2 x 4 inches x 16 inches long (2 required)  
(Item 2, Appendix C)

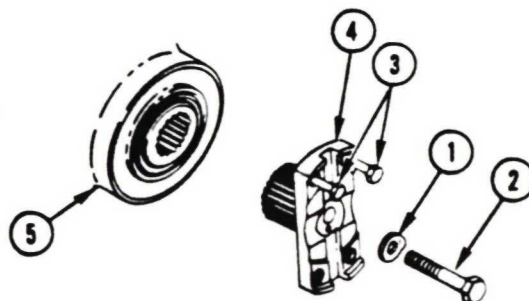
**PRELIMINARY PROCEDURE:** Left end cover is removed. Refer to paragraph 4-8.

### PERSONNEL REQUIRED: Two

- One soldier hold end cover on edge for removal of output shaft.
- One soldier use hammer and punch to drive shaft from end cover.



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Go to Sheet 3

4-22. DISASSEMBLE LEFT END COVER ASSEMBLY  
(SHEET 3 OF 4)

NOTE

- Left end cover is turned inside up when not held on edge.
- End cover leveled by two wooden blocks on edge positioned under corner nearest to output shaft.

- 1 Using screwdrivers, remove retaining ring (1) retaining bearing assembly (2) and LH output shaft (3).
- 2 One soldier hold left end cover (4) on edge to allow access to exterior.
- 3 Other soldier locate drift on inside of end of LH output shaft (3); using hammer and drift, drive shaft from end cover (4).

NOTE

Second soldier may be dismissed.

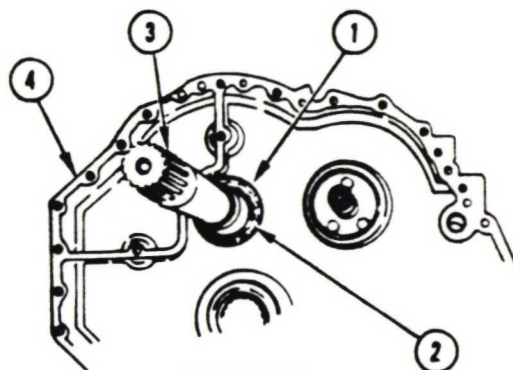
- 4 Place end cover (4) on wooden blocks, inside up.
- 5 Using hammer and punch, drive output shaft seal (5) from left end cover (4).
- 6 Remove two seal rings (6) from shaft (3).

NOTE

When bearing is removed from shaft, sleeve is forced off ahead of bearing.

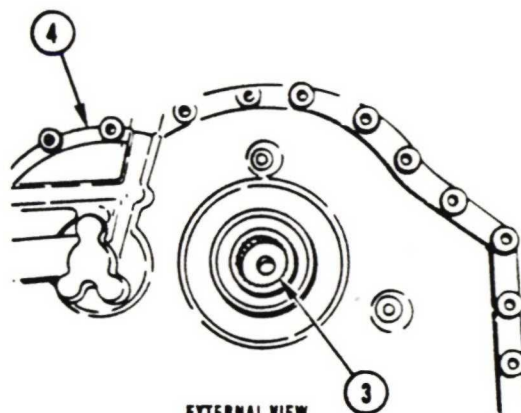
- 7 If bearing (2) is to be replaced, press bearing (2) and sleeve (7) from output shaft (3) using an arbor press.

**FOLLOW-ON PROCEDURE:** Install output shaft and seal. Refer to paragraph 4-24.



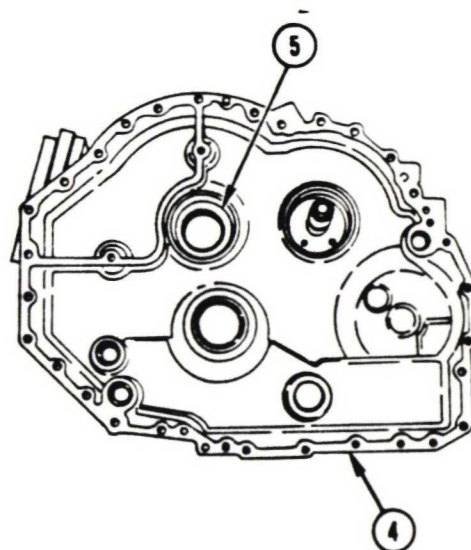
INTERNAL VIEW

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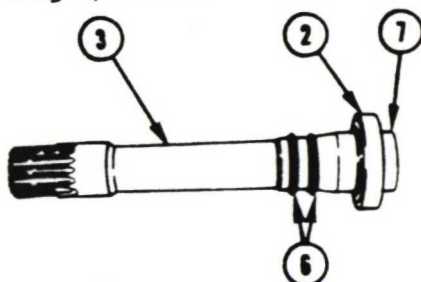


EXTERNAL VIEW

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End of Task 2

Go to Sheet 4



#### 4-22. DISASSEMBLE LEFT END COVER ASSEMBLY (SHEET 4 OF 4)

#### TASK 3. REMOVE RANGE INPUT DRIVEN GEAR RACE, RANGE INPUT DRIVE GEAR BEARING AND OIL TRANSFER TUBE SEAL RINGS

##### COMMON TOOLS:

- Gun, heat (2 required)
- Pry Bars, roller head (2 required)
- Puller, mechanical, gear and bearing

##### SUPPLIES:

- Wooden Blocks, 2 x 4 inches x 16 inches (2 required) (Item 2, Appendix C)

**PRELIMINARY PROCEDURE:** Left end cover removed. Refer to paragraph 4-8.

#### WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

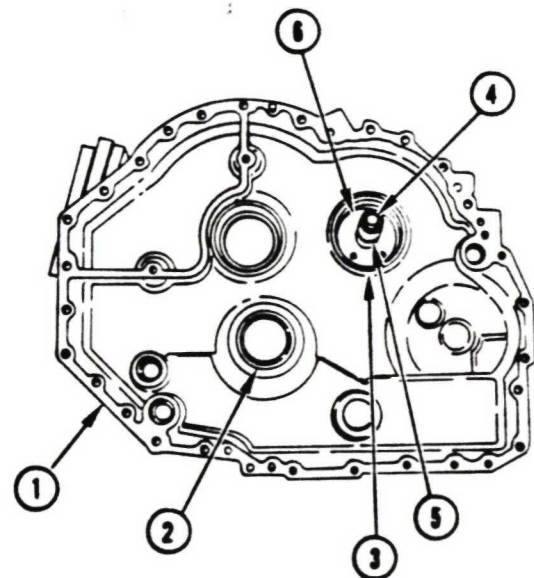
#### NOTE

- Left end cover turned inside up.
- Wooden blocks on edge under corner nearest output shaft bore.

- 1 Using two heat guns, heat left end cover (1) around bearing (2) and race (3) for one hour to approximately 300°F (149°C).

#### NOTE

End cover housing is cut away two places 180 degrees apart under bearing to provide puller access to bearing.



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- 2 Using bearing puller, remove bearing (2).
- 3 Using pry bars, remove race (3).
- 4 Remove small seal ring (4) and two large seal rings (5) from oil transfer tube assembly (6).

**FOLLOW-ON PROCEDURE:** Install race, bearing and seal rings. Refer to paragraph 4-24.

End of Task 3

4-23. REPAIR LEFT END COVER COMPONENTS  
(SHEET 1 OF 3)

Task	Title	Page
1	Repair Left End Cover Assembly	4-152

**WARNING**

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Left end cover weighs approximately 90 pounds (41 kg). When lifting end cover, use hoist to avoid bodily injury.

**TASK 1. REPAIR LEFT END COVER ASSEMBLY**

**COMMON TOOLS:**

Adapter, socket wrench, 1/2 to 3/8 inch  
 Extension, socket wrench, 3/8 inch square drive, 10 inch  
 Handle, socket wrench, 3/8 inch square drive  
 Socket, socket wrench, 3/8 inch square drive, 7/16 inch  
 Socket, socket wrench, 3/8 inch square drive, 9/16 inch  
 Socket, socket wrench, 3/8 inch square drive, 11/16 inch  
 Socket Wrench Attachment, socket head screw, 3/8 inch square drive, 11/16 inch hex plug end  
 Wrench, combination, 9/16 inch (2 required)  
 Wrench, torque, 0-600 in.-lb  
 Wrench, torque, 0-175 ft-lb

**FABRICATED TOOLS:**

Spacer, tapping insert remover, internal thread (refer to Appendix D)

**REPAIR PARTS:**

Packing, preformed (use with lube pressure port pipe plug) (73342) 23045477

**SUPPLIES:**

Bolt, 3/8-16 x 3 inches  
 Nut, 3/8-16  
 Washer, flat, 3/8 inch  
 Petrolatum (Item 14, Appendix C)  
 Sealant, lubricating, thread locking (Item 16, Appendix C)

**PRELIMINARY PROCEDURE:** Oil filter head

assembly is removed to provide access to tapped  
 inserts. Refer to paragraph 4-8.

**NOTE**

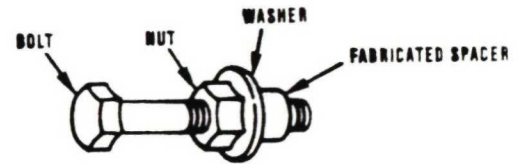
Left end cover is turned outside up.

Go to Sheet 2

**4-23. REPAIR LEFT END COVER COMPONENTS  
(SHEET 2 OF 3)**

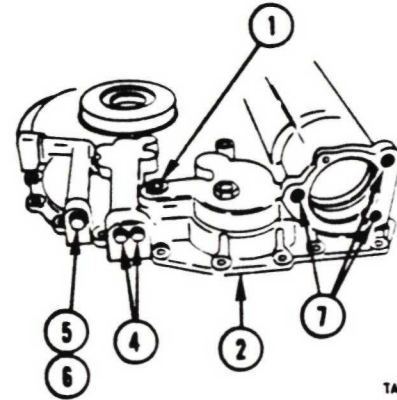
**Disassemble Left End Cover Assembly**

- 1 Using 11/16 inch hex plug socket attachment, remove pipe plug (1) from left end cover assembly (2).
- 2 Using 7/16 inch socket, remove pipe plug (3) from end cover (2).
- 3 Using 9/16 inch socket, remove four pipe plugs (4) from end cover (2).
- 4 Using 11/16 inch socket, remove pipe plug (5) and packing (6) from end cover (2).
- 5 If insert(s) (7) must be replaced, assemble 3/8-16 x 3 inch bolt, 3/8-16 nut, 3/8 inch flat washer and fabricated spacer.
- 6 Screw tip of bolt into one insert (7) in end cover (2).
- 7 Using one 9/16 inch combination wrench, lock nut against washer and hold nut to force insert (7) to turn with bolt.
- 8 Using other combination wrench, turn bolt to the left (counterclockwise) and remove insert (7).

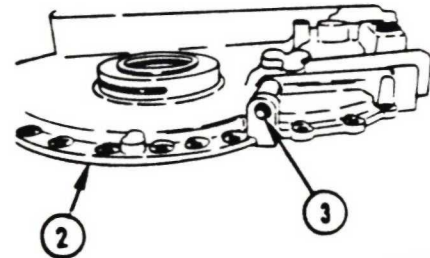


INSERT REMOVAL TOOL

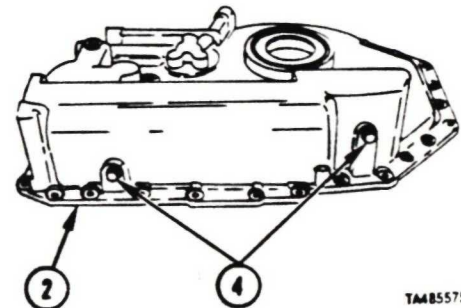
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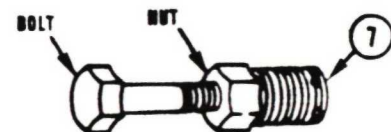
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INSERT INSTALLATION TOOL

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**Assemble Left End Cover Assembly**

- 9 If any of inserts (7) were removed, assemble 3/8-16 x 3 inch bolt and 3/8-16 nut.
- 10 Screw one insert (7) onto bolt. Screw nut against insert.
- 11 Using 9/16 inch combination wrench, install insert (7) in end cover (2) to 0.005-0.062 inch (0.127-0.157 mm) below surface of end cover (2). Install two other inserts if removed.

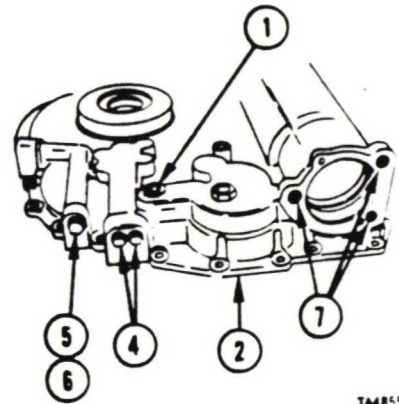
Go to Sheet 3



4-23. REPAIR LEFT END COVER COMPONENTS  
(SHEET 3 OF 3)

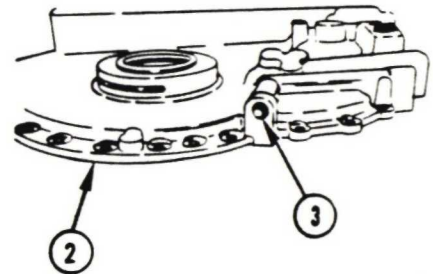
NOTE

Thread locking compound is not applied to pipe plug that has a preformed packing.

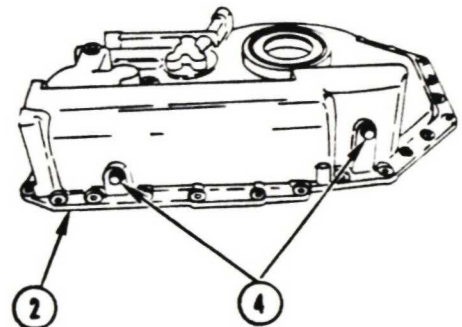


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- 12 Install new packing (6) on pipe plug (5).
- 13 Apply petrolatum to packing (6).
- 14 Using 11/16 inch socket, install plug (5) in end cover (2).
- 15 Using torque wrench, tighten plug (5) to 72-96 lb-in. (8-11 N·m).
- 16 Apply pipe thread locking compound to threads of six pipe plugs (1, 3, 4).
- 17 Using 9/16 inch socket, install four pipe plugs (4) in end cover (2).
- 18 Using torque wrench, tighten plugs (4) to 96-120 lb-in. (11-14 N·m).
- 19 Using 7/16 inch socket, install pipe plug (3) in end cover (2).
- 20 Using torque wrench, tighten plug (3) to 50-60 lb-in. (6-7 N·m).
- 21 Using 11/16 hex plug attachment, install pipe plug (1) in end cover (2).
- 22 Using torque wrench and attachment, tighten plug (1) to 21-28 lb-ft (28-38 N·m).



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**FOLLOW-ON PROCEDURE:** Assemble end cover assembly. Refer to paragraph 4-24.

End of Task 1

4-24. ASSEMBLE LEFT END COVER ASSEMBLY  
(SHEET 1 OF 5)

Task	Title	Page
1	Install Oil Transfer Tube Seal Rings, Range Input Drive Gear Bearing and Range Input Driven Gear Race	4-155
2	Install LH Output Shaft and Seal	4-156
3	Install LH Output Flange	4-158

**WARNING**

Left end cover weighs approximately 90 pounds (41 kg). When lifting end cover, use hoist to avoid bodily injury.

**TASK 1. INSTALL OIL TRANSFER TUBE SEAL RINGS, RANGE INPUT DRIVE GEAR BEARING AND RANGE INPUT DRIVEN GEAR RACE**

**COMMON TOOLS:**

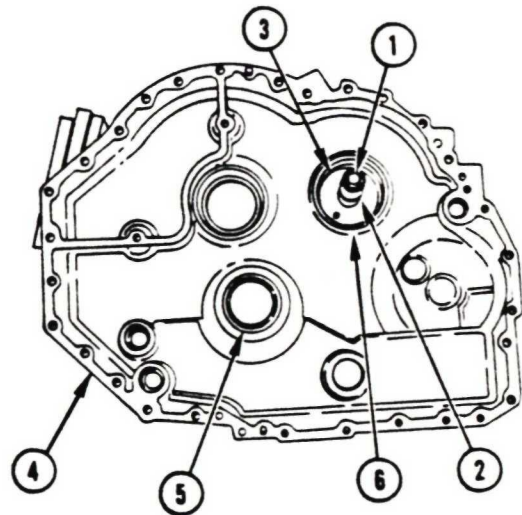
Press, arbor, hand operated

**SUPPLIES:**

Dry ice (Item 4, Appendix C)  
Oil, lubricating (Item 10, Appendix C)  
Petrolatum (Item 14, Appendix C)  
Wooden Blocks, 2 x 4 inches x 16 inches long  
(2 required) (Item 2, Appendix C)

**NOTE**

- Left end cover turned inside up.
- Wooden blocks on edge under corner nearest to output shaft bore.



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- 1 Install small seal ring (1) and two large seal rings (2) on oil transfer tube assembly (3).
- 2 If bearing (5) and race (6) were removed, apply petrolatum and lubricating oil to the bores in end cover (4).

**WARNING**

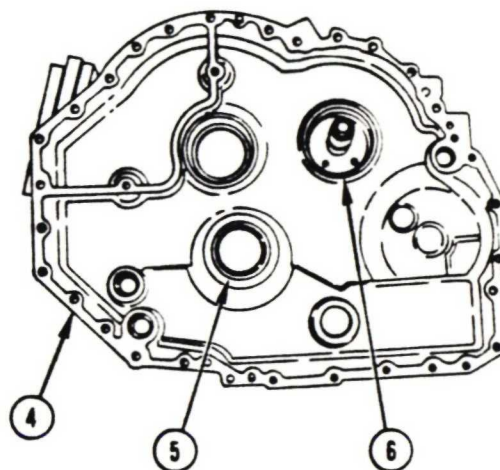
Frozen parts can stick to your fingers and cause serious injury. Always wear leather gloves when working with parts that have been frozen in dry ice.

End of Task 1

Go to Sheet 2

4-24. ASSEMBLE LEFT END COVER ASSEMBLY  
(SHEET 2 OF 5)

- 3 If race (6) was removed, freeze the race with dry ice.
- 4 Using arbor press, install new race (6) with numbered side down. Press race to shoulder.
- 5 If bearing (5) was removed, install new bearing (5) in end cover (4) using arbor press. Press bearing to shoulder.
- 6 Apply lubricating oil to bearing (5) and race (6).



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TASK 2. INSTALL LH OUTPUT SHAFT AND SEAL

COMMON TOOLS:

Gun, heat  
Hammer, hand, ball peen  
Hammer, hand, plastic faced  
Press, arbor, hand operated  
Screwdriver, flat tip

SPECIAL TOOLS:

Installer, output and brake shaft seal (19207) 11650176

SUPPLIES:

Oil, lubricating (Item 10, Appendix C)  
Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)  
Solvent, dry cleaning (Item 8, Appendix C)  
Wooden Blocks, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)

**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 138°F (50°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Go to Sheet 3



## -24. ASSEMBLE LEFT END COVER ASSEMBLY (SHEET 3 OF 5)

### NOTE

Left end cover turned outside up on wooden blocks.

### Install Output Shaft Seal

- 1 Using wiping rag and solvent, clean output shaft bore (1) in left end cover (2).

### CAUTION

Do not reuse output shaft seal after it has been removed. Removal of seal destroys dry sealant on outer edge of seal.

### NOTE

Seal installed numbered side out.

- 2 Using seal installer and ball peen hammer, install seal (3) in bore (1). Seat seal flush to 0.010 inch (0.254 mm) below surface of end cover (2).

### Install Bearing and Sleeve on LH Output Shaft

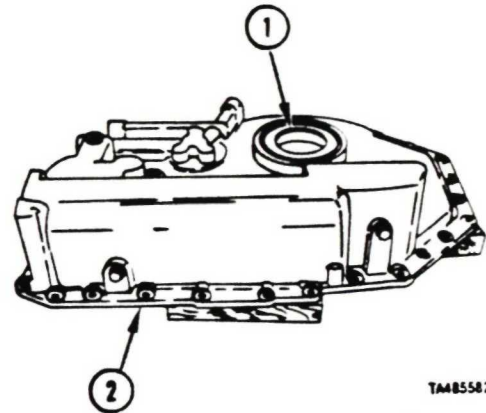
- 3 If output shaft bearing (4) was removed, apply petrolatum and lubricating oil to bearing end of LH output shaft (5).
- 4 Using arbor press, install new bearing (4), numbered end out, on output shaft (5). Press bearing to shoulder.

### WARNING

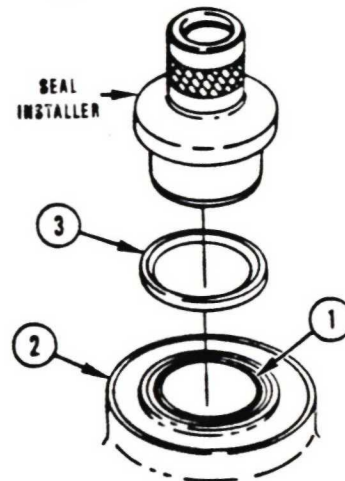
Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

- 5 If sleeve (6) was removed, heat sleeve for 30 minutes to approximately 250°F (121°C) using heat gun.
- 6 Using arbor press, install sleeve (6) on output shaft (5) with inside beveled edge on first. Press sleeve to bearing (4).
- 7 Install two seal rings (7) on output shaft (5).

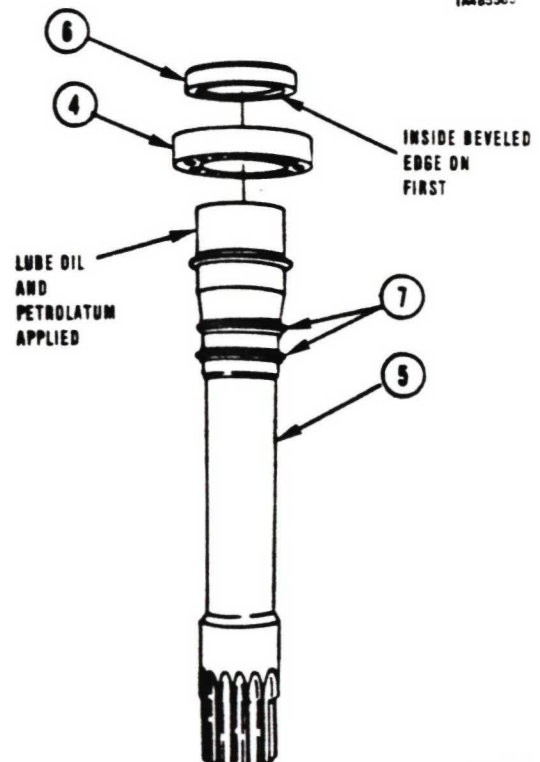
Go to Sheet 4



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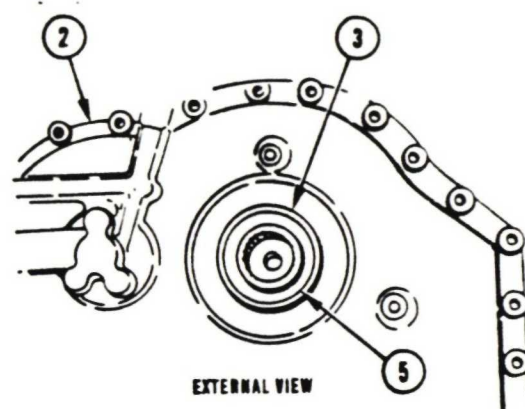
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4-24. ASSEMBLE LEFT END COVER ASSEMBLY  
(SHEET 4 OF 5)

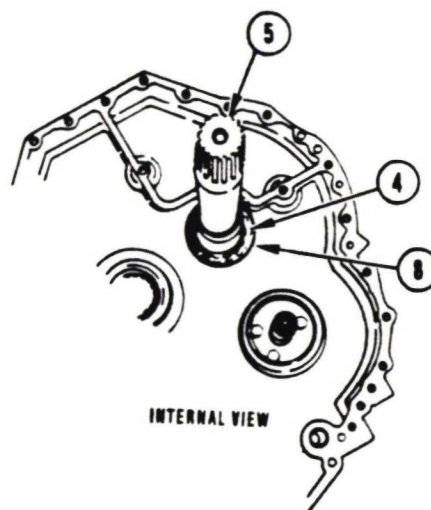
- 8 Position left end cover, inside upward. Block cover so that it is level.
- 9 Apply petrolatum to inner surface of seal (3).
- 10 Carefully rotate shaft (5) and push end of shaft through seal.
- 11 Keeping shaft very straight, use plastic faced hammer on splined end of shaft (5) to seat bearing (4) in shoulder on end cover (2). If necessary, heat end cover with heat gun around bearing journal if bearing does not easily seat.
- 12 Check that seal (3) remains in position in end cover (2) and that lip on seal is not distorted when shaft (5) passes through seal.

NOTE

When output shaft and bearing are seated, snapping groove will be accessible in sleeve at outer edge of bearing.



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- 13 Using screwdriver, install snapping (8) in groove in sleeve above bearing (4).
- 14 Apply lubricating oil to bearing (4).

End of Task 2

TASK 3. INSTALL LH OUTPUT FLANGE

COMMON TOOLS:

- Bar, pry
- Hammer, hand, machinist's
- Handle, socket wrench, 1/2 inch square drive
- Punch, center, tapered point
- Socket, socket wrench, 1/2 inch square drive, 3/4 inch
- Wrench, torque, 0-175 ft-lb

REPAIR PARTS:

- Washer, tab type (73342) 6752556

SUPPLIES:

- Bolt, 1/2-20 x 3 inch (2 required)
- Rag, wiping (Item 15, Appendix C)
- Wooden Blocks, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)

Go to Sheet 5

#### 4. ASSEMBLE LEFT END COVER ASSEMBLY (SHEET 5 OF 5)

**PRELIMINARY PROCEDURE:** LH output shaft and seal is installed. Refer to this paragraph, TASK 2.

- 1 Install output flange (1) in LH output shaft (2) located in left end cover (3).
- 2 Install new tab washer (4) on 1/2-20 x 3-1/4 inch bolt (5) with bent tab on washer toward head of bolt.
- 3 Install bolt (5) through center of flange (1) and into center of output shaft (2). Install bolt finger tight.
- 4 Using 3/4 inch socket, install two 1/2-20 x 3 inch bolts (6) in tapped holes at either end of output flange (1) until bolts are flush with inner surface of flange.
- 5 Using one hand, hold pry bar between two bolts (6) to prevent flange (1) from turning.

#### CAUTION

Do not install washer so that tab is over dimple in flange. To prevent bolt from turning, tab must be against flat of bolt and washer must be dimpled into flange dimple hole. When tab of washer is at dimple hole, washer cannot be dimpled. Bolt retaining flange to output shaft may then loosen.

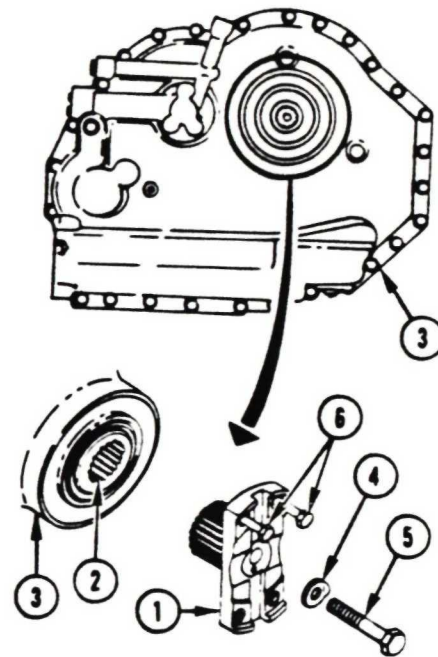
- 6 Using 3/4 inch socket with other hand, tighten bolt (5).
- 7 Using torque wrench, tighten bolt (5) to 72-86 lb-ft (98-117 N·m).
- 8 Using 3/4 inch socket, remove two bolts (6) from flange (1).

#### NOTE

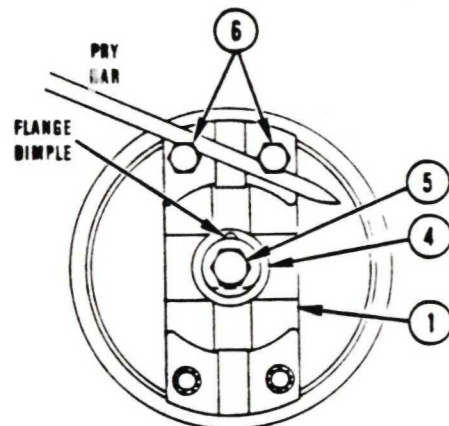
Do not bend the tab of washer (4) against flat of bolt (5) at this time.

- 9 Using punch and hammer, punch dimple in washer (4). Dimple must depress washer into dimple hole in flange (1).

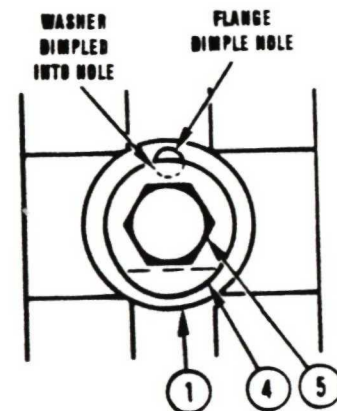
**FOLLOW-ON PROCEDURE:** Install left end cover assembly. Refer to paragraph 4-15.



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End of Task 3



4-25. REPAIR INPUT HOUSING ASSEMBLY  
(SHEET 1 OF 3)

OVERVIEW

Input housing assembly does not have to be removed from transmission to perform maintenance procedures provided in this paragraph, except for removal and installation of flat aluminum plug (73342) 23018028. However, text and illustrations are based upon input housing removed from transmission.

Task	Title	Page
1	Repair Input Housing Assembly	4-160

TASK 1. REPAIR INPUT HOUSING ASSEMBLY

COMMON TOOLS:

Adapter, socket wrench, 1/2 to 3/8 inch square drive  
 Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Hammer, hand, ball peen  
 Handle, socket wrench, 1/2 inch square drive  
 Press, arbor, hand operated  
 Punch, center  
 Socket, socket wrench, 1/2 inch square drive, 5/8 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Socket Wrench Attachment, socket head screw, 3/8 inch square drive, 1/4 inch hex plug end  
 Wrench, torque, 0-175 ft-lb

REPAIR PARTS:

Packing, preformed (2 required) (73342) 6832592

SUPPLIES:

Block, wooden, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)  
 Petrolatum (Item 14, Appendix C)  
 Rag, wiping (Item 15, Appendix C)  
 Sealant, lubricating, thread locking (Item 16, Appendix C)

NOTE

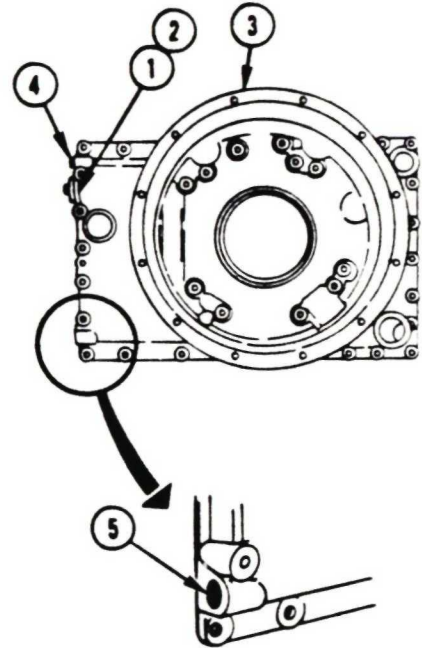
Input housing is turned outside up.

Go to Sheet 2

## 25. REPAIR INPUT HOUSING ASSEMBLY (SHEET 2 OF 3)

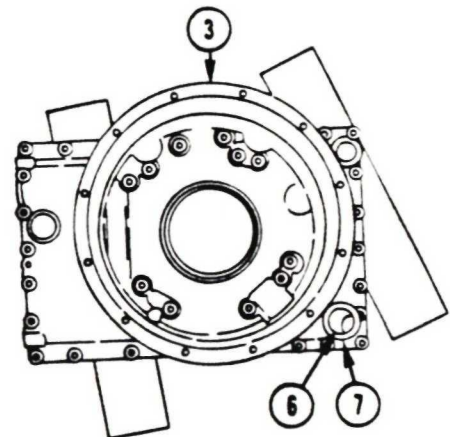
### Disassemble Input Housing Assembly

- 1 Using 5/8 inch socket, remove steering adjustment access plug (1) and packing (2) from input housing (3).
- 2 Using 9/16 inch socket, remove pipe plug (4) from input housing (3).
- 3 Using 1/4 inch hex plug socket attachment and adapter, remove pipe plug (5) from input housing (3).
- 4 Place two wooden blocks under input housing (3).



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- 5 If replacement of aluminum plug (6) is required, put punch into oil cooler-out port (7) so that tip of punch is against aluminum plug (6).
- 6 Using punch and hammer, punch plug (6) from input housing (3).



TAM85591

Go to Sheet 3

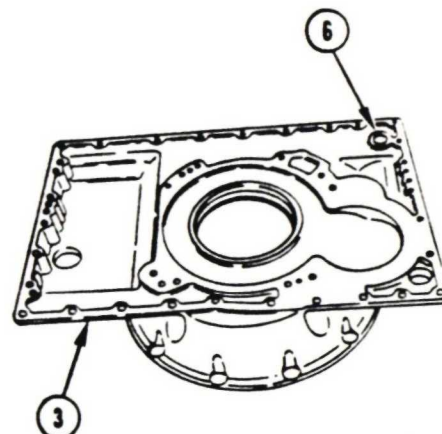
4-25. REPAIR INPUT HOUSING ASSEMBLY  
(SHEET 3 OF 3)

Assemble Input Housing Assembly

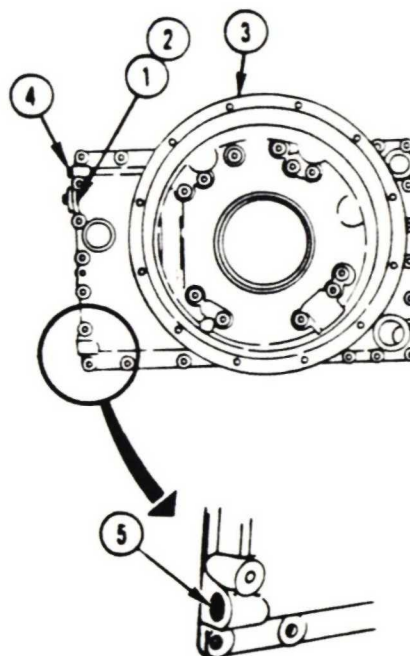
- 7 Turn input housing (3) over, inside up.
- 8 If aluminum plug (6) was removed, install new plug (6) in input housing (3) using arbor press. Press plug flush to 0.010 inch (0.2540 mm) below surface of input housing.
- 9 Turn housing (3) over, outside up.
- 10 Apply thread locking compound to threads of two pipe plugs (4, 5).
- 11 Using 1/4 inch hex plug socket attachment and adapter, install pipe plug (5) in input housing (3).
- 12 Using torque wrench and adapter, tighten plug (5) to 8-10 lb-ft (11-14 N·m).
- 13 Using 9/16 inch socket, install pipe plug (4) in input housing (3).
- 14 Using torque wrench, tighten plug (4) to 8-10 lb-ft (11-14 N·m).
- 15 Install new packing (2) on steering adjustment access plug (1).
- 16 Apply petrolatum to packing (2).
- 17 Using 5/8 inch socket, install plug (1) in input housing (3).
- 18 Using torque wrench, tighten plug (1) to 50-60 lb-ft (68-81 N·m).

**FOLLOW-ON PROCEDURE:** Install input housing assembly. Refer to paragraph 4-13.

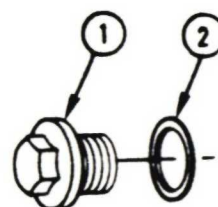
End of Task 1



TM9B5592



TM9B5593



PLUG ENLARGED FOR CLARITY

TM9B5594



## 26. DISASSEMBLE BEVEL GEAR ASSEMBLY (SHEET 1 OF 4)

### OVERVIEW

The bevel gear assembly does not have to be removed from the transmission to remove exterior components. However, text and illustrations are based upon removal of the bevel gear assembly from the transmission.

Task	Title	Page
1	Remove Exterior Components	4-163

### TASK 1. REMOVE EXTERIOR COMPONENTS

#### COMMON TOOLS:

Adapter, 1/2 to 3/8 inch  
 Bar, pry (two required)  
 Extension, socket wrench, 1/2 inch square drive, 10 inch  
 Extension, socket wrench, 3/8 inch square drive, 6 inch  
 Handle, socket wrench, 1/2 inch square drive  
 Pliers, diagonal cutting  
 Pliers, retaining ring, external  
 Press, arbor, hand  
 Screwdriver, flat tip, 1/4 inch wide tip  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Universal Socket, socket wrench, 3/8 inch square drive, 9/16 inch  
 Wrench, combination, 9/16 inch  
 Wrench, torque, 0-175 ft-lb

#### SUPPLIES:

Rag, wiping (Item 15, Appendix C)  
 Wooden blocks, 4 x 4 x 16 (6 required) (Item 3, Appendix C)

#### PERSONNEL REQUIRED: Two

- One soldier helps to lift and turn bevel gear assembly.
- One soldier disassembles bevel gear assembly.

Go to Sheet 2

4-26. DISASSEMBLE BEVEL GEAR ASSEMBLY  
(SHEET 2 OF 4)

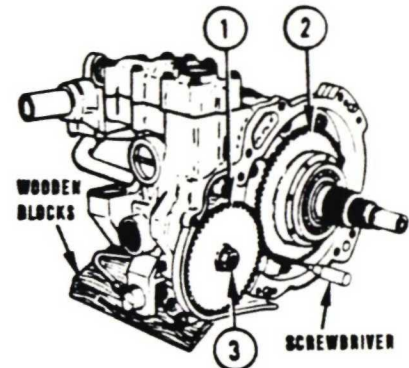
- 1 Position bevel gear assembly on wooden blocks as shown.
- 2 Wedge screwdriver between input oil pump driven gear (1) and input oil pump drive gear (2) to prevent gears from turning.
- 3 Using 3/4 inch socket, remove nut (3) that retains gear (1).
- 4 Using pry bar, remove gear (1).
- 5 Using diagonal cutting pliers, remove woodruff key (4) from input oil pump shaft (5).
- 6 Using 1/2 inch socket and extension, remove seven bolts (6) and washers (7).
- 7 Using external retaining ring pliers, remove retaining ring (8).
- 8 Remove spacer (9).
- 9 Using two pry bars, remove gear (2) and bearing (10).
- 10 Using arbor press, remove bearing (10) from gear (2).
- 11 Position bevel gear assembly on wooden blocks as shown.
- 12 Using 1/2 inch socket and extension, remove two bolts (11) and washers (12) and one bolt (13) and washer (14) that retain scavenge tube assembly (15). Remove tube assembly (15).

**NOTE**

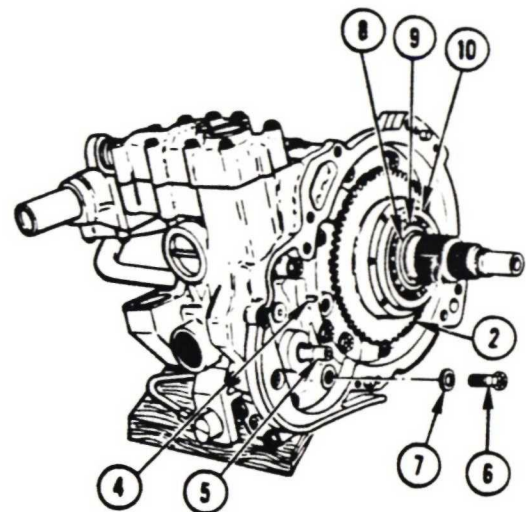
If output pump assembly (16) is to be sent to depot for overhaul, do Step 13. If not, go to Step 14.

- 13 Using 1/2 inch socket, reinstall washer (14) and bolt (13). Using torque wrench, torque bolt (13) to 17-20 lb-ft (23-27 N·m).
- 14 Using 9/16 inch universal socket, extension and adapter, remove two bolts (17) and washers (18) that retain output pump assembly (16). Remove pump assembly (16).

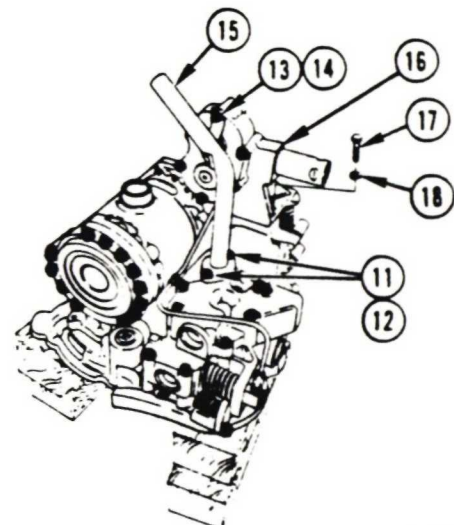
Go to Sheet 3



TM485595



TM485596



TM485597



## 26. DISASSEMBLE BEVEL GEAR ASSEMBLY (SHEET 3 OF 4)

- 15 Remove spring (19) and valve (20) exposed when pump assembly was removed.
- 16 Using 1/2 inch socket, remove nine bolts (21) and washers (22). Remove check valve (push-start valve body) (23).
- 17 Using 9/16 inch socket and extension, remove bolt (24) and washer (25) that retain reverse signal tube (26) to bevel gear carrier.

### NOTE

If bevel gear carrier assembly is to be sent to depot for overhaul, do step (18). If not, go to step (19).

- 18 Using 9/16 inch socket and extension, reinstall washer (25) and bolt (24). Using torque wrench, tighten bolt (24) to 36-43 lb-ft (49-58 N·m).

- 19 Using 1/2 inch socket and extension, remove bolt (27) that retains reverse signal tube (26) to input and scavenge pump assembly (28).

### NOTE

If input and scavenge pump assembly (28) is to be sent to depot for overhaul, do Step 20. If not, go to Step 21.

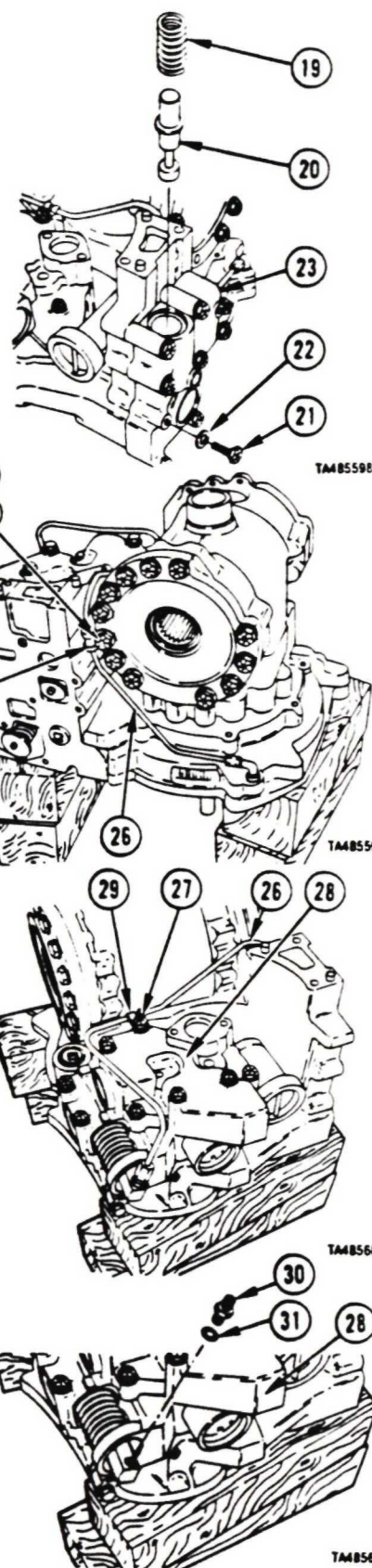
- 20 Using 1/2 inch socket and extension, reinstall bolt (27) in pump assembly (28). Torque bolt (27) to 13-16 lb-ft (18-22 N·m).

- 21 Using combination wrench, remove reverse signal tube (26) from bevel gear assembly.

- 22 Remove two clamps (29) from tube (26).

- 23 Using combination wrench, remove connector (30) and packing (31) from pump assembly (28). Remove packing (31) from connector (30).

Go to Sheet 4





4-26. DISASSEMBLE BEVEL GEAR ASSEMBLY  
(SHEET 4 OF 4)

24 Using combination wrench, remove elbow (32) and packing (33) from bevel gear housing. Remove packing (33) from elbow (32).

25 Using 1/2 inch socket and extension, remove two bolts (34) and washers (35) that retain input and scavenge pump assembly (28). Remove pump assembly (28).

26 Position bevel gear assembly on wooden blocks as shown.

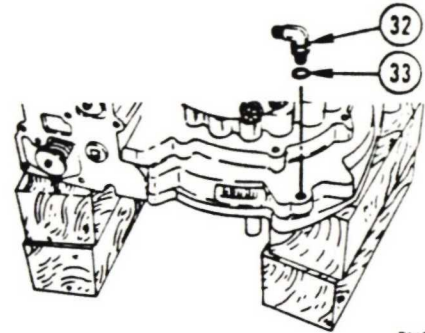
27 Remove packing (36) from sleeve of diaphragm assembly (37).

28 Using 9/16 inch socket and extension, remove nine bolts (38) and washers (39) that retain diaphragm assembly (37).

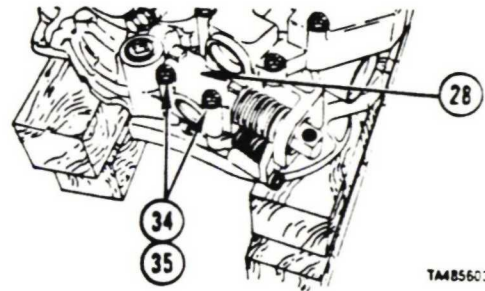
29 Install two bolts (38) (removed in step 28) in two jacking bolt holes (40).

30 Using 9/16 inch socket, evenly tighten two jack bolts (38). Remove diaphragm assembly (37). Remove two jack bolts (38).

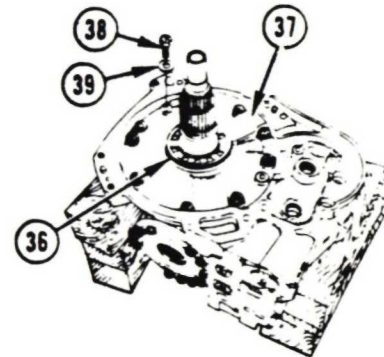
31 Remove two metal seal rings (41) from shaft (42).



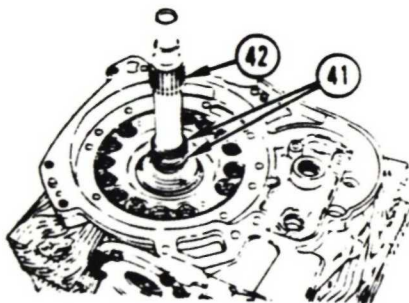
TM 85602



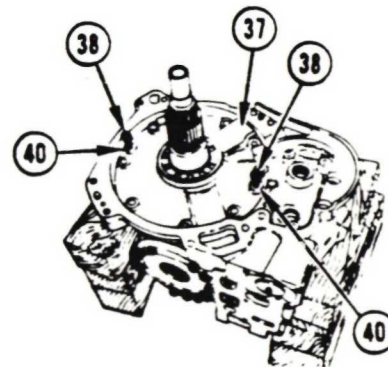
TM 85603



TM 85604



TM 85606



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End of Task 1

# 4-27. ASSEMBLE BEVEL GEAR ASSEMBLY (SHEET 1 OF 5)

## OVERVIEW

The bevel gear assembly does not have to be removed from the transmission to install exterior components. However, text and illustrations are based upon removal of the bevel gear assembly from the transmission.

Task	Title	Page
1	Install Exterior Components	4-167

## TASK 1. INSTALL EXTERIOR COMPONENTS

### COMMON TOOLS:

Adapter, socket wrench, 1/2 to 3/8 inch square drive  
 Crowfoot, socket wrench, 3/8 inch square drive, 9/16 inch  
 Extension, socket wrench, 1/2 inch square drive, 10 inch  
 Extension, socket wrench, 3/8 inch square drive, 6 inch  
 Hammer, hand, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Pliers, retaining ring, external  
 Press, arbor, hand operated  
 Screwdriver, flat tip, 1/4 inch wide tip  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Universal socket, socket wrench, 3/8 inch square drive, 9/16 inch  
 Wrench, combination, 9/16 inch  
 Wrench, torque, 0-175 ft-lb

### SUPPLIES:

Petrolatum (Item 14, Appendix C)  
 Rag, wiping (Item 15, Appendix C)  
 Wooden blocks, 4 x 4 x 16 (4 required) (Item 3, Appendix C)

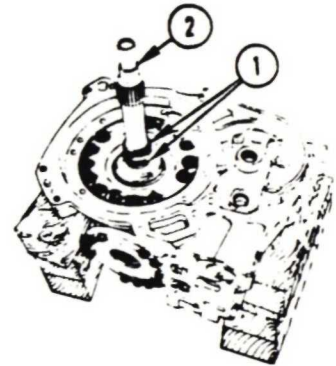
### PERSONNEL REQUIRED: Two

- One soldier helps to lift and turn bevel gear assembly.
- One soldier disassembles bevel gear assembly.

Go to Sheet 2

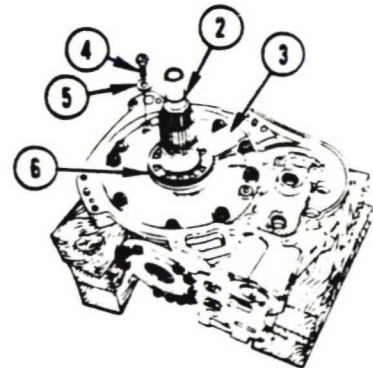
4-27. ASSEMBLE BEVEL GEAR ASSEMBLY  
(SHEET 2 OF 5)

- 1 Position bevel gear assembly, shaft upward, on wooden blocks as shown.
- 2 Install two metal seal rings (1) onto shaft (2). Coat seal rings (1) with petrolatum.



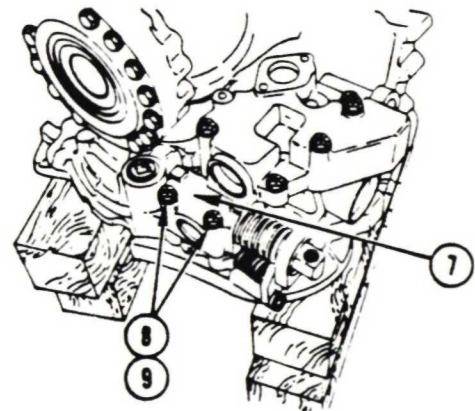
TM85607

- 3 Install diaphragm assembly (3) onto shaft (2).
- 4 Using 9/16 inch socket and extension, install nine bolts (4) and washers (5) that retain diaphragm assembly (3).
- 5 Using torque wrench, torque nine bolts (4) to 36-43 lb-ft (49-58 N·m).
- 6 Install packing (6) onto sleeve of diaphragm assembly (3).



TM85608

- 7 Position bevel gear assembly, shaft downward, on wooden blocks as shown.
- 8 Install input and scavenge pump assembly (7). Using 1/2 inch socket and extension, install two bolts (8) and washers (9) that retain input and scavenge pump assembly (7).
- 9 Using torque wrench, torque two bolts (8) to 17-20 lb-ft (23-27 N·m).



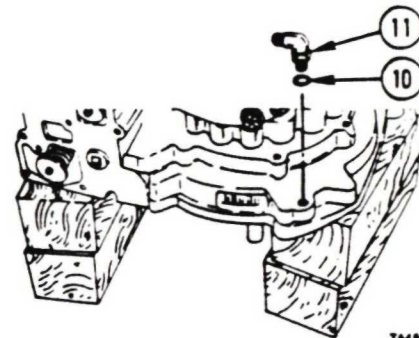
TM85609

Go to Sheet 3



# 27. ASSEMBLE BEVEL GEAR ASSEMBLY (SHEET 3 OF 5)

10 Install new packing (10) onto elbow (11). Using combination wrench, install elbow (11) and packing (10) into bevel gear housing.



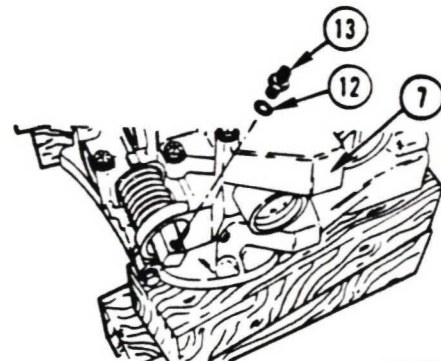
TA485610

11 Install new packing (12) onto connector (13). Using 9/16 inch socket, extension, and adapter, install connector (13) and packing (12) into pump assembly (7).

12 Using torque wrench, tighten connector (13) to 5-7 lb-ft (7-9 N·m).

13 Install two clamps (14) onto reverse signal tube (15).

14 Using 9/16 inch socket, remove bolt (16) and washer (17) (if present) from bevel gear carrier.



TA485611

15 Using 1/2 inch socket and extension, remove bolt (18) (if present) from input and scavenge pump assembly (7).

6 Using combination wrench, install reverse signal tube (15) onto elbow (11) and connector (13). After ferrule is seated, tighten the two nuts approximately 1/6 of a turn minimum and not more than 1/3 of a turn maximum.

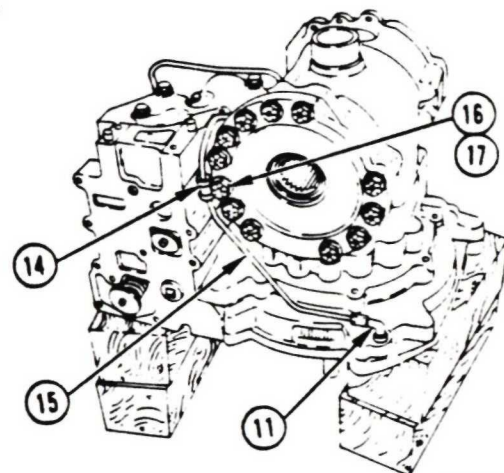
17 Using 9/16 inch socket and extension, install washer (17) and bolt (16) that retain tube (15) to bevel gear assembly.

18 Using torque wrench, tighten bolt (16) to 36-43 lb-ft (49-58 N·m).

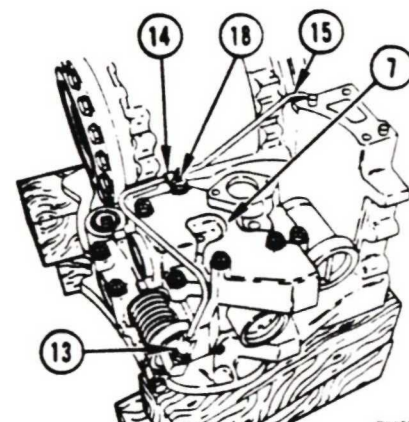
19 Using 1/2 inch socket and extension, install bolt (18) that retains tube (15) to pump assembly (7).

20 Using torque wrench, tighten bolt (18) to 17-20 lb-ft (23-27 N·m).

21 Using 9/16 inch crowfoot, extension, adapter and torque wrench, tighten nut that retains elbow (11) to 5-7 lb-ft (18-22 N·m).



TA485612

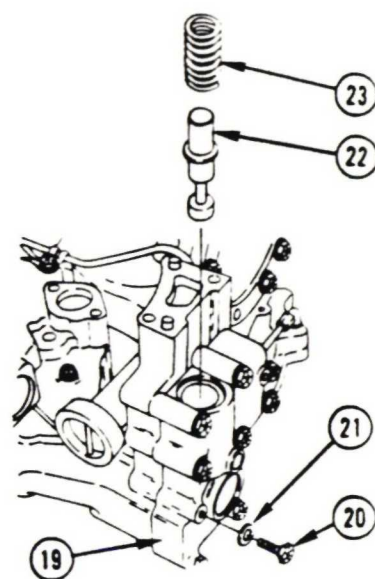


TA485613

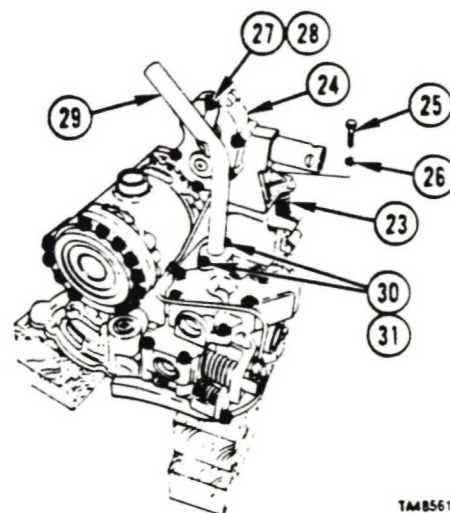
Go to Sheet 4

4-27. ASSEMBLE BEVEL GEAR ASSEMBLY  
(SHEET 4 OF 5)

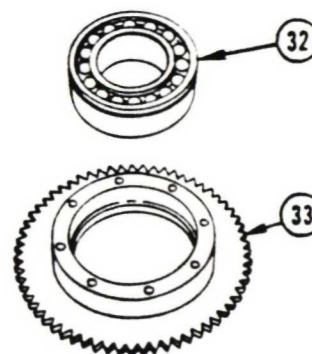
- 22 Install check valve (push-start valve body) (19) onto bevel gear assembly. Using 1/2 inch socket, install nine bolts (20) and washers (21) that retain check valve (19).
- 23 Using torque wrench, tighten bolts (20) to 17-20 lb-ft (23-27 N·m).
- 24 Install valve (22), stem downward, and spring (23) into check valve (19).
- 25 Install output oil pump assembly (24) over spring (23) and valve (22) and onto bevel gear assembly.
- 26 Using 9/16 inch universal socket, extension, and adapter, install two bolts (25) and washers (26) that retain pump assembly (24).
- 27 Using torque wrench, tighten bolts (25) to 36-43 lb-ft (49-58 N·m).
- 28 Using 1/2 inch socket and extension, remove one bolt (27) and washer (28) (if present) from pump assembly (24).
- 29 Install scavenge tube assembly (29). Using 1/2 inch socket and extension, retain tube assembly (29) with one bolt (27) and washer (28) and two bolts (30) and washers (31).
- 30 Using torque wrench, tighten bolts (27, 30) to 17-20 lb-ft (23-27 N·m).
- 31 Using arbor press, press bearing (32) onto gear (33) to shoulder.



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TA8B5615

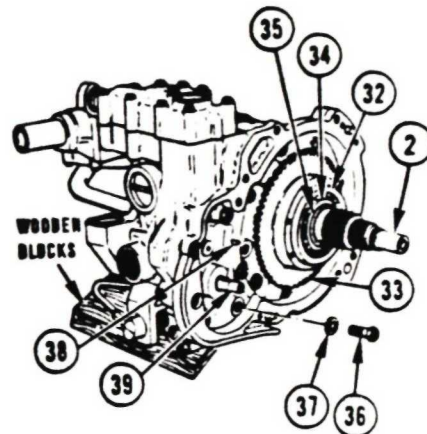


TA8B5616

Go to Sheet 5

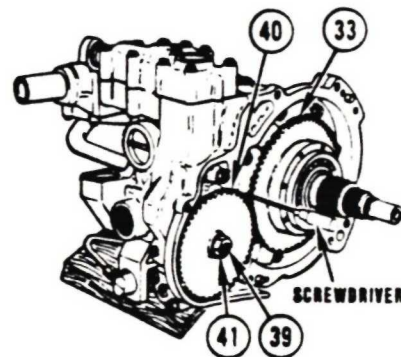
# 27. ASSEMBLE BEVEL GEAR ASSEMBLY (SHEET 5 OF 5)

- 32 Position bevel gear assembly, output oil pump upward, as shown.
- 33 Using plastic faced hammer, install gear (33) and bearing (32) onto shaft (2).
- 34 Install spacer (34) onto shaft (2).
- 35 Using external retaining ring pliers, install retaining ring (35).
- 36 Using 1/2 inch socket and extension, install seven bolts (36) and washers (37).
- 37 Using torque wrench, torque bolts (36) to 17-20 lb-ft (23-27 N·m).
- 38 Using hammer, install woodruff key (38) into slot in input oil pump shaft (39).



TAM85617

- 39 Install driven gear (40) over shaft (39) and key (38).
- 40 Wedge screwdriver between driven gear (40) and drive gear (33) to prevent gears from turning.
- 41 Using 3/4 inch socket, install nut (41) that retains gear (40). Using torque wrench, check prevailing torque by measuring the torque required to turn nut (41).
- 42 Using torque wrench, tighten nut (41) to 30 lb-ft (40 N·m) plus prevailing torque.



TAM85618

End of Task 1



4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 1 OF 19)

Task	Title	Page
	RIGHT SIDE OF CENTER HOUSING	
1	Remove Left Brake Assembly	4-172
2	Remove Left Steer Gear, Left Steer and Output Sun Gear, Left Output Shaft, and Output Pump Drive Gear	4-177
3	Remove Steer Control Assembly	4-179
4	Remove Hydrostatic Pump and Motor Assembly (Hydrostat)	4-179
5	Remove Governor Assembly, Governor Body Assembly, and Governor Drive Gear	4-181
	LEFT SIDE OF CENTER HOUSING	
6	Remove Range Pack	4-182
7	Remove Idler Gear Assembly	4-190

# **TASK 1. REMOVE LEFT BRAKE ASSEMBLY**

## **COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 10 inch  
 Hammer, hand, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Pliers, long round nose  
 Pliers, retaining ring, internal  
 Pry Bar, roller head (2 required)  
 Screwdriver, flat tip, small  
 Socket, socket wrench, 1/2 inch square drive, 7/16 inch  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Socket, socket wrench, 1/2 inch square drive, 5/8 inch

## **SUPPLIES:**

Rag, wiping (Item 15, Appendix C)  
 Wooden blocks, 4 x 4 inches x 16 inches long (2 required) (Item 3, Appendix C)

## **PRELIMINARY PROCEDURES:**

1. Transmission top components are removed. Refer to paragraph 4-5.
2. Right end cover is removed. Refer to paragraph 4-7.

## **NOTE**

Transmission is on maintenance stand, right end turned up.

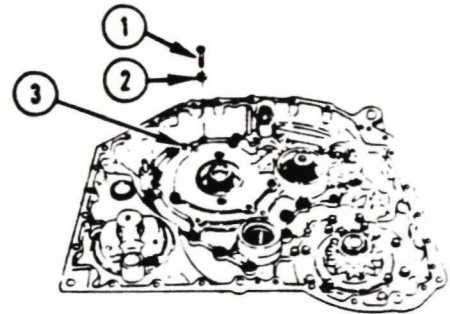
Go to Sheet 2

## 28. DISASSEMBLE CENTER HOUSING (SHEET 2 OF 19)

- 1 Using 5/8 inch socket, remove 15 bolts (1) and washers (2) from left brake support (3).

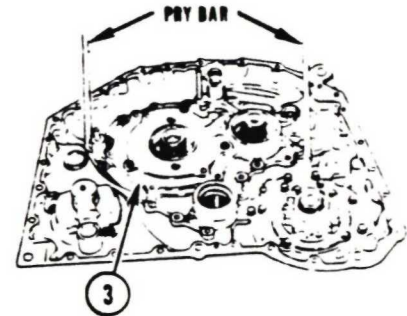
### NOTE

When left brake support (3) is removed, the brake cam may come out of the brake assembly with the support or it may remain in the center housing.



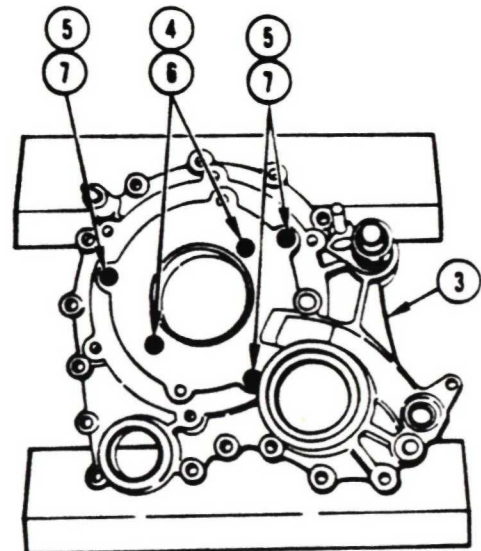
TA485619

- 2 Using two pry bars, pry under opposite ends of brake support (3) and loosen support. Remove brake support (3).



TA485620

- 3 Position support (3) on wooden blocks as shown.
- 4 Using 7/16 inch socket, loosen two retainer bolts (4). Using 1/2 inch socket, loosen three stationary cam bolts (5). Loosen bolts (4, 5) until bolt heads are approximately 1/4 inch (6-1/2 mm) out of holes in support (3).
- 5 Using plastic faced hammer, tap bolt heads (4, 5) to loosen retainer and stationary cam located under support (3).
- 6 Using 7/16 inch socket, remove two bolts (4) and washers (6) from support (3). Using 1/2 inch socket, remove three bolts (5) and washers (7) from support (3).



TA485621

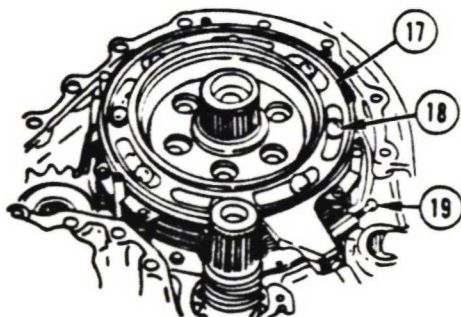
Go to Sheet 3

4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 3 OF 19)

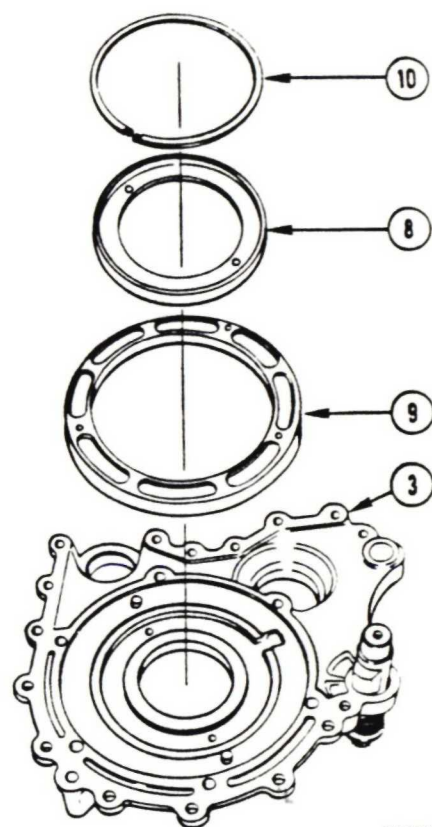
- 7 Turn support (3) over as shown.
- 8 Remove packing retainer (8) and stationary cam (9) from support (3).
- 9 Remove seal ring (10) from retainer (8).
- 10 Using retaining ring pliers, remove retaining ring (11) from end of control cam (12).
- 11 Remove washer (13) from cam (12).
- 12 Using screwdriver, remove torsion helical spring (14) from cam (12).
- 13 Remove control cam (15) from cam (12).
- 14 Using retaining ring pliers, remove retaining ring (16) from cam (12).
- 15 Remove cam (12) from support (3).
- 16 Check support (3), including bearing, for serviceability.

**REPAIR:** Refer to paragraph 4-29 for repair of left brake support (3).

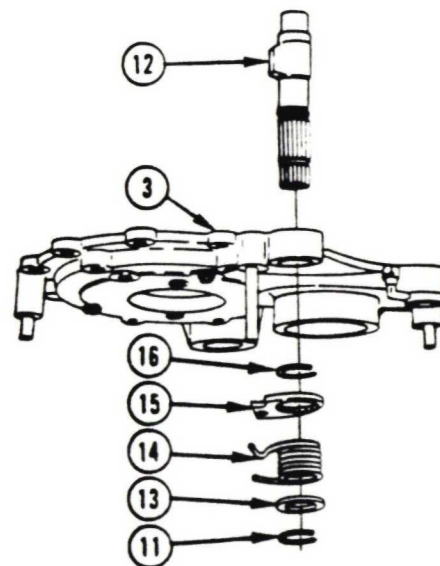
- 17 Remove brake cam (17) with eight balls (18) and brake adjusting linkage (19).
- 18 Remove eight balls (18) from brake cam (17). Place balls (18) in a container.



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TM85622



TM85623

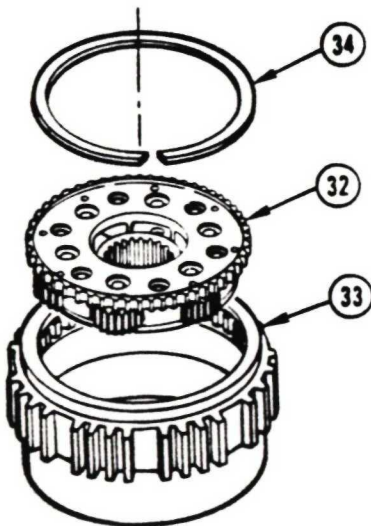


4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 4 OF 19)

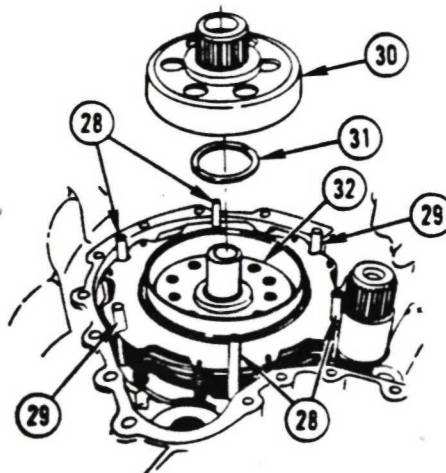
- 19 Using screwdriver, remove seals (20, 21) from brake cam (17).
- 20 Using screwdriver, remove preformed packings (22, 23) from face of brake cam (17).
- 21 Using 7/16 inch socket, remove bolt (24) and two spring tension clips (25) from brake cam (17).
- 22 Remove brake adjusting linkage (19) from brake cam (17).
- 23 Unscrew inner brake adjusting link (26) from outer brake adjusting link (27).

**REPAIR:** Refer to paragraph 4-29 for replacement of pin in inner brake adjusting link (26).

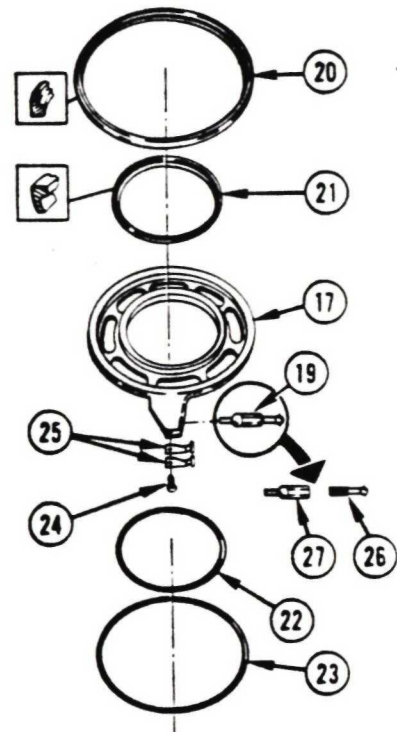
- 24 Remove four brake reaction pins (28).
- 25 Remove spur gear cluster (30).
- 26 Remove thrust washer bearing (31) from output carrier assembly (32) or from underside of spur gear cluster (30).
- 27 Remove output carrier (32), brake clutch drum (33) and retaining ring (34), as an assembly and turn it over for disassembly.



TA485627



TA485626

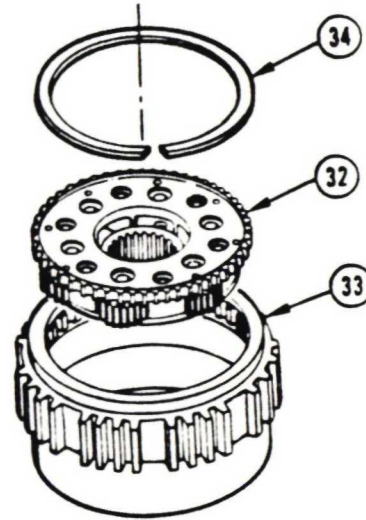


TA485625

Go to Sheet 5

4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 5 OF 19)

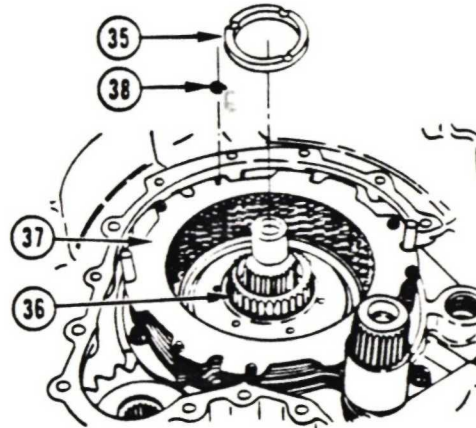
- 28 Remove thrust washer bearing (35) from underside of assembly removed in Step 27 or from left steer and output sun gear (36).
- 29 Using screwdriver, remove retaining ring (34) from brake clutch drum (33).
- 30 Remove output planetary (32) from drum (33).
- 31 With one hand, press downward on clutch disk (37), against spring force, near retaining ring (38). Using long nose pliers, remove retaining ring (38). Using same method, remove five more retaining rings (38).
- 32 Remove disk (37).



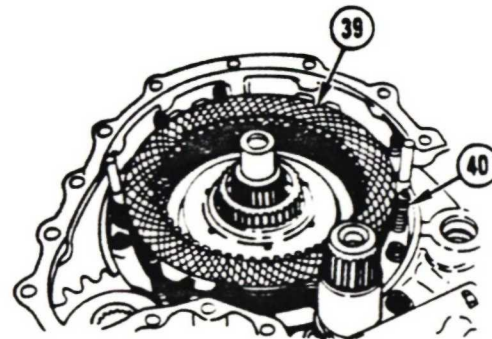
TM485628

**CAUTION**

- When removing, handling, or installing clutch packs, keep all clutch disks and plates in the same order and facing the same way. Under heat and pressure, clutch plates can take on a conical shape, called coning. Each plate will differ in degree of coning. When coned plates are mixed or turned over, they cannot seat properly against each other. This can prevent plates from making adequate surface contact with each other for the clutch pack to operate effectively.
- When one clutch disk or plate needs to be replaced, replace the entire clutch pack. Individual clutch plates should not be replaced, because such new plates will not have the surface contour of adjoining older plates, decreasing effectiveness of the clutch pack.



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- 33 Remove left brake clutch pack (39) consisting of eleven disks and plates.
- 34 Remove six helical compression springs (40).

Go to Sheet 6

4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 6 OF 19)

35 Remove brake coolant seal (41).

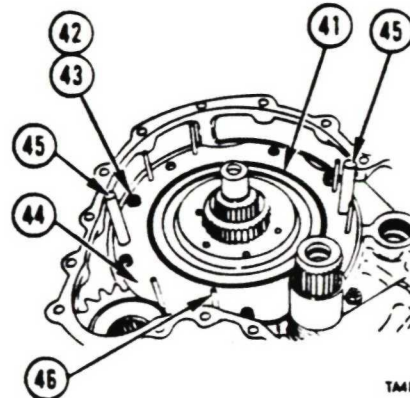
36 Using 9/16 inch socket, remove five bolts (42) and washers (43) which hold brake backing plate (44) to center housing.

**CAUTION**

If pry bars are used in Step 37, use care to not damage inner lip on backing plate (44).

37 Using two pry bars (if necessary), remove plate (44) from large pins (45).

38 Remove six headless straight pins (46).



**FOLLOW-ON PROCEDURE:** Install left brake assembly. Refer to paragraph 4-30.

End of Task 1

**TASK 2. REMOVE LEFT STEER GEAR, LEFT STEER AND OUTPUT SUN GEAR, LEFT OUTPUT SHAFT, AND OUTPUT PUMP DRIVE GEAR**

**TOOLS:**

- Drift pin, 18 inches minimum length
- Hammer, hand, plastic faced
- Puller, gear
- Puller, mechanical bearing, inside jaws (slide hammer)

**NOTE**

Transmission is on maintenance stand, right end up.

**PRELIMINARY PROCEDURE:** Left brake assembly is removed. Refer to this procedure, TASK 1.

Go to Sheet 7



**4-28. DISASSEMBLE CENTER HOUSING**  
(SHEET 7 OF 19)

- 1 Using gear puller (if necessary), remove left steer and output sun gear (1). Remove left steer gear (2).

**REPAIR:** Refer to paragraph 4-29 for replacement of bearings on spur gears (1, 2).

- 2 If possible, lift left output shaft (3) from its bore. If shaft (3) does not lift out, do Step 3. If shaft (3) is removed, go to Step 9.
- 3 If left end cover has not been removed, go to Step 4. If left end cover has been removed, go to Step 5.
- 4 Using slide hammer with tube expander end, remove left output shaft (3). Go to Step 9.
- 5 Using rotary control handle on maintenance stand, turn transmission front upward.
- 6 Insert drift pin through output shaft hole in left side of transmission and through output pump drive gear (4) to bottom of left output shaft (3) in right side of transmission.
- 7 Using hammer, tap drift pin to drive left output shaft (3) from transmission.
- 8 Using rotary control handle on maintenance stand, turn transmission right end upward.

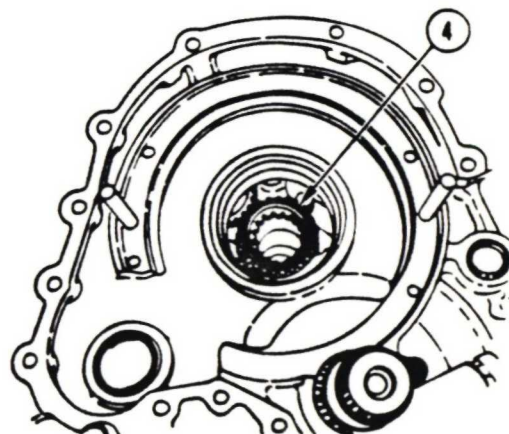
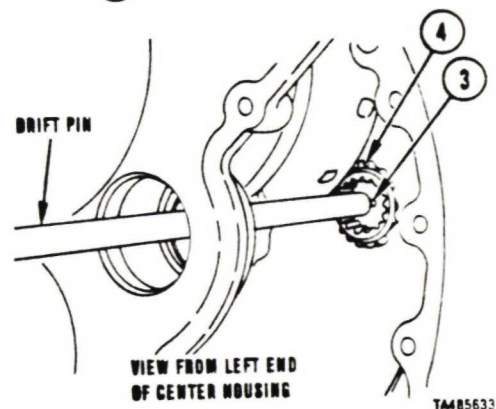
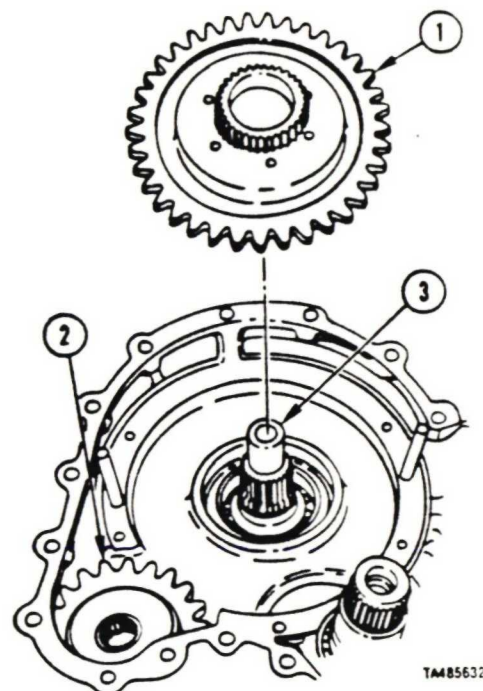
**REPAIR:** Refer to paragraph 4-29 for replacement of bearing on left output shaft (3).

- 9 Remove output pump drive gear (4) from right side of transmission.

**FOLLOW-ON PROCEDURE:** Install output pump drive gear, left output shaft, left steer and output sun gear, and left steer gear. Refer to paragraph 4-30.

End of Task 2

Go to Sheet 8



## 4-28. DISASSEMBLE CENTER HOUSING (SHEET 8 OF 19)

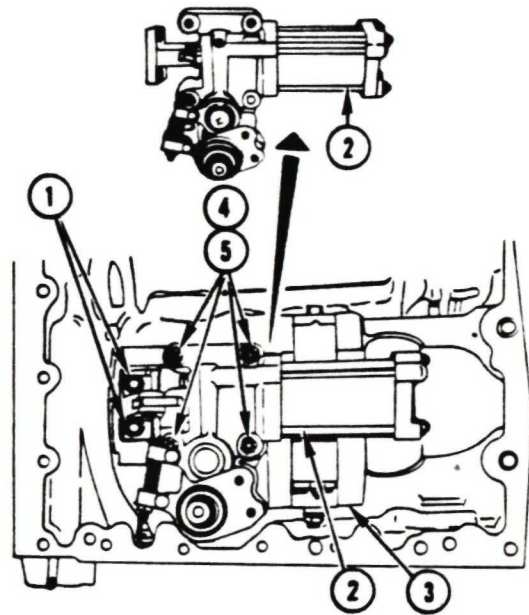
### TASK 3. REMOVE STEER CONTROL ASSEMBLY

#### COMMON TOOLS:

Extension, socket wrench, 3/8 inch square drive, 6 inch  
Handle, socket wrench, 3/8 inch square drive  
Socket, socket wrench, 3/8 inch square drive, 1/2 inch  
Socket Head Screw Attachment, socket wrench,  
3/8 inch square drive, 3/8 inch hex plug end

- 1 Using 3/8 inch socket head screw attachment, remove two socket head screws (1) holding steer control assembly (2) to hydrostat (3).
- 2 Using 1/2 inch socket, remove four bolts (4) and washers (5) holding steer control assembly (2) to hydrostat (3).
- 3 Remove steer control assembly (2) from hydrostat (3).

**FOLLOW-ON PROCEDURE:** Install steer control assembly. Refer to paragraph 4-30.



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End of Task 3

### TASK 4. REMOVE HYDROSTATIC PUMP AND MOTOR ASSEMBLY (HYDROSTAT)

#### COMMON TOOLS:

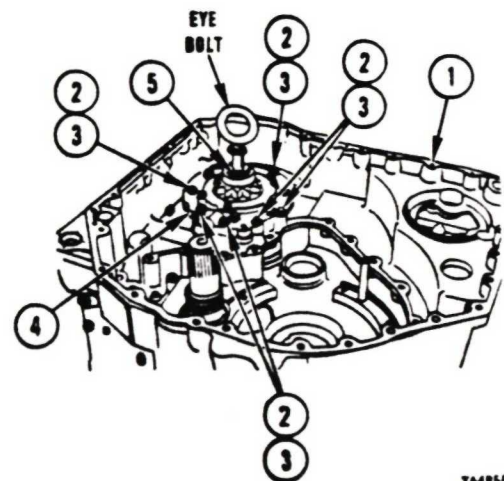
Extension, socket wrench, 3/8 inch square drive, 12 inch  
Handle, socket wrench, 3/8 inch square drive  
Hoist, 100 pound minimum capacity  
Pliers, retaining ring, external  
Socket, socket wrench, 3/8 inch square drive, 9/16 inch

#### SPECIAL TOOLS:

S-hook (19207) 11650102

#### SUPPLIES:

Eyebolt, 7/8-9



TA485636

- 1 Using rotary control handle on maintenance stand, rotate transmission (1) to right end up.
- 2 Using socket, remove six bolts (2) and washers (3) holding hydrostat (4) to transmission (1).
- 3 Install 7/8-9 eyebolt in threaded hole (5) located in center of shaft on hydrostat (4).

Go to Sheet 9

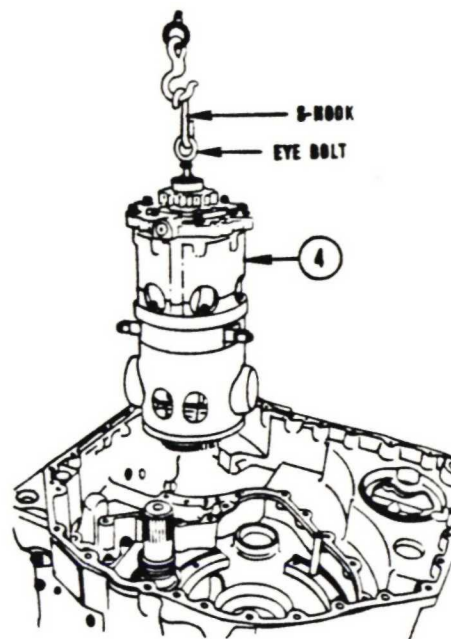


4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 9 OF 19)

- 4 Install S-hook in eyebolt.
- 5 Attach sling to S-hook and raise hydrostat (4) out of transmission (1).
- 6 Lay hydrostat (4) on table and remove sling, S-hook, and eyebolt.

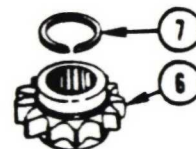
**NOTE**

- o Gears located on each end of hydrostat may be removed when hydrostat is in the transmission, or gears may be removed after hydrostat has been removed from transmission.
- o Hydrostatic drive gear (6) in Step 7 below is located on the end of the hydrostat where the eyebolt was attached.

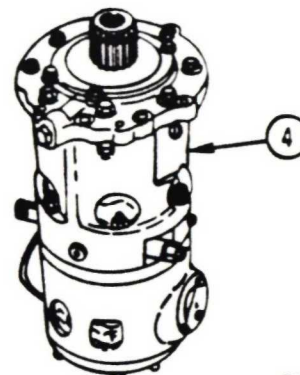


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- 7 Using external retaining ring pliers, remove retaining ring (7) that holds hydrostatic drive gear (6) on hydrostat (4).
- 8 Remove hydrostatic gear (6) from hydrostat (4).



- 9 Using external retaining ring pliers, remove retaining ring (8) that holds hydrostatic gear (9) on hydrostat (4).
- 10 Remove hydrostatic gear (9) from hydrostat (4).

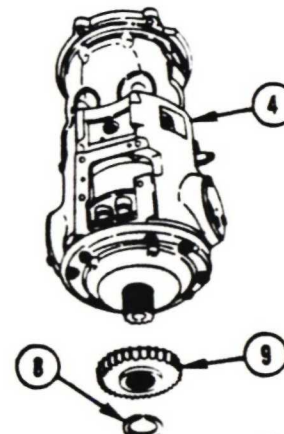


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**FOLLOW-ON PROCEDURE:** Install hydrostatic pump and motor assembly. Refer to paragraph 4-30.

End of Task 4

Go to Sheet 10



TA485639



# 4-28. DISASSEMBLE CENTER HOUSING (SHEET 10 OF 19)

## TASK 5. REMOVE GOVERNOR ASSEMBLY, GOVERNOR BODY ASSEMBLY, AND GOVERNOR DRIVE GEAR

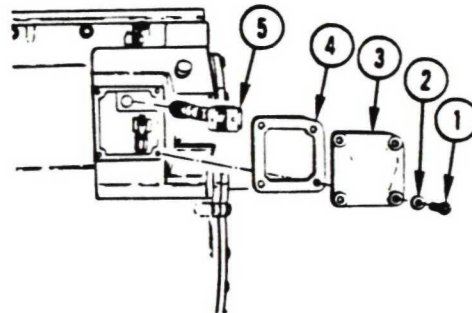
### TOOLS:

Extension, socket wrench, 1/2 inch square drive, 10 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch

### NOTE

Transmission is on maintenance stand, right end up.

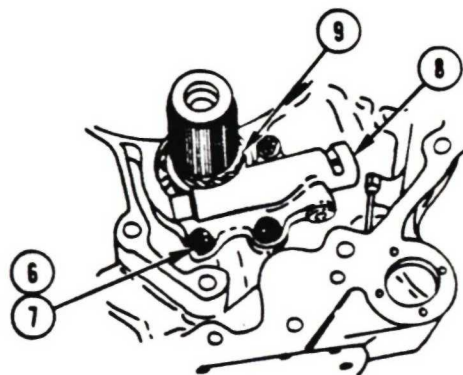
- 1 Using 1/2 inch socket, remove four bolts (1) and washers (2) that retain access cover (3) to center housing.
- 2 Remove cover (3) and gasket (4).
- 3 Turn governor assembly (5) slightly to the left (counterclockwise) and pull it from center housing.



TM 85640

- 4 Using 9/16 inch socket, remove three bolts (6) and washers (7). Remove governor body assembly (8).
- 5 Remove governor drive gear (9).

**FOLLOW-ON PROCEDURE:** Install governor drive gear, governor body assembly, governor assembly, and sleeve spacer. Refer to paragraph 4-30.



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End of Task 5

Go to Sheet 11

4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 11 OF 19)

**TASK 6. REMOVE RANGE PACK**

**TOOLS:**

Adapter, socket wrench, 3/8 to 1/2 inch square drive  
Extension, socket wrench, 1/2 inch square drive, 10 inch  
Extension, socket wrench, 1/2 inch square drive, 6 inch  
Hammer, hand, plastic faced  
Handle, socket wrench, 1/2 inch square drive  
Hoist, 200-pound minimum capacity  
Pliers, long round nose  
Pliers, retaining ring, internal  
Pliers, slip joint, straight nose (2 required)  
Pry Bar (2 required)  
Screwdriver, flat tip (2 required)  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Socket Wrench Attachment, socket head screw, 3/8 inch square drive, 5/32 inch hex plug

**SPECIAL TOOLS:**

Bar and stud assembly (25341) J 24204-2  
Compressor, spring (25341) J 24452  
Lifter, front support assembly (25341) J 24473  
S-hook (19207) 11650102

**SUPPLIES:**

Bolt, 5/16-18 x 1-1/2 inch  
Screws, pitot, 1/4-20 x 3/4 inch (2 required)

**NOTE**

Transmission is on maintenance stand, left end up.

**PRELIMINARY PROCEDURES:**

1. Transmission top components are removed. Refer to paragraph 4-5.
2. Left end cover is removed. Refer to paragraph 4-8.

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-28. DISASSEMBLE CENTER HOUSING  
(SHEET 12 OF 19)

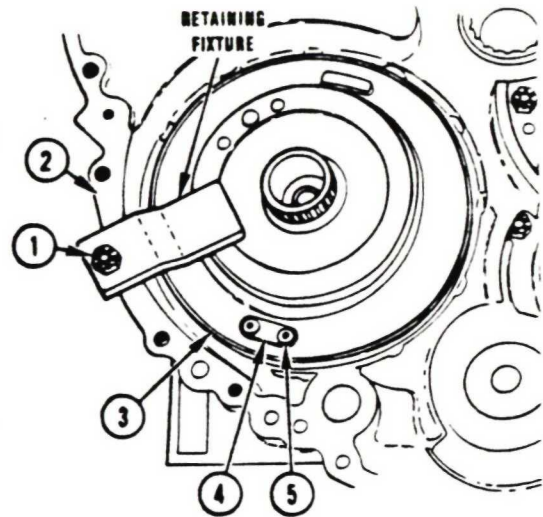
- 1 Using 9/16 socket, remove bolt (1) that holds fabricated retaining fixture to center housing (2).
- 2 Rotate forward clutch housing assembly (3) so that one of the slotted openings is located over pitot (4).
- 3 Using socket head screw attachment, remove two screws (5), tapping tool lightly with hammer, if necessary, to loosen screws.
- 4 Using needle nose pliers, remove pitot (4).
- 5 Remove forward clutch housing assembly (3), wiggling it to free it, if necessary.

REPAIR: Refer to paragraph 4-29 for repair of forward clutch housing assembly (3).

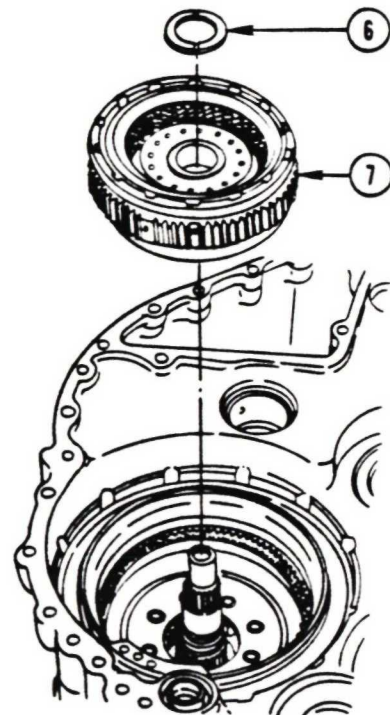
- 6 Remove thrust washer bearing (6).

- 7 Remove fourth and reverse clutch assembly (7).

REPAIR: Refer to paragraph 4-29 for repair of fourth and reverse clutch assembly (7).



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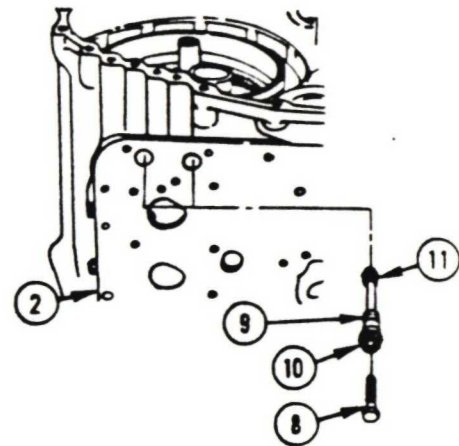
TM485643

Go to Sheet 13

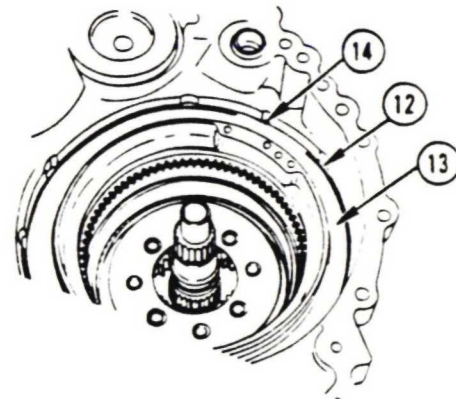


4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 13 OF 19)

- 8 Using fingers, install 5/16-18 x 1-1/2 inch bolt (8) two or three turns into one pitot tube (9).
- 9 Pull tube (9) out of center housing (2).
- 10 Remove preformed packings (10, 11) from tube (9).
- 11 Repeat steps 8, 9 and 10 for other tube (9), then go to step 12.
- 12 Using two screwdrivers, remove retaining ring (12) that retains clutch disk (third clutch backing plate) (13).
- 13 Using two pry bars, gently wiggle backing plate (13) to loosen it. Remove backing plate (13).
- 14 Remove pin (14) which was freed when plate (13) was removed.



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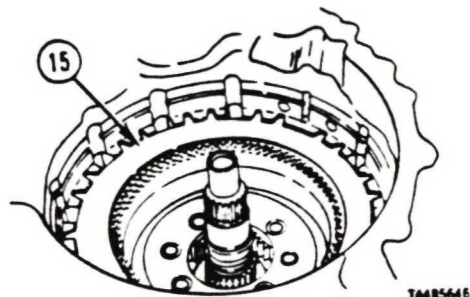
**CAUTION**

- When removing, handling, or installing clutch packs, keep all clutch disks and plates in the same order and facing the same way. Under heat and pressure, clutch plates can take on a conical shape, called coning. Each plate will differ in degree of coning. When coned plates are mixed or turned over, they cannot seat properly against each other. This can prevent plates from making adequate surface contact with each other for the clutch pack to operate effectively.
- When one clutch disk or plate needs to be replaced, replace the entire clutch pack. Individual clutch plates should not be replaced, because such new plates will not have the surface contour of adjoining older plates, decreasing effectiveness of the clutch pack.
- Clutch assemblies function in pairs. When one clutch pack fails, a second clutch pack will often be defective. Failure of one clutch pack requires inspection of all clutch assemblies in the range pack.

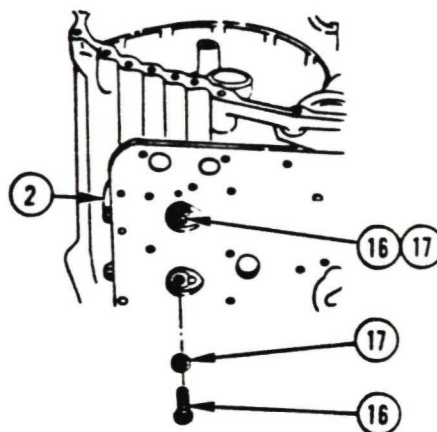
Go to Sheet 14

28. DISASSEMBLE CENTER HOUSING  
(SHEET 14 OF 19)

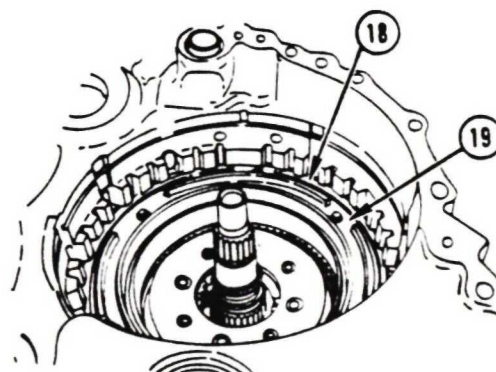
- 15 Remove third clutch pack (15) consisting of three friction disks and four steel reaction disks.



- 16 Using 9/16 inch socket and extension, remove two bolts (16) and washers (17) that retain clutch housings in center housing (2).



- 17 Using two screwdrivers, remove retaining ring (18) that retains third clutch piston housing (19).



- 18 Using two pry bars, gently wiggle piston housing (19) to loosen it. Remove piston housing (19).

**REPAIR:** Refer to paragraph 4-29 for repair of third clutch piston housing (19).

Go to Sheet 15

4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 15 OF 19)

19 Remove front carrier assembly (20).

20 Remove thrust washer (21) from inside carrier assembly (20).

21 Remove thrust washer (22) from underside of carrier assembly (20) or from top of center carrier assembly (23).

22 Using two screwdrivers, remove retaining ring (24) that retains second clutch pack (25).

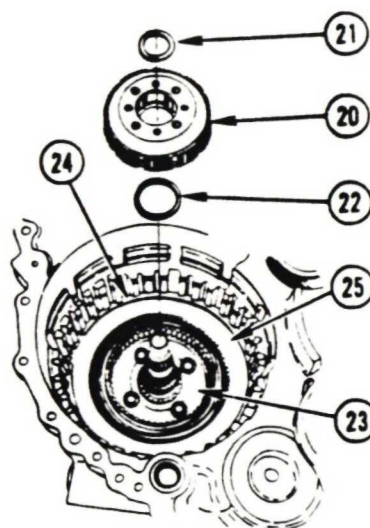
23 Remove second clutch pack (25) consisting of four friction disks and five steel reaction disks.

24 Using two screwdrivers, remove retaining ring (26) that retains second clutch piston housing assembly (27).

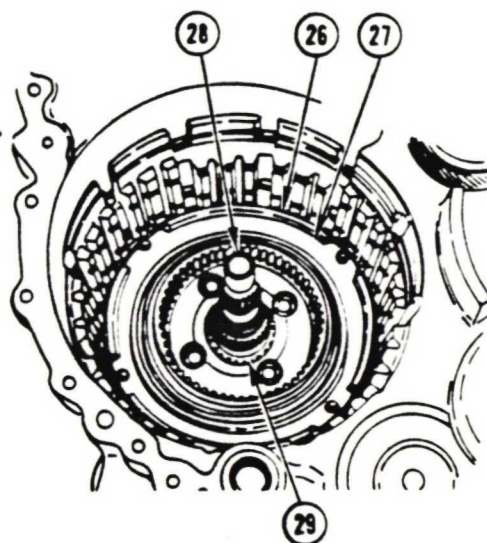
25 Put front support assembly lifter tool J 24473 over end of shouldered shaft (range input shaft) (28) and put lower end of tool in groove below splined area of center sun gear (29).

26 Using thumb screw on tool, tighten bottom of lifting tool in groove.

27 Install S-hook in top of lifting tool.



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Go to Sheet 16

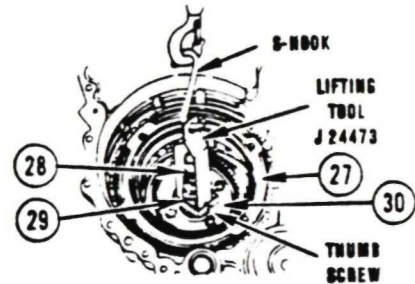


**-28. DISASSEMBLE CENTER HOUSING  
(SHEET 16 OF 19)**

28 Using hoist, S-hook and lifting tool, raise range input shaft (28) and attached center carrier assembly (30) until second clutch piston housing assembly (27) is high enough to get hands under it.

29 Lower range input shaft (28) and center carrier assembly (30) into transmission.

30 Remove hoist and S-hook from lifting tool.



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**NOTE**

Second clutch piston housing assembly (27) has to be pulled upward (one side, then the other) using two hands, to get it free.

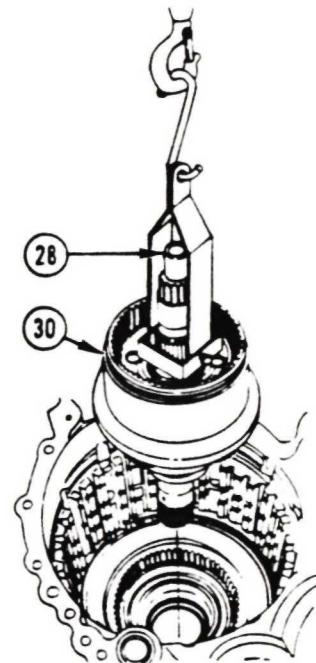
31 Remove second clutch piston housing assembly (27).

**REPAIR:** Refer to paragraph 4-29 for repair of second clutch piston housing assembly (27).

32 Reattach S-hook and hoist to lifting tool and remove range input shaft (28) and center carrier assembly (30).

33 Remove S-hook and lifting tool from shaft (28).

**REPAIR:** Refer to paragraph 4-29 for repair of range input shaft (28).



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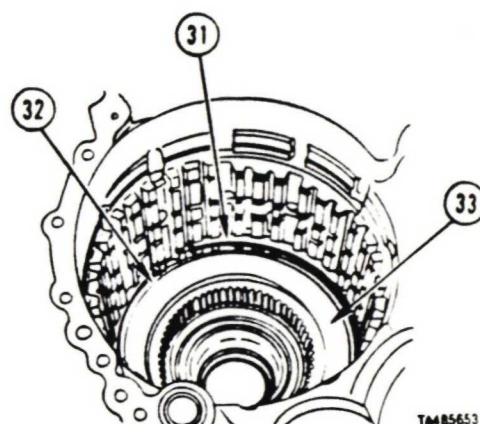
Go to Sheet 17

4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 17 OF 19)

- 34 Using two screwdrivers, remove two retaining rings (31, 32).

**NOTE**

To keep all of clutch pack (34) together and in proper order, reach inside internal gear (35) and back under entire clutch pack (34). If gear (35) only is pulled out, three clutch disks will remain in transmission.



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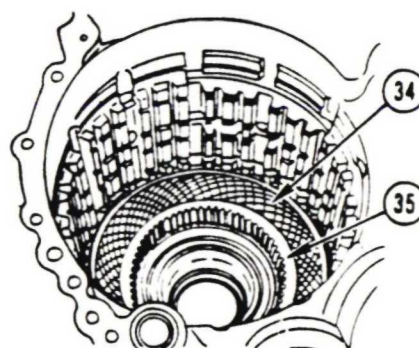
- 35 Remove backing plate (33) and first clutch pack (34) consisting of nine disks, along with internal gear (35).

- 36 Remove wing nut from bar and stud assembly J 24204-2 and compressor J 24452.

- 37 Put tool J 24204-2 inside transmission through first clutch piston assembly (36) in range pack bore and hold with one hand.

- 38 With other hand, install spring compressor tool J 24452 over stud, then install wing nut.

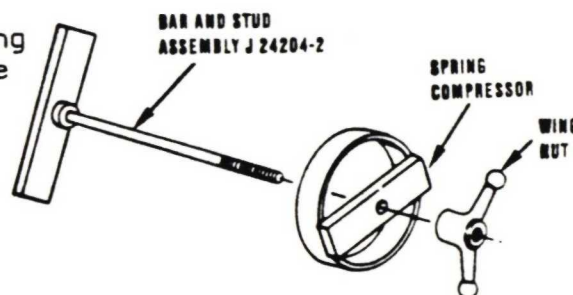
- 39 Turn wing nut on spring compressor until piston spring retainer ring (37) is compressed enough to take force from retaining ring (38).



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**NOTE**

When removed from groove, retaining ring (38) will remain under spring compressor tool until tool is removed.

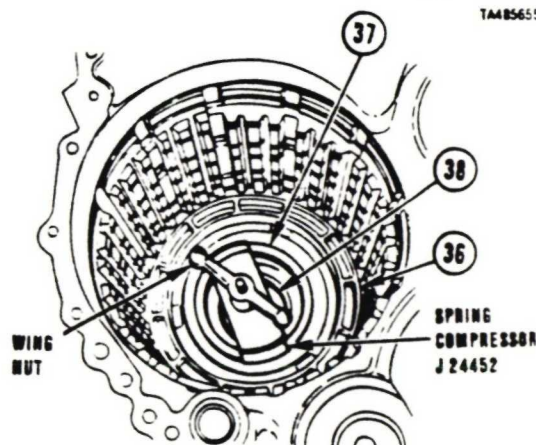


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- 40 Using internal retaining ring pliers, reach through opening in spring compressor tool and remove retaining ring (38) from its groove.

- 41 Remove wing nut and remove spring compressor.

- 42 Remove retaining ring (38) and piston spring retainer (37).



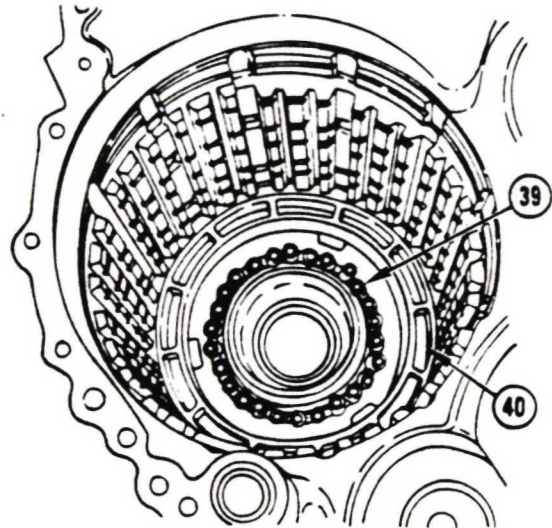
TA485656

Go to Sheet 18

28. DISASSEMBLE CENTER HOUSING  
(SHEET 18 OF 19)

43 Remove 26 springs (39).

44 Using two pairs of slip joint pliers, grasp cross members on first clutch piston (40) at two points, 180 degrees apart, and remove piston.

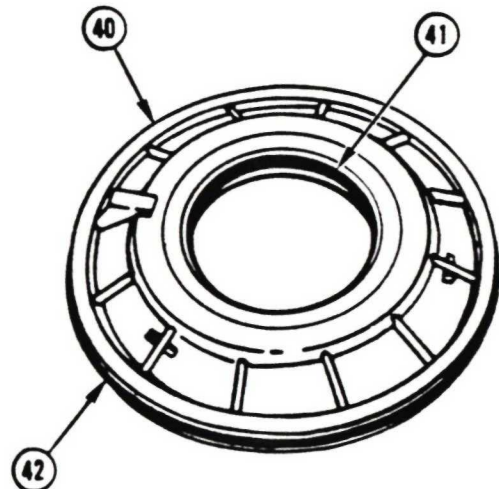


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45 Turn first clutch piston (40) over.

46 Remove preformed packings (41, 42) from first clutch piston (40).

**FOLLOW-ON PROCEDURE:** Install range pack. Refer to paragraph 4-30.



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End of Task 6

Go to Sheet 19



4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 19 OF 19)

TASK 7. REMOVE IDLER GEAR ASSEMBLY

TOOLS:

- Extension, socket wrench, 1/2 inch square drive, 6 inch
- Handle, socket wrench, 1/2 inch square drive
- Socket, socket wrench, 1/2 inch square drive, 9/16 inch

SUPPLIES:

- Bolt, 5/16-18 x 1 inch (2 required)

NOTE

Transmission is on maintenance stand, left end up.

PRELIMINARY PROCEDURE: Left end cover is removed. Refer to paragraph 4-8.

- 1 Using socket and extension, remove six bolts (1) and washers (2) that retain bearing retaining plate (3) to center housing.
- 2 Using socket and extension, install two 3/8-16 x 1 inch bolts (4) in jacking holes (5) in retainer (3). Tighten bolts evenly until retainer loosens.

NOTE

Outer race of bearing, located on top of hydrostatic pump idler gear, will come off with retainer.

- 3 Remove retaining plate (3).
- 4 Remove jack bolts (4).

NOTE

Outer race of bearing, located under hydrostatic pump idler gear, remains in center housing.

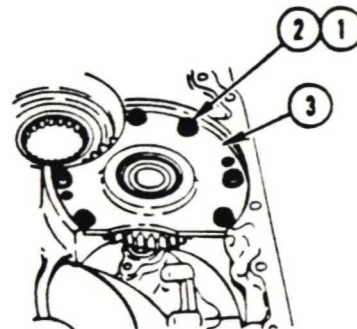
- 5 Remove hydrostatic pump idler gear (6).

REPAIRS:

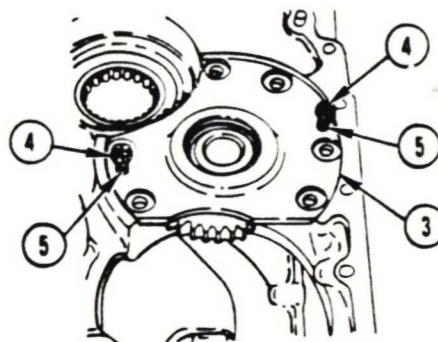
- Refer to paragraph 4-29 for replacement of bearings on idler gear (6).
- Refer to paragraph 4-29 for repair of center housing.

FOLLOW-ON PROCEDURE: Install left idler gear assembly. Refer to paragraph 4-30.

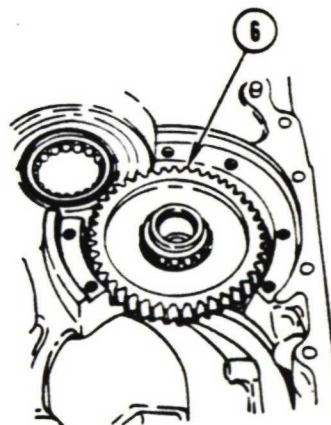
End of Task 7



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-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 1 OF 31)

Task	Title	Page
1	Repair Left Brake Support	4-191
2	Replace Inner Brake Adjusting Link Pin	4-194
3	Replace Bearings on Spur Gears and Shafts	4-195
4	Repair Forward Clutch Housing Assembly	4-198
5	Repair 4th and Reverse Clutch Housing Assembly	4-202
6	Repair Clutch Piston Housing Assembly	4-206
7	Replace Range Input Shaft Components	4-208
8	Repair Center Housing	4-212

# TASK 1. REPAIR LEFT BRAKE SUPPORT

## NOTE

Do not remove left brake support components unless repair is necessary.

## COMMON TOOLS:

Chisel, cold  
Driver, needle bearing  
Gage, vernier caliper  
Gloves, leather  
Hammer, hand, ball peen  
Heat Gun (2 required)  
Pliers, retaining ring, external  
Press, arbor, hand operated  
Rotary Tool Kit, electric

## SUPPLIES:

Dry Ice (Item 4, Appendix C)  
Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURES:** Left brake support is removed. Refer to paragraph 4-28.

## PERSONNEL REQUIRED: 2

- One soldier holds housing steady.
- One soldier removes bearing race.

Remove Left Brake Support Components

## WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

Go to Sheet 2

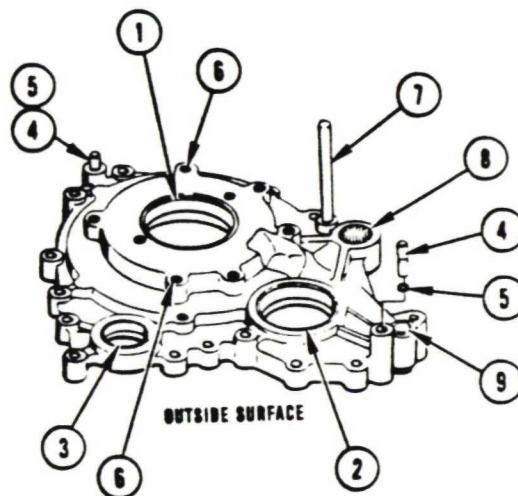
4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 2 OF 31)

NOTE

Left brake support has bearing races (1, 2, 3) in place. These are for bearings on output driven gear, output drive gear, and steer gear. Each of these separable bearings is a matched set consisting of an outer race and an inner race and rollers. DO NOT REPLACE these three inner races unless the outer races and rollers of the respective bearings are also being replaced. Refer to paragraph 4-7 for removal of the inner races and rollers.

**CAUTION**

Use care not to cut into brake support when using grinder to cut slots in bearing race.



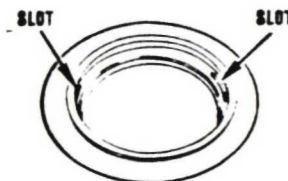
TA485662

- 1 Using grinder, cut two slots 180 degrees apart at base of bearing races (1, 2, 3). Cut slots deep enough to catch the end of the chisel, but not deep enough to cut into brake support.

- 2 Using two heat guns, heat brake support around bearing races (1, 2, 3) for 15 minutes.

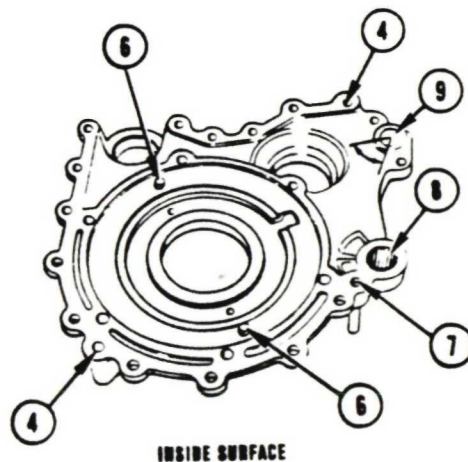
**CAUTION**

Use care not to damage brake support when using hammer and chisel to remove races.



TA485663

- 3 Turn brake support over. Using hammer and chisel, drive out races (1, 2, 3).
- 4 Using arbor press, remove two headless straight pins (4). Using retaining ring pliers, remove two retaining rings (5) from pins (4).
- 5 Using arbor press, remove two headless straight pins (6).
- 6 Using arbor press, remove headless straight pin (7).
- 7 Using arbor press, remove needle roller bearing (8).
- 8 Using arbor press, remove valve plug (9).



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Go to Sheet 3



## 29. REPAIR CENTER HOUSING COMPONENTS (SHEET 3 OF 31)

### Install Left Brake Support Components

- 9 Check brake support for damage. Smooth out scratches with crocus cloth. If grinding damage is present, replace support.

#### CAUTION

When installed, plug (9) scribe line must lie within 60 degree sector between raised lines in brake support casting.

- 10 Using arbor press, install valve plug (9) flush to 0.010 inch (0.25 mm) below inside surface of brake support.
- 11 Using arbor press and bearing driver, press driver against the numbered end of bearing (8) to install it. Press bearing (8) to a depth of 0.310-0.320 inch (7.88-8.12 mm) below inside surface of brake support.
- 12 Using arbor press, install pin (7) to a height of 2.88- 2.92 inches (73.2-74.1 mm) above outside surface of brake support.
- 13 Using arbor press, install two pins (6) to a height of 0.240 inch (6.10 mm) above inside surface of brake support.
- 14 Using retaining ring pliers, install two retaining rings (5) onto two pins (4).
- 15 Using arbor press, install two pins (4) to a height of 1.01-1.05 inch (25.7-26.6 mm) above outside surface of brake support.

#### WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

- 16 Using two heat guns, heat brake support near locations for bearing races (1, 2, 3) for one hour.

#### WARNING

Frozen parts can stick to your fingers and cause serious injury. Always wear leather gloves when working with parts that have been frozen in dry ice.

- 17 Freeze new bearing races (1, 2, 3) in dry ice for one hour.
- 18 Using arbor press, install new bearing races (1, 2, 3) into outside bores in brake support to a firm seat against the shoulders in the bores.
- 19 Allow brake support to return to room temperature.

**FOLLOW-ON PROCEDURE:** Install left brake support. Refer to paragraph 4-30.

End of Task 1

Go to Sheet 4

4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 4 OF 31)

TASK 2. REPLACE INNER BRAKE ADJUSTING LINK PIN

NOTE

Do not remove inner brake adjusting link pin unless replacement is necessary.

COMMON TOOLS:

Gage, vernier caliper  
Hammer, hand, ball peen  
Punch, center  
Vise, soft jaw

REPAIR PARTS:

Pin, spring (24617) 455675

SUPPLIES:

Rag, wiping (Item 15, Appendix C)

PRELIMINARY PROCEDURES: Inner brake adjusting link is removed. Refer to paragraph 4-28.

Remove Pin

- 1 Place inner brake adjusting link (1) in vise.
- 2 Using hammer and punch, drive pin (2) from link (1).

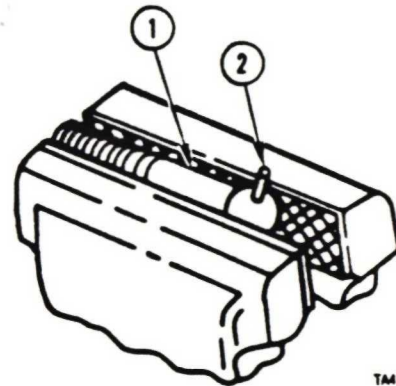
Install Pin

- 3 Using hammer and punch, install new pin (2) to a height of 0.118-0.138 inch (3.00-3.50 mm) above surface of link (1).
- 4 Remove link (1) from vise.

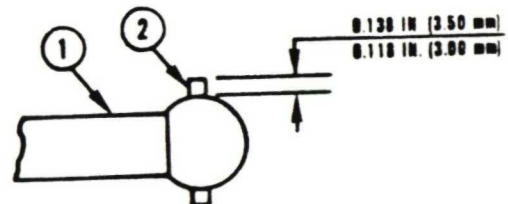
FOLLOW-ON PROCEDURE: Install inner brake adjusting link. Refer to paragraph 4-30.

End of Task 2

Go to Sheet 5



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TA485666

## 29. REPAIR CENTER HOUSING COMPONENTS (SHEET 5 OF 31)

### TASK 3. REPLACE BEARINGS ON SPUR GEARS AND SHAFTS

#### NOTE

Do not remove bearings unless replacement is necessary.

#### COMMON TOOLS:

Gloves, leather  
Gun, heat (2 required)  
Hammer, hand, ball peen  
Press, arbor, hand operated  
Puller, bearing  
Punch, 1/4 inch round tip  
Screwdriver, flat tip

**PRELIMINARY PROCEDURES:** Left steer and output sun gear and bearing are removed.  
Left steer shaft and bearing are removed. Idler gear and bearings are removed. Refer to paragraph 4-28.

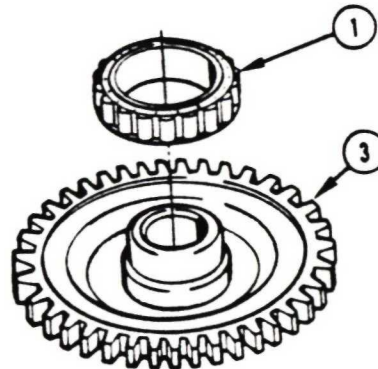
#### NOTE

Outer races for bearings (1, 2) stay in center housing when the spur gears are removed. Each of these separable bearings is a matched set consisting of an outer race and an inner race and rollers. **DO NOT REPLACE** these inner races and rollers unless the outer races of the respective bearings are also being replaced. Refer to this paragraph, TASK 8, for removal of the outer races.

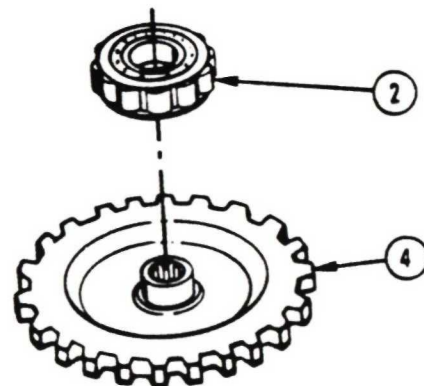
#### Remove Bearings

- 1 Using hammer and punch, remove bearing (1) from left steer and output sun gear (3).
- 2 Using hammer and punch, remove bearing (2) from left steer gear (4).

Go to Sheet 6



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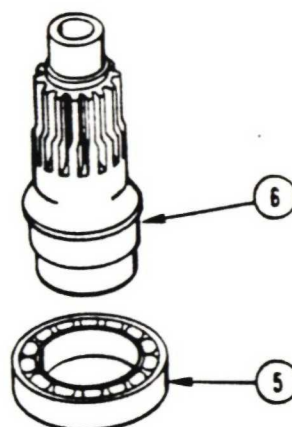


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4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 6 OF 31)

- 3 Using arbor press, remove bearing (5) from output shaft (6).



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NOTE

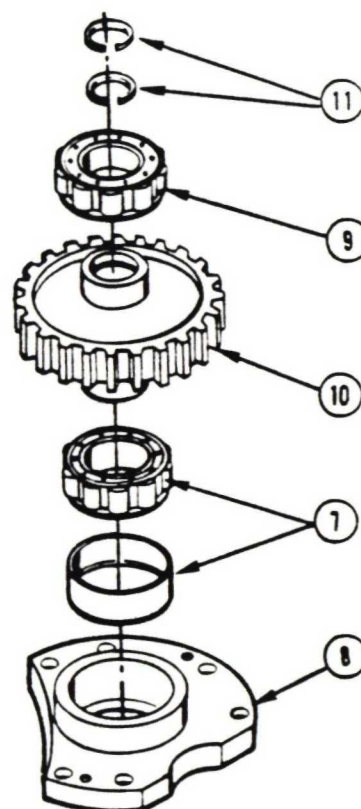
Outer race for bearing (7) stays in retaining plate (8) and outer race for bearing (9) stays in center housing when idler gear (10) is removed. Each of these separable bearings is a matched set consisting of an outer race and an inner race and rollers. DO NOT REPLACE these inner races and rollers unless the outer races of the respective bearings are also being replaced. Refer to this paragraph, TASK 5, for removal of the outer race of bearing (9).

- 4 Using screwdriver, remove two retaining rings (11).  
5 Using bearing puller, remove inner race and rollers of bearings (7, 9) from idler gear (10).

**WARNING**

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

- 6 Using two heat guns, heat retaining plate (8) for one hour.  
7 Using arbor press, press outer race of bearing (7) from retaining plate (8).



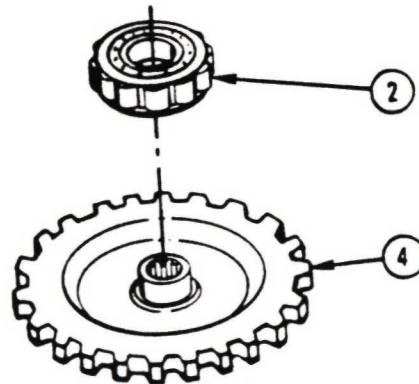
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Go to Sheet 7

# 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 7 OF 31)

## Install Bearings

- 8 Using two heat guns, heat retaining plate (8) for one hour.
- 9 Using arbor press, press new outer race of bearing (7) to a seat in shoulder of retaining plate (8).
- 10 Using arbor press, press against the numbered end of bearing (7) to install inner race and rollers of bearing (7) to a seat against the shoulder of gear (10).
- 11 Using arbor press, press against the numbered end of bearing (9) to install inner race and rollers of bearing (9) to a seat against the shoulder of gear (10).
- 12 Using screwdriver, install two retaining rings (11).
- 13 Using arbor press, install bearing (5) to a seat against shoulder on output shaft (6).

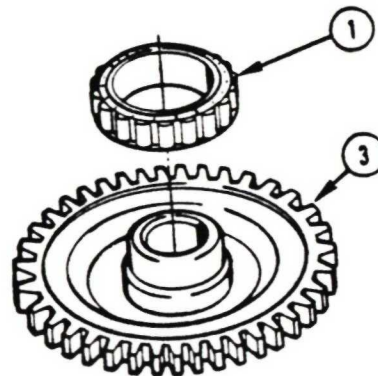


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- 14 Using arbor press, install bearing (2) to a seat against shoulder on left steer gear (4).

- 15 Using arbor press, install bearing (1) to a seat against shoulder on left steer and output sun gear (3).

**FOLLOW-ON PROCEDURE:** Install left steer and output sun gear and bearing. Install left steer gear and bearing. Install left output shaft and bearing. Install idler gear and bearings. Refer to paragraph 4-30.



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End of Task 3

Go to Sheet 8

4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 8 OF 31)

TASK 4. REPAIR FORWARD CLUTCH HOUSING ASSEMBLY

COMMON TOOLS:

- Pliers, retaining ring, external
- Screwdriver, flat tip (2 required)
- Wrench, combination, 3/4 inch

SPECIAL TOOLS:

- Bar and Stud Assembly (25341) J 24204-2
- Clutch Spring Compressor (25341) J 23616
- Fixture Assembly, Leak Test (19207) 11650178
- Inner Seal Protector (25341) J 21362

SUPPLIES:

- Lubricating Oil (Item 10, Appendix C)
- Petrolatum (Item 14, Appendix C)
- Rag, wiping (Item 15, Appendix C)

REPAIR PARTS:

- Seal, inner (73342) 8623102
- Seal, outer (73342) 8623101

CAUTION

- When removing, handling, or installing clutch pack, keep all clutch disks and plates in the same order and facing the same way. Under heat and pressure, clutch plates can take on a conical shape, called coning. Each plate will differ in degree of coning. When coned plates are mixed or turned over, they cannot seat properly against each other. This can prevent plates from making adequate surface contact with each other for the clutch pack to operate effectively.
- When one clutch disk or plate needs to be replaced, replace the entire clutch pack. Individual clutch plates should not be replaced because such new plates will not have the surface contour of adjoining older plates, decreasing effectiveness of the clutch pack.
- Clutch assemblies function in pairs. When one clutch pack fails, a second clutch pack will often be defective. Failure of one clutch pack requires inspection of all clutch assemblies in the range pack.

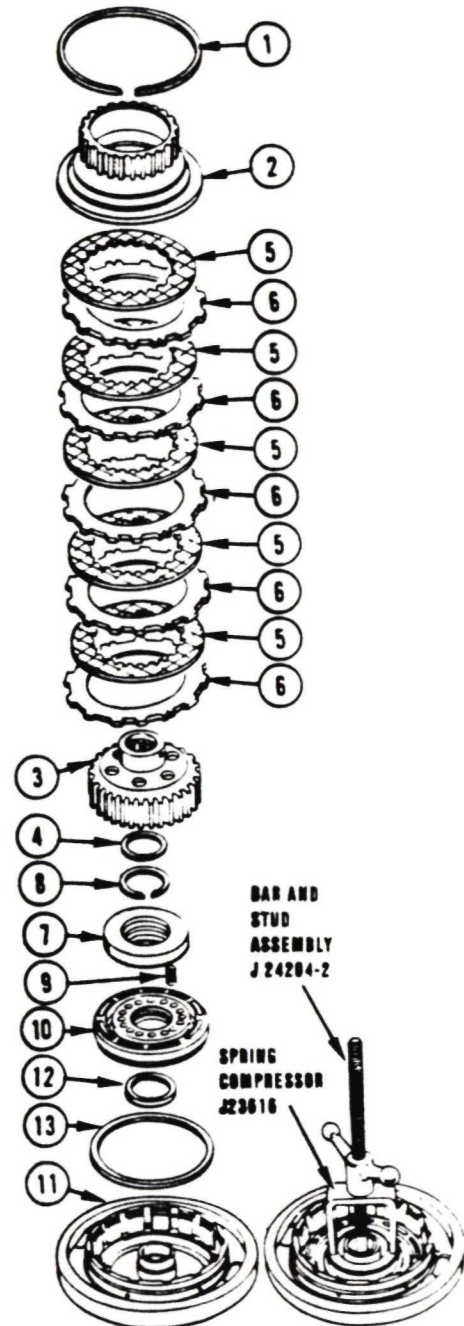
Go to Sheet 9



# 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 9 OF 31)

## Remove Forward Clutch Housing Assembly Components

- 1 Using two screwdrivers, remove retaining ring (1).
- 2 Remove clutch assembly (hub) (2).
- 3 Remove body hub (3).
- 4 Remove thrust washer (4).
- 5 Remove clutch pack consisting of five clutch disks (friction-faced clutch plates) (5) and five clutch disks (clutch reaction plates) (6).
- 6 Using wrench and bar and stud assembly J 24204-2 and clutch spring compressor J 23616, compress retaining plate (7) to gain access to retaining ring (8).
- 7 Using retaining ring pliers, remove retaining ring (8).
- 8 Remove bar and stud assembly and spring compressor from housing.
- 9 Remove retaining plate (7).
- 10 Remove sixteen compression helical springs (9).
- 11 Using retaining ring pliers in spring holes of piston (10), remove piston (10) from clutch housing (11).
- 12 Remove inner seal (12) and outer seal (13) from piston (10).



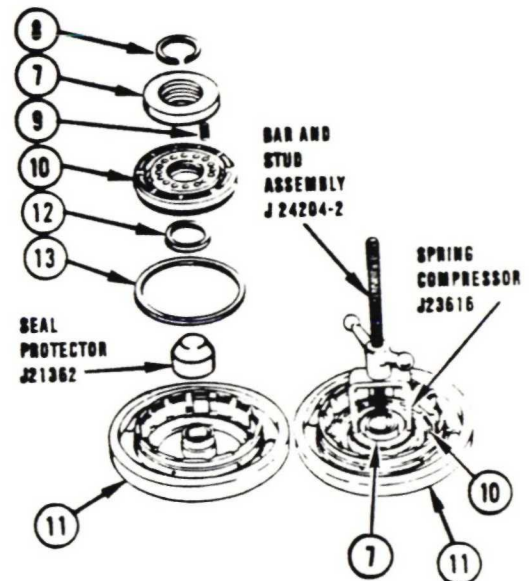
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Go to Sheet 10

4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 10 OF 31)

Install Clutch Housing Assembly Components

- 13 Install new outer seal (13) and new inner seal (12) onto piston (10). Coat seals (12, 13) with petrolatum.
- 14 Coat inside surface of clutch housing (11) with light coat of petrolatum.
- 15 Install inner seal protector J 21362 over hub of clutch housing (11). Coat seal protector J 21362 with light coat of petrolatum.
- 16 Install piston (10), spring holes upward, into clutch housing (11).
- 17 Remove inner seal protector J 21362.
- 18 Install sixteen springs (9) into spring holes in piston (10).
- 19 Install retaining plate (7) over springs (9).
- 20 Lay retaining ring (8) in place on retaining plate (7).
- 21 Using wrench and bar and stud assembly J 24204-2 and clutch spring compressor J 23616, compress retaining plate (7) against spring force to access groove for retaining ring (8).
- 22 Using retaining ring pliers, install retaining ring (8).
- 23 Remove bar and stud assembly and clutch spring compressor.



Go to Sheet 11

## 29. REPAIR CENTER HOUSING COMPONENTS (SHEET 11 OF 31)

- 24 Coat thrust washer (4) with petrolatum. Install thrust washer (4) in under side of body hub (3).
- 25 Install body hub (3) over retaining plate (7).
- 26 Soak five friction-faced clutch plates (5) in lubricating oil for two minutes prior to assembly.
- 27 Install one reaction clutch plate (6), then one friction-faced clutch plate (5). Continue until all five plates (6) and five plates (5) are installed.
- 28 Install clutch assembly (hub) (2).
- 29 Using screwdriver, install retaining ring (1).

### Check Assembled Clutch for Damaged Seals

- 30 Apply petrolatum onto two seals (14) on smaller hub of the leak test fixture assembly. Install the fixture all the way into clutch assembly (15).

#### WARNING

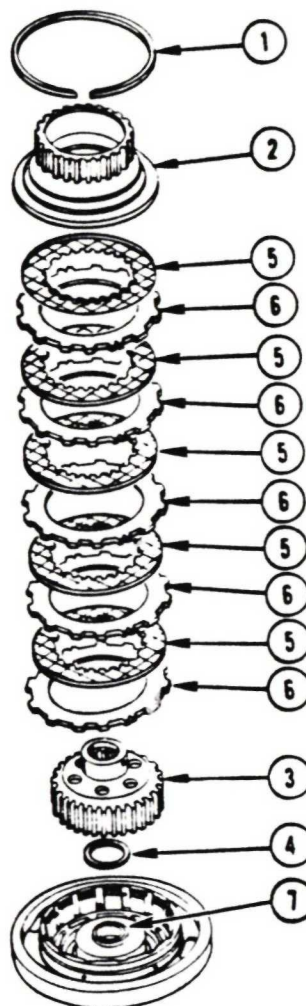
Compressed air used for testing purposes must not exceed 30 pounds of pressure per square inch. Use only with effective chip guards and protective personal equipment including goggles or face shield and gloves. Never blow compressed air toward another person.

- 31 Connect air hose (16) to coupling (17) and try to turn hub (3). If hub (3) can be turned, repeat Steps 1 through 29 to replace damaged seals. If hub (3) will not turn, the clutch assembly is OK.

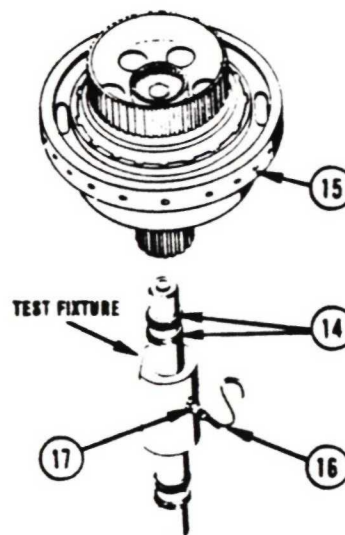
**FOLLOW-ON PROCEDURE:** Install forward clutch housing assembly. Refer to paragraph 4-30.

End of Task 4

Go to Sheet 12



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4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 12 OF 31)

TASK 5. REPAIR 4TH AND REVERSE CLUTCH HOUSING ASSEMBLY

COMMON TOOLS:

- Pliers, retaining ring, external
- Screwdriver, flat tip (2 required)
- Wrench, combination, 3/4 inch

SPECIAL TOOLS:

- Bar and Stud Assembly (25341) J 24204-2
- Clutch Spring Compressor (25341) J 23616
- Fixture Assembly, Leak Test (19207) 11650178
- Inner Seal Protector (25341) J 21362

SUPPLIES:

- Lubricating Oil (Item 10, Appendix C)
- Petrolatum (Item 14, Appendix C)
- Rag, wiping (Item 15, Appendix C)

REPAIR PARTS:

- Seal, inner (73342) 8623102
- Seal, outer (73342) 8623101

CAUTION

- When removing, handling, or installing clutch pack, keep all clutch disks and plates in the same order and facing the same way. Under heat and pressure, clutch plates can take on a conical shape, called coning. Each plate will differ in degree of coning. When coned plates are mixed or turned over, they cannot seat properly against each other. This can prevent plates from making adequate surface contact with each other for the clutch pack to operate effectively.
- When one clutch disk or plate needs to be replaced, replace the entire clutch pack. Individual clutch plates should not be replaced because such new plates will not have the surface contour of adjoining older plates, decreasing effectiveness of the clutch pack.
- Clutch assemblies function in pairs. When one clutch pack fails, a second clutch pack will often be defective. Failure of one clutch pack requires inspection of all clutch assemblies in the range pack.

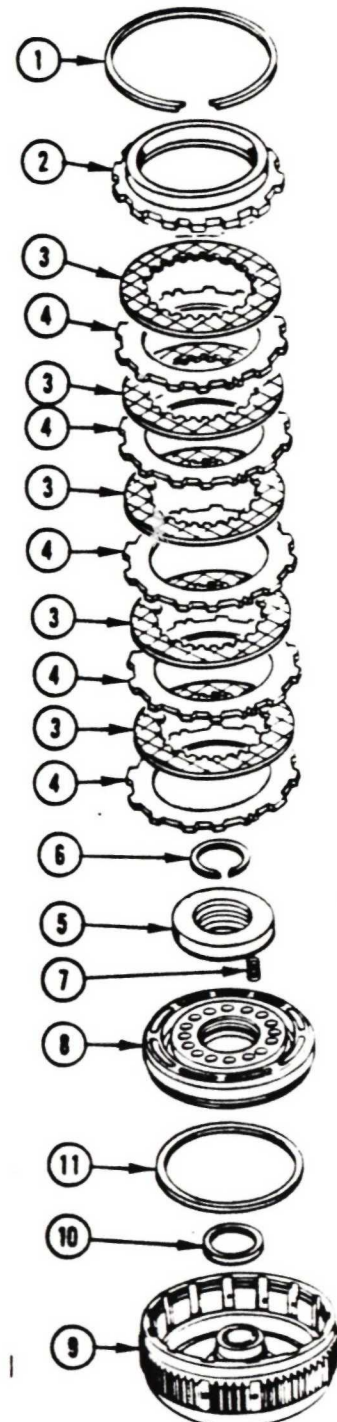
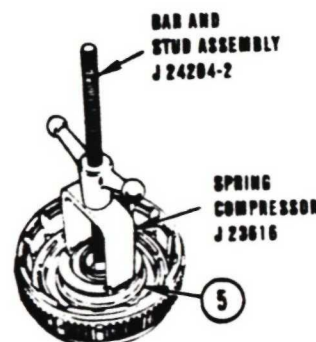
Go to Sheet 13

# 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 13 OF 31)

## Remove Clutch Housing Assembly Components

- 1 Using two screwdrivers, remove retaining ring (1).
- 2 Remove clutch disk (backing plate) (2).
- 3 Remove clutch pack consisting of five clutch disks (friction-faced clutch plates) (3) and five clutch disks (reaction clutch plates) (4).
- 4 Using wrench and bar and stud assembly J 24204-2 and clutch spring compressor J 23616, compress retaining plate (5) to gain access to retaining ring (6).
- 5 Using retaining ring pliers, remove retaining ring (6).
- 6 Remove bar and stud assembly and spring compressor from housing.
- 7 Remove retaining plate (5).
- 8 Remove sixteen compression helical springs (7).
- 9 Using retaining ring pliers in spring holes of piston (8), remove piston (8) from clutch housing (9).
- 10 Remove inner seal (10) and outer seal (11) from piston (8).

Go to Sheet 14

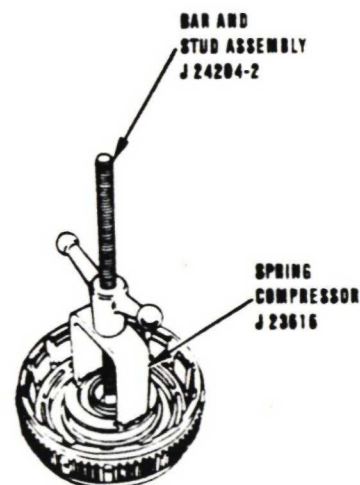
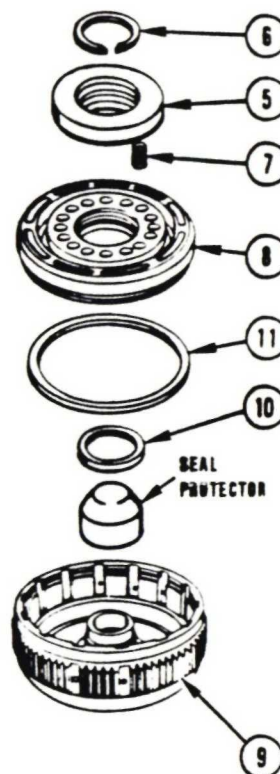


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**4-29. REPAIR CENTER HOUSING COMPONENTS**  
(SHEET 14 OF 31)

**Install 4th and Reverse Clutch Housing Assembly Components**

- 11 Install new outer seal (11) and new inner seal (10) onto piston (8). Coat seals (10, 11) with petrolatum.
- 12 Coat clutch housing (9) surface with light coat of petrolatum.
- 13 Install inner seal protector J 21362 over hub of housing assembly (9). Coat seal protector J 21362 with light coat of petrolatum.
- 14 Install piston (8), spring holes upward, into clutch housing (9).
- 15 Remove seal protector J 21362.
- 16 Install sixteen springs (7) into spring holes in piston (8).
- 17 Install retaining plate (5) over springs (7).
- 18 Lay retaining ring (6) in place on retaining plate (5).
- 19 Using wrench and bar and stud assembly J 24204-2 and clutch spring compressor J 23616, compress retaining plate (5) against spring force to access groove for retaining ring (6).
- 20 Using retaining ring pliers, install retaining ring (6).
- 21 Remove bar and stud assembly and clutch spring compressor.



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Go to Sheet 15



29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 15 OF 31)

- 22 Soak five friction-faced clutch plates (3) in lubrication oil for two minutes prior to assembly.
- 23 Install one reaction clutch plate (4), then one friction-faced clutch plate (3). Continue until all five plates (4) and five plates (3) are installed.
- 24 Install backing plate (2).
- 25 Using screwdriver, install retaining ring (1).

Check Assembled Clutch for Damaged Seals

- 26 Apply petrolatum onto two seals (12) on larger hub of the leak test fixture assembly. Install the fixture all the way into clutch assembly (13).

**WARNING**

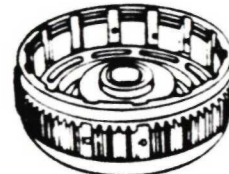
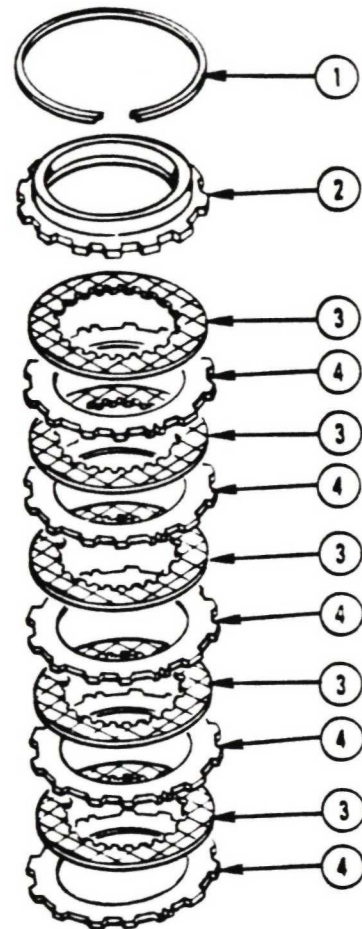
Compressed air used for testing purposes must not exceed 30 pounds of pressure per square inch. Use only with effective chip guards and protective personal equipment including goggles or face shield and gloves. Never blow compressed air toward another person.

- 27 Connect air hose (14) to coupling (15) and watch for plates (3) and (4) to press together. If the plates did not press together, repeat Steps 1 through 25 to replace the damaged seals. If plates moved, the clutch assembly is OK.

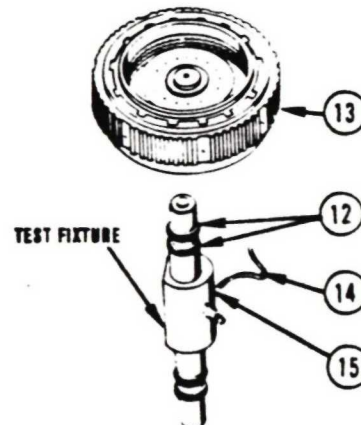
**FOLLOW-ON PROCEDURE:** Install 4th and reverse clutch housing assembly. Refer to paragraph 4-30.

End of Task 5

Go to Sheet 16



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4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 16 OF 31)

TASK 6. REPAIR CLUTCH PISTON HOUSING ASSEMBLY

PRELIMINARY PROCEDURE: Clutch piston housing assemblies removed. Refer to paragraph 4-28.

COMMON TOOLS:

Pliers, diagonal, cutting  
Screwdriver, large flat tip

SPECIAL TOOLS:

Lock Ring Installer (25341) J 24453

SUPPLIES:

Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)

REPAIR PARTS:

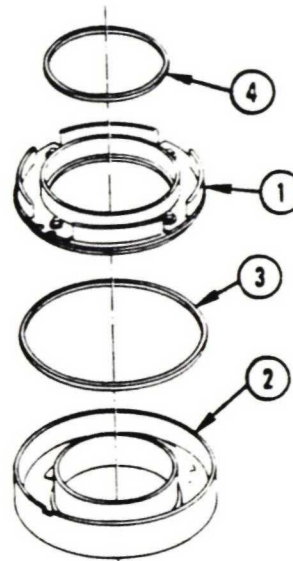
Plain Seal (73342) 23011456 (1 required for each piston)  
Push On Nut (24617) 9429473 (4 required for each piston)  
Seal (77342) 23011475 (1 required for each piston)

NOTE

This task will repair either third clutch piston housing assembly or second clutch piston housing assembly.

Disassemble Clutch Piston Housing Assembly

- 1 Remove piston assembly (1) from piston housing (2).
- 2 Remove seals (3, 4) from piston assembly (1).
- 3 Compress spring retainer (5) and, using diagonal pliers, cut and remove four push on nuts (locking rings) (6).
- 4 Remove spring retainer (5).
- 5 Remove twelve springs (7) from piston (8).



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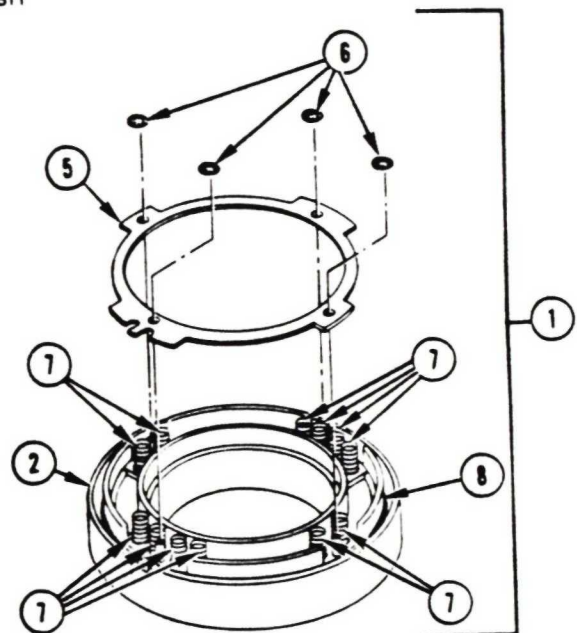
Go to Sheet 17

# 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 17 OF 31)

## Assemble Clutch Piston Housing Assembly

- 6 Install piston (8) (without seals) into piston housing (2).
- 7 Install twelve springs (7) into spring holes in piston (8).
- 8 Install spring retainer (5), indexing retainer (5) with cutaways in piston housing (2).
- 9 Using lock ring installer J 24453, install four new push on nuts (locking rings) (6).
- 10 Using screwdriver, remove piston assembly (1) from piston housing (2).
- 11 Install seals (3, 4), seal lips downward, onto piston assembly (1). Coat seals (3, 4) with petrolatum.
- 12 Coat the seal mating surfaces of piston housing (2) with light coat of petrolatum.
- 13 Install piston assembly (1) into piston housing (2).

**FOLLOW-ON PROCEDURE:** Install clutch piston housing assemblies. Refer to paragraph 4-30.



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End of Task 6

Go to Sheet 18



4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 18 OF 31)

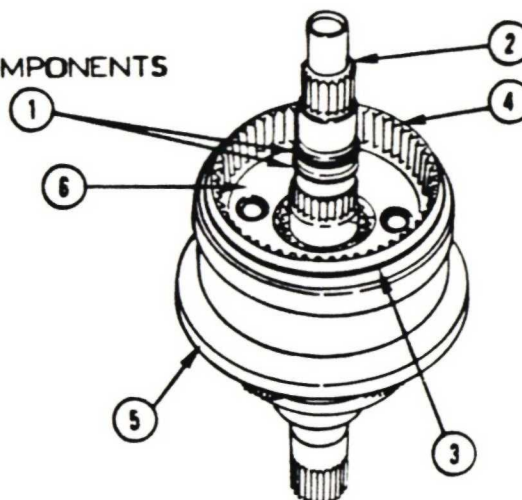
TASK 7. REPLACE RANGE INPUT SHAFT COMPONENTS

COMMON TOOLS:

Drift, brass  
Hammer, hand, ball peen  
Hammer, hand, plastic faced  
Pliers, retaining ring, external  
Pliers, wrench  
Press, arbor, hand operated  
Screwdriver, flat tip (2 required)

SUPPLIES:

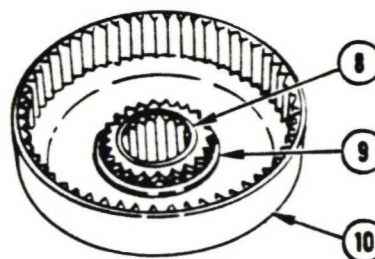
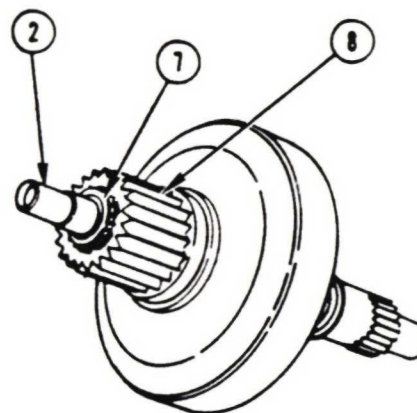
Petrolatum (Item 14, Appendix C)  
Rag, wiping (Item 15, Appendix C)



PRELIMINARY PROCEDURE: Input shaft components are removed. Refer to paragraph 4-28.

Disassemble Input Shaft Components

- 1 Remove two seal rings (1) from shouldered shaft (range input shaft) (2).
- 2 Using screwdriver, remove retaining ring (3).
- 3 Remove front internal gear (4) from range input shaft (2).
- 4 Remove range input shaft (2) with its attached parts from rear carrier drum (5).
- 5 Remove center carrier (6) from input shaft (2).
- 6 Using retaining ring pliers, remove retaining ring (7) that holds spur gear (rear sun gear) (8) onto range input shaft (2).
- 7 Remove rear sun gear (8) and attached parts from range input shaft (2).
- 8 Using retaining ring pliers, remove retaining ring (9) that holds rear sun gear (8) to internal gear (center carrier ring gear) (10).



Go to Sheet 19

REPAIR CENTER HOUSING COMPONENTS  
(SHEET 19 OF 31)

- 9 Remove thrust washer (11) from range input shaft (2).
- 10 Remove center sun gear assembly (12) from range input shaft (2).
- 11 Remove thrust bearing races (13, 14) and thrust bearing (15) from shouldered shaft (16).
- 12 Using screwdriver, remove retaining ring (17) that holds drum (5) onto carrier assembly (18).
- 13 Remove drum (5) from shaft (16).

NOTE

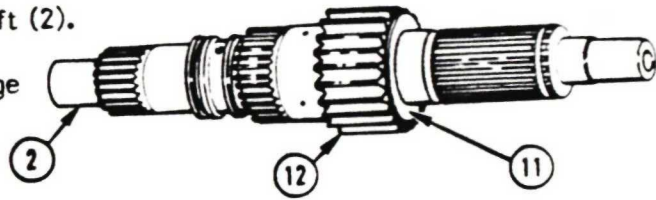
Do not remove retaining ring (19) unless parts require replacement.

- 14 Using plastic faced hammer, drive shaft (16) into rear carrier assembly (18) so that access to retaining ring (19) is obtained.

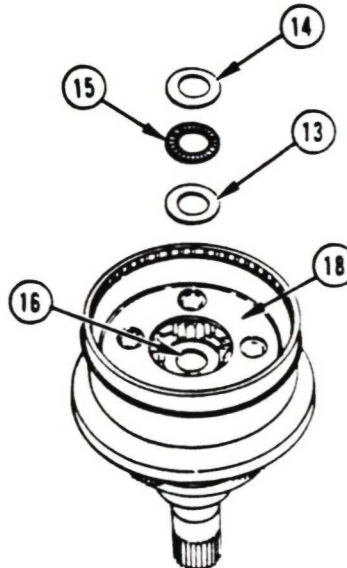
NOTE

Opening of retaining ring (19) must be rotated so that it is between gears of rear carrier assembly (18).

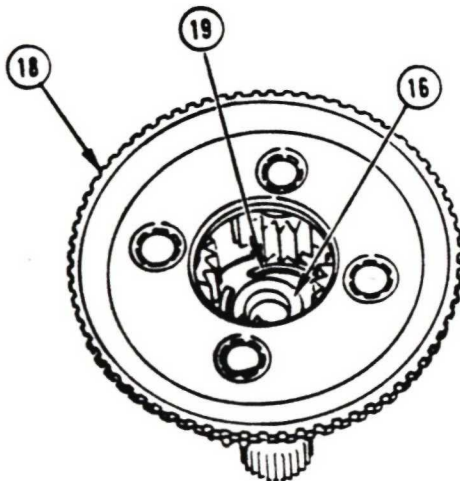
- 15 Using screwdrivers and retaining ring pliers, remove retaining ring (19) that holds shaft (16) to rear carrier assembly (18). When retaining ring (19) is spread, drive downward on shaft (16) with brass drift and ball peen hammer.



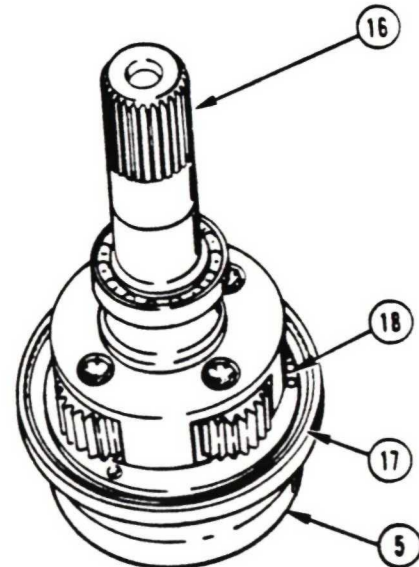
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Go to Sheet 20

4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 20 OF 31)

**NOTE**

Do not remove pin (20) and bearing (21) unless replacement is necessary.

16 Using wrench pliers, remove pin (20) from shaft (16).

17 Using arbor press, press bearing (21) from shaft (16).

**Assemble Input Shaft Components**

18 Using arbor press, install bearing (21) to a seat against the shoulder of shaft (16).

19 Using arbor press, install pin (20) to a height of 1.92-1.96 inch (48.8-49.7 mm) above surface of shaft (16), measured from opposite side of shaft.

20 Install rear carrier assembly (18) onto shaft (16).

**NOTE**

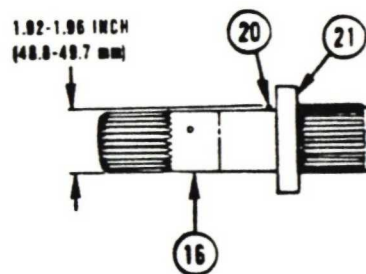
Opening of retaining ring (19) must be rotated so that it is between gears of rear carrier assembly (18).

21 Using retaining ring pliers, install retaining ring (19) that holds shaft (16) to rear carrier assembly (18).

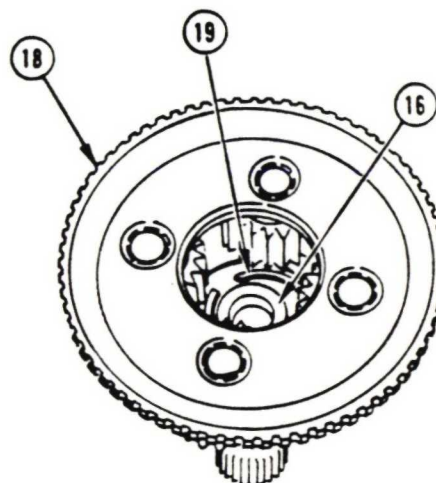
22 Install drum (5) onto carrier (18).

23 Using screwdriver, install retaining ring (17) to hold drum (5) onto carrier (18).

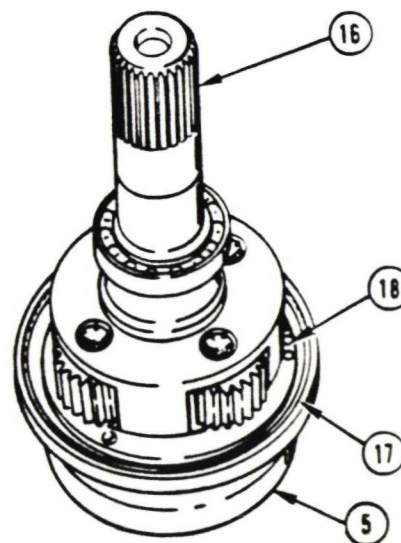
Go to Sheet 21



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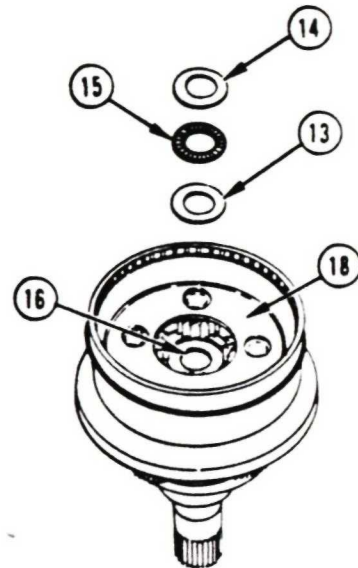


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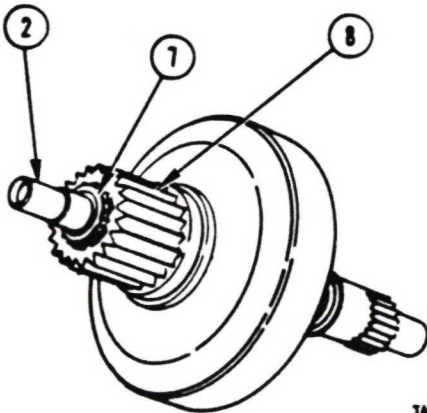
## 29. REPAIR CENTER HOUSING COMPONENTS (SHEET 21 OF 31)

- 24 Coat thrust bearing races (13, 14) and thrust bearing (15) with petrolatum.
- 25 Install race (13), bearing (15), and race (14) into rear carrier assembly (18) and over shaft (16).
- 26 Install center sun gear assembly (12) onto range input shaft (2), indexing smaller splines next to two packing grooves in shaft (2).
- 27 Install thrust washer (11) onto range input shaft (2).
- 28 Using retaining ring pliers, install retaining ring (9) that holds rear sun gear (8) to center carrier ring gear (10).
- 29 Install rear sun gear (8) and attached parts onto range input shaft (2).
- 30 Using retaining ring pliers, install retaining ring (7) that holds rear sun gear (8) to range input shaft (2).

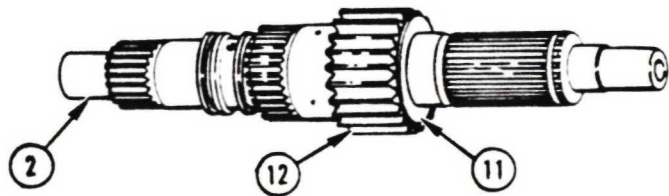


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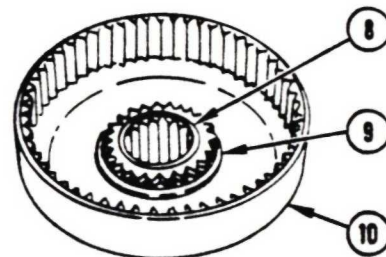
Go to Sheet 22



TA485696



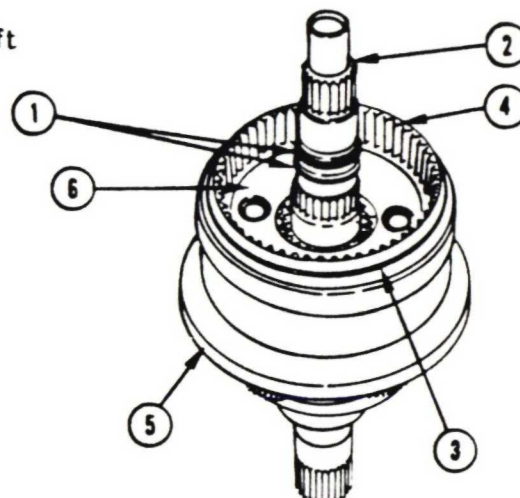
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**4-29. REPAIR CENTER HOUSING COMPONENTS**  
**(SHEET 22 OF 31)**

- 31 Install range input shaft (2) with its attached parts into rear carrier drum (5).
- 32 Install center carrier assembly (6) on range input shaft (2).
- 33 Install front internal gear (4), large end downward, onto range input shaft (2).
- 34 Using screwdriver, install retaining ring (3).
- 35 Install two seal rings (1) onto range input shaft (2).



TM 85697

**FOLLOW-ON PROCEDURE:** Install input shaft components. Refer to paragraph 4-30.

End of Task 7

**TASK 8. REPAIR CENTER HOUSING**

**NOTE**

Do not remove center housing components unless repair is necessary.

**COMMON TOOLS:**

Adapter, socket wrench, 1/2 to 3/8 inch square drive  
Coil Thread Insert Kit  
Extension, socket wrench, 1/2 inch square drive, 6 inch  
Extractor Set  
Hammer, hand, ball peen  
Hammer, hand, plastic faced  
Handle, socket wrench, 1/2 inch square drive  
Gun, heat (2 required)  
Pliers, slip joint  
Pliers, wrench  
Press, arbor, hand operated  
Puller Kit, mechanical, bearing and gear  
Screwdriver, small flat tip  
Socket, socket wrench, 1/2 inch square drive, 7/16 inch  
Socket, socket wrench, hex, 3/8 inch square drive, 3/16 inch  
Socket, socket wrench, hex, 3/8 inch square drive, 5/8 inch  
Threading Set  
Wrench, adjustable  
Wrench, combination, 1/2 inch (2 required)  
Wrench, combination, 9/16 inch (2 required)  
Wrench, combination, 3/4 inch (2 required)  
Wrench, torque, 0-175 ft-lb

Go to Sheet 23

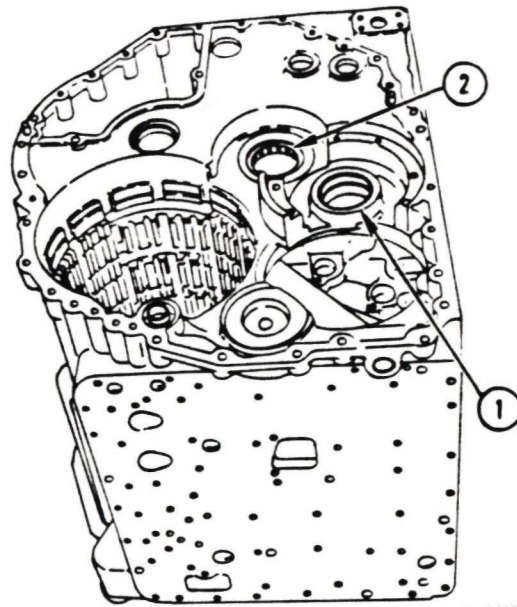
## 29. REPAIR CENTER HOUSING COMPONENTS (SHEET 23 OF 31)

### FABRICATED TOOLS:

Screw Thread Insert Remover (refer to Appendix D)

### SUPPLIES:

Bolt, 5/16-18 x 2 inch  
 Bolt, 1/2-13 x 2 inch  
 Bolt, 3/8-16 x 2 inch  
 Dry Ice (Item 4, Appendix C)  
 Nut, 5/16-18  
 Nut, 1/2-13  
 Nut, 3/8-16  
 Rag, wiping (Item 15, Appendix C)  
 Washer, flat, 1/2 inch  
 Washer, flat, 3/8 inch  
 Washer, flat, 5/16 inch



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### Remove Center Housing Components

#### WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

#### NOTE

Left side of center housing has a bearing race (1) in place. This is the outer race for bearing on idler gear. This separable bearing is a matched set consisting of an outer race and an inner race and rollers. DO NOT REPLACE this inner race unless the outer race and rollers of the respective bearing is also being replaced. Refer to paragraph 4-28, TASK 7, for removal of the inner races and rollers.

- 1 Using two heat guns, heat center housing near bearing race (1) for one hour.
- 2 Using bearing puller, remove bearing race (1).

#### NOTE

Left side of center housing has outer race and rollers (2) in place. This is for bearing on range input drive gear. This separable bearing is a matched set consisting of an inner race and an outer race and rollers. Do not replace this outer race and rollers unless the inner race of the respective bearing is also being replaced. Refer to paragraph 4-8, TASK 3, for removal of the inner race.

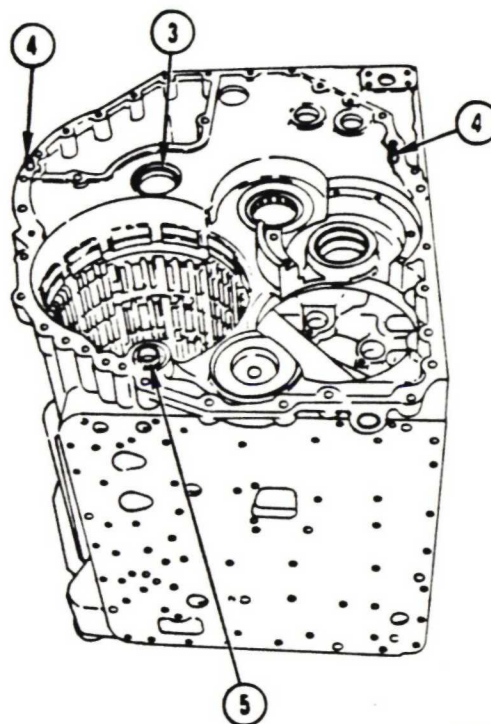
- 3 Using two heat guns, heat center housing near outer race and rollers (2) for one hour.
- 4 Using bearing puller, remove outer race and rollers (2).

Go to Sheet 24

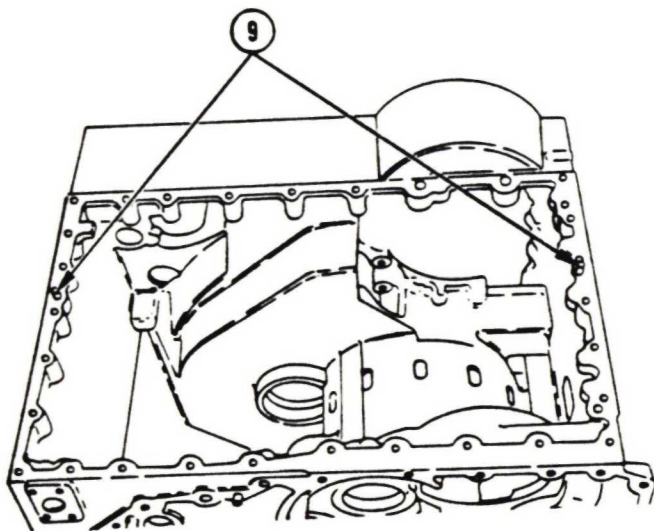


4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 24 OF 31)

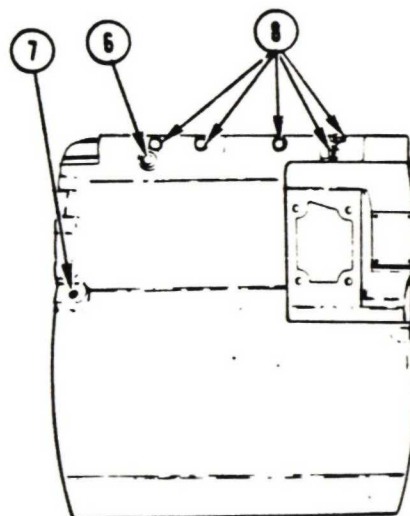
- 5 Using bearing puller, remove oil transfer sleeve (3) from left side of center housing.
- 6 Using wrench pliers, remove two headless straight pins (4) from left side of center housing.
- 7 Using bearing puller, remove sleeve spacer (tube) (5) from left side of center housing.
- 8 Using 5/8 inch hex socket, remove plug (6) from back side of center housing.
- 9 Using 3/16 inch hex socket, remove pipe plug (7) from back side of center housing.
- 10 Using 7/16 inch socket and extension, remove five pipe plugs (8).
- 11 Using wrench pliers, remove two headless straight pins (9) from front side of center housing.



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Go to Sheet 25

## 29. REPAIR CENTER HOUSING COMPONENTS (SHEET 25 OF 31)

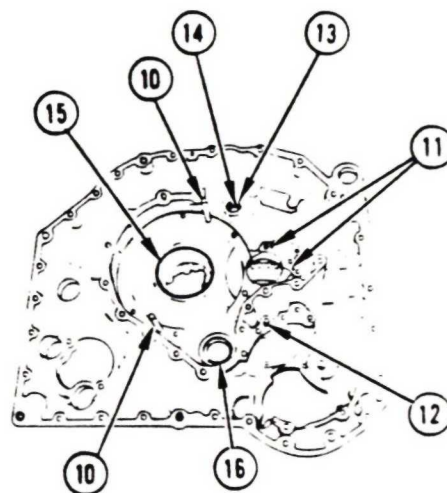
- 12 Using wrench pliers, remove two headless straight pins (brake reaction pins) (10) from right side of center housing.
- 13 Using wrench pliers, remove two headless straight pins (dowel pins) (11) from right side of center housing.
- 14 Using wrench pliers, remove one headless straight pin (dowel pin) (12) from right side of center housing.
- 15 Using bearing puller, remove needle roller bearing (13) from right side of center housing. Remove thrust washer (14).

### WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

### NOTE

Center housing has bearing races (15, 16) in place. These are for bearings on left steer and output sun gear and left steer gear. Each of these separable bearings is a matched set consisting of an outer race and an inner race and rollers. DO NOT REPLACE these two outer races unless the inner races and rollers of the respective bearings are also being replaced. Refer to this paragraph, TASK 3, for removal of the inner races and rollers.



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- 16 Using two heat guns, heat center support near bearing races (15, 16) for one hour.
- 17 Using bearing puller, remove bearing races (15, 16).

Go to Sheet 26

4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 26 OF 31)

Replace Helical Coil Inserts

NOTE

Use coil thread insert tool kit to replace any of eight screw thread inserts (helical coil inserts) (17).

18 Using screwdriver, pry out end of insert (17).

19 Using slip joint pliers, remove insert (17).

20 Clean out threads.

21 Using threading set, retap threads.

**WARNING**

Compressed air used for cleaning purposes must not exceed 30 pounds of pressure per square inch. Use only with effective chip guards and protective personal equipment including goggles or face shield and gloves. Never blow compressed air toward another person.

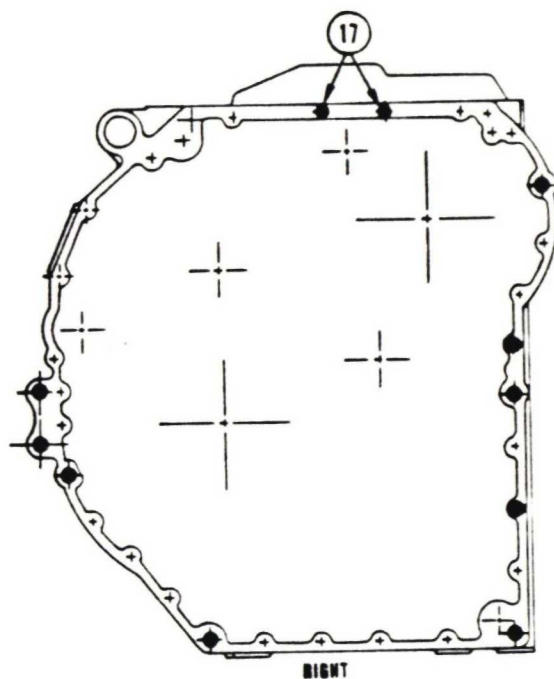
22 Clean out hole with compressed air.

23 Screw new insert (17) onto insertion tool of helical coil kit.

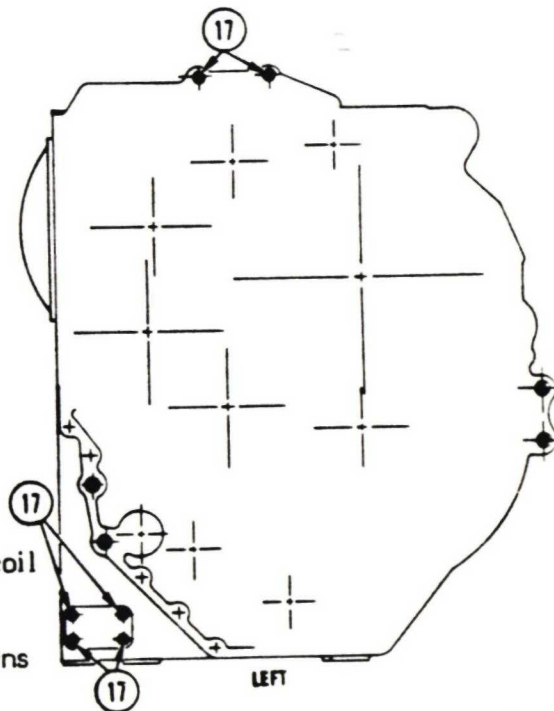
24 Using insertion tool, screw new insert (17) 1 to 2 turns below surface of center housing.

25 Remove insertion tool. Remove tang.

Go to Sheet 27



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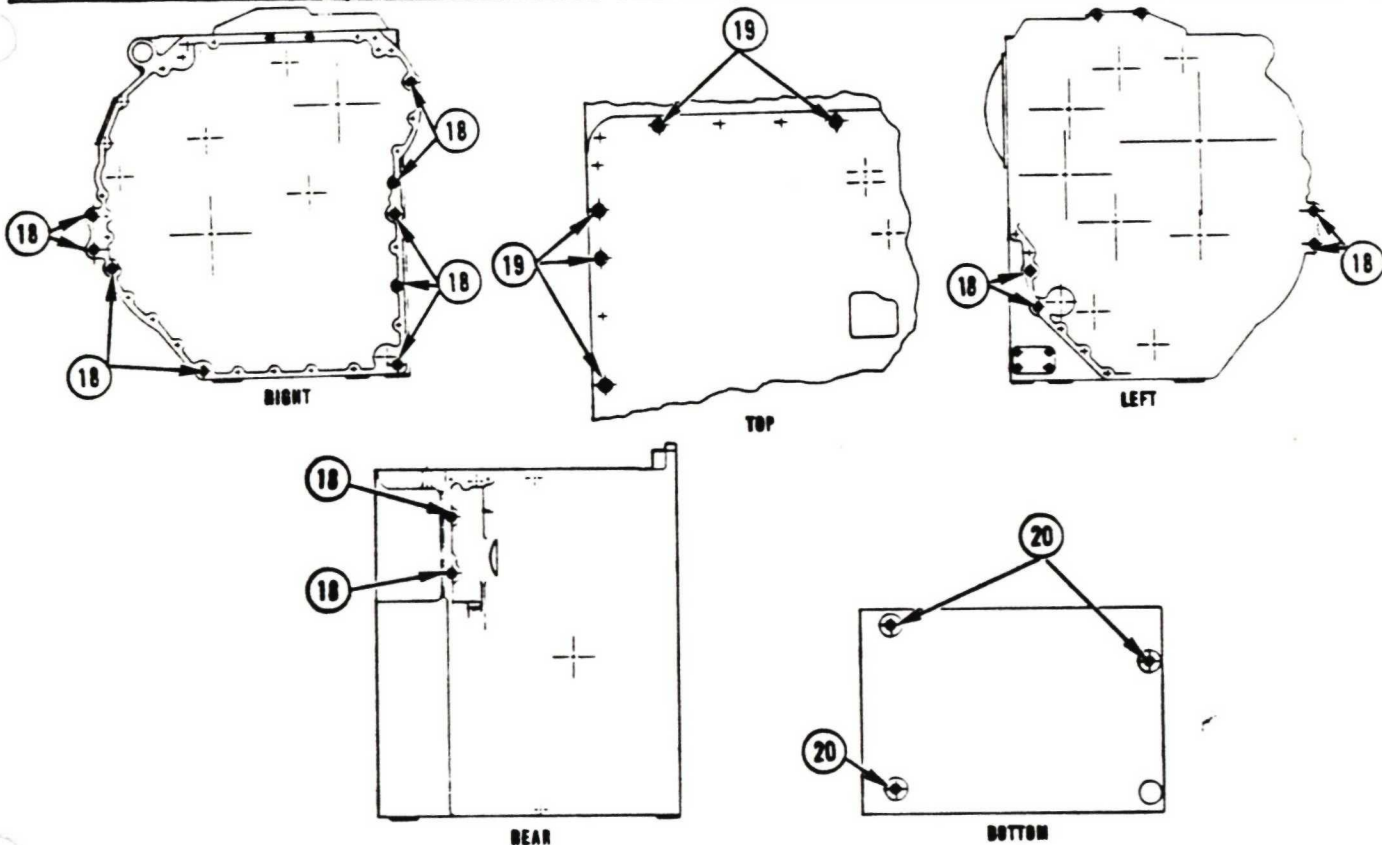


# -29. REPAIR CENTER HOUSING COMPONENTS (SHEET 27 OF 31)

Replace Screw Thread Inserts

SCREW THREAD INSERT TABLE

Screw Thread Insert Item Number	Screw Thread Insert Part Number	Fabricated Tool Parts Required			Combination Wrenches Size Required	Installation Depth Below Center Housing
		Bolt Size	Nut Size	Washer Size		
(18)	9425031	3/8-16 x 2 inch	3/8-16	3/8 inch	9/16 inch	0.005-0.062 inch (0.13-1.57 mm)
(19)	9425029	5/16-18 x 2 inch	5/16-18	5/16 inch	1/2 inch	0.005-0.057 inch (0.13-1.44 mm)
(20)	23018271	1/2-13 x 2 inch	1/2-13	1/2 inch	3/4 inch	0.005-0.077 inch (0.13-1.95 mm)



Go to Sheet 28

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# 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 28 OF 31)

## NOTE

Refer to illustrations and table on Sheet 27, page 4-217, for location of inserts and correct size of bolt, nut, and flat washer to use for replacement of any screw thread inserts (18, 19, 20).

- 26 If any insert(s) (18, 19, 20) must be replaced, assemble bolt, nut, and flat washer selected from table. Refer to Appendix D to fabricate spacer for the respective insert to be replaced.
- 27 Screw tip of bolt into one insert (18, 19, 20) in center housing.
- 28 Using combination wrenches selected from table, turn bolt to the left (counterclockwise) and remove insert (18, 19, 20).
- 29 If insert(s) (18, 19, 20) were removed, assemble bolt, nut, and insert selected from table. Screw nut against insert.
- 30 Using combination wrenches selected from table, install insert (18, 19, 20) into center housing to dimension shown in table.

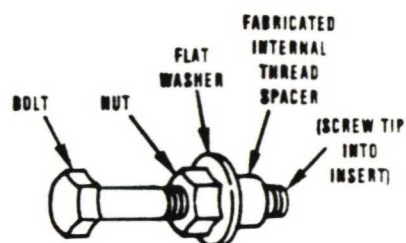
## Replace Identification Plate

### **CAUTION**

DO NOT REMOVE IDENTIFICATION PLATE (21) from center housing unless replacement is absolutely necessary. If new nameplate is to be installed, BE SURE to include all accurate information on new nameplate.

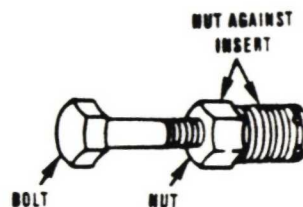
- 31 If identification plate is loose or must be replaced, using slip joint pliers, remove four screws (22).
- 32 If identification plate must be replaced, remove identification plate (21).
- 33 Install identification plate (21) and, using ball peen hammer, secure it with four new screws (22).

Go to Sheet 29



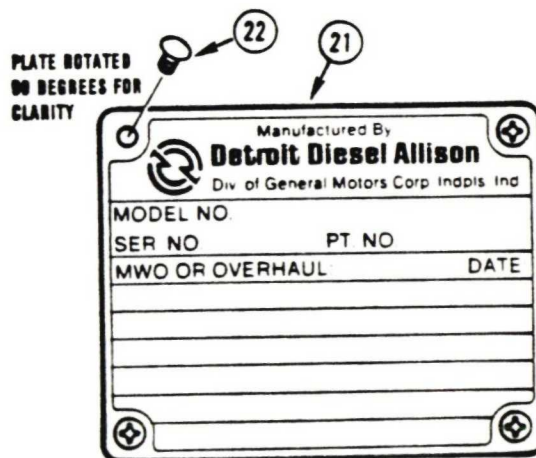
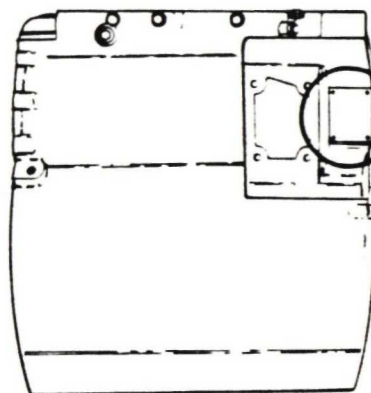
INSERT REMOVAL TOOL

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INSERT INSTALLATION TOOL

TM485707



TM485708

## 9. REPAIR CENTER HOUSING COMPONENTS (SHEET 29 OF 31)

### Install Center Housing Components

#### WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

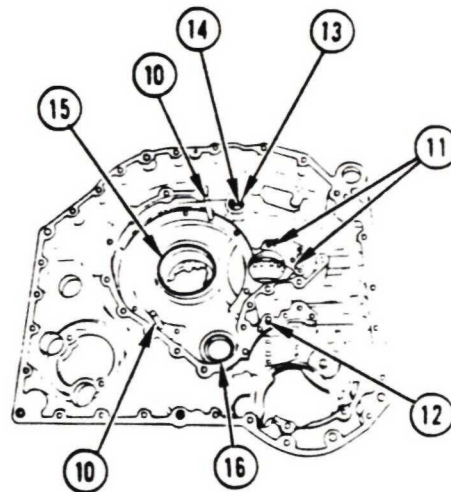
- 34 Using two heat guns, heat center housing near locations for bearing races (15, 16) for one hour.

#### WARNING

Frozen parts can stick to your fingers and cause serious injury. Always wear leather gloves when working with parts that have been frozen in dry ice.

- 35 Freeze new bearing races (15, 16) in dry ice for one hour.

- 36 Using plastic faced hammer, install new bearing races (15, 16) into bores in center housing to a firm seat against the shoulders in the bores.



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- 37 Allow center housing to return to room temperature.
- 38 Install thrust washer (14) in right side of center housing.
- 39 Using arbor press, press with driver against numbered end to install bearing (13). Press bearing (13) to a depth of 6.28 inches (159.5 mm) below the outmost surface of the right side of center housing.
- 40 Using arbor press, install one pin (12) to a height of 0.40 inch (10.2 mm) above the surface of the right side of center housing.
- 41 Using arbor press, install two pins (11) to a height of 0.25 inch (6.4 mm) above the surface of the right side of center housing.
- 42 Using arbor press, install two pins (10) to a height of 3.15 inches (80.0 mm) above the surface of the right side of center housing.

Go to Sheet 30



4-29. REPAIR CENTER HOUSING COMPONENTS  
(SHEET 30 OF 31)

43 Using arbor press, install two pin (9) to a height of 0.38 inch (9.7 mm) above the front side of center housing.

44 Using 7/16 inch socket and extension, install five pipe plugs (8).

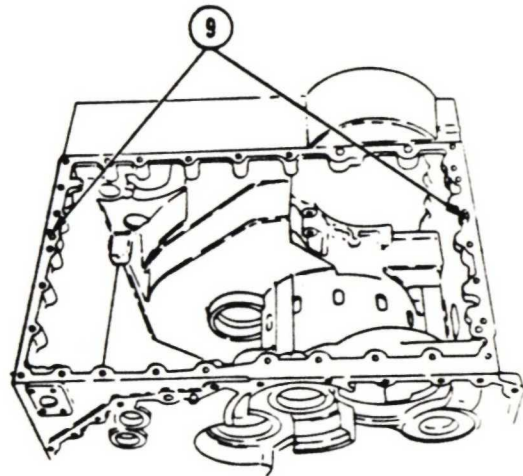
45 Using torque wrench, tighten plugs (8) to 50-60 lb-in. (6-7 N·m).

46 Using a 3/16 inch hex socket, install pipe plug (7) in back side of center housing.

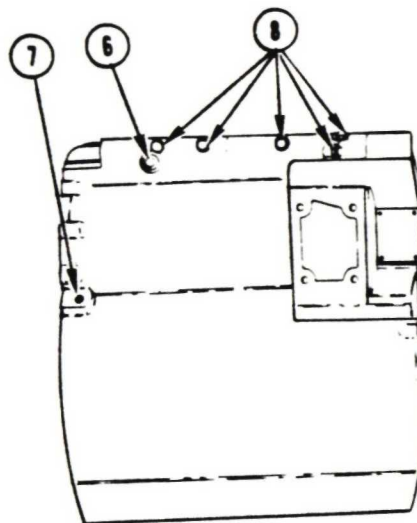
47 Using torque wrench, tighten plug (7) to 50-60 lb-in. (6-7 N·m).

48 Using 5/8 inch hex socket, install plug (6) in back side of center housing.

49 Using torque wrench, tighten plug (6) to 70-90 lb-ft (95-122 N·m).



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TA485711

Go to Sheet 31

## 29. REPAIR CENTER HOUSING COMPONENTS (SHEET 31 OF 31)

- 50 Using arbor press, install sleeve spacer (tube) (5) to a height of 0.12 inch (3.0 mm) above left side of center housing.
- 51 Using arbor press, install two pins (4) to a height of 0.38 inch (9.7 mm) above left side of center housing.
- 52 Using arbor press, install oil transfer sleeve (3) to a seat in its bore in left side of center housing.

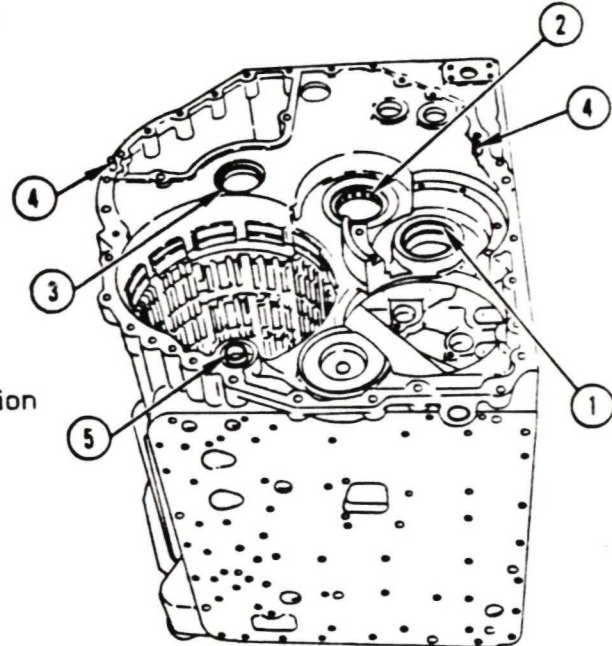
### WARNING

Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

- 53 Using two heat guns, heat center housing near location for outer race and rollers (2) for one hour.

### WARNING

Frozen parts can stick to your fingers and cause serious injury. Always wear leather gloves when working with parts that have been frozen in dry ice.



TM85712

- 54 Freeze new outer race and rollers (2) in dry ice for one hour.
- 55 Using plastic faced hammer, install new race and rollers (2) to a firm seat against the shoulder in the bore.
- 56 Allow center housing to return to room temperature.
- 57 Using two heat guns, heat center housing near location for bearing race (1) for one hour.
- 58 Freeze new bearing race (1) in dry ice for one hour.
- 59 Using plastic faced hammer, install new bearing race (1) into bore in center housing to a firm seat against the shoulder in the bore.
- 60 Allow center housing to return to room temperature.

End of Task 8

4-30 ASSEMBLE CENTER HOUSING  
(SHEET 1 OF 21)

Task	Title	Page
	LEFT SIDE OF CENTER HOUSING	
1	Install Idler Gear Assembly	4-222
2	Install Range Pack	4-223
	RIGHT SIDE OF CENTER HOUSING	
3	Install Governor Drive Gear, Governor Body Assembly, Governor Assembly	4-232
4	Install Hydrostatic Pump and Motor Assembly	4-233
5	Install Steer Control Assembly	4-235
6	Install Output Pump Drive Gear, Left Output Shaft, Left Steer and Output Sun Gear, and Left Steer Gear	4-237
7	Install Left Brake Assembly	4-238

**TASK 1. INSTALL IDLER GEAR ASSEMBLY**

**COMMON TOOLS:**

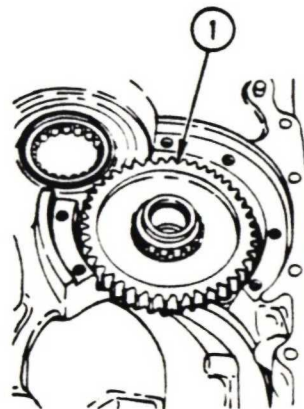
Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Wrench, torque, 0-175 ft-lb

**SUPPLIES:**

Lubricating Oil (Item 10, Appendix C)  
Rag, wiping (Item 15, Appendix C)

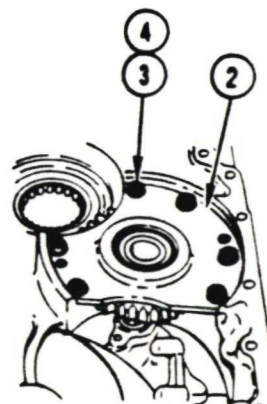
**NOTE**

Transmission is on maintenance stand, left end up.



TM485713

- 1 Install hydrostatic pump idler gear (1).
- 2 Install bearing retaining plate (2).
- 3 Using socket, install six washers (3) and bolts (4) to retain bearing retaining plate (2) to center housing.
- 4 Using torque wrench, tighten six bolts (4) to 36-43 lb-ft (49-68 N·m).



TM485714

End of Task 1

Go to Sheet 2



# **30. ASSEMBLE CENTER HOUSING (SHEET 2 OF 21)**

## **TASK 2. INSTALL RANGE PACK**

### **TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 10 inch  
 Extension, socket wrench, 3/8 inch square drive, 10 inch  
 Hammer, hand, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Hoist, 200-pound minimum capacity  
 Pliers, retaining ring, external  
 Pliers, slip joint, straight nose (2 required)  
 Screwdriver, flat tip (2 required)  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Socket Head Screw Attachment, socket wrench, 3/8 inch square drive, 5/32 inch hex plug  
 Wrench, torque, 0-175 ft-lb  
 Wrench, torque, 0-600 in-lb

### **SPECIAL TOOLS:**

Bar and Stud Assembly (25341) J 24204-2  
 Compressor, spring (25341) J 24452  
 Feeler Gage, bent blade, 45 degree angle NSN 5210-01-029-8448  
 Lifter, front support assembly (25341) J 24473  
 S-hook (19207) 11650102  
 Sleeve, piston and seal assembly (19207) 12268021

### **REPAIR PARTS:**

Packing, preformed (pitot tube, large end) (73342) 6836130 (2 required)  
 Packing, preformed (pitot tube, small end) (73342) 6836129 (2 required)  
 Seal, plain (first clutch piston) (73342) 6883031  
 Seal, special (first clutch piston) (73342) 6883033

### **SUPPLIES:**

Lubricating Oil (Item 10, Appendix C)  
 Marker, black (Item 13, Appendix C)  
 Petrolatum (Item 14, Appendix C)  
 Rag, wiping (Item 15, Appendix C)  
 Retaining Fixture (fabricated) (Appendix D)

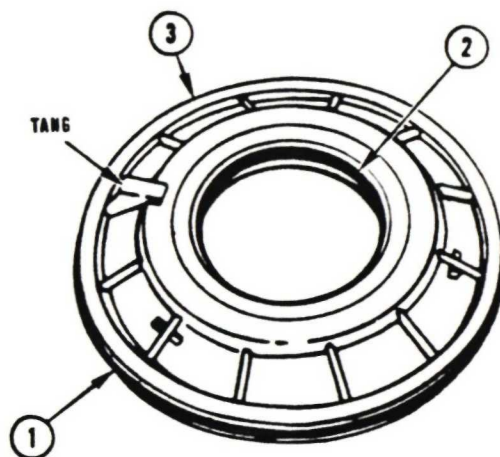
### **PERSONNEL REQUIRED: Two**

- One soldier holds shim and tool J 24204-2 in place.
- Other soldier compresses first clutch piston spring retainer.

Go to Sheet 3

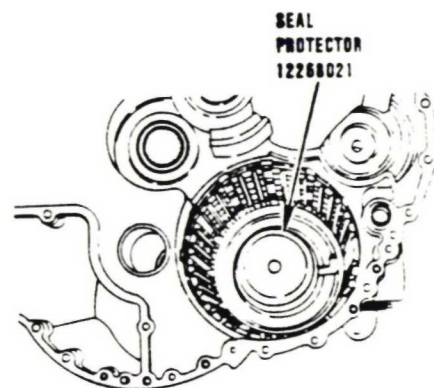
**4-30 ASSEMBLE CENTER HOUSING**  
(SHEET 3 OF 21)

- 1 Install new packings (1, 2) onto first clutch piston (3).  
Coat packings (1, 2) with petrolatum.



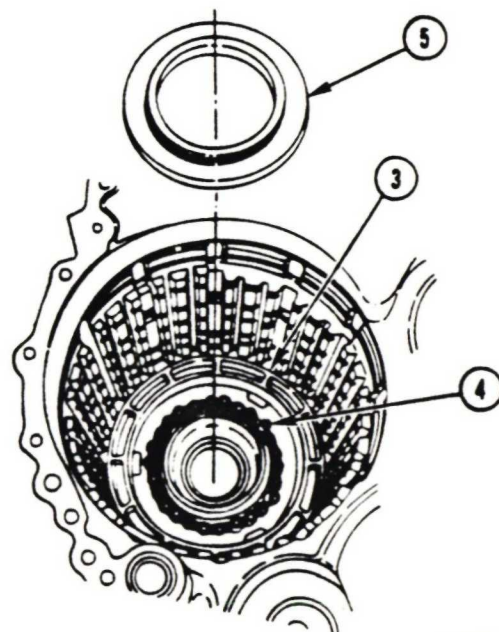
TM485715

- 2 Install piston and seal assembly sleeve 12268021 into center housing.
- 3 Mark outer piston face with felt tip marker across from tang. Mark range bore above slot in center housing. This will assist in properly locating piston (3) in center housing.



TM485716

- 4 Using two pairs of slip joint pliers, grasp cross members on first clutch piston (3) at two points, 180 degrees apart and install piston (3) into center housing. Index the tang on piston with the slot in center housing.
- 5 Remove sleeve 12268021.
- 6 Install twenty-six springs (4) into spring pockets in piston (3).
- 7 Install spring retainer (5) over springs (4). Be sure twenty-six springs (4) are seated in retainer (5).

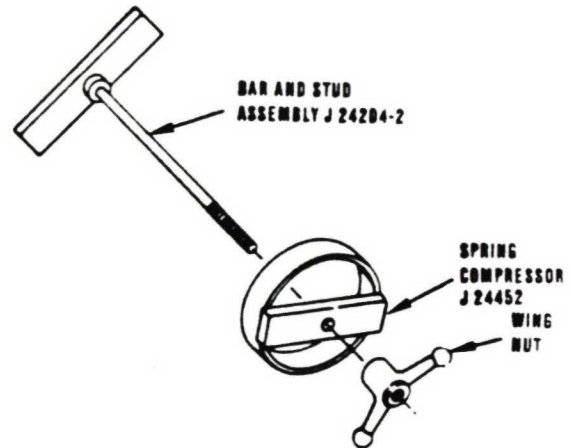


TM485717

Go to Sheet 4

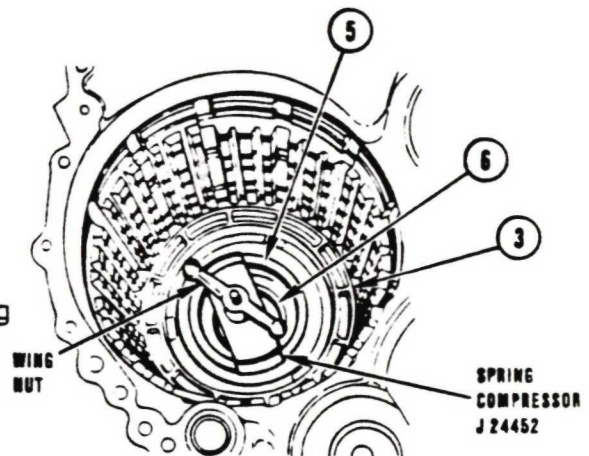
### 30. ASSEMBLE CENTER HOUSING (SHEET 4 OF 21)

- 8 Remove wing nut from bar and stud assembly J 24204-2 and compressor J 24452.



TA485718

- 9 One soldier, put tool J 24204-2 inside transmission through first clutch piston (3) in range pack bore and hold in place. Place 3/8 inch thick shim under bar of stud assembly so that bar and stud assembly is level, centered, and will compress spring retainer evenly.
- 10 Other soldier, install spring compressor tool J 24452 over stud, then install wing nut.
- 11 Turn wing nut on spring compressor until piston spring retainer (5) is compressed enough to enable installation of retaining ring (6).
- 12 Using retaining ring pliers, reach through opening in spring compressor tool and install retaining ring (6).
- 13 Remove wing nut and compressor.



TA485719

Go to Sheet 5

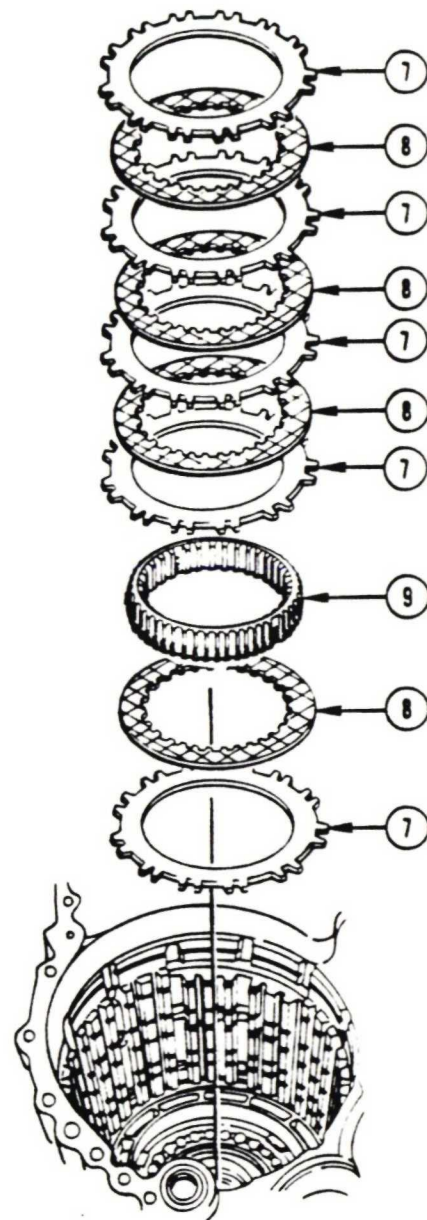


4-30. ASSEMBLE CENTER HOUSING  
(SHEET 5 OF 21)

**CAUTION**

- When removing, handling, or installing clutch packs, keep all clutch disks and plates in the same order and facing the same way. Under heat and pressure, clutch plates can take on a conical shape, called coning. Each plate will differ in degree of coning. When coned plates are mixed or turned over, they cannot seat properly against each other. This can prevent plates from making adequate surface contact with each other for the clutch pack to operate effectively.
- When one clutch disk or plate needs to be replaced, replace the entire clutch pack. Individual clutch plates should not be replaced, because such new plates will not have the surface contour of adjoining older plates, decreasing effectiveness of the clutch pack.

- 14 Install one of five clutch disks (reaction plates) (7) into range pack bore.
- 15 Soak four clutch plates (8) in lubricating oil for two minutes prior to assembly. Install one of four clutch disks (friction-faced plates) (8) onto reaction plate (7).
- 16 Install internal gear (9), shorter splines downward.
- 17 Install second of five reaction plates (7), then second of four friction-faced plates (8) onto internal gear (9) until all five plates (7) and all four plates (8) have been installed.

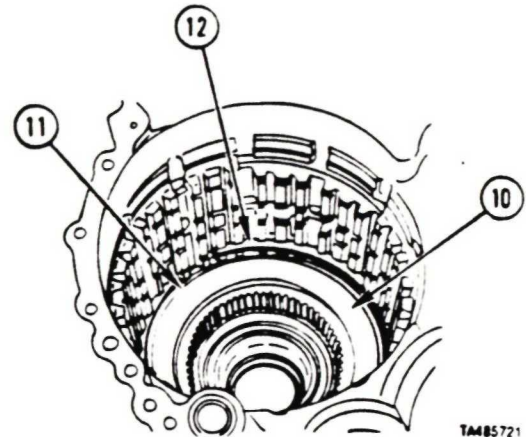


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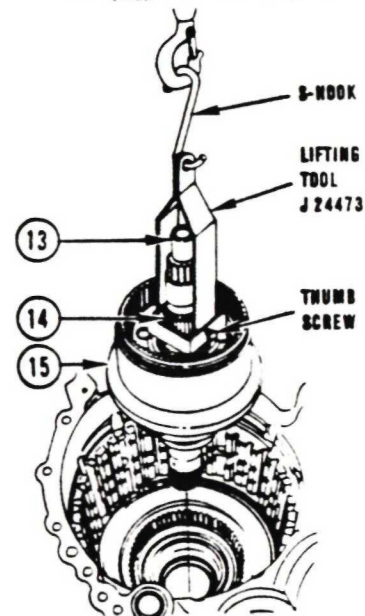
Go to Sheet 6

# -30. ASSEMBLE CENTER HOUSING (SHEET 6 OF 21)

- 18 Install clutch disk (backing plate) (10) onto reaction plate (7).
- 19 Using screwdriver, install retaining ring (11) to retain backing plate (10).

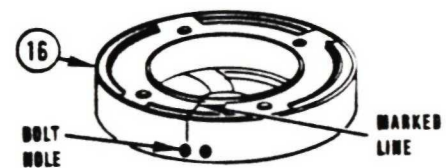


- 20 Using screwdriver, install retaining ring (12) into range pack bore.
- 21 Put front support assembly lifter tool J 24473 over end of shouldered shaft (range input shaft) (13) and put lower end of tool in groove below splined area of center sun gear (14).

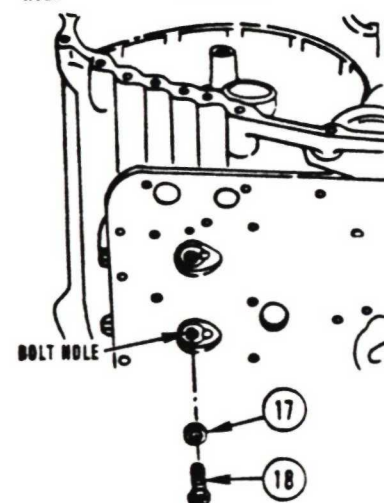


- 22 Using thumb screw on tool, tighten bottom of lifting tool in groove.
- 23 Install S-hook in top of lifting tool.
- 24 Using hoist, S-hook and lifting tool, lower range input shaft (13) and attached center carrier assembly (15) to a seat against retaining ring (12).

- 25 Remove S-hook and lifting tool.
- 26 Using marker, mark edge of second clutch piston housing assembly (16) above bolt hole.
- 27 Install second clutch piston housing assembly (16), aligning bolt hole in piston housing assembly (16) with bolt hole in center housing.



- 28 Using 9/16 inch socket and extension, install washer (17) and bolt (18) through center housing and into piston housing assembly (16) finger tight.



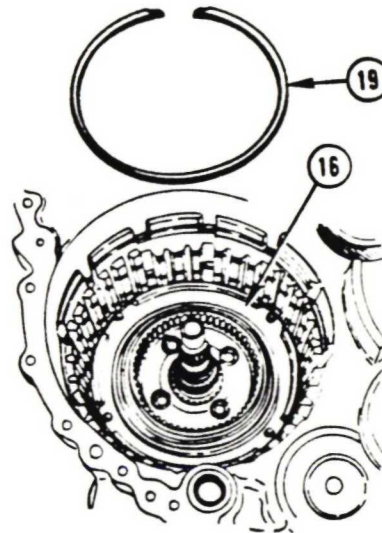
Go to Sheet 7



**4-30. ASSEMBLE CENTER HOUSING  
(SHEET 7 OF 21)**

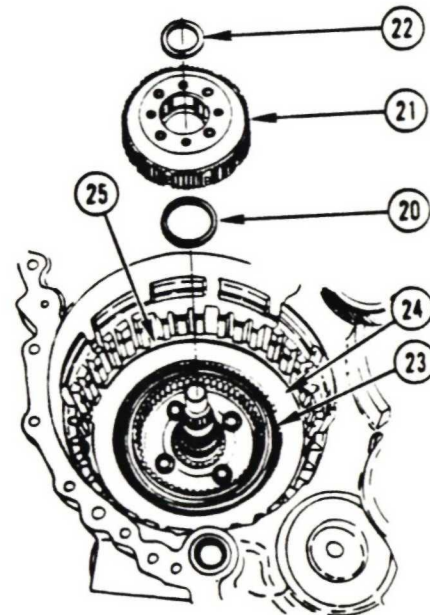
- 29 Using feeler gage, measure space between piston housing assembly (16) and top of retaining ring groove in range pack bore of center housing. Select retaining ring (19) from table.

For Measured Distance	Select Ring
0.149-0.152 inch (3.79-3.88 mm)	6884274
0.153-0.155 inch (3.89-3.96 mm)	6884273
0.156-0.158 inch (3.97-4.03 mm)	6884275
0.159-0.161 inch (4.04-4.08 mm)	6884276



TM485724

- 30 Using screwdriver, install selected retaining ring (19).
- 31 Using torque wrench, tighten bolt (18) (installed in Step 28) to 36-43 lb-ft (49-68 N·m).
- 32 Coat thrust washer (20) with petrolatum and install it on the underside of front carrier assembly (21).
- 33 Install front carrier assembly (21) into center housing, being careful that thrust washer bearing (20) stays in place.
- 34 Install thrust washer (22) onto front carrier assembly (21).
- 35 Soak four clutch plates (23) in lubricating oil for two minutes prior to assembly. Install one clutch disk (reaction plate) (24), then one clutch disk (friction-faced plate) (23).
- 36 Repeat Step 35 until all five reaction plates (24) and all four friction-faced plates (23) are installed.
- 37 Using screwdriver, install retaining ring (25).



TM485725

Go to Sheet 8



# **Q. ASSEMBLE CENTER HOUSING (SHEET 8 OF 21)**

38 Using marker, mark edge of third clutch piston housing assembly (26) above bolt hole.

39 Install third clutch piston housing assembly (26), aligning bolt hole in piston housing assembly (26) with bolt hole in center housing.

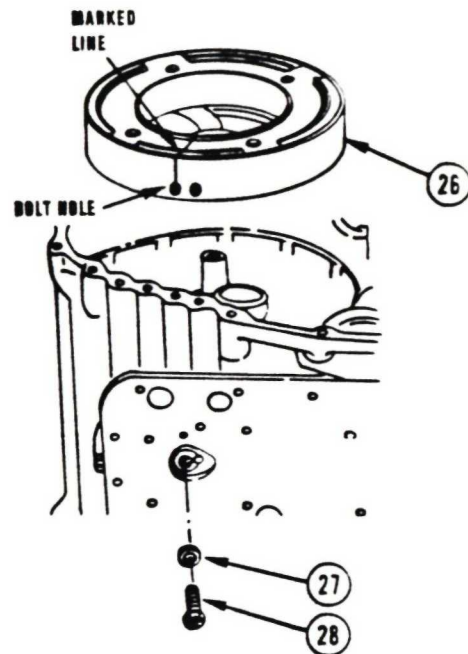
40 Using 9/16 inch socket and extension, install washer (27) and bolt (28) through center housing and into piston housing assembly (26) finger tight.

41 Using feeler gage, measure space between piston housing assembly (26) and to of retaining ring groove in range pack bore of center housing. Select retaining ring (29) from table.

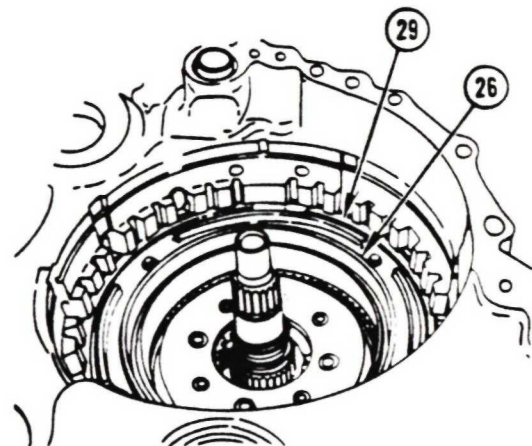
For Measured Distance	Select Ring
0.149-0.152 inch (3.79-3.88 mm)	6884274
0.153-0.155 inch (3.89-3.96 mm)	6884273
0.156-0.158 inch (3.97-4.03 mm)	6884275
0.159-0.161 inch (4.04-4.08 mm)	6884276

42 Using screwdriver, install selected retaining ring (29).

43 Using torque wrench, tighten bolt (28) to 36-43 lb-ft (49-68 N·m).



TM9B5726



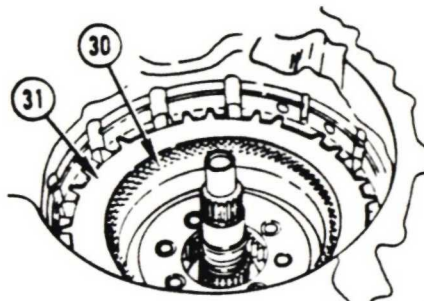
TM9B5727

Go to Sheet 9

**4-30 ASSEMBLE CENTER HOUSING**  
(SHEET 9 OF 21)

44 Soak three clutch plates (30) in lubricating oil for two minutes prior to assembly. Install one clutch disk (reaction plate) (31), then one clutch disk (friction-faced plate) (30).

45 Repeat Step 44 until all four reaction plates (31) and all three friction-faced plates (30) are installed.

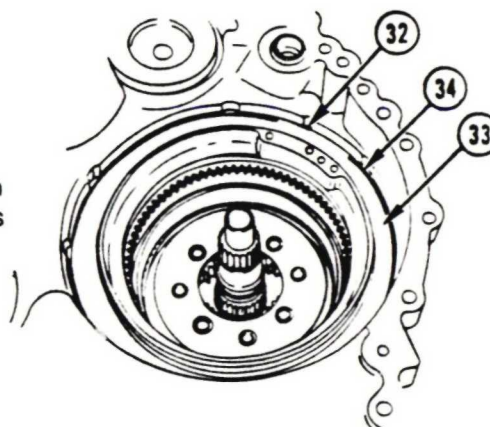


TA485728

46 Coat backing plate pin (32) with petrolatum. Install pin (32) into slot in clutch disk (third clutch backing plate) (33).

47 Evenly tap with plastic faced hammer to install clutch backing plate (33) and pin (32), ensuring that pin (32) is seated in slot in range bore of center housing.

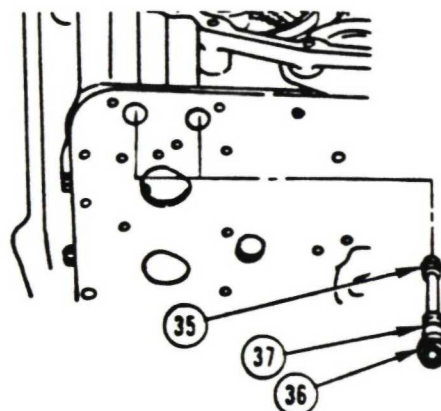
48 Using screwdriver, install retaining ring (34) that retains backing plate (33).



TA485729

49 Install new preformed packings (35, 36) onto two pitot tubes (37). Coat packings (35, 36) with petrolatum.

50 Install two tubes (37), small end first, into bores in center housing.



TA485730

Go to Sheet 10

### 30. ASSEMBLE CENTER HOUSING (SHEET 10 OF 21)

- 51 Install fourth and reverse clutch assembly (38).
- 52 Install thrust washer (39) onto clutch assembly (38).
- 53 Using two screwdrivers, line up fourth and reverse clutch plates. Install forward clutch housing assembly (40).

#### NOTE

If forward clutch does not easily install, place mating output gear on the hub to use as a tool to help rock the hub slightly back and forth, and left and right to a seat. The forward clutch housing is fully seated when it rocks evenly in all four directions.

- 54 Rotate forward clutch housing assembly (40) so that one of the slotted openings is located over the bolt holes for pitot (41).

- 55 Install pitot (41). Using socket head screw attachment, install two screws (42) to hold pitot (41) in place.

- 56 Using torque wrench, tighten two screws (42) to 108-132 lb-in (12-15 N·m).

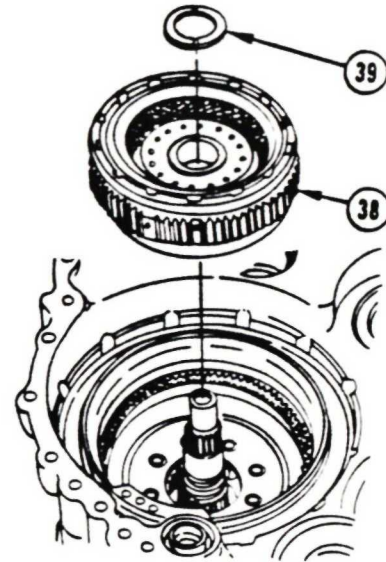
- 57 Lay fabricated retaining fixture in place on forward clutch housing (40) and center housing (2).

- 58 Using 9/16 inch socket, install 3/8-16 x 3/4 inch bolt (43) to retain retaining fixture.

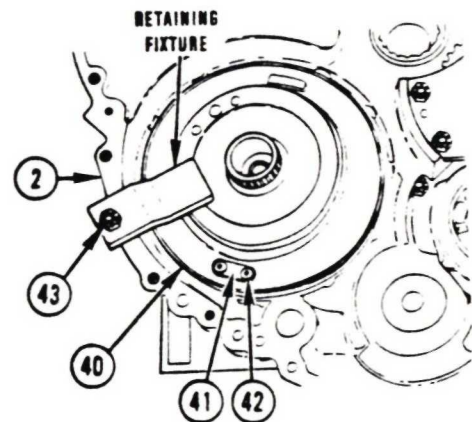
- 59 Using rotary control handle on maintenance stand, turn transmission right end upward.

End of Task 2

Go to Sheet 11



TA485731



TA485732



**4-30. ASSEMBLE CENTER HOUSING**  
(SHEET 11 OF 21)

**TASK 3. INSTALL GOVERNOR DRIVE GEAR, GOVERNOR BODY ASSEMBLY, GOVERNOR ASSEMBLY**

**COMMON TOOLS:**

Extension, socket wrench, 1/2 inch square drive, 10 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
Wrench, torque, 0-175 ft-lb

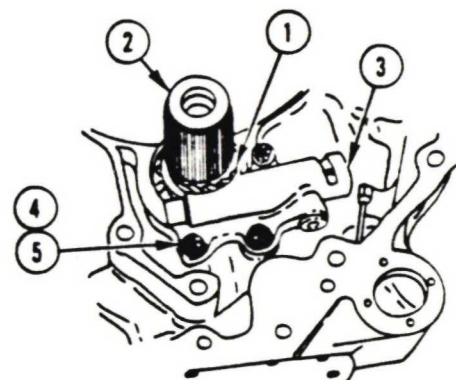
**SUPPLIES:**

Lubricating Oil (Item 10, Appendix C)  
Rag, wiping (Item 15, Appendix C)

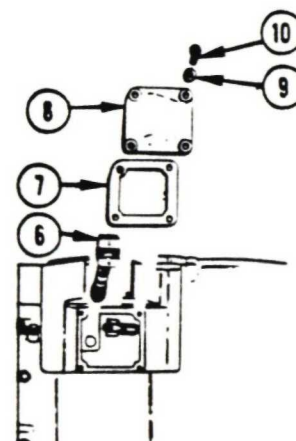
**NOTE**

Transmission is on maintenance stand, right end up.

- 1 Install governor drive gear (1), slot downward, onto shaft (2), engaging pin in shaft (2) with slot in gear (1).
- 2 Install governor body assembly (3).
- 3 Using 9/16 inch socket and extension, install three washers (4) and bolts (5) to retain governor body assembly (3).
- 4 Using torque wrench, tighten three bolts (5) to 36-43 lb-ft (49-68 N·m).
- 5 Install governor assembly (6), turning it slightly to the left (counterclockwise).
- 6 Install gasket (7) and cover (8).
- 7 Using 1/2 inch socket, install four washers (9) and bolts (10) to retain access cover (8) to center housing.
- 8 Using torque wrench, tighten four bolts (10) to 17-20 lb-ft (23-27 N·m).



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TM9B5734

End of Task 3

Go to Sheet 12

# 30. ASSEMBLE CENTER HOUSING (SHEET 12 OF 21)

## TASK 4. INSTALL HYDROSTATIC PUMP AND MOTOR ASSEMBLY

### COMMON TOOLS:

Adapter, socket wrench, 1/2 inch female square drive, 3/8 inch male square drive  
 Extension, socket wrench, 3/8 inch square drive, 10 inch  
 Handle, socket wrench, 3/8 inch square drive  
 Hoist, 100 pound minimum capacity  
 Pliers, retaining ring, external  
 Socket, socket wrench, 3/8 inch, square drive, 9/16 inch  
 Wrench, torque, 0-175 lb-ft

### SPECIAL TOOLS:

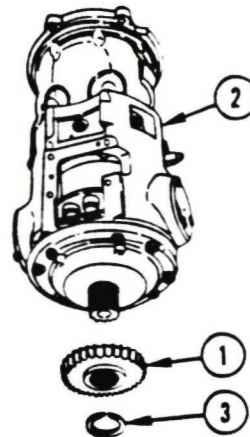
S-hook (19207) 11650102

### SUPPLIES:

Eyebolt, 7/8-9

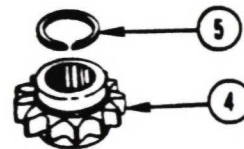
### NOTE

Transmission installed on maintenance stand with input housing and right end cover assemblies removed, right end of transmission turned up.

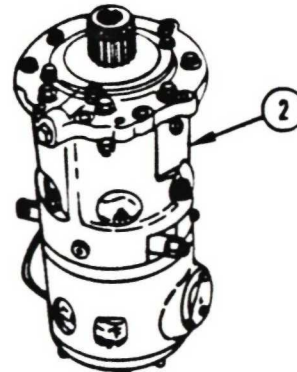


TM9B5735

- 1 Install 32-tooth hydrostatic gear (1) on end of hydrostat (2) opposite hydrostat mounting end, with larger shoulder of gear out.
- 2 Using external retaining ring pliers, install retaining ring (3) to hold gear (1) on hydrostat (2).



- 3 Install 13-tooth hydrostatic drive gear (4) on hydrostat (2) mounting end, with shoulder of gear out.
- 4 Using external retaining ring pliers, install retaining ring (5) to hold gear (4) on hydrostat (2).



TM9B5736

Go to Sheet 13

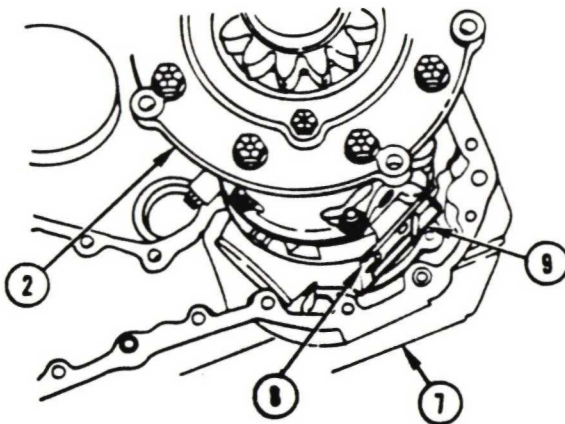
4-30. ASSEMBLE CENTER HOUSING  
(SHEET 13 OF 21)

- 5 Install eyebolt in threaded hole (6) located in shaft on mounting end of hydrostat (2).
- 6 Install S-hook in eyebolt and attach hoist; hoist hydrostat (2) over hydrostat bore in center housing (7).

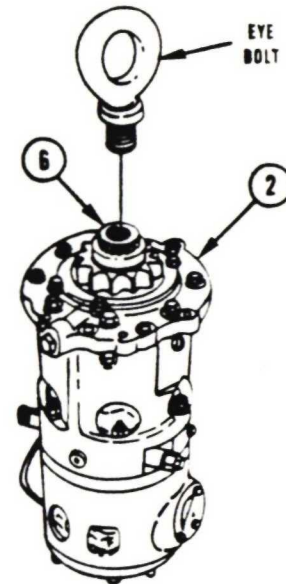
NOTE

Center housing is cut away to receive the raised part of the hydrostat housing where the steer control assembly will be installed (TASK 5).

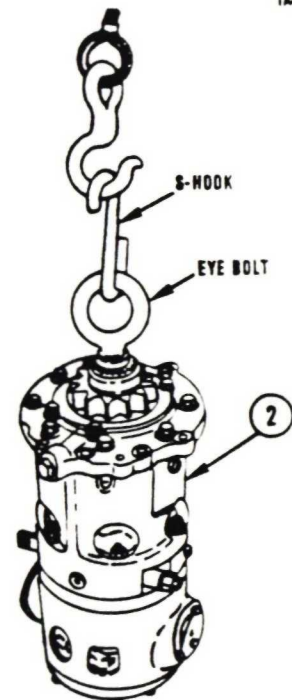
- 7 Turn hydrostat (2) so that platform (8) for steer control assembly lines up with recess (9) in center housing. Lower hydrostat into transmission, aligning gear at base of hydrostat with gear in center housing.



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TA485737



TA485738

Go to Sheet 14



**-30. ASSEMBLE CENTER HOUSING  
(SHEET 14 OF 21)**

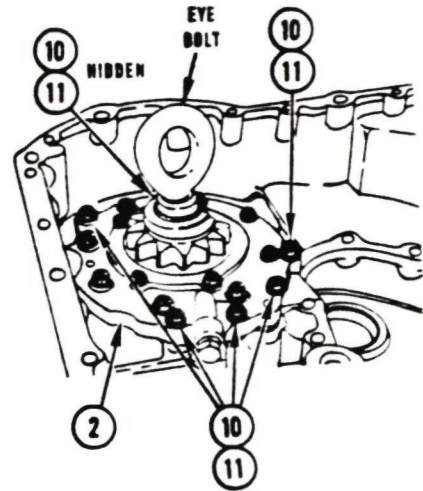
**NOTE**

Leave hoist hooked to hydrostat so that you can raise and turn hydrostat as necessary to align bolt holes.

8 Using socket, install six bolts (10) and washers (11) in hydrostat (2).

9 Remove hoist, S-hook, and eyebolt from hydrostat (2).

10 Using torque wrench and adapter, tighten six bolts (10) to 36-43 lb-ft (49-68 N·m).



TM485740

**FOLLOW-ON PROCEDURE:** Install steer control assembly. Refer to this paragraph, TASK 5.

End of Task 4

**TASK 5. INSTALL STEER CONTROL ASSEMBLY**

**COMMON TOOLS:**

Adapter, socket wrench, 1/2 inch to 3/8 inch square drive  
 Extension, socket wrench, 3/8 inch square drive, 6 inch  
 Handle, socket wrench, 3/8 inch square drive  
 Socket, socket wrench, 3/8 inch square drive, 1/2 inch  
 Socket Head Screw Attachment, socket wrench, 3/8 inch square drive, 3/8 inch hex plug end  
 Wrench, torque, 0-175 ft-lb  
 Wrench, torque, 0-600 in-lb

**SUPPLIES:**

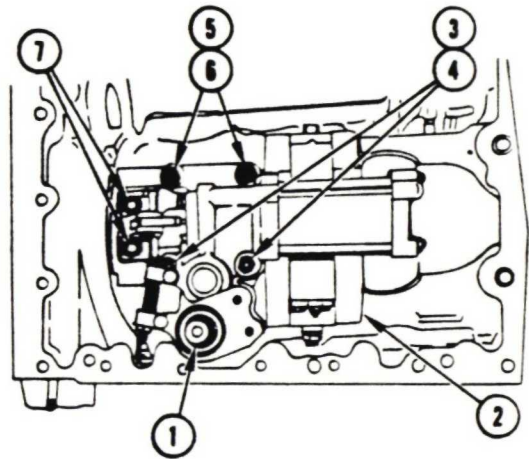
Sealant, lubricating, thread-locking (Item 16, Appendix C)

**PRELIMINARY PROCEDURE:** Hydrostat is installed. Refer to this paragraph, TASK 4.

Go to Sheet 15

**4-30 ASSEMBLE CENTER HOUSING**  
(SHEET 15 OF 21)

- 1 Using rotary control on transmission maintenance stand, turn transmission to input side up.
- 2 Place steer control assembly (1) on hydrostat (2).
- 3 Using socket, install two 5/16-18 x 2-1/4 inch bolts (3) and washers (4) in steer control assembly (1).
- 4 Using socket, install two 5/16-18 x 1-1/2 inch bolts (5) and washers (6) in steer control assembly (1).
- 5 Apply sealing lube on threads of two socket head screws (7).
- 6 Using 3/8 inch socket head screw attachment, install two socket head screws (7) in cam lever of steer control assembly (1).
- 7 Using torque wrench and socket, tighten four bolts (3, 5) to 258-260 lb-in (29-30 N·m).
- 8 Using torque wrench and socket head screw attachment, tighten two socket head screws (7) to 87-88 lb-ft (117-119 N·m).



TAM85741

End of Task 5

Go to Sheet 16

# 30. ASSEMBLE CENTER HOUSING (SHEET 16 OF 21)

## TASK 6. INSTALL OUTPUT PUMP DRIVE GEAR, LEFT OUTPUT SHAFT, LEFT STEER AND OUTPUT SUN GEAR, AND LEFT STEER GEAR

### COMMON TOOLS:

Hammer, hand, plastic faced

### SUPPLIES:

Lubricating Oil (Item 10, Appendix C)

Petrolatum (Item 14, Appendix C)

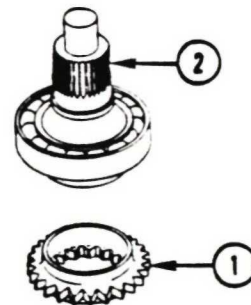
Rag, wiping (Item 15, Appendix C)

### NOTE

Transmission is on maintenance stand, left end up.

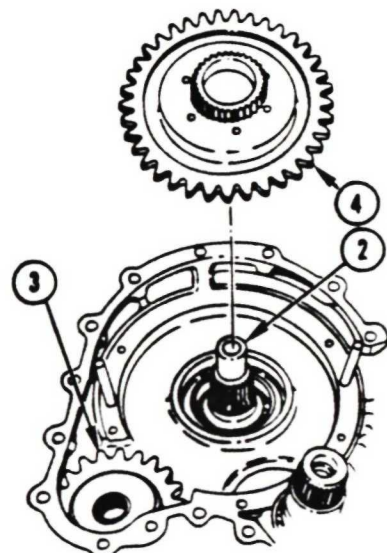
**PRELIMINARY PROCEDURE:** Output pump drive gear, left output shaft, left steer and output sun gear, and left steer gear are removed. Refer to paragraph 4-28.

- 1 Coat output pump drive gear (1) with petrolatum.  
Install output pump drive gear (1) onto left output shaft (2).



TM9B5742

- 2 Using plastic faced hammer, install left output shaft (2), with gear (1) in place, into center housing.
- 3 Install left steer gear (3).
- 4 Install left steer and output sun gear (4).



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End of Task 6

Go to Sheet 17



**4-30. ASSEMBLE CENTER HOUSING**  
(SHEET 17 OF 21)

**TASK 7. INSTALL LEFT BRAKE ASSEMBLY**

**COMMON TOOLS:**

- Adapter, 1/2 to 3/8 inch square drive
- Extension, socket wrench, 1/2 inch square drive, 6 inch
- Gage, feeler
- Hammer, hand, plastic faced
- Pliers, retaining ring, external
- Screwdriver, large flat tip
- Socket, socket wrench, 1/2 inch square drive, 9/16 inch
- Socket, socket wrench, 1/2 inch square drive, 7/16 inch
- Socket, socket wrench, 1/2 inch square drive, 1/2 inch
- Socket, socket wrench, 1/2 inch square drive, 5/8 inch
- Wrench, torque, 0-175 ft-lb
- Wrench, torque, 0-600 in-lb

**REPAIR PARTS:**

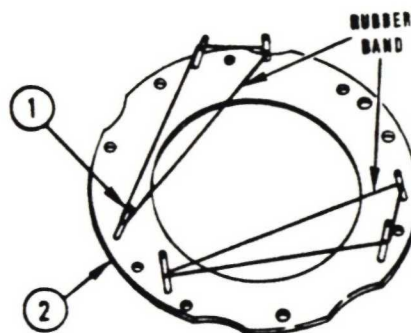
- Packing, preformed (left brake cam) (73342) 23046647
- Packing, preformed (left brake cam) (73342) 23046648
- Seal, lip-type (left brake cam) (73342) 6836128
- Seal, lip-type (left brake cam) (73342) 6836127

**SPECIAL TOOLS:**

- Socket, socket wrench (19207) 8355955

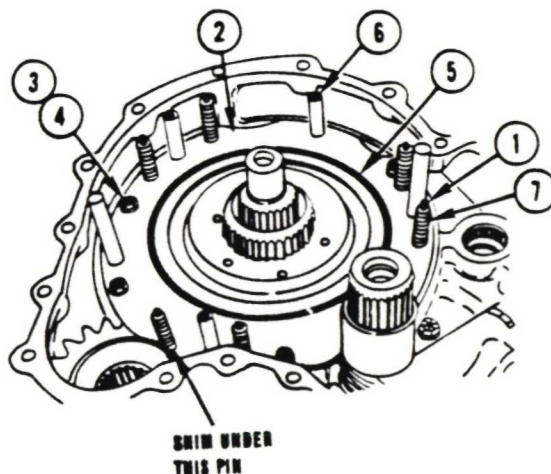
**SUPPLIES:**

- Band, rubber (2 required) (Item 1, Appendix C)
- Lubricating Oil (Item 10, Appendix C)
- Petrolatum (Item 14, Appendix C)
- Rag, wiping (Item 15, Appendix C)
- Wooden Blocks, 4 x 4 x 16 inches (2 required) (Item 3, Appendix C)



TM85744

- 1 Install six headless straight pins (1) in brake backing plate (2). Wrap with rubber bands to hold pins (1) in place.
- 2 Install brake backing plate (2), along with pins (1). Remove rubber bands. Place feeler gage blade under one pin (1) to hold it upward until assembly is complete.
- 3 Using 9/16 inch socket and extension, install five washers (3) and bolts (4) that retain backing plate (2).
- 4 Using torque wrench, tighten five bolts (4) to 36-43 lb-ft (49-68 N·m).
- 5 Install brake coolant seal (5).

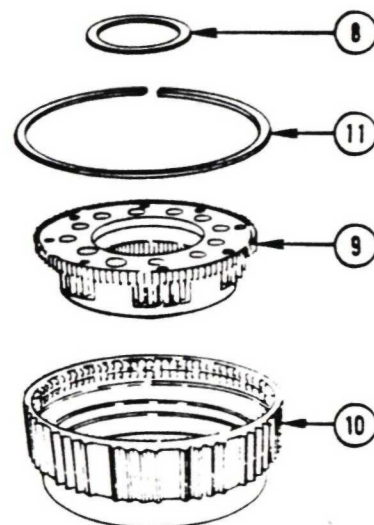


TM85745

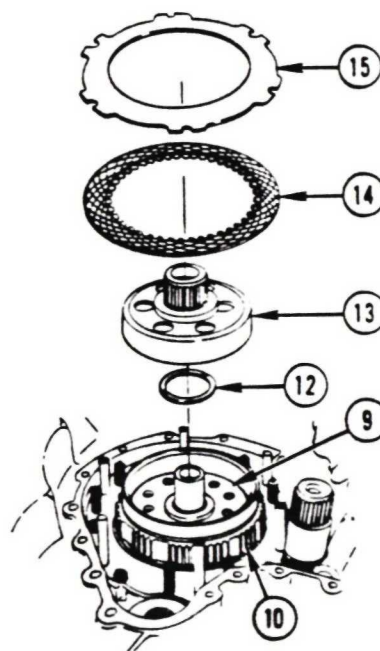
Go to Sheet 18

# **-30. ASSEMBLE CENTER HOUSING (SHEET 18 OF 21)**

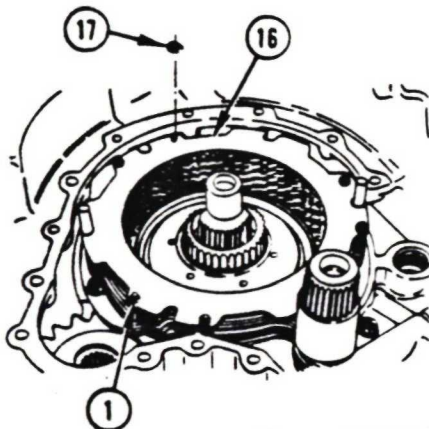
- 6 Install four brake reaction pins (6).
- 7 Install six springs (7) over six pins (1).
- 8 Coat thrust washer (8) with petrolatum and install it on output carrier (9).
- 9 Install output carrier (9) and thrust washer (8) into brake clutch drum (10).
- 10 Using screwdriver, install retaining ring (11) to retain output carrier (9) in brake clutch drum (10).
- 11 Invert the components assembled in Step 10, and install the assembly into the center housing.
- 12 Coat thrust washer (12) with petrolatum and install onto the underside of spur gear cluster (13).
- 13 Install gear cluster (13) and thrust washer (12) into clutch drum (10).
- 4 Soak friction-faced plates (14) in lubricating oil for two minutes prior to installation. Install one clutch disk (friction-faced plate) (14), then one clutch disk (reaction plate) (15).
- 15 Repeat Step 14 until all six friction-faced plates (14) and all five reaction plates (15) are installed.
- 16 Install clutch disk (16) onto clutch stack, ensuring that six pins (1) are engaged.
- 17 With one hand, press downward on clutch disk (16), against spring force, near one pin (1). Using screwdriver, install retaining ring (17). Using same method, install five more retaining rings (17). Remove feeler gage.



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Go to Sheet 19



**4-30. ASSEMBLE CENTER HOUSING  
(SHEET 19 OF 21)**

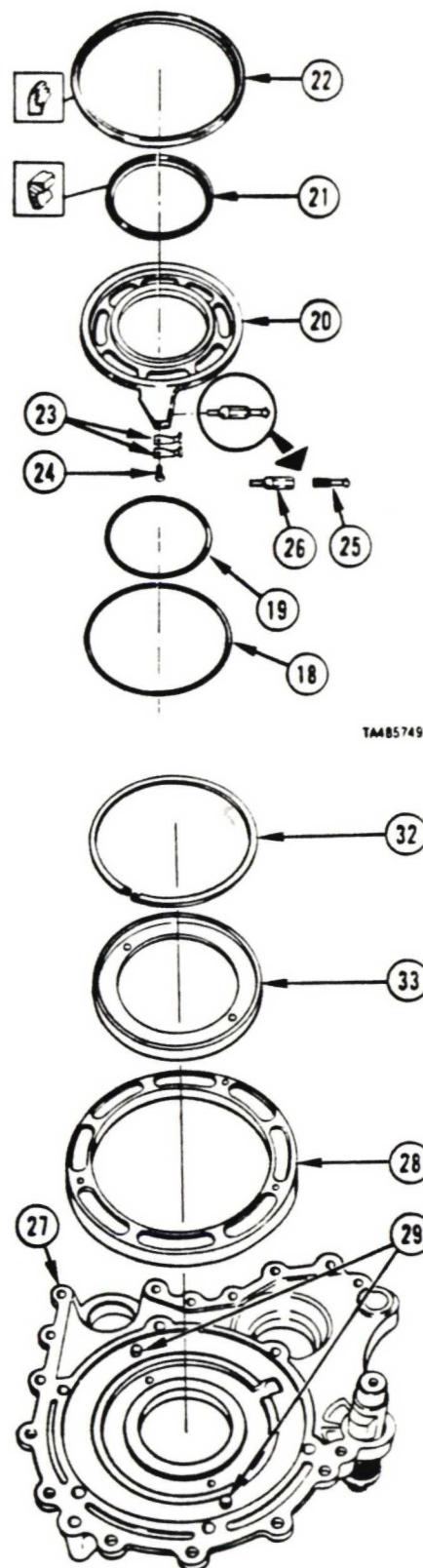
- 18 Install two new preformed packings (18, 19) into face of brake cam (20).

**CAUTION**

Be sure to install seals (21, 22) so that seal lips are in direction shown in illustration. If seals are not installed correctly, components may not function correctly.

- 19 Install new seal (21), seal lip downward.
- 20 Install new seal (22), seal lip upward.
- 21 Coat packings (18, 19) and seals (21, 22) with petrolatum.
- 22 Hold two spring tension clips (23) in place on brake cam (20) in position shown in illustration.
- 23 Using 7/16 inch socket, install bolt (24) to retain clips (23).
- 24 Using torque wrench, tighten bolt (24) to 108-132 lb-in (12-15 N·m).
- 25 Assemble inner brake adjusting link (25) and outer brake adjusting link (26) so that threads on inner link (25) cannot be seen.
- 26 Install slotted end of outer link (26) into brake cam (20) so that flat on link (26) is against free ends of spring tension clips (23).
- 27 Place support (27), inside surface upward, on wooden blocks.
- 28 Install stationary cam (28) onto two pins (29) in support (27). Ensure bolt holes are aligned.
- 29 Using plastic faced hammer, tap stationary cam (28) onto pins (29) until cam is seated.

Go to Sheet 20



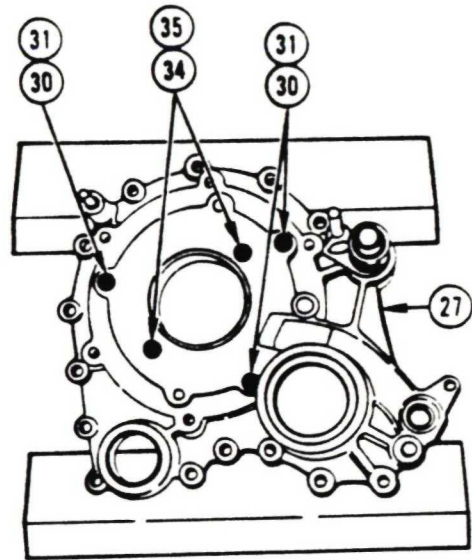
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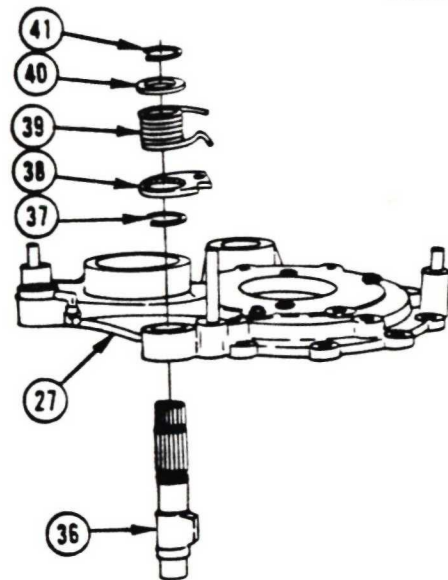


### 30. ASSEMBLE CENTER HOUSING (SHEET 20 OF 21)

- 30 Turn support (27) over and place on wooden blocks.
- 31 Using 1/2 inch socket and extension, install three washers (30) and bolts (31).
- 32 Tighten three bolts (31) to 17-20 lb-ft (23-27 N·m).
- 33 Turn support (27) over and place on wooden blocks.
- 34 Install hook-type metal seal ring (32) onto retainer (33).
- 35 Coat seal ring (32) with petrolatum.
- 36 Tip support (27) on edge.
- 37 Install retainer (33), flat side first, into support (27).  
Using fingers, start two washers (34) and bolts (35) into support (27) to hold retainer (33) in place.
- 38 Turn support (27) over and place on wooden blocks.
- 39 Using 7/16 inch socket and torque wrench, tighten two bolts (35) to 10-12 lb-ft (14-16 N·m).
- 40 Turn support (27) over and place on wooden blocks.
- 41 Install control cam (cam shaft) (36) into support (27).
- 42 Using retaining ring pliers, install retaining ring (37) onto cam shaft (36).
- 43 Turn support (27) over and place on wooden blocks.
- 44 Install control cam (stop) (38) onto cam shaft (36).
- 45 Install torsion helical spring (39) onto cam shaft (36).  
Engage straight end of spring (39) behind pin in support (27); using screwdriver, engage hook end of spring (39) with hole in stop (38).
- 46 Install washer (40) onto cam shaft (36).
- 47 Using retaining ring pliers, install retaining ring (41) against washer (40).



TM 85751

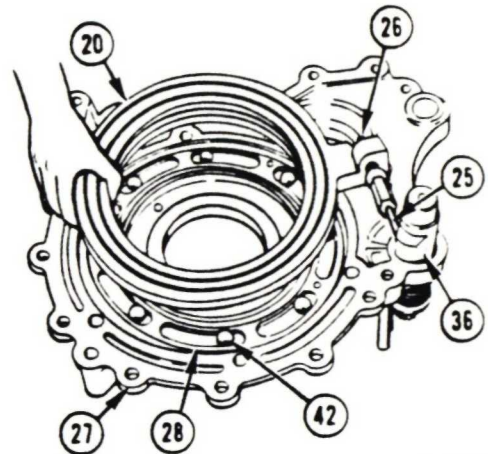


TM 85752

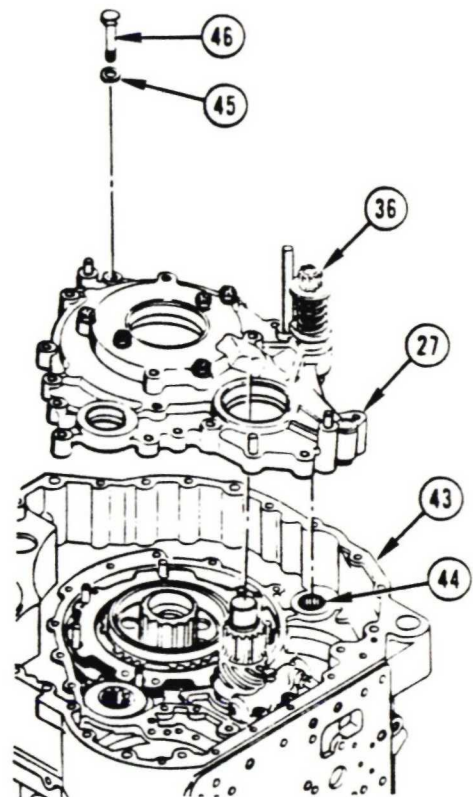
Go to Sheet 21

**4-30. ASSEMBLE CENTER HOUSING  
(SHEET 21 OF 21)**

- 48 Turn support (27) over and place on wooden blocks.
- 49 Install eight balls (42) into lowest areas of ramps on stationary cam (28).
- 50 Apply petrolatum to balls (42) and in ramps around balls.
- 51 Using hand, hold brake cam (20) in position shown in illustration.
- 52 Install end of inner link (25) in pocket of cam shaft (36). Holding brake cam (20), turn and twist cam (20) so that end of link (25) is fully seated in pocket of cam shaft (36).
- 53 After link (25) is seated in pocket of cam shaft (36), place brake cam (20) onto stationary cam (28). Arm on brake cam (20) must be about two inches counterclockwise from cam shaft (36).
- 54 Using screwdriver, turn slotted end of link (26) counterclockwise until tension is felt on screwdriver. Then, continue to turn 1/2 to 3/4 of a turn, but not to the extent that cam (20) starts to lift.
- 55 Install support (27) into center housing (43), aligning cam shaft (36) with bearing (44) in center housing. Use plastic faced hammer to seat support (27).
- 56 Using 5/8 inch socket, install fifteen washers (45) and bolts (46) that retain support (27).
- 57 Using handle and socket wrench socket 8355955, turn cam shaft (36) slightly so that shaft (36) will seat in bearing (44).
- 58 Using torque wrench, tighten fifteen bolts (46) to 54-65 lb-ft (74-88 N·m).



TA485753



TA485754

End of Task 7

**-31. REPAIR TRANSMISSION TOP COMPONENTS  
(SHEET 1 OF 7)**

Task	Title	Page
1	Replace Solenoids	4-243
2	Replace Insulators, Terminals on Solenoids, Wire Harness	4-246
3	Replace Top Cover Components, Oil Transfer Plate Components	4-247

**TASK 1. REPLACE SOLENOIDS**

**COMMON TOOLS:**

Extension, socket wrench, 3/8 inch square drive, 5 inch  
 Handle, socket wrench, 3/8 inch square drive  
 Socket, socket wrench, 3/8 inch square drive, 3/8 inch  
 Wrench, torque, 0-600 in-lb

**PRELIMINARY PROCEDURES:** Main control valve body is removed. Lockup valve body is removed. Refer to paragraph 4-5.

Go to Sheet 2



# 4-31. REPAIR TRANSMISSION TOP COMPONENTS (SHEET 2 OF 7)

## Remove Solenoids

### **CAUTION**

Do not remove solenoids (1) from valve assemblies (2, 3) while valve assemblies (2, 3) are installed on the transmission. Bolts can drop through oil return holes into the transmission, damaging transmission. Bolt must be retrieved, even if transmission has to be disassembled.

### **NOTE**

Do not remove solenoids (1) unless replacement is necessary.

- 1 Using socket, remove two bolts (4) from any of seven solenoids (1) on main valve body assembly (2) and lockup valve body assembly (3).

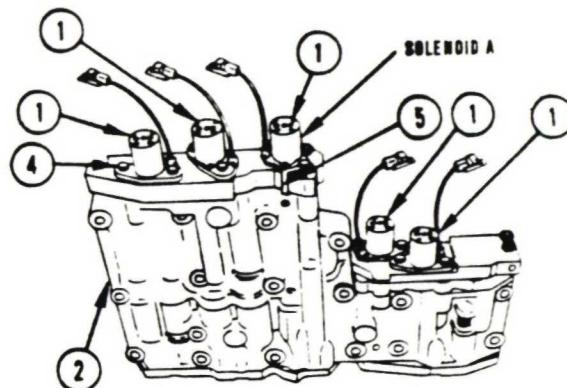
### **NOTE**

For solenoid A, one bolt (4) is 1/4 inch longer than the other bolts (4). This is to allow for the thickness of spring retainer (5).

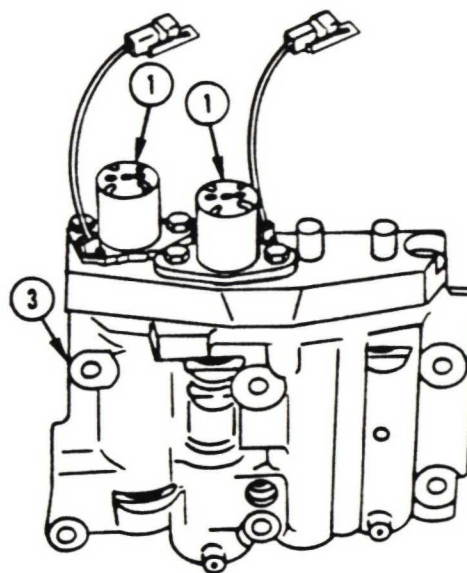
- 2 For solenoid A, remove spring retainer (5).
- 3 Remove any of seven solenoids (1).

**REPAIR:** For replacement of solenoid insulators and terminals, refer to this paragraph, TASK 2.

Go to Sheet 3



TA485755



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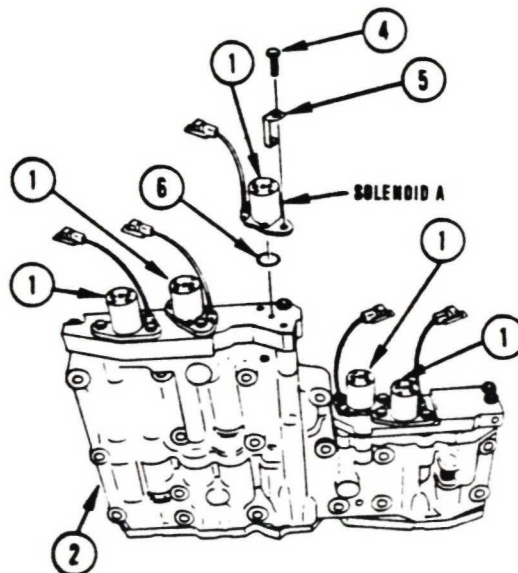
### 31. REPAIR TRANSMISSION TOP COMPONENTS (SHEET 3 OF 7)

#### Install Solenoids

- 4 For any solenoids (1) being replaced, be sure there is a preformed packing (6) in place on the under side of each new solenoid (1).
- 5 Install new solenoids (1) in positions shown on main control valve body assembly (2) and on lockup valve body assembly (3).
- 6 For solenoid A, install spring retainer (5) in position shown to cover exhaust port.
- 7 Using socket, install two bolts (4) into each solenoid (1) on main valve body assembly (2) and lockup valve body assembly (3).
- 8 Using torque wrench, tighten all replaced bolts (4) to 108-132 lb-in. (12-15 N·m).

End of Task 1

Go to Sheet 4



TA085757

4-31. REPAIR TRANSMISSION TOP COMPONENTS  
(SHEET 4 OF 7)

TASK 2. REPLACE INSULATORS, TERMINALS ON SOLENOIDS, WIRING HARNESS

COMMON TOOLS:

- Pliers, diagonal, cutting
- Pliers, long round nose
- Screwdriver, small flat tip (2 required)

SPECIAL TOOLS:

- Maintenance Kit, electrical

Remove Terminal From Insulator

- 1 Using two screwdrivers, insert screwdrivers between insulator (1) and terminal (2).
- 2 Press down on screwdrivers to release insulator (1) from terminal (2). Pull terminal (2) from insulator (1).

Replace Terminal

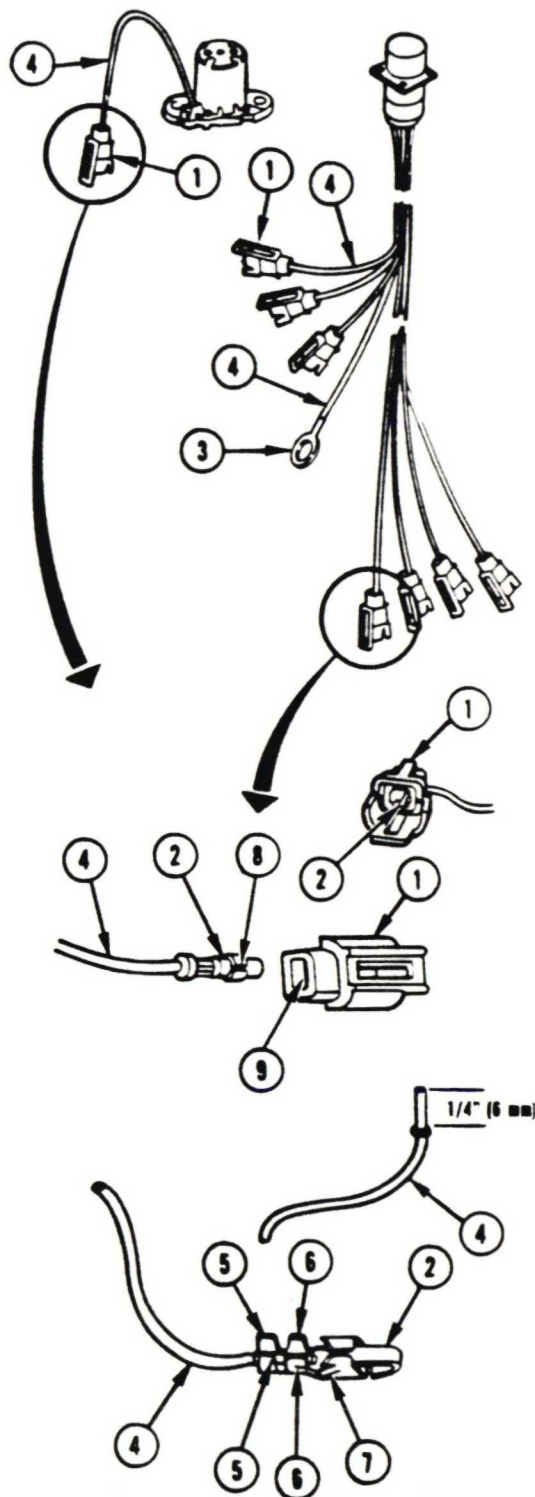
- 3 Using cutting pliers, cut quick disconnect terminal (2) or straight ring (ground) terminal (3) off lead (4) as close to terminal (2, 3) as possible.
- 4 Using wire stripper, strip 1/4 inch (6 mm) of insulation from end of lead (4).
- 5 Put new terminal (2, 3) on stripped end of lead (4). Using round nose pliers, bend tabs (5) of terminal (2, 3) around insulation and bend tabs (6) around wire of lead (4). Bend tangs (7) slightly away from terminal.

Install Terminal Onto Insulator

- 6 Line up slot (8) on terminal (2) with key (9) in new insulator (1). Push insulator (1) onto terminal (2) until tangs lock into place.

End of Task 2

Go to Sheet 5



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# 1. REPAIR TRANSMISSION TOP COMPONENTS (SHEET 5 OF 7)

## TASK 3. REPLACE TOP COVER COMPONENTS, OIL TRANSFER PLATE COMPONENTS

### COMMON TOOLS:

Drive Sleeve, 13/16 inch O.D.  
 Hammer, hand, ball peen  
 Hammer, hand, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Handle, socket wrench, 3/8 inch square drive  
 Pliers, diagonal, cutting  
 Punch, drive pin, straight, 3/32 inch dia. point  
 Screwdriver, flat tip  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Socket, socket wrench, 3/8 inch square drive, 7/16 inch  
 Wrench, torque 0-600 in-lb

### REPAIR PARTS:

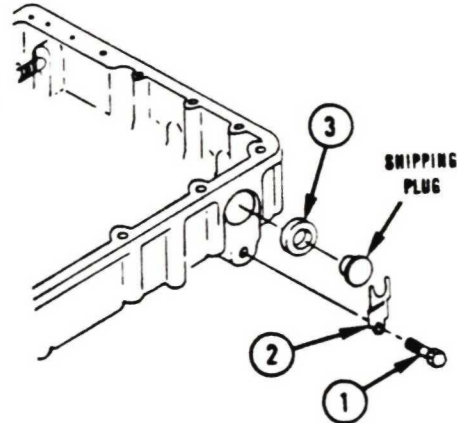
Packing Assembly (80201) 544306  
 Seal, plain encased (80201) 504260

### PERSONNEL REQUIRED: Two

- o One soldier holds push rod extension from flying out.
- o One soldier replaces push rod components.

### Replace Packing Assembly

- 1 Using 1/2 inch socket, remove bolt (1) (if present) and bracket (2). (If present, remove metal shipping plug.)
- 2 Using ball peen hammer and punch, drive packing assembly (seal) (3) from inside of top cover.
- 3 Using ball peen hammer and 13/16 inch drive sleeve, drive against the identification numbers on new packing assembly (seal) (3). Install packing assembly (seal) (3) to a firm seat against the shoulder in the bore.
- 4 Using 1/2 inch socket, install bolt (1) (if removed) and bracket (2) over shipping plug, if necessary.



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Go to Sheet 6

4-31. REPAIR TRANSMISSION TOP COMPONENTS  
(SHEET 6 OF 7)

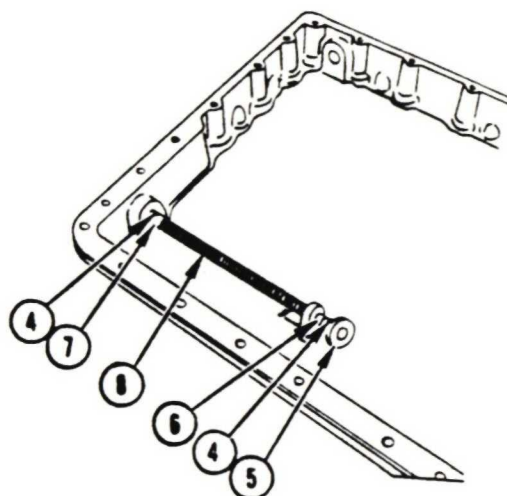
Replace Push Rod Components

**WARNING**

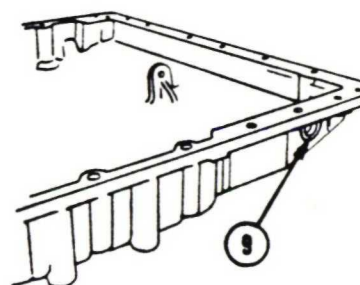
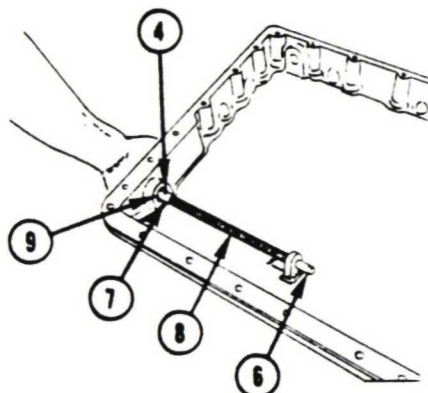
Spring-loaded parts can fly and injure you. Push rod components are spring loaded and must be restrained when spring pins (4) are removed and installed.

**CAUTION**

When using cutting pliers to remove pins (4), be careful not to cut pins (4).



- 5 Using ball peen hammer and punch, tap two pins (4) flush with push rod.
- 6 Using cutting pliers, remove two pins (4).
- 7 Pull linear actuator cap (5) from headless straight pin (push rod) (6).
- 8 From inside of top cover, push to remove push rod (6) and extension (7) through cover.
- 9 Remove extension (7) from rod (6).
- 10 Remove spring (8).
- 11 Using screwdriver, pry plain encased seal (9) from inside of cover.
- 12 Using ball peen hammer and 13/16 inch drive sleeve, drive against the identification numbers on new plain encased seal (9). Install seal (9) to a firm seat against the shoulder in the bore.



Go to Sheet 7

### 31. REPAIR TRANSMISSION TOP COMPONENTS (SHEET 7 OF 7)

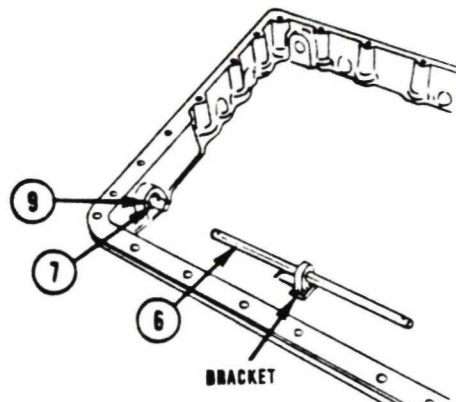
13 Insert rod (6) through bracket.

14 Install extension (7), beveled end first, into bore.  
Using plastic faced hammer, tap extension into seal (9) so that pin hole is about 3/8 inch from inside of cover. One soldier hold it firmly in place by hand. Be sure to keep holding extension until pin (4) is installed.

15 The other soldier, install spring (8) onto rod (6) inside cover. Install rod (6) into extension (7) and install pin (4). Using ball peen hammer and punch, tap pin (4) until it is of equal height on both sides of extension (7).

16 Place cap (5) onto rod (6).

17 Install other pin (4) to hold cap (5) on rod (6). Using ball peen hammer and punch, tap pin (4) until it is of equal height on both sides of rod (6).



TM 9-2520-272-34&amp;P

#### Replace Oil Transfer Plate Plugs

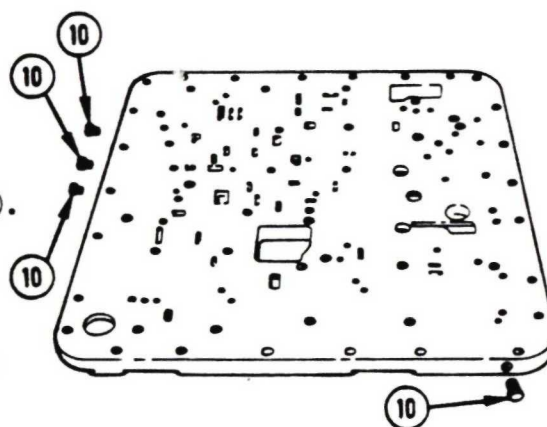
##### NOTE

Do not remove plugs (10) unless replacement is necessary.

18 Using 7/16 inch socket, remove any of four plugs (10).

19 Using 7/16 inch socket, install any of four new plugs (10).

20 Using torque wrench, tighten any replaced plugs (10) to 50-60 lb-in. (6-7 N·m).



TM 9-2520-272-34&amp;P

**FOLLOW-ON PROCEDURE:** Install top cover onto transmission. Refer to paragraph 4-20.

End of Task 3



4-32. REPAIR CONVERTER ELEMENT COMPONENTS  
(SHEET 1 OF 3)

Task	Title	Page
1	Repair Converter Pump Cover Assembly	4-250
2	Repair Stator Group	4-251

**TASK 1. REPAIR CONVERTER PUMP COVER ASSEMBLY**

**COMMON TOOLS:**

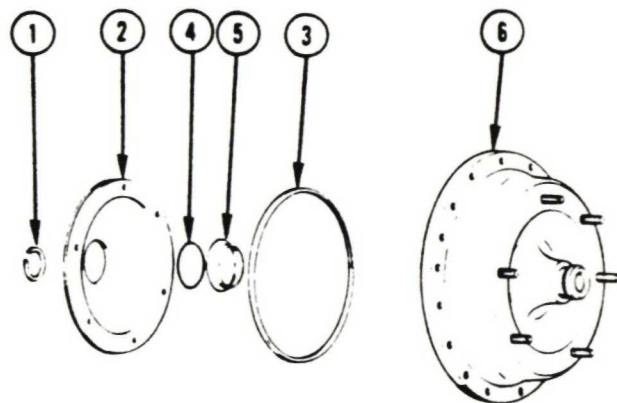
Chisel, cold  
Hammer, hand, ball peen  
Pliers, retaining ring, external  
Press, arbor, hand operated  
Screwdriver, flat tip

**SUPPLIES:**

Lubricating Oil (Item 10, Appendix C)

**REPAIR PARTS:**

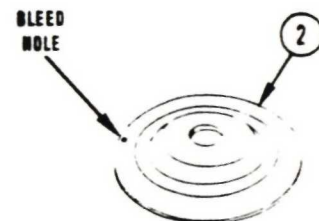
Packing, preformed (73342) 6770820  
Seal Ring, transmission (73342) 6758036



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**Disassemble Converter Pump Cover Assembly**

- 1 Using retaining ring pliers, remove retaining ring (1).
- 2 Turn assembly over and drop assembly on work bend to bump piston (2) out.
- 3 Using screwdriver, remove seal ring (3) from piston (2) and preformed packing (4) from retainer (5).
- 4 If replacement is necessary, using hammer and chisel, remove retainer (5).



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**Assemble Converter Pump Cover Assembly**

- 5 Using arbor press, install retainer to a seat in pump cover (6).
- 6 Install seal ring (3) onto piston (2) and preformed packing (4) onto new retainer (5). Apply oil to packing (4) and seal ring (3).
- 7 Install piston (2) into pump cover, aligning bleed hole in piston (2) with stud in cover (6).
- 8 Using retaining ring pliers, install retaining ring (1).

**FOLLOW-ON PROCEDURE:** Install converter pump cover assembly into transmission. Refer to paragraph 4-14.

End of Task 1

Go to Sheet 2

## 32. REPAIR CONVERTER ELEMENT COMPONENTS (SHEET 2 OF 3)

### TASK 2. REPAIR STATOR GROUP

#### COMMON TOOLS:

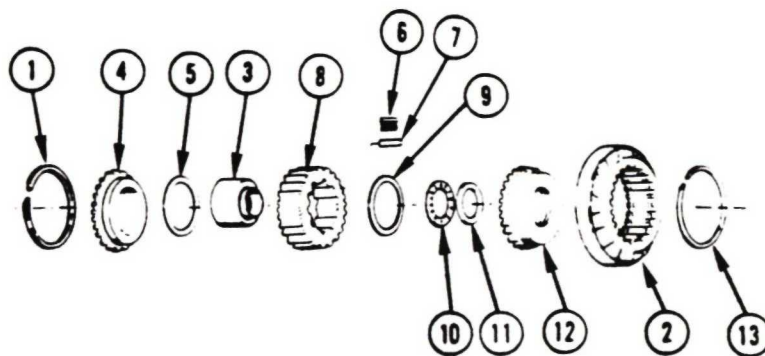
Screwdriver, flat tip (2 required)

#### SUPPLIES:

Petrolatum (Item 14, Appendix C)

#### Disassemble Stator Group

- 1 Using screwdrivers, remove retaining ring (1) from stator (2).
- 2 Pull up on race (3). Using screwdriver, remove rear stator washer (4).
- 3 Remove thrust washer (5).
- 4 Remove race (3). Springs (6) and rollers (7) will fall free from cam (8). Remove cam (8).
- 5 Remove thrust washer (9).
- 6 Remove bearing (10) and race (11).
- 7 Remove clutch disk (front stator washer) (12).
- 8 Using screwdrivers, remove retaining ring (13).



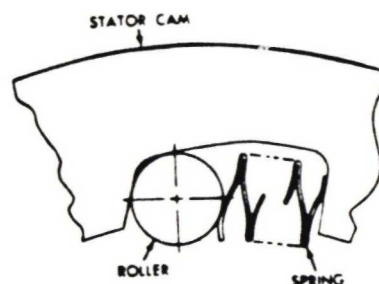
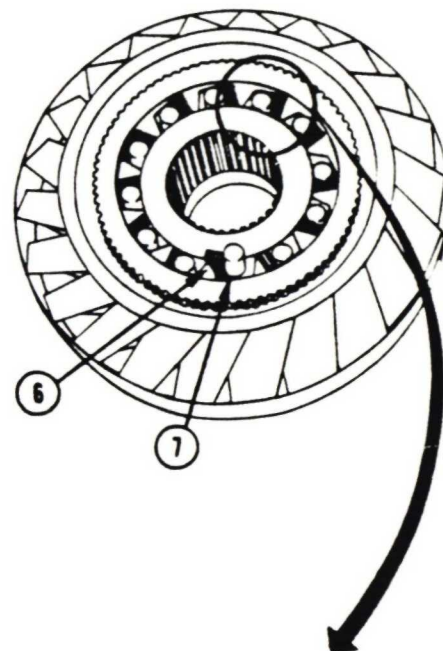
TA485767

Go to Sheet 3

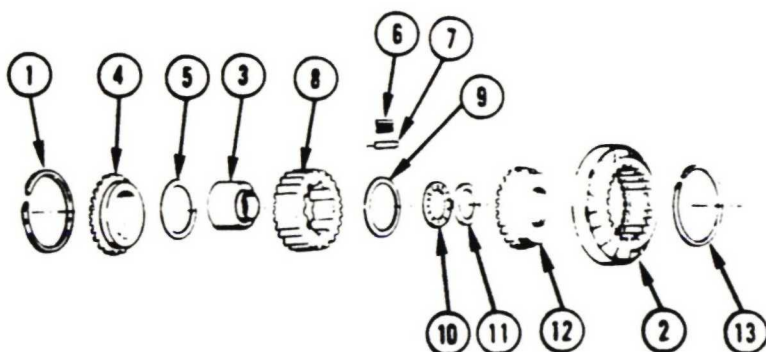
# 4-32. REPAIR CONVERTER ELEMENT COMPONENTS (SHEET 3 OF 3)

## Assemble Stator Group

- 9 Using screwdrivers, install retaining ring (13) into stator (2).
- 10 Install clutch disk (front stator washer) (12).
- 11 Install race (11) and bearing (10).
- 12 Install thrust washer (9).
- 13 Install race (3). Install cam (8).
- 14 Using petrolatum to hold parts in place, install twelve springs (6) and rollers (7) into cam (8) in position shown in illustration. The open end of the spring touching the roller must be toward the center of cam (8). Rollers (7) are installed in the shallow ends of cam (8) pockets.
- 15 Install thrust washer (5).
- 16 Install rear stator washer (4).
- 17 Using screwdrivers, install retaining ring (1).



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TA485769

**FOLLOW-ON PROCEDURE:** Install torque converter stator group into transmission. Refer to paragraph 4-14.

End of Task 2



## CHAPTER 5

FINAL ADJUSTMENTS AND PREPARATION  
FOR STORAGE OR SHIPMENT

## Section I. INTRODUCTION

## OVERVIEW

Final static checks and adjustments shall be performed after the General Support Maintenance actions have been completed and prior to shipment or storage.

Functional tests shall be performed with the transmission coupled to the engine and the powerpack installed in the vehicle. (Refer to TM 9-1450-300-20 or TM 9-2350-277-20.) Functional tests must include correct oil and level and a thorough inspection for oil leaks, steering adjustment check, and brake adjustment check. Maintenance records shall be reviewed for complete and correct entries.

## 5-1. CHAPTER CONTENTS

Section	Paragraph	Title	Page
I		Introduction	5-1
II		Checks and Adjustments	5-1
	5-2	Output Shaft Drag Check	5-1
	5-3	Brake Adjustment	5-4
III		Preservation and Storage	5-9
	5-4	Install Transmission in Container	5-9

## Section II. CHECKS AND ADJUSTMENTS

5-2. OUTPUT SHAFT DRAG CHECK  
(SHEET 1 OF 3)

## OVERVIEW

When the left or right end cover has been removed and maintenance work has been performed in either cover, or in the left or right end of the center housing, the output shaft(s) on the side(s) where the work was performed must be given a drag check. This check will indicate if an assembly error exists such as omission of a spacer or gear or binding of parts.

The output shaft drag check is performed after assembly of the transmission has been completed. The transmission must be on the work table or on the floor in the normal upright operating position.

Go to Sheet 2

## 5-2. OUTPUT SHAFT DRAG CHECK (SHEET 2 OF 3)

This check is performed on a dry transmission (a transmission not filled with oil). Each output shaft in a dry transmission should rotate with the application of 20 pound feet (27 N·m) of torque. When rotation of the output shaft produces a torque reading higher than 20 pound feet (27 N·m), the side with the faulty drag must be disassembled and checked for missing parts, or parts improperly installed.

### NOTE

A high drag check torque reading on a wet transmission should not be interpreted as indication of a problem. For example, a transmission full of oil may produce a normal drag check reading of 50 pound feet (68 N·m), or more, because of all the oil being moved around. However, an uneven drag check reading, such as 50 pound feet (68 N·m) on one shaft and 40 pound feet (54 N·m) on the other shaft, would indicate something binding in the side with the high reading.

When there is excessive drag on one output shaft, there will probably also be excessive drag on the other output shaft. The output shaft with the higher torque reading represents the side of the transmission which must be disassembled.

Task	Title	Page
1	Output Shaft Drag Check	5-2

### TASK 1. OUTPUT SHAFT DRAG CHECK

#### COMMON TOOLS:

- Chisel, cold, 3/8 inch
- Extension, socket wrench, 1/2 inch square drive, 6 inch
- Hammer, hand, ball peen
- Handle, socket wrench, 1/2 inch square drive
- Punch, center, tapered point
- Socket, socket wrench, 1/2 inch square drive, 3/4 inch
- Wrench, torque, 0-175 ft-lb

Go to Sheet 3

## -2. OUTPUT SHAFT DRAG CHECK (SHEET 3 OF 3)

- 1 If tab of washer (1) is bent, use chisel and hammer to straighten bent tab of washer (1) that retains bolt (2) on output flange (3).
- 2 Using torque wrench on bolt (2), turn output flange to the right (clockwise). Torque while turning should not exceed 20 lb-ft (27 N·m).
- 3 If dimple is not present in washer (1), use punch and hammer to punch dimple in washer (1). Dimple must go down into dimple hole (4) in left and right flanges (3).

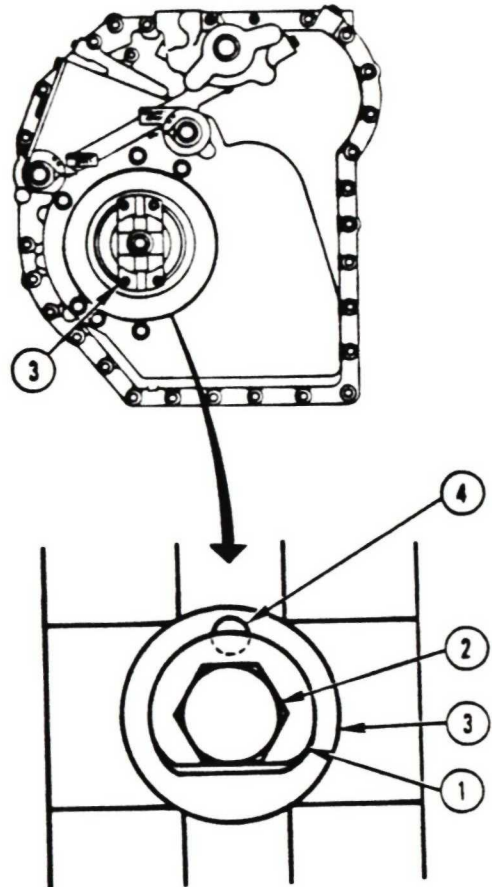
### NOTE

Tab of washer (1) may be on any flat of the bolt (2) head, except tab must be away from dimple hole (4).

- 4 Using hammer and punch, bend tab on washers (1) up against flat of left and right bolt heads (2).

### FOLLOW-ON PROCEDURE:

- If torque reading in drag check (Step 2) did not exceed 20 lb-ft (27 N·m), go to paragraph 5-3.
- If torque reading in drag check exceeded 20 lb-ft (27 N·m), return transmission to General Support maintenance with report on output shaft drag check.



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End of Task 1



5-3. BRAKE ADJUSTMENT  
(SHEET 1 OF 5)

Task	Title	Page
1	Torque wrench check	5-4
2	Adjust left-hand brake	5-5
3	Adjust right-hand brake	5-7

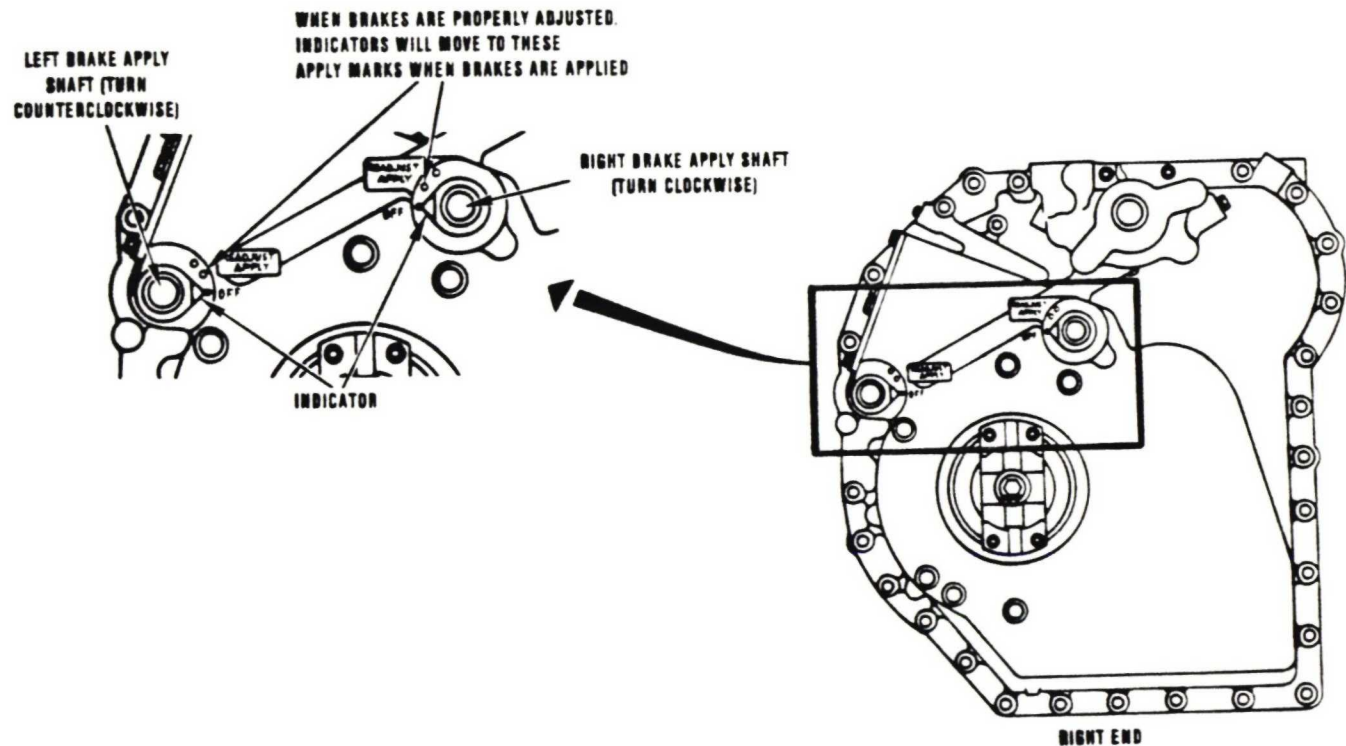
TASK 1. TORQUE WRENCH CHECK

COMMON TOOLS:

Wrench, torque, 0-175 ft-lb

SPECIAL TOOLS:

Adapter, splined, brake adjustment (73342) 8355955



TM485771

Go to Sheet 2

### 3. BRAKE ADJUSTMENT (SHEET 2 OF 5)

#### NOTE

- The torque wrench check provides an accurate method to check brakes.
  - When a brake is adjusted properly, 40 lb-ft applied to the torque wrench on the brake shaft should cause the indicator to line up opposite the APPLY mark.
- 1 Using torque wrench and splined adapter, turn left brake apply shaft counterclockwise until torque wrench reads 40 lb-ft (54 N·m) and hold it there.
  - 2 Check position of indicator. Adjust brake if indicator does not line up opposite APPLY mark. (Refer to this paragraph, TASK 2.)
  - 3 Using torque wrench and splined adapter, turn right brake apply shaft clockwise until torque wrench reads 40 lb-ft (54 N·m) and hold it there.
  - 4 Check position of indicator in relation to the APPLY mark. Adjust brake if indicator does not line up opposite APPLY mark. (Refer to this paragraph, TASK 3.)

End of Task 1

#### TASK 2. ADJUST LEFT-HAND BRAKE

##### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
Handle, socket wrench, 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
Wrench, torque, 0-175 ft-lb

##### FABRICATED TOOLS:

Wrench, combination, 11/16 inch, thin ground open end (refer to Appendix D)

##### SPECIAL TOOLS:

Adapter, splined, brake adjustment (73342) 8355955

##### REPAIR PARTS:

Gasket, brake adjusting cover (73342) 23017880

#### NOTE

- Brake needs tightened if indicator passes APPLY mark when 40 lb-ft (54 N·m) is applied with torque wrench.
- Brake needs loosening if indicator does not get to APPLY mark when 40 lb-ft (54 N·m) is applied with torque wrench.
- Brake adjusting link should be turned only 1/6 turn (60°) at a time until proper brake adjustment is achieved.

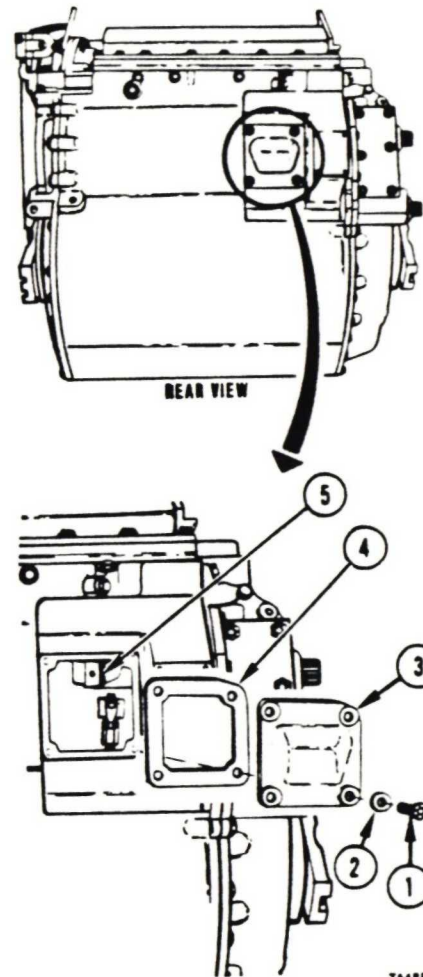
Go to Sheet 3

### 5-3. BRAKE ADJUSTMENT (SHEET 3 OF 5)

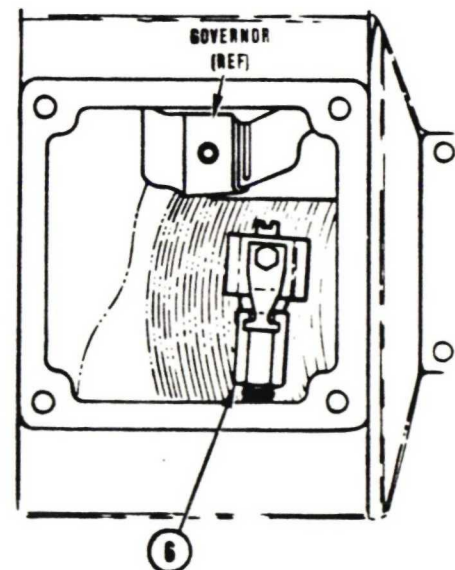
- 1 Using 1/2 inch socket, remove four bolts (1) and washers (2) retaining LH brake adjusting cover (3).
- 2 Remove cover (3) and gasket (4).
- 3 Remove governor assembly (5), turning clockwise to disengage gear teeth.

#### NOTE

- Combination wrench turned to right (counterclockwise rotation of adjusting link) tightens brake.
  - Combination wrench turned to left (clockwise rotation of adjusting link) loosens brake.
- 4 Using fabricated 11/16 inch combination wrench, turn brake adjusting link (6).
  - 5 Alternately turn adjusting link (6) with combination wrench and apply torque wrench at 40 lb-ft (54 N·m) on shaft until indicator lines up opposite APPLY mark.
  - 6 Install governor assembly (5), engaging gear counterclockwise.
  - 7 Install cover (3) with new gasket (4).
  - 8 Using 1/2 inch socket, install four bolts (1) and washers (2) retaining cover.
  - 9 Using torque wrench, tighten four bolts (1) to 17-20 lb-ft (23-27 N·m).



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End of Task 2

Go to Sheet 4



### 5-3. BRAKE ADJUSTMENT (SHEET 4 OF 5)

#### TASK 3. ADJUST RIGHT-HAND BRAKE

##### COMMON TOOLS:

Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Handle, socket wrench, 1/2 inch square drive  
 Screwdriver, flat tip  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Wrench, torque, 0-175 ft-lb

##### SPECIAL TOOLS:

Adapter, splined, brake adjustment (73342) 8355955

##### MATERIAL/PARTS:

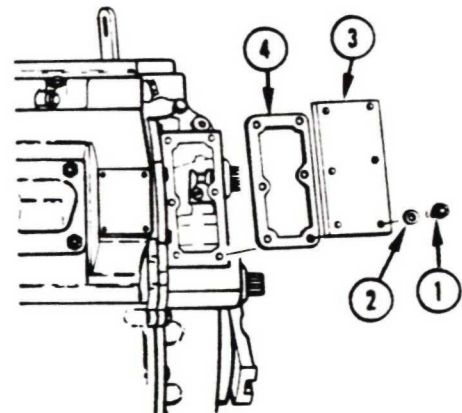
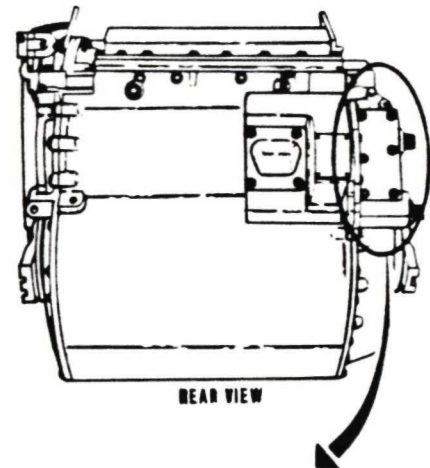
Gasket, brake adjusting cover (1 required) (73342) 23017882

##### NOTE

- Brake needs tightened if indicator passes APPLY mark when 40 lb-ft (54 N·m) is applied with torque wrench.
- Brake needs loosening if indicator does not get to APPLY mark when 40 lb-ft (54 N·m) is applied with torque wrench.
- Brake adjusting link should be turned only 1/6 turn (60°) at a time until proper brake adjustment is achieved.

- 1 Using 1/2 inch socket, remove six bolts (1) and washers (2) retaining RH brake adjusting cover (3).
- 2 Remove cover (3) and gasket (4).

Go to Sheet 5



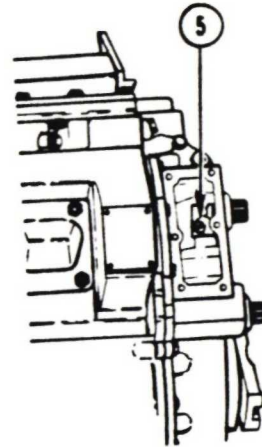
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5-3. BRAKE ADJUSTMENT  
(SHEET 5 OF 5)

NOTE

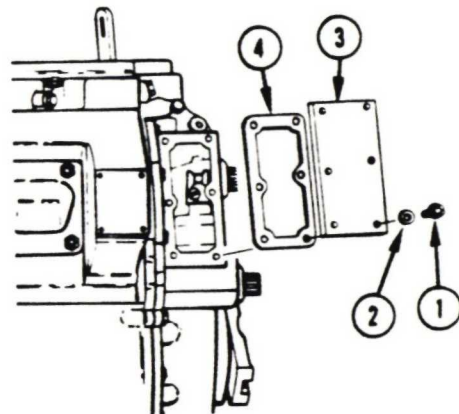
- Screwdriver turned clockwise in slotted tip of adjusting link loosens brake.
- Screwdriver turned counterclockwise in slotted tip of adjusting link tightens brake.

- 3 Alternately turn adjusting link (5) 1/6 turn (60°) with screwdriver and apply torque wrench at 40 lb-ft (54 N·m) on shaft until indicator lines up opposite APPLY mark



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- 4 Install cover (3) with new gasket (4).
- 5 Using 1/2 inch socket, install six bolts (1) and washers (2) retaining cover (3).
- 6 Using torque wrench, tighten six bolts (1) to 13-15 lb-ft (17-20 N·m).



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End of Task 3

## Section III. PRESERVATION AND STORAGE

5-4. INSTALL TRANSMISSION IN CONTAINER  
(SHEET 1 OF 2)

## OVERVIEW

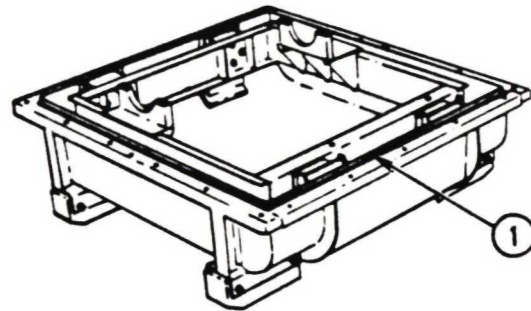
Transmissions repaired at General Support level are usually reinstalled in the vehicle. Sometimes a repaired transmission is to be returned to a depot or retained in long term storage. Proper preparation for packing the transmission in a container is important. The transmission should be clean and drained of fluid. All appropriate plugs and covers should be installed on all inlets and outlets.

Task	Title	Page
1	Install Transmission in Container	5-9

## TASK 1. INSTALL TRANSMISSION IN CONTAINER

## COMMON TOOLS:

Bar, pry, 15 inch  
 Extension, 1/2 inch square drive, 6 inch  
 Handle, socket wrench, 1/2 inch square drive  
 Hoist, 2-ton minimum capacity  
 Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
 Socket, socket wrench, 1/2 inch square drive, 9/16 inch  
 Universal Joint, socket wrench, 1/2 inch square drive  
 Wrench, combination, 3/4 inch  
 Wrench, combination, 9/16 inch  
 Wrench, torque, 0-175 ft-lb



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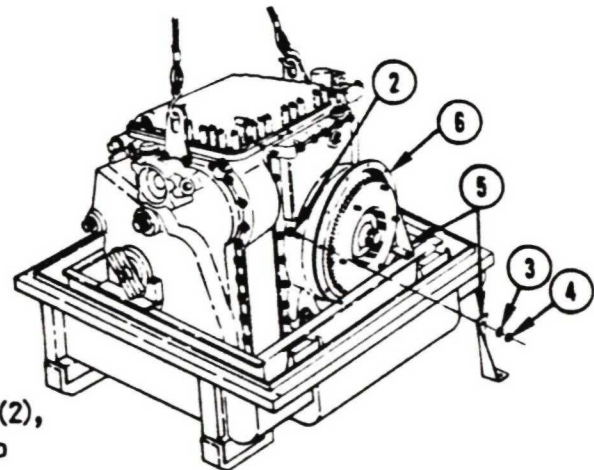
## SPECIAL TOOLS:

Lifting Sling, 2 leg (19207) 12268037

## SUPPLIES:

Dehydrating agent (Item 7, Appendix B)

- 1 Inspect closure gasket (1) for bends, breaks or distortion. Replace if necessary.
- 2 Using 9/16 inch socket and wrench, install six bolts (2), washers (3) and nuts (4) that hold two brackets (5) to transmission converter housing (6).
- 3 Using torque wrench, tighten nuts (4) to 24-28 lb-ft (32-37 N·m).



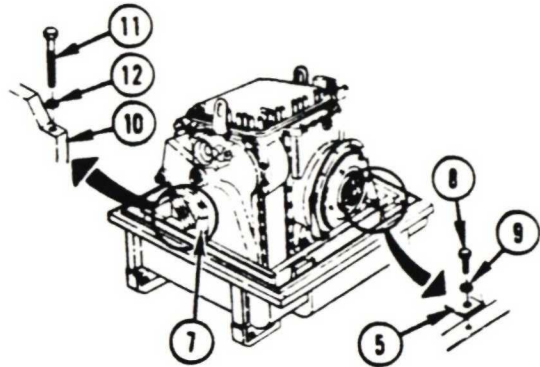
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Go to Sheet 2

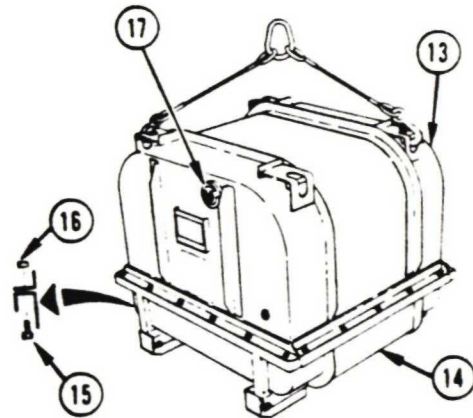


**5-4. INSTALL TRANSMISSION IN CONTAINER  
(SHEET 2 OF 2)**

- 4 Using sling and hoist, install transmission into container. Place transmission outputs on pillows (7). Remove sling.
- 5 Using 3/4 inch socket, install two bolts (8) and washer (9) holding brackets (5).
- 6 Install caps (10). Using 3/4 inch socket, install four bolts (11) and washers (12) holding caps (10).
- 7 Using torque wrench, tighten bolts (8) and (11) 58-66 lb-ft (79-89 N·m).
- 8 Attach sling to opposite and diagonal ends of container top (13).
- 9 Install top (13) on container bottom (14). Line up bolt holes of top and bottom with pry bar.
- 10 Using 3/4 inch socket and wrench, install 22 bolts (15) and nuts (16). Remove sling.
- 11 Using torque wrench, tighten nuts (16) 58-66 lb-ft (79-89 N·m).
- 12 Turning counterclockwise, remove desiccant access cover (17).
- 13 Place 42 units of dehydrating agent in desiccant access hole.
- 14 Install desiccant access cover (17), hand tight.



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**WARNING**

- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Transmission and container weigh about 1500 lbs (680 kg). To avoid injury or death, keep out from under and clear of transmission at all times. Do not let transmission swing freely during hoisting.

End of Task 1

## APPENDIX A

### REFERENCES

#### A-1. ADMINISTRATIVE PUBLICATIONS.

##### a. Regulations

- |               |   |
|---------------|---|
| (1) AR 310-25 | Dictionary of U.S. Army Terms             |
| (2) AR 725-50 | Requisitioning, Receipt, and Issue System |
| (3) AR 750-22 | Army Oil Analysis Program (AOAP)          |

##### b. Pamphlets

- |                |  |
|----------------|--|
| DA PAM 738-750 | The Army Maintenance Management System (TAMMS) |
|----------------|--|

##### c. Forms

- |                  |                                     |
|------------------|-------------------------------------|
| (1) DA Form 2028 | Recommended Changes to Publications |
| (2) SF 368       | Quality Deficiency Report (QDR)     |
| (3) DD Form 6    | Packaging Improvement Report        |

#### A-2. SPECIFICATIONS AND STANDARDS.

##### Catalog

- |            |                  |
|------------|------------------|
| CTA 50-970 | Expendable Items |
|------------|------------------|

#### A-3. TECHNICAL PUBLICATIONS.

##### a. Bulletins

- |                   |  |
|-------------------|--|
| (1) TB 43-0001-39 | Equipment Improvement Report and Maintenance Digest: Tank-Automotive Equipment |
| (2) TB 43-0210    | Army Oil Analysis Program  |
| (3) TB 43-0219    | Nonaeronautical Equipment: Army Oil Analysis Program (AOAP)                    |
| (4) TB 43-0211    | Army Oil Analysis Program User's Guide   |

b. Manuals

- |                      |   |
|----------------------|---|
| (1) TM 9-214         | Inspection, Care, and Maintenance of Antifriction Bearings  |
| (2) TM 9-1450-300-34 | Direct Support and General Support Maintenance Manual for M730A2 Guided Missile Equipment Carrier |
| (3) TM 9-1450-300-20 | Organizational Maintenance Manual for M730 A2 Guided Missile Equipment Carrier                    |
| (4) TM 9-1450-300-10 | Operator's Manual for M730 A2 Guided Missile Equipment Carrier                                    |
| (5) TM 9-2350-277-10 | Operator's Manual for M113A3 Full Tracked Armored Personnel Carrier                               |
| (6) TM 9-2350-277-20 | Organizational Maintenance Manual for M113A3 Full Tracked Armored Personnel Carrier               |
| (7) TM 9-2350-277-34 | Direct and General Support Maintenance Manual for M113A3 Full Tracked Armored Personnel Carrier   |
| (8) TM 9-243         | Use and Care of Hand Tools and Measuring Tools  |
| (9) TM 38-230        | Preservation, Packaging, and Packing of Military Supplies and Equipment (Volumes I and II)        |

c. Lubrication Orders

- |                     |   |
|---------------------|---|
| (1) L09-1450-300-12 | Lubrication Order for M730 A2 Guided Missile Equipment Carrier      |
| (2) L09-2350-277-12 | Lubrication Order for M113A3 Full Tracked Armored Personnel Carrier |

d. Packaging Data Sheet. 5703227



APPENDIX B  
ORGANIZATIONAL, DIRECT SUPPORT, AND  
GENERAL SUPPORT MAINTENANCE  
REPAIR PARTS AND SPECIAL TOOLS LIST  
(INCLUDING DEPOT MAINTENANCE REPAIR PARTS)  
SECTION I. INTRODUCTION

1. Scope.

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of organizational, direct support, and general support maintenance of the X200-4 transmission. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

2. General.

In addition to Section I, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section II - Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Repair parts kits appear as the last entries in the repair parts listing for the figure in which its parts are listed as repair parts. Repair parts for repairable special tools are also listed in the section.

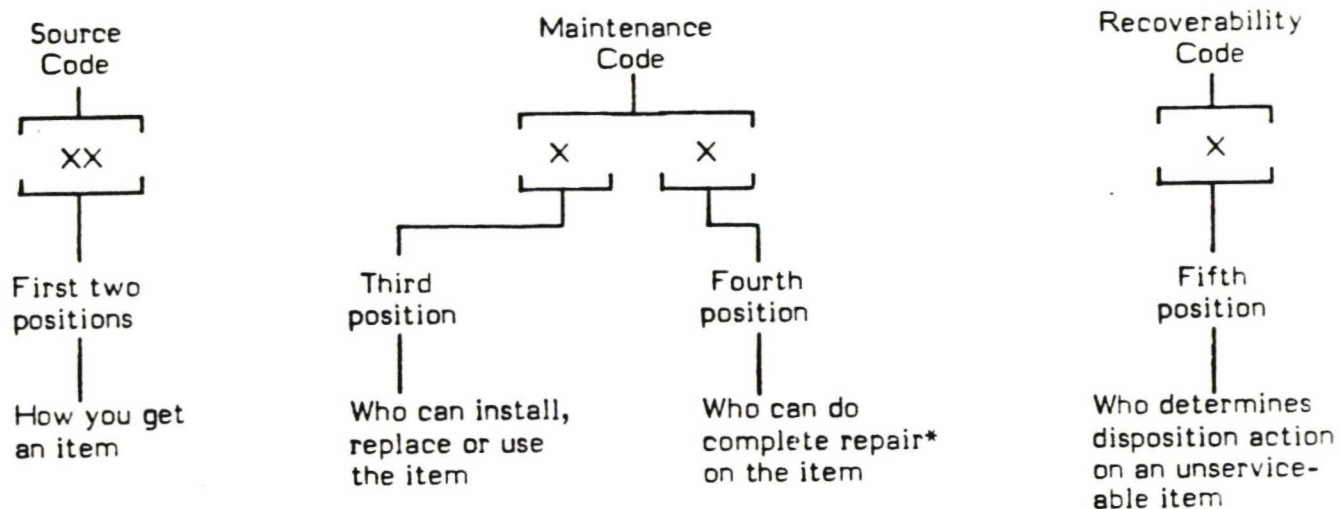
b. Section III - Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE (UOC) column) for the performance of maintenance.

c. Section IV - National Stock Number and Part Number Index. A list, in National item identification number (NIIN) sequence, of all National stock numbered items appearing in the listings, followed by a list in alphanumeric sequence of all part numbers appearing in the listing. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

### 3. Explanation of Columns (Sections II and III).

a. ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.



b. SMR CODE (Column (2)). The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:



\*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

Code	Explanation
PA PB PC** PD PE PF PG	Stocked items; use the applicable NSN to request/requisition item with these source codes. They are authorized to the category indicated by the code entered in the third position of the SMR code.  ** Items coded PC are subject to deterioration.
KD KF KB	
	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the third position of the SMR code. The complete kit must be requisitioned and applied.

Code	Explanation
MO - (Made at org Level)	 Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in the RPSTL. If the item is authorized to you by the third position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.
MF - (Made at DS Level)	
MH - (Made at GS Level)	
ML - (Made at Specialized Repair Act (SRA))	
MD - (Made at Depot)	
AO - (Assembled by org Level)	 Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the third position code of the SMR code authorizes you to replace the item, but the source code indicates the items are assembled at a higher level, order the item from the higher level of maintenance.
AF - (Assembled by DS Level)	
AH - (Assembled by GS Category)	
AL - (Assembled by SRA)	
AD - (Assembled by Depot)	
XA - Do not requisition an "XA" coded item. Order its next higher assembly. (Also, refer to the NOTE below.)	
XB - If an "XB" item is not available from salvage, order it using the FSCM and part number given.	
XC - Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.	
XD - Item is not stocked. Order an "XD" coded item through normal supply channels using the FSCM and part number given if no NSN is available.	

#### NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA."



(2) Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance.

Code	Application/Explanation
C	Crew or operator maintenance done within organizational maintenance.
O	Organizational category can remove, replace, and use the item.
F	Direct support level can remove, replace, and use the item.
H	General support level can remove, replace, and use the item.
L	Specialized repair activity can remove, replace, and use the item.
D	Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions). Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes. This position will contain one of the following maintenance codes:

Code	Application/Explanation
O	Organizational is the lowest level that can do complete repair of the item.
F	Direct support is the lowest level that can do complete repair of the item.
H	General support is the lowest level that can do complete repair of the item.
L	Specialized repair activity (designate the specialized repair activity) is the lowest level that can do complete repair of the item.
D	Depot is the lowest level that can do complete repair of the item.

Code	Application/Explanation
Z	Nonreparable. No repair is authorized.
B	No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item.) However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Recoverability Codes	Application/Explanation
Z	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in third position of SMR Code.
O	Reparable item. When uneconomically repairable, condemn and dispose of the item at organizational level.
F	Reparable item. When uneconomically repairable, condemn and dispose of the item at the direct support level.
H	Reparable item. When uneconomically repairable, condemn and dispose of the item at the general support level.
D	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. FSCM (Column (3)). The Federal Supply Code for Manufacturer (FSCM) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

d. PART NUMBER (Column (4)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use a NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. DESCRIPTION AND USABLE ON CODE (UOC) (Column (5)). This column includes the following information:

- (1) The Federal item name and, when required, a minimum description to identify the item.
- (2) The physical security classification of the item is indicated by the parenthetical entry (insert applicable physical security classification abbreviation, e.g., Phy Sec CI (C) - Confidential, Phy Sec CI (S) - Secret, Phy Sec CI (T) - Top Secret).
- (3) Items that are included in kits and sets are listed below the name of the kit or set.
- (4) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.
- (5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.
- (6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC).
- (7) The usable on code, when applicable (see paragraph 5, Special information).
- (8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.
- (9) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.

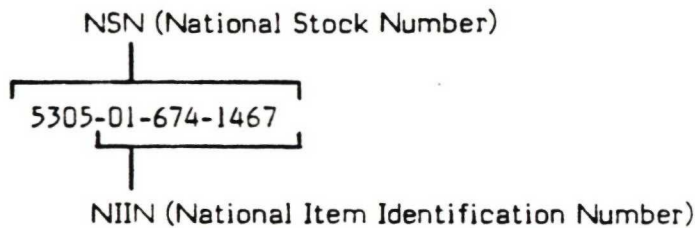
f. QTY (Column (6)). The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.



4. Explanation of Columns (Section IV).

a. NATIONAL STOCK NUMBER (NSN) INDEX.

(1) STOCK NUMBER column. This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN. When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.



(2) FIG. column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in Section II and Section III.

(3) ITEM column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

b. PART NUMBER INDEX. Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

(1) FSCM column. The Federal Supply Code for Manufacturer (FSCM) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(2) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

(3) STOCK NUMBER column. This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and FSCM columns to the left.

(4) FIG. column. This column lists the number of the figure where the item is identified/located in Sections II and III.

(5) ITEM column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

5. Special Information. Use the following subparagraphs as applicable:

a. USABLE ON CODE. Not applicable.

b. FABRICATION INSTRUCTIONS. Not applicable.

c. ASSEMBLY INSTRUCTION. Detailed assembly instructions for items source coded to be assembled from component spare/repair parts are found in TM 9-2520-272-34&P. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

d. KITS. Line item entries for repair parts kits appear in a group in Section II (see table of contents).

e. INDEX NUMBERS. Not applicable.

f. ASSOCIATED PUBLICATIONS. Not applicable.

g. ILLUSTRATIONS - LISTING. Not applicable.

6. How to Locate Repair Parts

a. When National Stock Number or Part Number is Not Known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and note the item number.

(4) Fourth. Refer to the Repair Parts List for the figure to find the part number for the item number noted on the figure.

(5) Fifth. Refer to the Part Number Index to find the NSN, if assigned.

b. When National Stock Number or Part Number is Known:

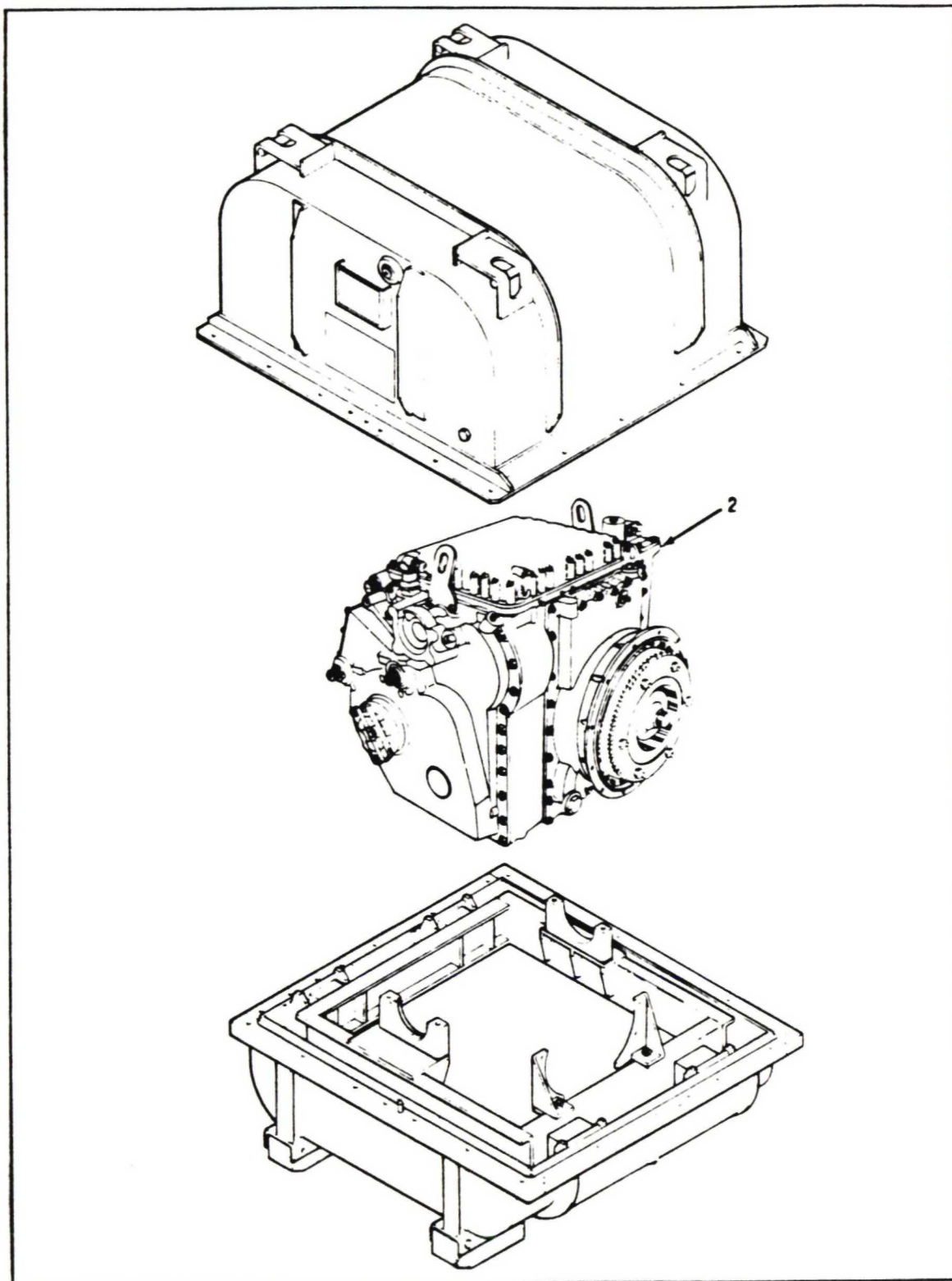
(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see 4.a(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see 4.b). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) Second. After finding the figure and item number, verify that the item is the one you're looking for; then locate the item number in the repair parts list for the figure.

7. Abbreviations.

<u>Abbreviations</u>	<u>Explanation</u>
bk	brake
cl	clutch
gr	gear
LH	left-hand
mach	machining
Phy Sec Cl	physical security classification
rev	reverse
RH	right-hand
rvs	reverse
scav	scavenge
SRA	specialized repair activity
UOC	usable on code
V	variable





TAB 1-6

Figure 1. Transmission Assembly

SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 07 TRANSMISSION

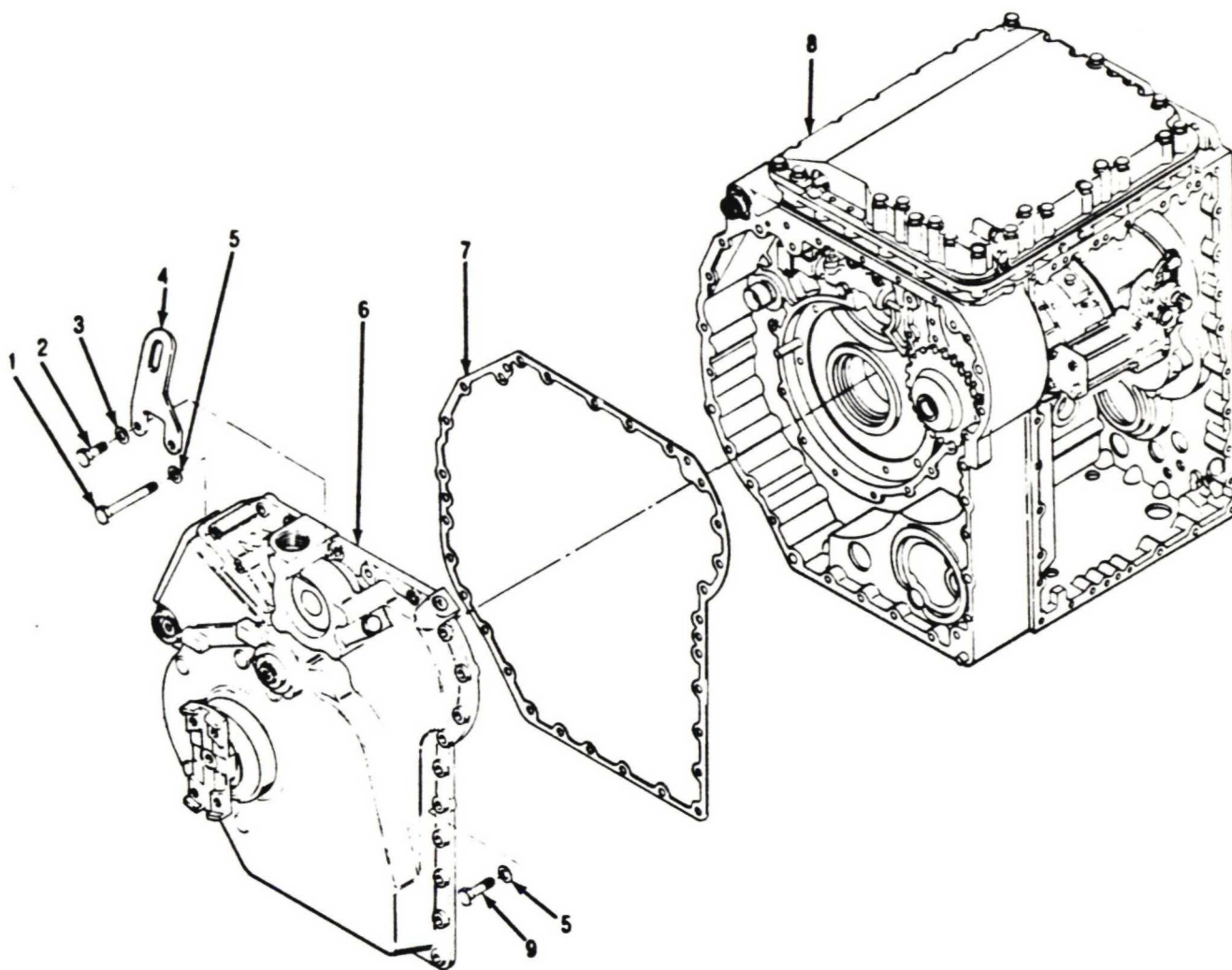
GROUP 0710 TRANSMISSION ASSEMBLY

FIG. 1 TRANSMISSION WITH CONTAINER

1 PAFFD 19207 57C3227  
2 XAFHD 73342 23C17800

TRANS W/CONTAINER.....	1
. TRANSMISSION.....	1

END OF FIGURE



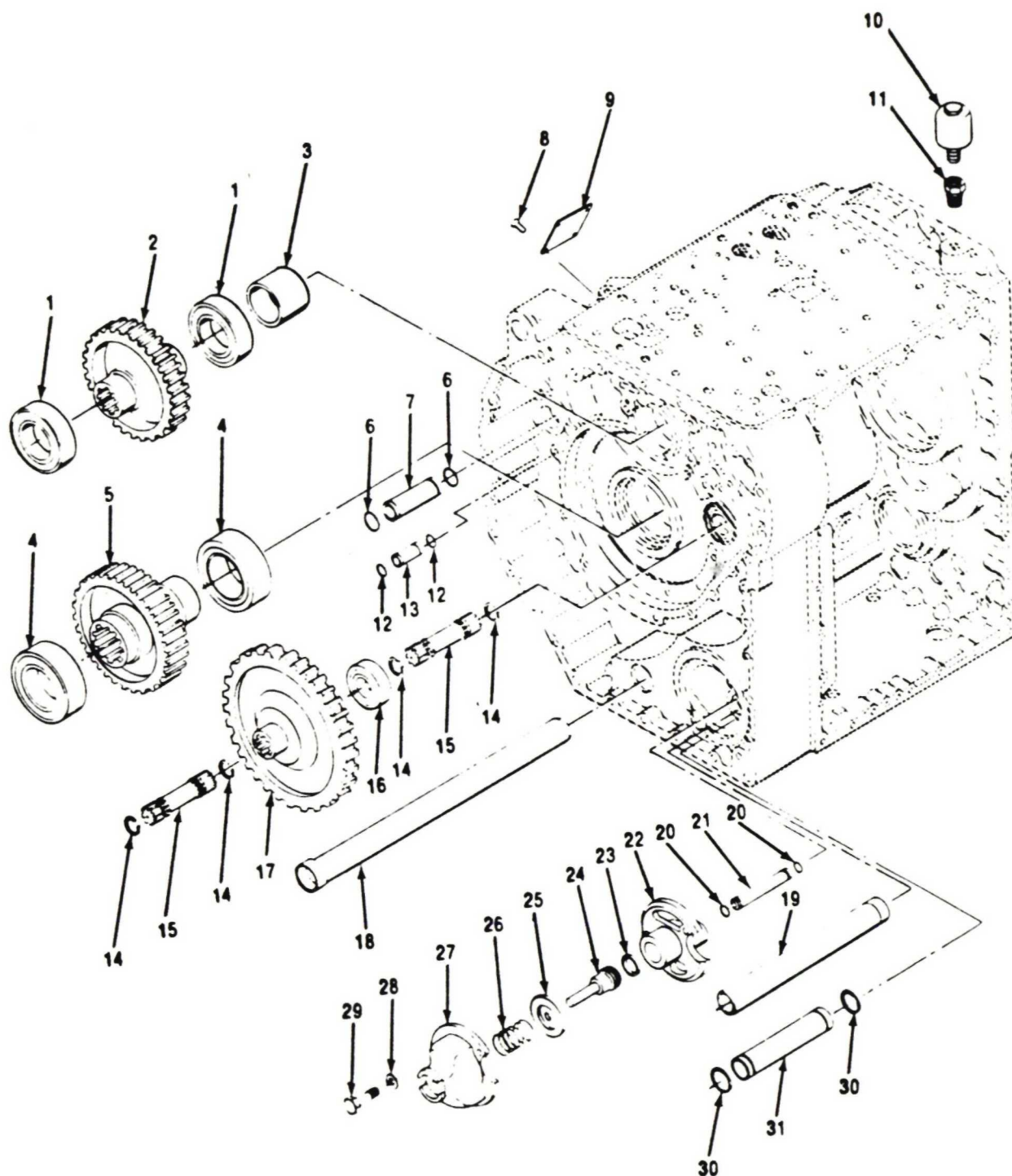
TM 9-2520-272-34&P

Figure 2. Right Hand Cover and Center Housing



SECTION II			TM9-2520-272-34&P		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY	
GROUP 0710 TRANSMISSION ASSEMBLY						
FIG. 2 RIGHT HAND COVER AND CENTER HOUSING						
1	PAHZZ	24617	9434184	BOLT,SELF-LOCKING.....	1	
2	PAOZZ	72582	9409028	BOLT,SELF-LOCKING.....	2	
3	PAOZZ	73342	23018196	WASHER,FLAT.....	2	
4	PAOZZ	73342	23046917	BRACKET,LIFTING,RIG.....	1	
5	PAHZZ	73342	23018196	WASHER,FLAT.....	27	
6	AHHDD	73342	23045131	COVER ASSY,RH COMP (SEE FIGS 15, 32, 33 FOR COMPONENT PARTS).....	1	
7	PAHZZ	73342	23018072	GASKET.....	1	
8	AHHDD	73342	23045130	HSG ASSY,CTR COMP (SEE FIGS 11, 17 THRU 22, AND 31).....	1	
9	PAHZZ	24617	9409082	BOLT,SELF-LOCKING.....	26	

END OF FIGURE



T4487751

Figure 3. Output Driven Gear and Steer Shaft Drive Gear

SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC) QTY		

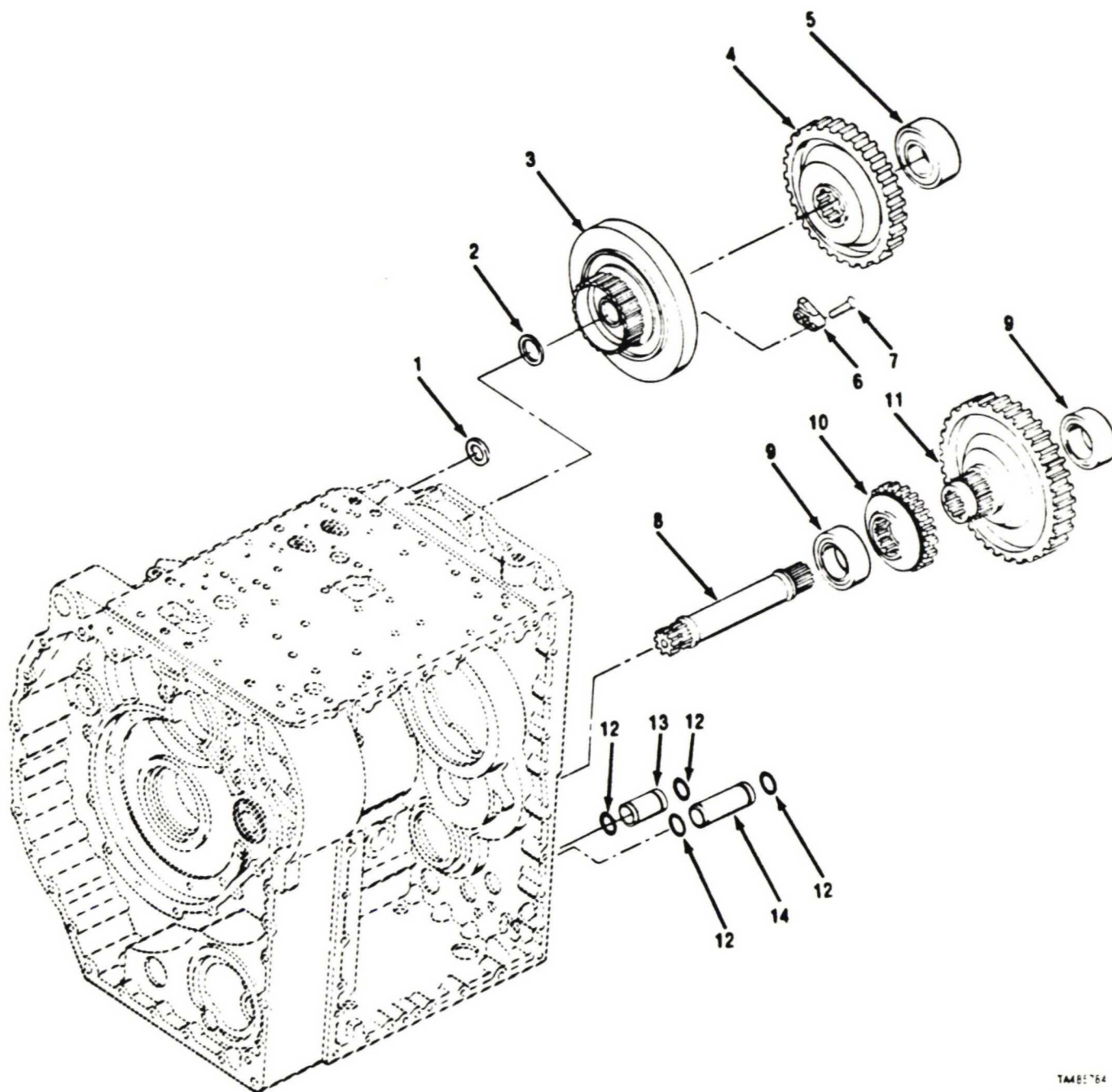
GROUP 0710 TRANSMISSION ASSEMBLY

FIG. 3 OUTPUT DRIVEN GEAR AND STEER  
SHAFT DRIVE GEAR

1	PAHZZ	43334	BU1012L-18	BEARING,ROLLER,CYLI.....	2
2	PAHZZ	73342	23018104	GEAR,SPUR.....	1
3	PAHZZ	73342	23018103	SPACER,SLEEVE.....	1
4	PAHZZ	43334	BU61015L-16	BEARING,ROLLER,CYLI.....	2
5	PAHZZ	73342	23018106	GEAR,SPUR.....	1
6	PAHZZ	73342	23040580	PACKING,PREFORMED.....	2
7	PAHZZ	73342	23045406	TUBE,METALLIC.....	1
8	PAOZZ	73342	145372	SCREW,DRIVE.....	4
9	PBOZZ	73342	6881100	PLATE,IDENTIFICATIO.....	1
10	PAOZZ	73342	2677565	BREATHER.....	1
11	XDOZZ	30379	444335	REDUCER,TRANSMISSIO.....	1
12	PAHZZ	73342	23018753	PACKING,PREFORMED.....	2
13	PAHZZ	73342	23045408	TUBE,METALLIC.....	1
14	PAHZZ	73342	6756606	RING,SNAP.....	4
15	PAHZZ	73342	23018111	SHAFT,SHOULDERED.....	2
16	PAHZZ	43334	BU1008L-21	BEARING,ROLLER,CYLI.....	1
17	PAHZZ	73342	23018116	GEAR,SPUR.....	1
18	PAHZZ	73342	23017855	TUBE,METALLIC.....	1
19	PAHZZ	73342	23018163	STRAINER ELEMENT,SE.....	1
20	PAHZZ	73342	23040579	PACKING,PREFORMED.....	2
21	PAHZZ	73342	23045405	TUBE,METALLIC.....	1
22	PAHZZ	73342	23017856	DIAPHRAGM,EQUALIZ.....	1
23	PAHZZ	73342	23018234	RETAINER,PACKING.....	1
24	PAHZZ	73342	23017857	PISTON AND PIN ASSE.....	1
25	PAHZZ	73342	23018025	VALVE,RESERVOIR EQU.....	1
26	PAHZZ	73342	23018049	SPRING,HELICAL,COMP.....	1
27	PAHZZ	73342	23018086	HOUSING,SPRING-EQUA.....	1
28	PAHZZ	90407	12C84P11	WASHER,FLAT.....	2
29	PAHZZ	63005	94C9030	SCREW,CAP,HEXAGON H.....	2
30	PAHZZ	73342	23040582	PACKING,PREFORMED.....	2
31	PAHZZ	73342	23045407	TUBE,METALLIC.....	1

END OF FIGURE





TAM 81764

Figure 4. Range Input Driven Gear and Drive Gear

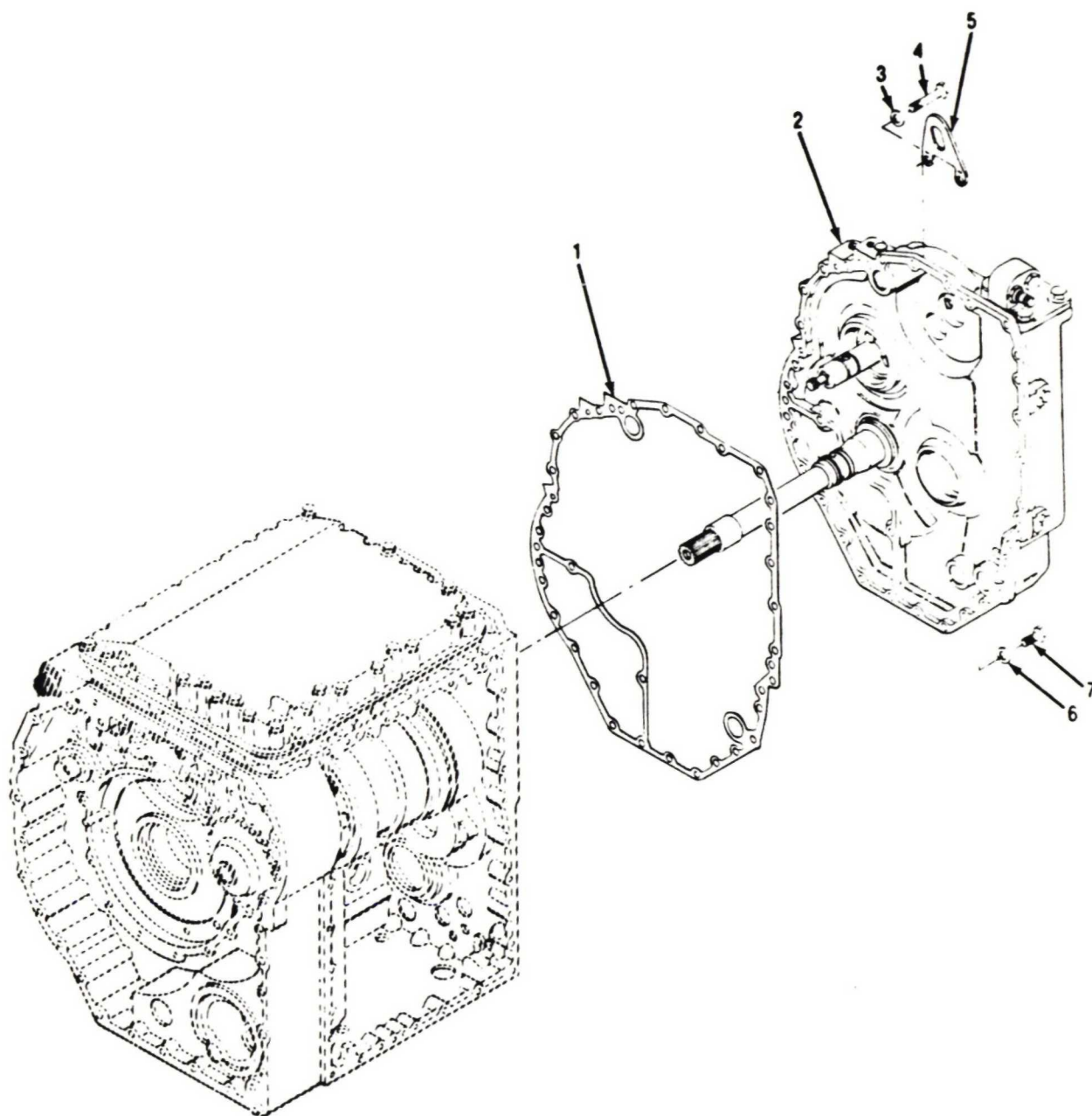
SECTION II			TM9-2520-272-34EP		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PAKT		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 0710 TRANSMISSION ASSEMBLY

FIG. 4 RANGE INPUT DRIVEN GEAR AND  
DRIVE GEAR

1	PAHZZ	73342	6832517	PACKING,PREFORMED.....	1
2	PAHZZ	73342	23018282	BEARING,WASHER,THRU.....	1
3	AHHHH	73342	23045116	CLUTCH ASSY,FWD (SEE FIG 16 FOR COMPONENT PARTS).....	1
4	PAHZZ	73342	23018092	GEAR,SPUR.....	1
5	PAHZZ	43334	BU1012L-18	BEARING,ROLLER,CYLI.....	1
6	PAHZZ	73342	23018044	PITCT,TRANSMISSION.....	1
7	PAHZZ	24617	455531	SCREW,CAP,SOCKET HE.....	2
8	PAHZZ	73342	23C18157	GEAR,BEVEL.....	1
9	PAHZZ	43334	R61010WB-17	BEARING,ROLLER,CYLI.....	2
10	PAHZZ	73342	23C18159	GEAR,SPUR.....	1
11	PAHZZ	73342	23C18158	GEAR,SPUR.....	1
12	PAHZZ	73342	23040581	PACKING,PREFORMED.....	4
13	PAHZZ	73342	23C46064	TUBE.....	1
14	PAHZZ	73342	23045374	COUPLING,TUBE.....	1

END OF FIGURE



TAA8781

Figure 5. Left Hand Cover



SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY

GROUP 0710 TRANSMISSION ASSEMBLY

FIG. 5 LEFT HAND COVER

1	PAHZZ	73342	23018076	GASKET.....	1
2	AHHDD	73342	23045132	COVER ASSY, LH COMP (SEE FIG 14 AND	1
				26 FOR COMPONENT PARTS).....	
3	PAOZZ	73342	23018196	WASHER, FLAT.....	2
4	PAOZZ	24617	5408992	BOLT, SELF-LOCKING.....	2
5	PAOZZ	73342	23046916	BRACKET, LIFTING, LEF.....	1
6	PAHZZ	73342	23018196	WASHER, FLAT.....	29
7	PAHZZ	24617	9409082	BOLT, SELF-LOCKING.....	29

END OF FIGURE

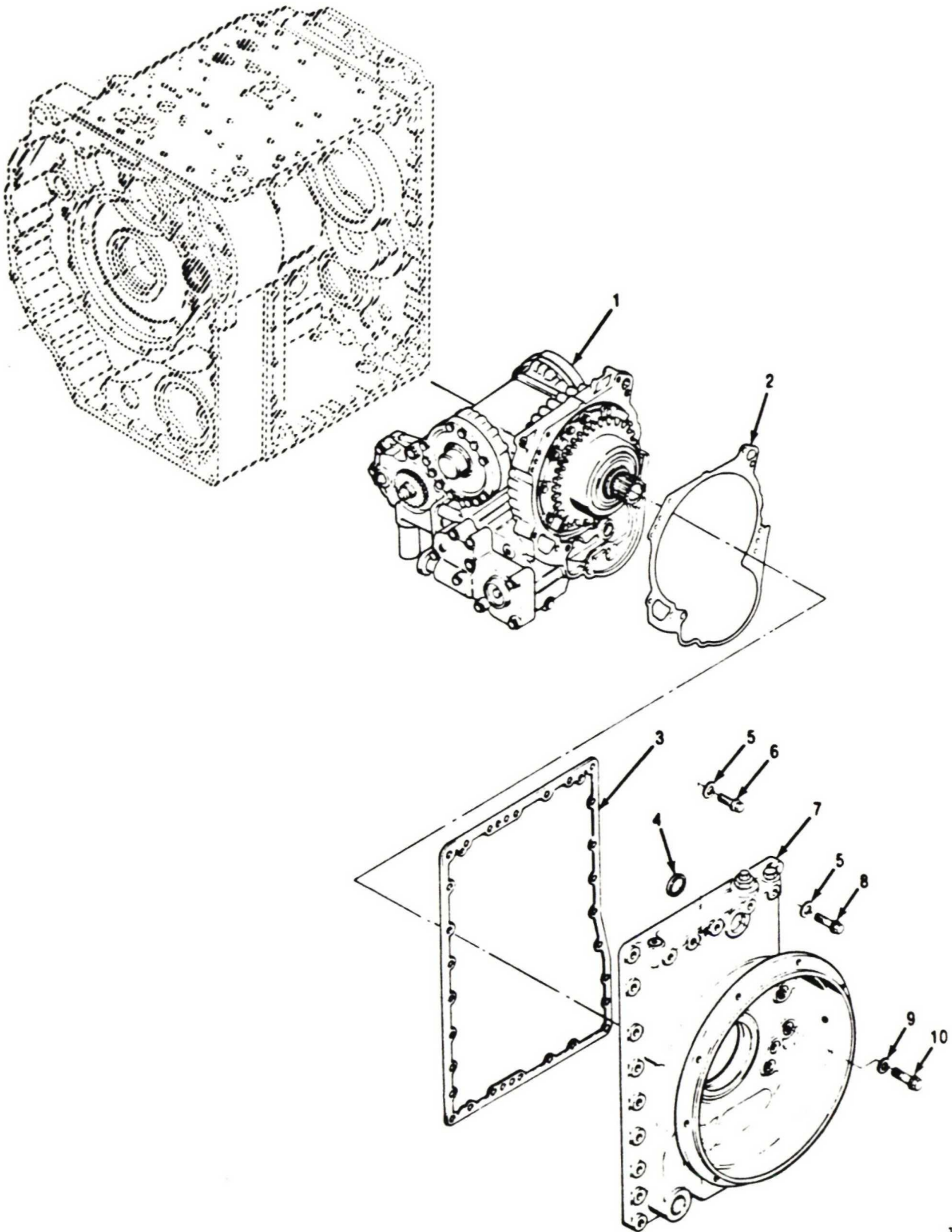


Figure 6. Bevel Gear and Input Housing

SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UDC)	QTY	
GROUP 0710 TRANSMISSION ASSEMBLY						
FIG. 6 BEVEL GEAR AND INPUT HOUSING						
1	AHHHH	73342	23045119	BEVEL GEAR ASSY (SEE FIGS 12, 13, 23, 24, AND 25 FOR COMPONENT PARTS).	1	
2	PAHZZ	73342	23018187	GASKET.....	1	
3	PAHZZ	73342	23018073	GASKET.....	1	
4	PAHZZ	73342	23018034	PACKING,PREFORMED.....	1	
5	PAHZZ	73342	23018196	WASHER,FLAT.....	29	
6	PAHZZ	24617	54C8993	BOLT,SELF-LOCKING.....	5	
7	PAHHH	73342	23018026	HOUSING,MECHANICAL (SEE FIG 10 FOR COMPONENT PARTS).....	1	
8	PAHZZ	24617	54C9082	BOLT,SELF-LOCKING.....	24	
9	PAHZZ	90407	12C84P11	WASHER,FLAT.....	9	
10	PAHZZ	63005	54C9030	SCREW,CAP,HEXAGON H.....	9	

END OF FIGURE



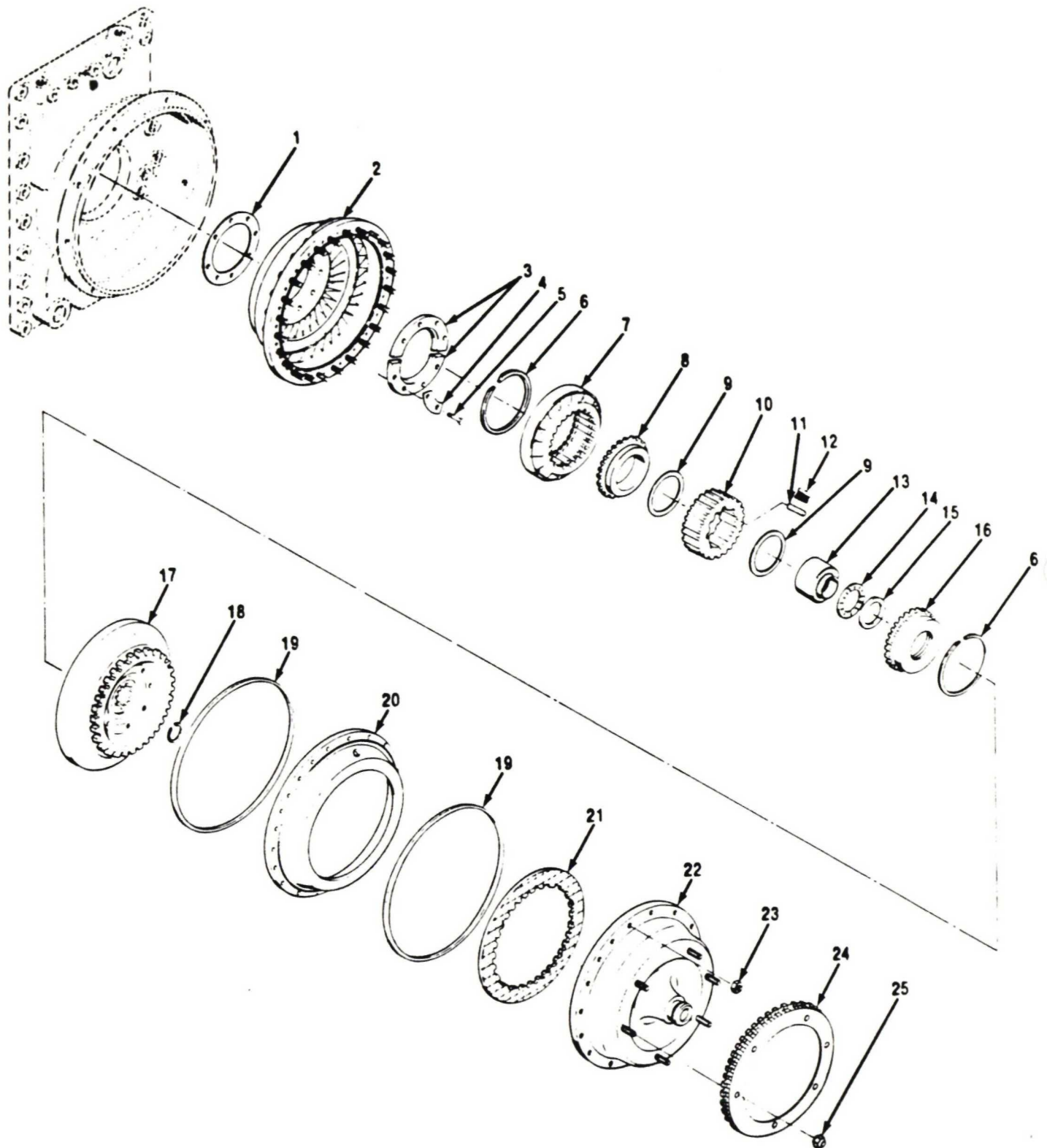


Figure 7. Converter Pump and Cover

SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE CN CODES (UOC)	QTY
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 7 CONVERTER PUMP AND COVER					
1	PAHZZ	73342	23018191	GASKET.....	1
2	PAHZZ	73342	23017981	PUMP, ROTARY.....	1
3	PAHZZ	73342	23018195	PLATE, RETAINING, BEA.....	2
4	PAHZZ	73342	23018194	LOCKING PLATE, NUT A.....	4
5	PAHZZ	96906	MS90727-36	SCREW, CAP, HEXAGON H.....	8
6	PAHZZ	73342	6750199	RING, RETAINING.....	2
7	PAHZZ	73342	23018075	STATOR, TORQUE CONVE.....	1
8	PAHZZ	19207	8351717	WASHER, STATOR, REAR.....	1
9	PAHZZ	19207	8351718	BEARING, WASHER, THRU.....	2
10	PAHZZ	19207	8351725	CAM, TRANSMISSION ST.....	1
11	PAHZZ	73342	6765648	ROLLER, BEARING.....	12
12	PAHZZ	19207	8351366	SPRING, TRANSMISSION.....	12
13	PAHZZ	73342	23018190	ROLLER, LINEAR-ROTAR.....	1
14	PAHZZ	60380	NTA-3650	RETAINER AND ROLLER.....	1
15	PAHZZ	60380	TRD-3648	SEAT, BEARING.....	1
16	PAHZZ	73342	23018117	DISK, CLUTCH.....	1
17	PAHZZ	73342	23018165	TURBINE ASSEMBLY, TR.....	1
18	PAHZZ	73342	23018254	RING, RETAINING.....	1
19	PAHZZ	73342	23016564	GASKET.....	2
20	PAHZZ	73342	6756778	PLATE, LOCKUP, CLUTCH.....	1
21	PAHZZ	73342	6835314	DISK, CLUTCH.....	1
22	AHHHH	73342	23046164	COVER ASSY, CONV (SEE FIG 9 FOR COMPONENT PARTS).....	1
23	PAHZZ	24617	190139	NUT, SELF-LOCKING, HE.....	24
24	PAFZZ	19207	11650255	RING, EXT SPLINE.....	1
25	PAFZZ	73342	6836873	KIT, FLEX DISK NUT.....	6

END OF FIGURE

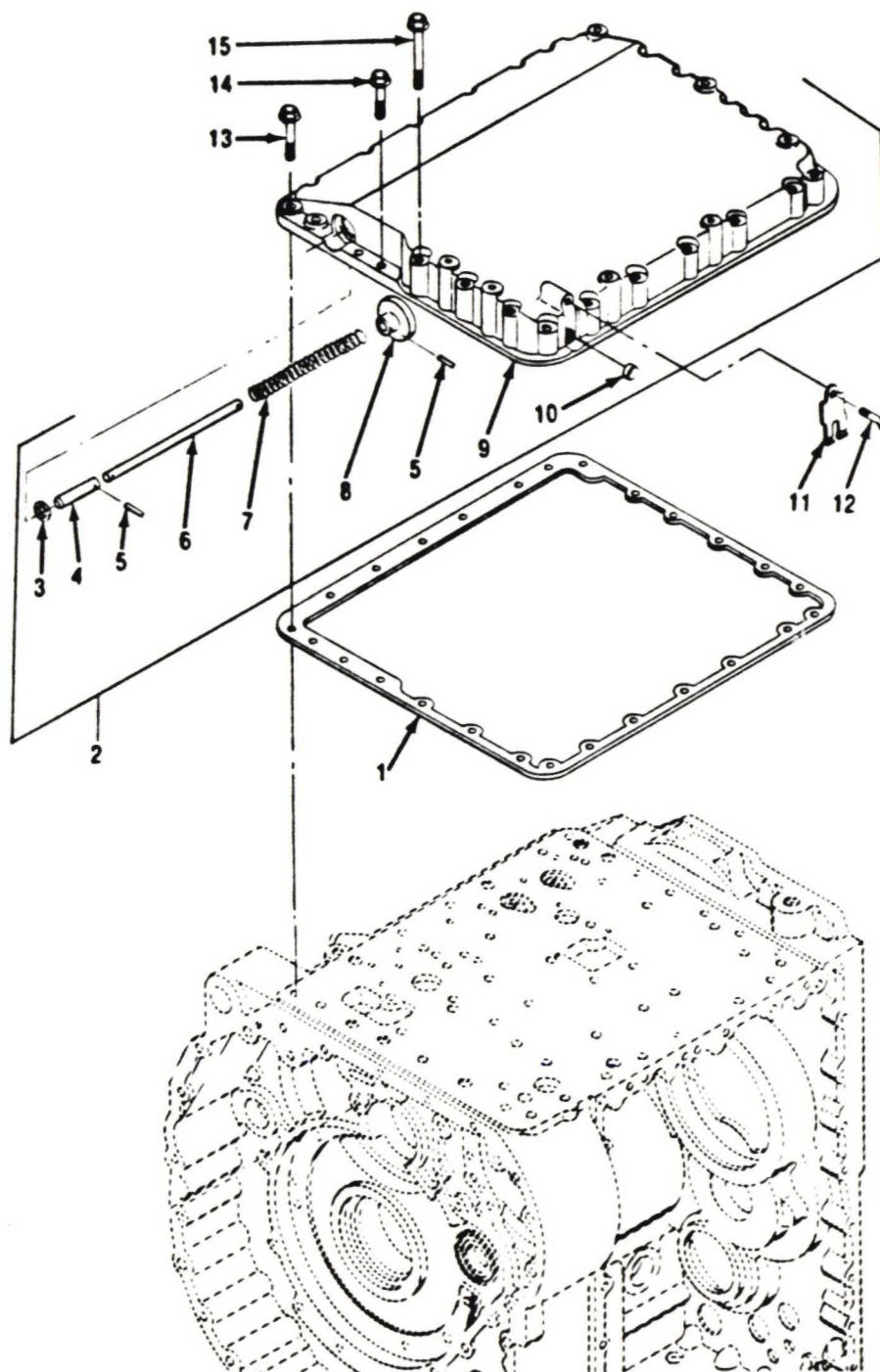


Figure 8. Top Cover



SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 0710 TRANSMISSION ASSEMBLY

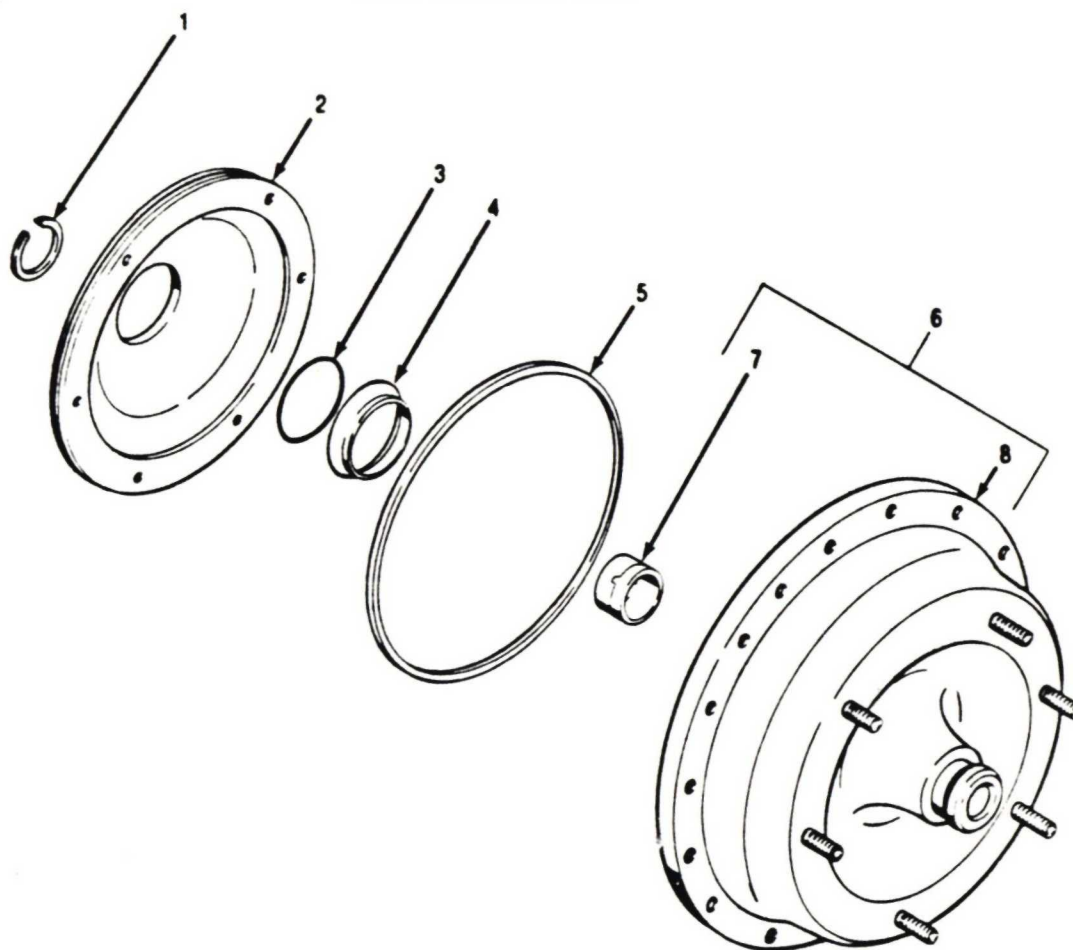
FIG. 8 TOP COVER

1	PAFZZ	73342	23045129	GASKET.....	1
2	PAFFF	73342	23045114	COVER,ACCESS.....	1
3	PAFZZ	80201	504260	.SEAL,PLAIN ENCASED.....	1
4	PAFZZ	73342	23017949	.EXTENSION,PUSH ROD.....	1
5	PAFZZ	72582	455862	.PIN.....	2
6	PAFZZ	73342	23017951	.PIN,STRAIGHT,HE.....	1
7	PAFZZ	73342	23017953	.SPRING,HELICAL,COMP.....	1
8	PAFZZ	73342	23017952	.CAP,LINEAR ACTUATIN.....	1
9	XAFZZ	73342	23018270	.COVER,XMSN TOP.....	1
10	PAFZZ	80201	544306	.PACKING ASSEMBLY.....	1
11	PAOZZ	73342	6627650	RETAINER,MODULATOR.....	1
12	PAOZZ	24617	5409000	BOLT,SELF-LOCKING.....	1
13	PAFZZ	24617	5441598	BOLT,MACHINE.....	4
14	PAFZZ	24617	5427637	BOLT,MACHINE.....	2
15	PAFZZ	24617	5441599	BOLT,MACHINE.....	15

END OF FIGURE

## SECTION II

TM 9-2520-272-34&amp;P

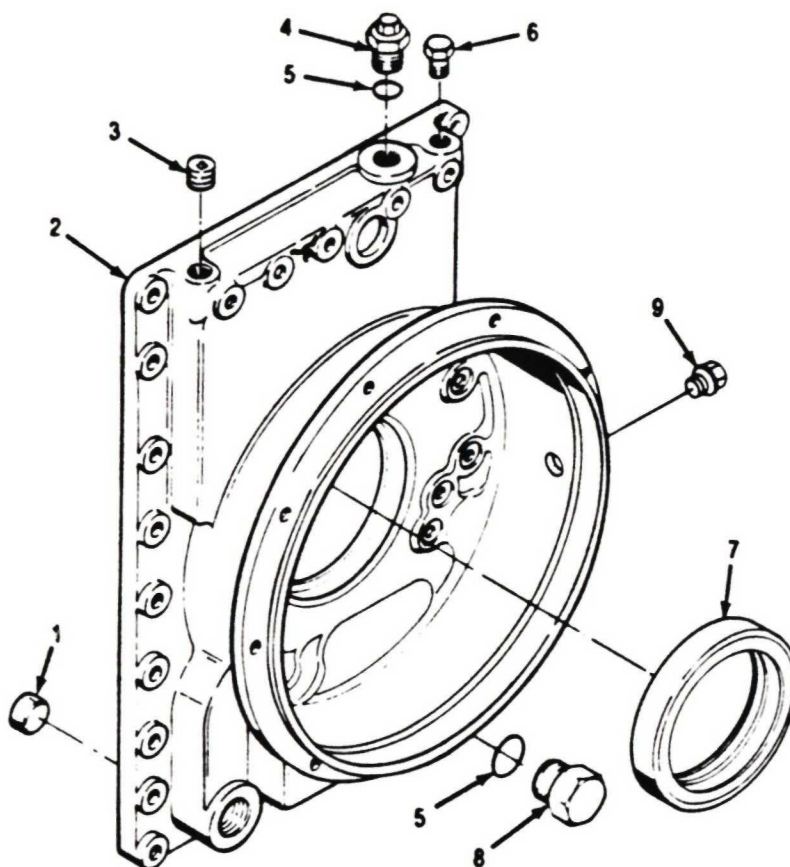


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Figure 9. Converter Pump Cover and Lockup Piston

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UDC)	(6) QTY
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 9 CCNVERTER PUMP COVER AND LOCKUP PISTON					
1	PAHZZ	73342	6836676	RING, RETAINING.....	1
2	PAHZZ	73342	6770845	PISTON ASSEMBLY, LOC.....	1
3	PAHZZ	73342	6770820	PACKING, PREFORMED.....	1
4	PAHZZ	73342	6770822	RETAINER, PACKING.....	1
5	PAHZZ	73342	6758036	SEAL RING, TRANSMISS.....	1
6	PAHDD	73342	23046165	COVER ASSEMBLY, PUMP.....	1
7	PADZZ	73342	6756782	. BEARING, SLEEVE.....	1
8	XAHZZ	73342	23046166	. COVER ASSY, MACH.....	1

END OF FIGURE



TM 8579C

Figure 10. Input Housing

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 10 INPUT HOUSING					
1	PAHZZ	73342	23018028	BUSHING BLANK.....	1
2	XAHZZ	73342	23018027	HOUSING, INPUT (SEE FIG 6 FOR NEXT HIGHER ASSEMBLY).....	1
3	PAHZZ	73342	23018209	PLUG, PIPE.....	1
4	PAOZZ	73342	23018085	PLUG, MACHINE THREAD.....	1
5	PAOZZ	73342	6832592	PACKING, PREFORMED.....	2
6	PAOZZ	73342	23018207	PLUG, PIPE.....	1
7	PAHZZ	73342	6839079	GASKET.....	1
8	PAOZZ	73342	23018179	PLUG, MACHINE THREAD.....	1
9	PAFZZ	73342	23046813	PLUG.....	1

END OF FIGURE



SECTION II

TM 9-2520-272-34&P

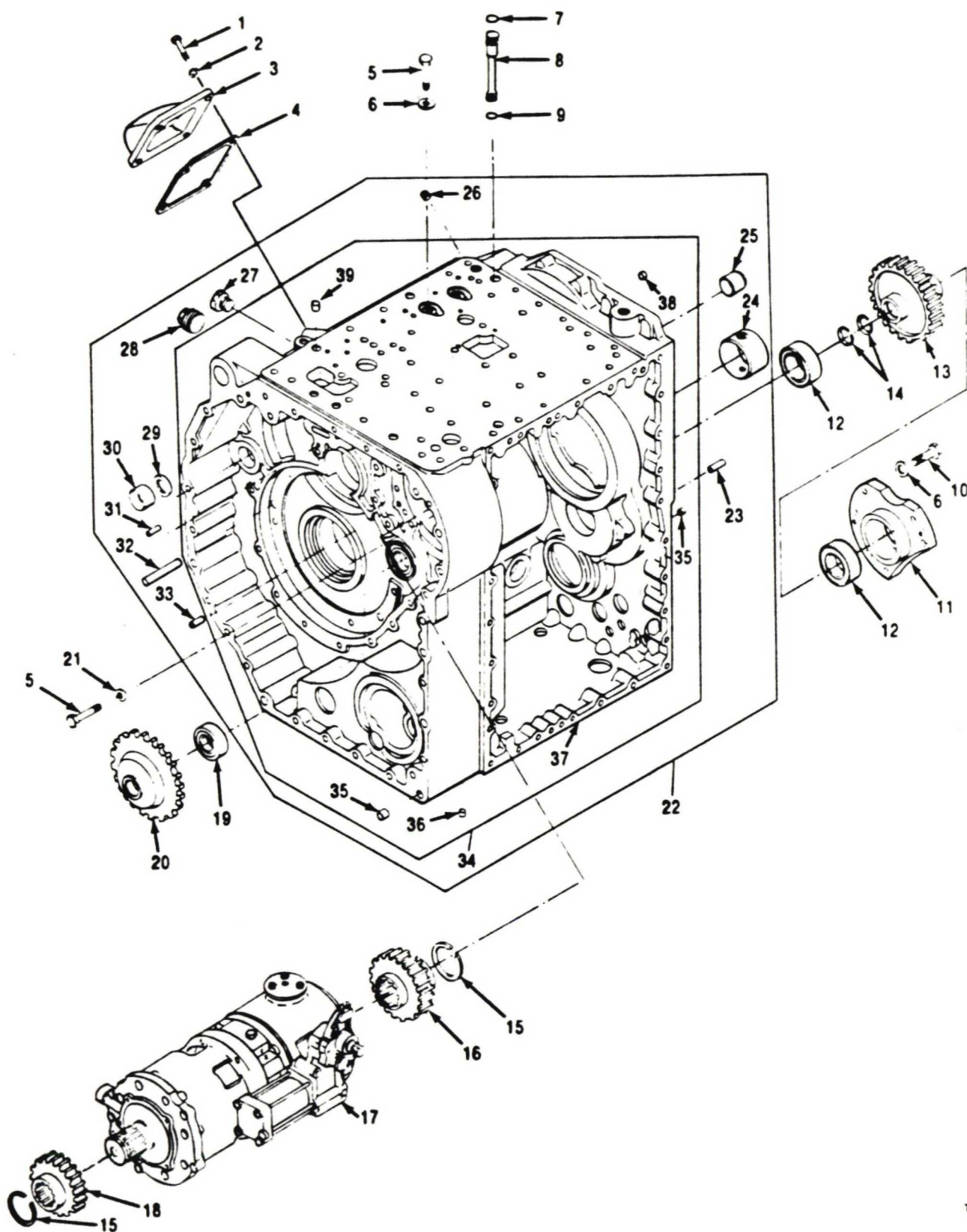


Figure 11. Center Housing and Hydrostatic Pump and Motor

SECTION II			TM9-2520-272-34&P		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PAKT			
NO	CODE	FSCM	NUMBER			
DESCRIPTION AND USABLE ON CODES (UOC)						
GROUP 0710 TRANSMISSION ASSEMBLY						
FIG. 11 CENTER HOUSING AND HYDROSTATIC PUMP AND MOTOR						
1	PAOZZ	73342	5440903	BOLT, SELF-LOCKING.....	4	
2	PAOZZ	73342	23018199	WASHER, FLAT.....	4	
3	PAOZZ	73342	23018221	COVER, ACCESS.....	1	
4	PAOZZ	73342	23017880	GASKET.....	1	
5	PAHZZ	96906	MS35764-236	BOLT, SELF-LOCKING.....	8	
6	PAHZZ	73342	6769636	WASHER, FLAT.....	8	
7	PAHZZ	73342	6836130	PACKING, PREFORMED.....	2	
8	PAHZZ	73342	23018172	PITOT TUBE, TRANSMIS.....	2	
9	PAHZZ	73342	6836129	PACKING, PREFORMED.....	2	
10	PAHZZ	72582	9409028	BOLT, SELF-LOCKING.....	6	
11	PAHZZ	73342	23017878	PLATE, RETAINING, BEA.....	1	
12	PAHZZ	43334	BU10C8L-21	BEARING, ROLLER, CYLI.....	2	
13	PAHZZ	73342	23018206	GEAR, SPUR.....	1	
14	PAHZZ	73342	6836111	RING, RETAINING.....	2	
15	PAHZZ	73342	6832579	RING, RETAINING.....	2	
16	PAHZZ	73342	23018074	GEAR, SPUR.....	1	
17	PAHDD	90166	653025	PUMP&MOTOR ASSY HYD (SEE FIGS 27, 28, 29, AND 30 FOR COMPONENT PARTS).	1	
18	PAHZZ	73342	23018115	GEAR, SPUR.....	1	
19	PAHZZ	43334	BU61007L-16	BEARING, ROLLER, CYLI.....	1	
20	PAHZZ	73342	23018113	GEAR, SPUR.....	1	
21	PAHZZ	90407	12C84P11	WASHER, FLAT.....	6	
22	PAHDD	73342	23045026	HOUSING, MECHANICAL.....	1	
23	PAHZZ	72582	141242	.PIN, STRAIGHT, HEADLE.....	4	
24	PAHZZ	73342	23017854	.SLEEVE, OIL TRANSFER.....	1	
25	PAHZZ	73342	23017853	.SPACER, SLEEVE.....	1	
26	PAHZZ	73342	23018205	.PLUG, PIPE.....	1	
27	PAOZZ	73342	23018206	.PLUG, PIPE.....	5	
28	PAHZZ	73342	23018204	.PLUG, PIPE.....	1	
29	PAHZZ	73342	6832310	.BEARING, WASHER, THRU.....	1	
30	PAHZZ	60380	B1880H	.BEARING, ROLLER, NEED.....	1	
31	PAHZZ	24617	443767	.PIN, STRAIGHT, HEADLE.....	2	
32	PAHZZ	73342	23018031	.PIN, STRAIGHT, HE.....	2	
33	PAHZZ	24617	141262	.PIN, STRAIGHT, HEADLE.....	1	
34	XAHDD	73342	23045027	.HOUSING CENTER MACH.....	1	
35	PAHZZ	24617	5425031	..INSERT, SCREW THREAD.....	15	
36	PAHZZ	73342	23018271	..INSERT, SCREW THREAD.....	3	
37	XAHZZ	73342	23045028	..HOUSING CENTER.....	1	
38	PAHZZ	24617	452692	..INSERT, SCREW THREAD.....	8	
39	PAHZZ	24617	5425029	..INSERT, SCREW THREAD.....	5	

END OF FIGURE

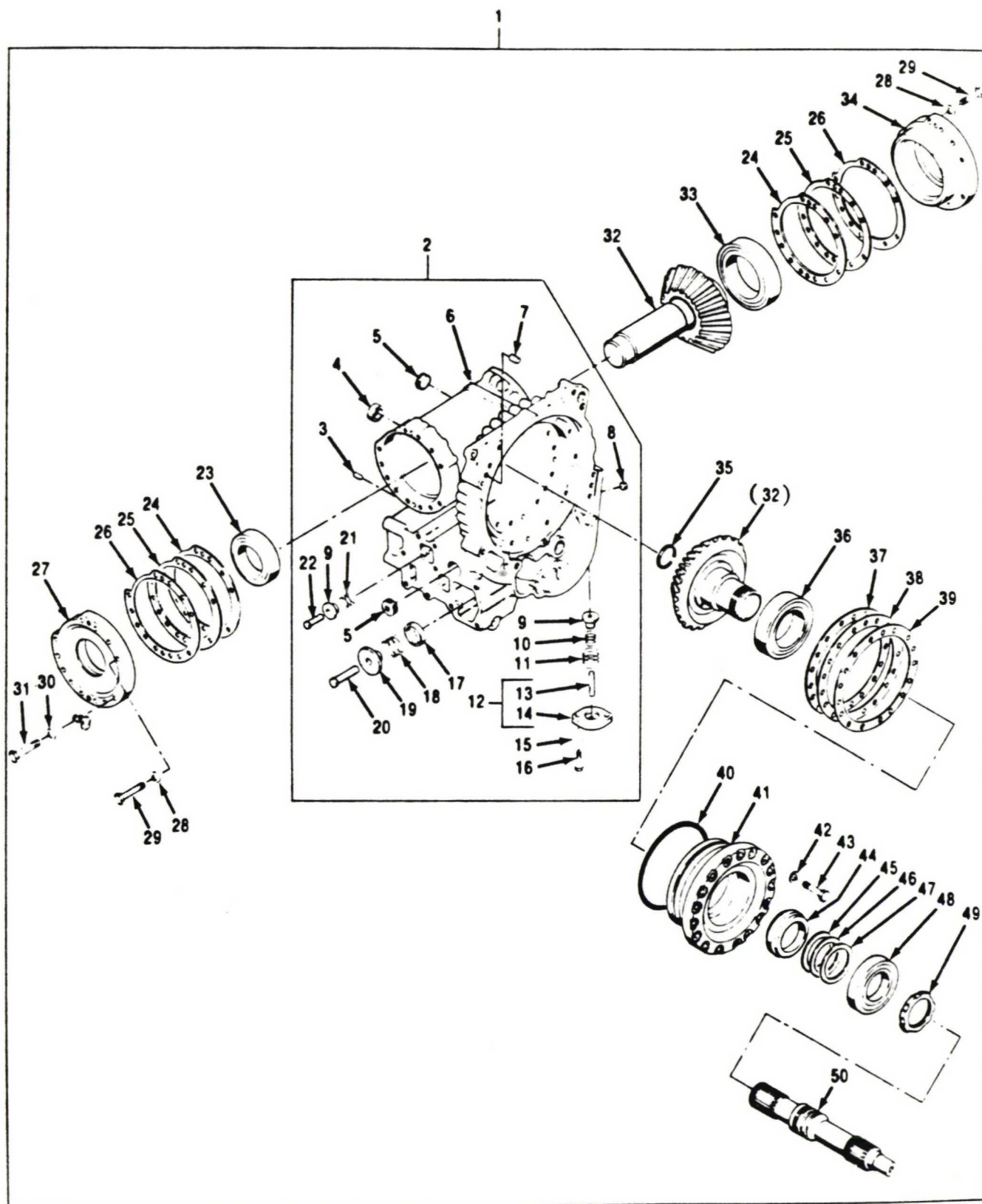


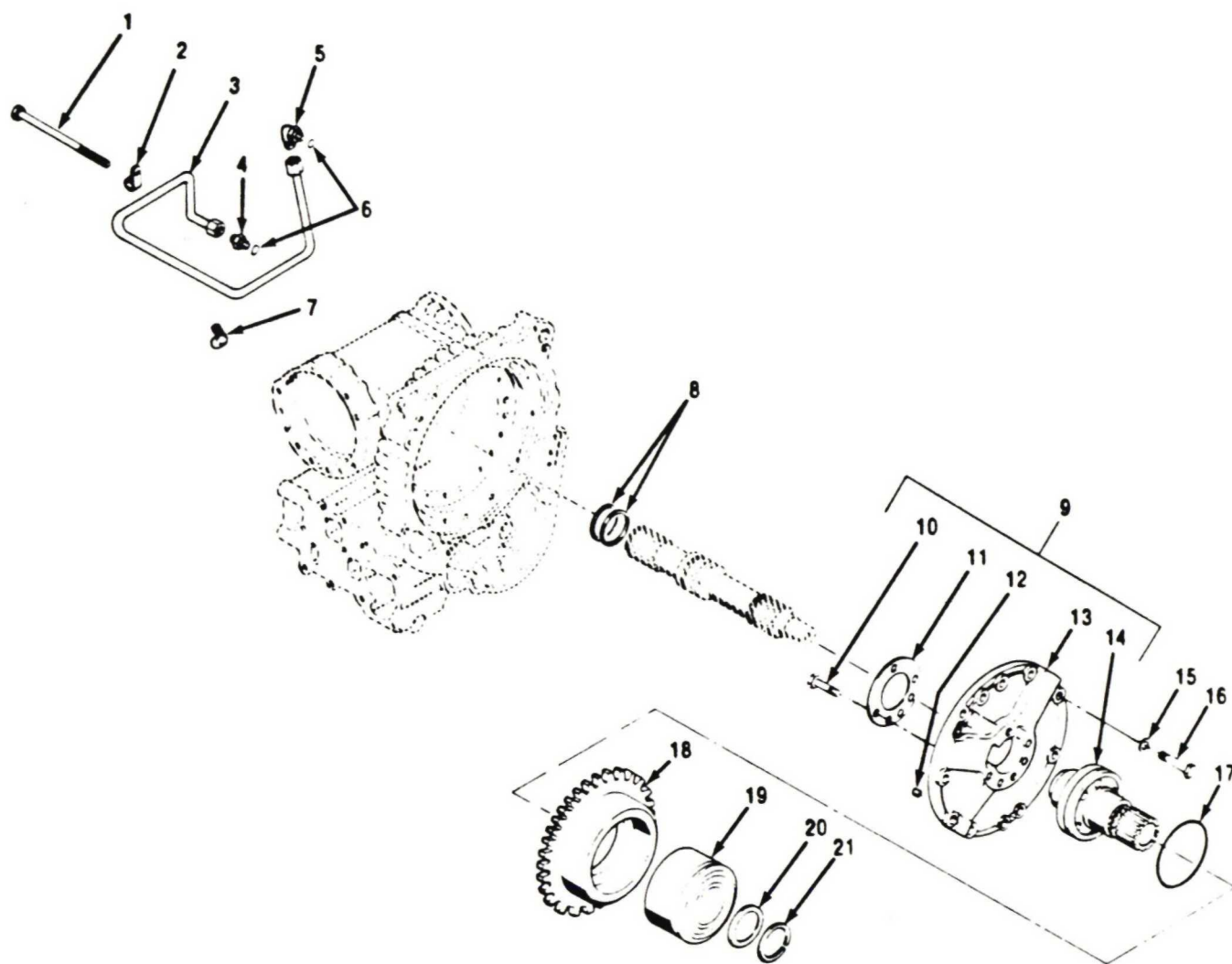
Figure 12. Bevel Gear and Bevel Gear Carrier



SECTION II			TM9-2520-272-34&P		(5)	(6)				
(1)	(2)	(3)	(4)							
ITEM	SMR		PART	DESCRIPTION AND USABLE ON CODES (UOC)		QTY				
NO	CODE	FSCM	NUMBER							
GROUP 0710 TRANSMISSION ASSEMBLY										
FIG. 12 BEVEL GEAR AND BEVEL GEAR CARRIER										
1	PAHDD	73342	23018045	CARRIER ASSEMBLY.....		1				
2	PADDD	73342	23045120	.CARRIER ASSEMBLY.....		1				
3	PADZZ	24617	141195	..PIN,STRAIGHT,HEADLE.....		2				
4	PADZZ	60380	B1210XOH	..BEARING,RCLLER,NEED.....		2				
5	PADZZ	96906	MS14314-52	..PLUG,PIPE.....		2				
6	XADZZ	73342	23018046	..CARRIER,BEVEL GEAR.....		1				
7	PADZZ	24617	141240	..PIN,STRAIGHT,HEADLE.....		4				
8	PADZZ	24617	444687	..PLUG,PIPE.....		2				
9	PADZZ	73342	23018047	..SPACER,SLEEVE.....		2				
10	PADZZ	73342	6836135	..SPRING,HELICAL,COMP.....		1				
11	PADZZ	73342	23018243	..SPRING,HELICAL,COMP.....		1				
12	PADDD	73342	23018053	..COVER ASSEMBLY,VAL.....		1				
13	PADZZ	24617	141210	...PIN,STRAIGHT,HEADLE.....		1				
14	XADZZ	73342	23018054	...COVER,CHECK VALVE.....		1				
15	PADZZ	24617	5422846	..WASHER,FLAT.....		2				
16	PADZZ	24617	5409076	..BOLT,SELF-LOCKING.....		2				
17	PADZZ	73342	23018051	..GUIDE,TRANSMISSION.....		1				
18	PADZZ	73342	23018049	..SPRING,HELICAL,COMP.....		1				
19	PADZZ	73342	23018050	..HUB,TRANSMISSION.....		1				
20	PADZZ	73342	23018052	..PIN,STRAIGHT,HEADED.....		1				
21	PADZZ	73342	6769825	..SPRING,HELICAL,COMP.....		1				
22	PADZZ	73342	23018048	..PIN,STRAIGHT,HEADED.....		1				
23	PADZZ	60038	LM603049LM603011	.BEARING,RCLLER,TAPE.....		1				
24	PADZZ	73342	23018128	.SHIM.....		V				
25	PADZZ	73342	23018129	.SHIM.....		V				
26	PADZZ	73342	23018130	.SHIM.....		V				
27	PADZZ	73342	23018132	.PLATE,RETAINING,BEA.....		1				
28	PADZZ	90407	12C84P11	.WASHER,FLAT.....		23				
29	PADZZ	96906	MS35764-236	.BOLT,SELF-LOCKING.....		23				
30	PAHZZ	90407	12C84P11	.WASHER,FLAT.....		1				
31	PAHZZ	96906	MS35764-236	.BOLT,SELF-LCKING.....		1				
32	PADZZ	73342	23018000	.GEAR SET,BEVEL,MATC.....		1				
33	PADZZ	60038	JM612949JM612910	.BEARING,RCLLER,TAPE.....		1				
34	PADZZ	73342	23018131	.PLATE,RETAINING,BEA.....		1				
35	PADZZ	73342	23018254	.RING,RETAINING.....		1				
36	PADZZ	60038	JM511946JM511910	.BEARING,RCLLER,TAPE.....		1				
37	PADZZ	73342	23018122	.SHIM.....		V				
38	PADZZ	73342	23018123	.SHIM.....		V				
39	PADZZ	73342	23018124	.SHIM.....		V				
40	PADZZ	73342	23018245	.PACKING,PREFORMED.....		1				
41	PADZZ	73342	23018119	.PLATE,RETAINING,BEA.....		1				
42	PADZZ	24617	5422848	.WASHER,FLAT.....		15				
43	PADZZ	24617	5416011	.BOLT,SELF-LOCKING.....		15				
44	PADZZ	73342	23018121	.RETAINER,PACKING.....		1				
45	PADZZ	73342	23018125	.SHIM.....		V				
46	PADZZ	73342	23018126	.SHIM.....		V				
47	PADZZ	73342	23018127	.SHIM.....		V				

SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC) Q		
48	PADZZ	60038	JM207049JM207010	.BEARING, RCLLER, TAPE.....		1
49	PADZZ	73342	23C18120	.NUT, PLAIN, RCUND.....		1
50	PADZZ	73342	23C45917	.SHAFT, SHOULDERED.....		1

END CF FIGURE



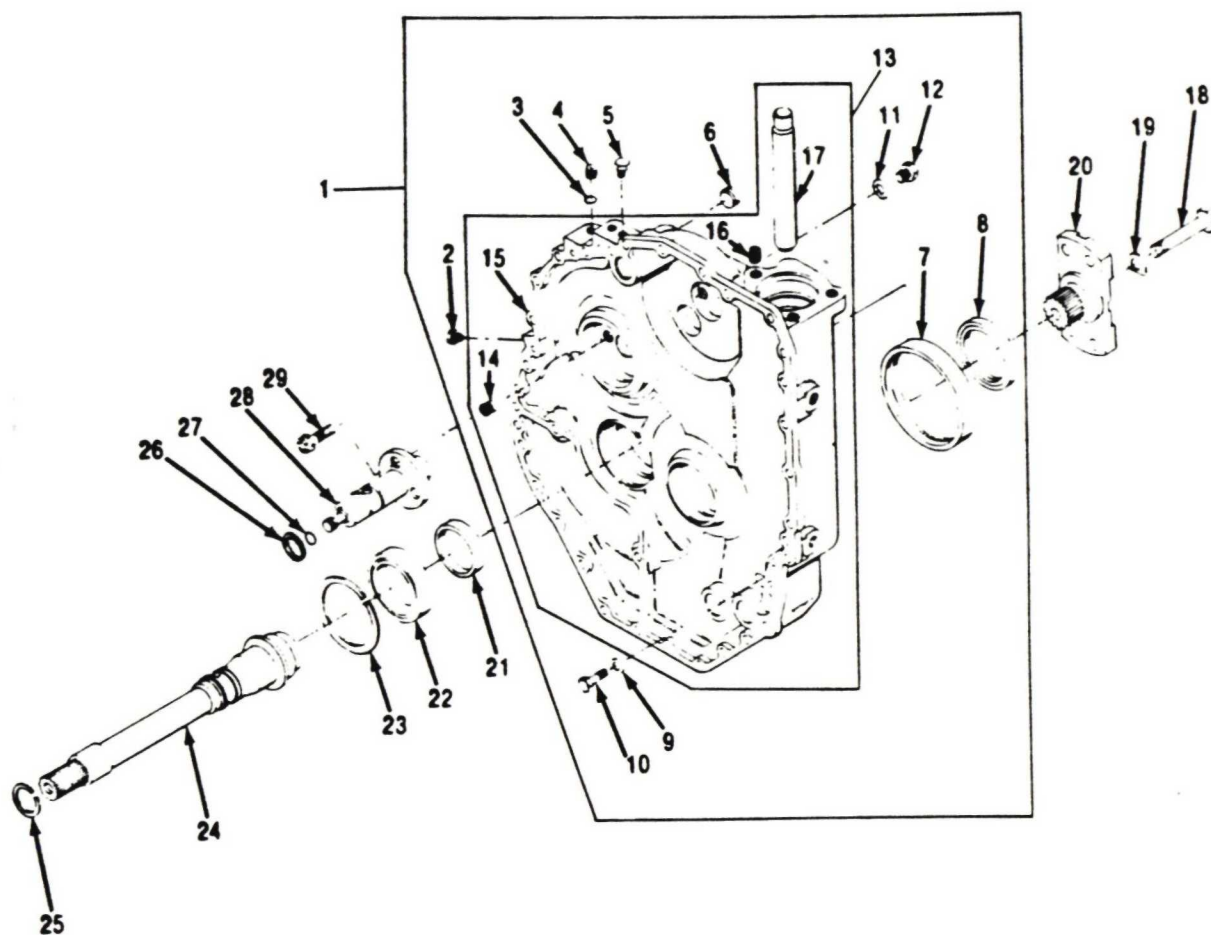
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Figure 13. Oil Transfer Diaphragm and Input Pump Drive Gear



SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UCC)	QTY	
GROUP 0710 TRANSMISSION ASSEMBLY						
FIG. 13 OIL TRANSFER DIAPHRAGM AND INPUT PUMP DRIVE GEAR						
1	PAHZZ	24617	5430187	BOLT.....	1	
2	PAHZZ	73342	23C18186	CLAMP, LOOP.....	1	
3	PAHZZ	73342	23C46057	TUBE ASSEMBLY, METAL.....	1	
4	PAHZZ	24617	5410714	NIPPLE, TUBE.....	1	
5	PAHZZ	24617	5411180	ELBOW, TUBE TC BOSS.....	1	
6	PAHZZ	73342	23C18247	PACKING, PREFORMED.....	2	
7	PAHZZ	73342	23C18185	CLAMP, LOOP.....	1	
8	PAHZZ	73342	6836115	SEAL RING, METAL.....	2	
9	PAHDD	73342	23C18020	DIAPHRAGM ASSEMBLY.....	1	
10	PADZZ	72582	54C9C60	. SCREW, MACHINE.....	6	
11	PADZZ	73342	23C18188	. SPACER, PLATE.....	1	
12	PADZZ	24617	141255	. PIN, STRAIGHT, HE.....	2	
13	PADZZ	73342	23C18021	. DIAPHRAGM, CIL TRANS.....	1	
14	PADZZ	73342	23C18022	. GEARSHAFT, SPUR.....	1	
15	PAHZZ	9C407	12C84P11	WASHER, FLAT.....	9	
16	PAHZZ	96906	MS35764-236	BOLT, SELF-LOCKING.....	9	
17	PAHZZ	73342	23C18235	PACKING, PREFORMED.....	1	
18	PAHZZ	73342	23C17980	GEAR, SPUR.....	1	
19	PAHZZ	43334	45212WVL1903A	BEARING UNIT, BALL.....	1	
20	PAHZZ	73342	23C18256	SPACER, PLATE.....	1	
21	PAHZZ	73342	23C18255	RING, RETAINING.....	1	

END OF FIGURE



TAA85794

Figure 14. Left Hand End Cover and Output Shaft

SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE CN CODES(UOC)	QTY
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 14 LEFT HAND END COVER AND CUTPUT SHAFT					
1	PADDD	73342	23C18292	COVER,ACCESS.....	1
2	PAHZZ	73342	23018206	.PLUG,PIPE.....	1
3	PAOZZ	73342	23C45477	.PACKING,PREFORMED.....	1
4	PADZZ	73342	23C45447	.PLUG,MACHINE THREAD.....	1
5	PADZZ	73342	23018207	.PLUG,PIPE.....	4
6	PAHZZ	73342	23C18208	.PLUG,PIPE.....	1
7	PADZZ	73342	23018042	.COVER,SLEEVE.....	1
8	PAOZZ	73342	6883697	.SEAL,PLAIN ENCASED.....	1
9	PADZZ	24617	5422845	.WASHER,FLAT.....	1
10	PADZZ	73342	23018279	.BOLT,SELF-LOCKING.....	1
11	PAFZZ	96906	MS28778-10	.PACKING,PREFORMED.....	1
12	PAFZZ	96906	MS51840-27	.PLUG,MACHINE THREAD.....	1
13	XADDD	73342	23C18289	.COVER ASSY,END MACH.....	1
14	PADZZ	24617	5425029	..INSERT,SCREW THREAD.....	3
15	XADZZ	73342	23018288	..COVER,LH END.....	1
16	PAHZZ	24617	5425031	..INSERT,SCREW THREAD.....	3
17	PADZZ	73342	23C18198	..REDUCER,TUBE.....	1
18	PAOZZ	24617	454465	SCREW,CAP,HEXAGON H.....	1
19	PADZZ	73342	6752556	WASHER,SPRING TENS.....	1
20	PAOZZ	73342	23C17998	FLANGE,OUTPUT.....	1
21	PADZZ	73342	23C45191	LINER,BEARING HOUS.....	1
22	PAHZZ	43334	3L13LR1214A	BEARING,BALL,ANNULA.....	1
23	PAHZZ	73342	23C45232	RING,RETAINING.....	1
24	PAHZZ	73342	23C17954	SHAFT,SHOULDERED.....	1
25	PAHZZ	73342	23C18202	SEAL,RING,METAL.....	2
26	PAHZZ	73342	6836112	SEAL RING,METAL.....	2
27	PAHZZ	73342	23C18233	SEAL RING,METAL.....	1
28	PADZZ	73342	23C18087	TUBE ASSEMBLY,METAL.....	1
29	PADZZ	73342	23C15337	BOLT.....	3

END OF FIGURE



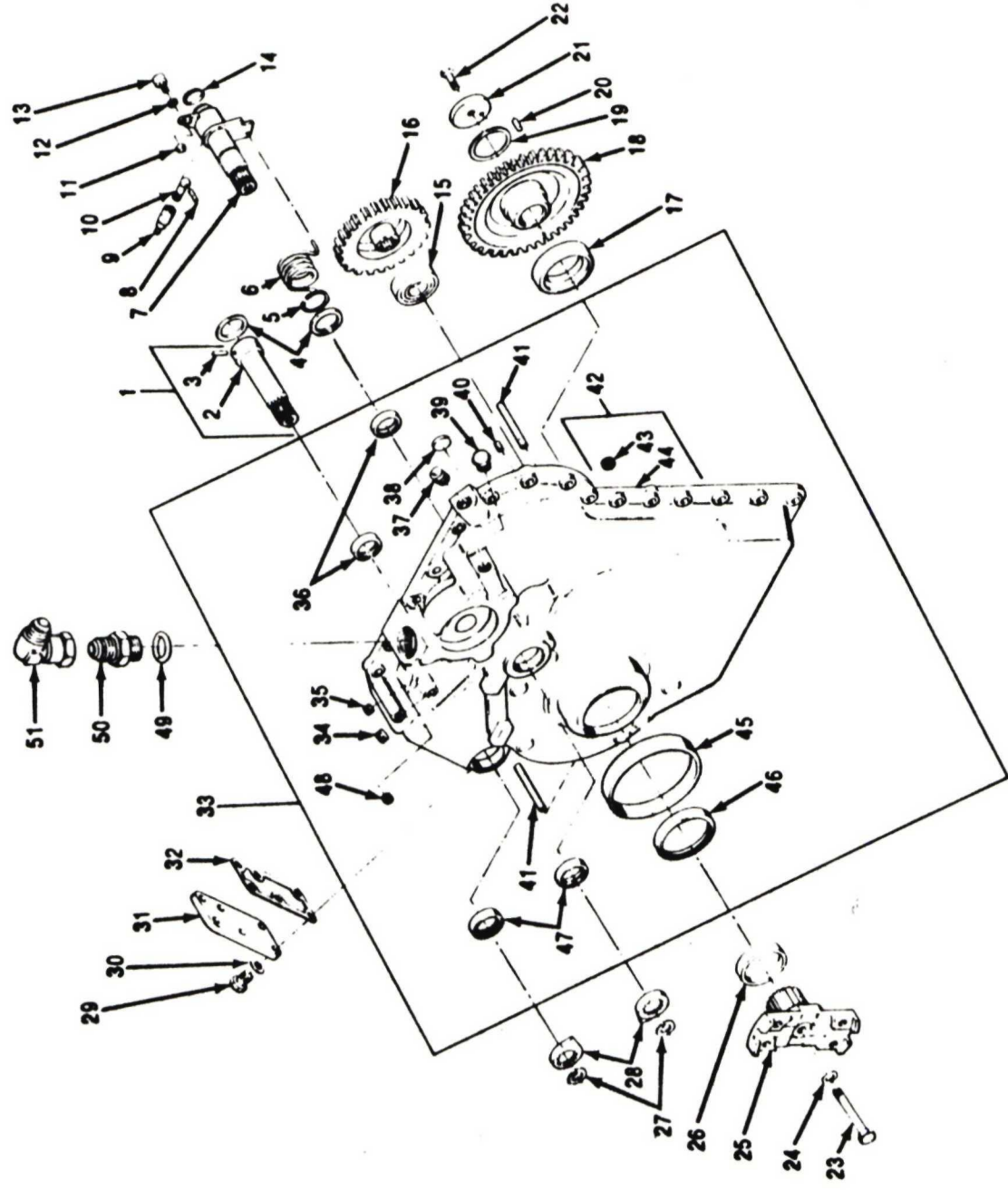


TABLE 19

Figure 15. Right Hand End Cover and Brake Apply Cam Shaft

SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY	
GROUP 0710 TRANSMISSION ASSEMBLY						
FIG. 15 RIGHT HAND END COVER AND BRAKE APPLY CAM SHAFT						
1	PAHHH	73342	23C18232	SHAFT, SHOULDERED.....	1	
2	XAHZZ	73342	23C18147	. SHAFT, BRK APPLY LH.....	1	
3	PAHZZ	24617	5421003	. PIN, SPRING.....	1	
4	PAHZZ	73342	6836102	WASHER, FLAT.....	2	
5	PAHZZ	73342	6751633	RING, RETAINING.....	1	
6	PAHZZ	73342	23C18151	SPRING, HELICAL, TORS.....	1	
7	PAHZZ	73342	23C18024	CAM, CONTROL.....	1	
8	PAHZZ	24617	455675	PIN, SPRING.....	1	
9	PAHZZ	73342	23C18143	LINK, BRAKE ADJUSTIN.....	1	
10	PAHZZ	73342	23C18142	LINK, BRAKE ADJUSTIN.....	1	
11	PAHZZ	24617	443318	NUT, SELF-LOCKING, HE.....	1	
12	PAHZZ	73342	23C18150	SPACER, SLEEVE.....	1	
13	PAHZZ	73342	23C18149	CAM FOLLOWER, NEEDLE.....	1	
14	PAHZZ	73342	23C18262	WASHER, FLAT.....	1	
15	PAHZZ	43334	BU61C07L-16	BEARING, ROLLER, CYLI.....	1	
16	PAHZZ	73342	23C18112	GEAR, SPUR.....	1	
17	PAHZZ	43334	12C9WB-HC	BEARING, ROLLER, CYLI.....	1	
18	PAHZZ	73342	23C18152	GEAR, SPUR.....	1	
19	PAHZZ	73342	23C18154	BEARING, WASHER, THRU.....	1	
20	PAHZZ	24617	455160	PIN.....	1	
21	PAHZZ	73342	23C18153	PLATE, RETAINING, SHA.....	1	
22	PAHZZ	72582	54C9C28	BOLT, SELF-LOCKING.....	1	
23	PAOZZ	24617	454465	SCREW, CAP, HEXAGON H.....	1	
24	PAOZZ	73342	6752556	WASHER, SPRING TENS.....	1	
25	PAOZZ	73342	23C17998	FLANGE, OUTPUT.....	1	
26	PAHZZ	73342	23C45191	LINER, BEARING HOUS.....	1	
27	PAOZZ	73342	67C0736	RING, RETAINING.....	2	
28	PAOZZ	73342	23C17999	CAM, CONTROL.....	2	
29	PAOZZ	24617	5425094	BOLT, SELF-LOCKING.....	6	
30	PAOZZ	73342	23C18199	WASHER, FLAT.....	6	
31	PAOZZ	73342	23C17881	COVER, ACCESS.....	1	
32	PAOZZ	73342	23C17882	GASKET.....	1	
33	PAHDD	73342	23C18291	COVER ASSEMBLY, END (SEE FIG 2 FOR NEXT HIGHER ASSEMBLY).....	1	
34	PAHZZ	73342	23C18209	. PLUG, PIPE.....	1	
35	PAHZZ	73342	23C18205	. PLUG, PIPE.....	1	
36	PAHZZ	6038C	B1680H	. BEARING, ROLLER, NEED.....	2	
37	PAHZZ	73342	23C18211	. PLUG, PIPE.....	1	
38	PAHZZ	73342	23C18028	. BUSHING BLANK.....	2	
39	PAOZZ	3078C	3/8 HP-SS	. PLUG, PIPE.....	1	
40	PAHZZ	7275C	141217	. PIN, STRAIGHT, HEADLE.....	2	
41	PAHZZ	73342	23C18031	. PIN, STRAIGHT, HE.....	2	
42	XAHDD	73342	23C18285	. COVER ASSY, RH MACH.....	1	
43	PAHZZ	24617	5425031	. . INSERT, SCREW THREAD.....	4	
44	XAHZZ	73342	23C18284	. . COVER, RH END.....	1	
45	PADZZ	73342	23C18036	. SLEEVE, COVER.....	1	
46	PAOZZ	73342	6883697	. SEAL, PLAIN ENCASED.....	1	

SECTION II			TM9-2520-272-346P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	Q	
47	PAOZZ	73342	6836137	. SEAL, PLAIN.....	2	
48	PAOZZ	73342	23C18205	. PLUG, PIPE.....	1	
49	PAOZZ	96906	MS28778-20	PACKING, PREFORMED.....	1	
50	PAOZZ	73342	23047080	ELBOW, PIPE.....	1	
51	PAOZZ	73342	23047081	ELBOW, 90 SWIVEL.....	1	

END OF FIGURE





SECTION II			TM9-2520-272-34EP		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
GROUP 0713 INTERMEDIATE CLUTCH					
FIG. 16 FORWARD CLUTCH					
1	PAHZZ	73342	23015985	RING,RETAINING.....	1
2	PAHZZ	73342	23018231	CLUTCH ASSEMBLY,FRI.....	1
3	PAHZZ	73342	23046713	DISK,CLUTCH.....	5
4	PAHZZ	73342	6836518	DISK,CLUTCH.....	5
5	PAHZZ	73342	23018094	HUB,BODY.....	1
6	PAHZZ	73342	23018282	BEARING,WASHER,THRU.....	1
7	PAHZZ	73342	6884730	RING,SNAP.....	1
8	PAHZZ	73342	23047191	PLATE,RETAINING,BRG.....	1
9	PAHZZ	73342	23045233	SPRING,HELICAL COMP.....	16
10	PAHZZ	73342	23047366	PISTON,DIAPHRAGM,CL.....	1
11	PAHZZ	73342	6623102	SEAL,INNER.....	1
12	PAHZZ	73342	6623101	SEAL,CUTER.....	1
13	PAHDD	73342	23018011	HOUSING,CLUTCH.....	1
14	PADZZ	73342	23018008	.BEARING,SLEEVE.....	1
15	XADZZ	73342	6622757	.BALL.....	2
16	XAHZZ	73342	23018192	.HOUSING & RING ASSY.....	1

END OF FIGURE

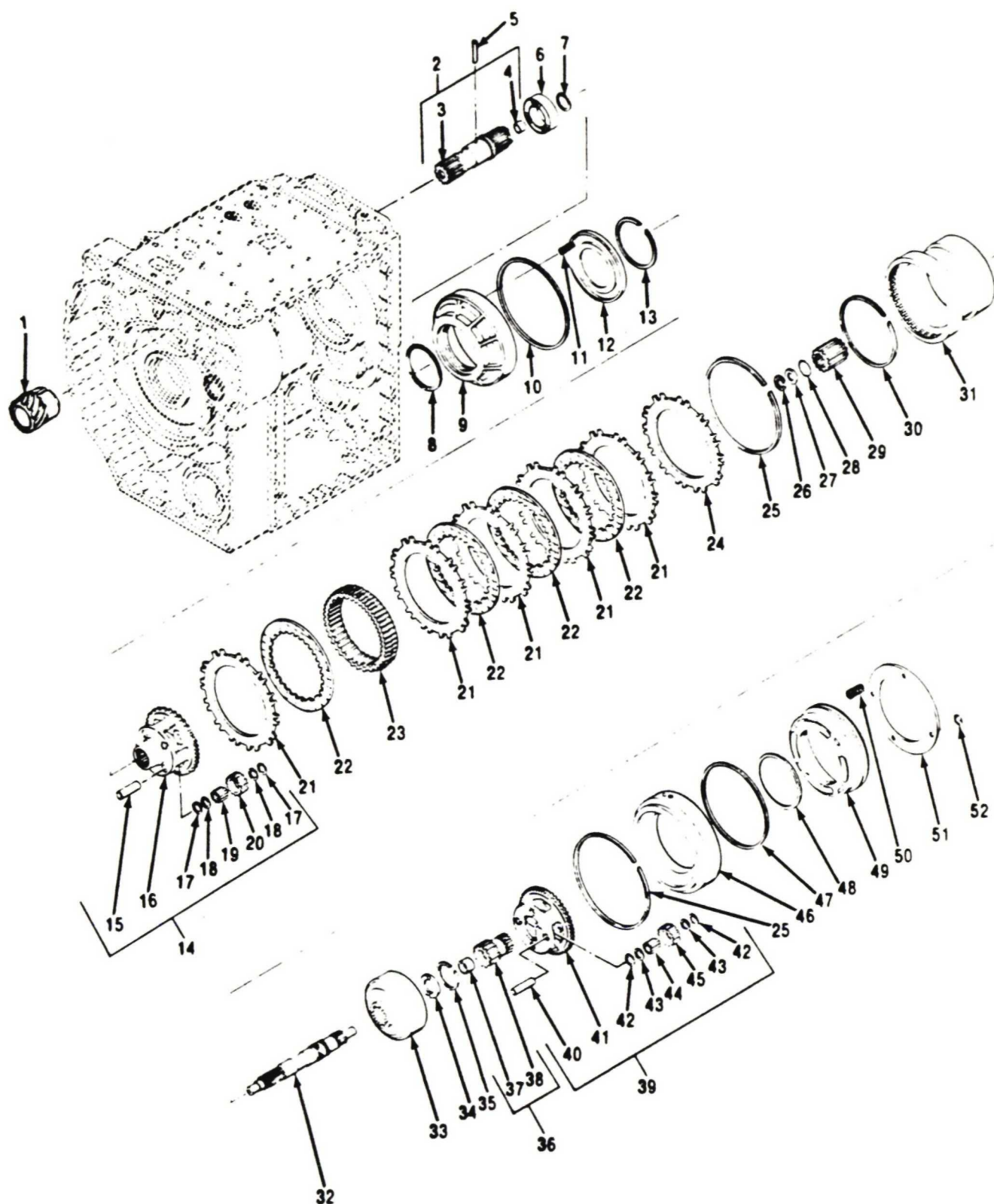


Figure 17. 1st Clutch, Center Carrier and Rear Carrier



SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	FSCM	PART NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
GROUP 0713 INTERMEDIATE CLUTCH					
FIG. 17 1ST CLUTCH,CENTER CARRIER AND REAR CARRIER					
1	PAHZZ	73342	23C18257	GEAR,HELICAL.....	1
2	PAHDD	73342	23C18096	SHAFT,SHOULDERED.....	1
3	XAHZZ	73342	23C18097	.SHAFT,RANGE OUTPUT.....	1
4	PADZZ	73342	23C18168	.BUSHING,RANGE SHAFT.....	1
5	PAHZZ	24617	456641	PIN,SPRING.....	1
6	PAHZZ	43334	3L10NR1214A	BEARING,BALL,ANNULA.....	1
7	PAHZZ	73342	23C18274	RING,RETAINING.....	1
8	PAHZZ	73342	68E3C31	SEAL,PLAIN.....	1
9	PAHZZ	73342	23C11665	PISTON,CLUTCH TRANS.....	1
10	PAHZZ	73342	6883C33	SEAL,SPECIAL.....	1
11	PAHZZ	73342	688C251	SPRING,PISTON PELEA.....	26
12	PAHZZ	73342	6834339	RETAINER,PISTON SPR.....	1
13	PAHZZ	73342	6833993	RING,RETAINING.....	1
14	PAHDD	73342	23C18136	CARRIER ASSEMBLY.....	1
15	KDDZZ	73342	6835567	.SHAFT,STRAIGHT PART OF KIT P/N 5703229.....	4
16	XADZZ	73342	23C18137	.CARRIER,REAR.....	1
17	KDDZZ	73342	6839375	.SEAT,BEARING PART OF KIT P/N 5703229.....	8
18	KDDZZ	73342	23C18960	.WASHER,THRUST PART CF KIT P/N 5703229.....	8
19	KDDZZ	73342	6834515	.BEARING,RCLLER,NEED PART OF KIT P/N 5703229.....	72
20	KDDZZ	73342	23C45482	.PINION ASSY,MATCHED PART OF KIT P/N 5703229.....	1
21	PAHZZ	73342	23C18099	DISK,CLUTCH.....	5
22	PAHZZ	73342	23C18225	DISK,CLUTCH.....	4
23	PAHZZ	73342	23C18135	GEAR,SPUR,INTERNAL.....	1
24	PAHZZ	73342	23C18167	DISK,CLUTCH.....	1
25	PAHZZ	73342	6884275	RING,RETAINING.....	2
26	PAHZZ	60380	NTA1220	RETAINER AND RCLLER.....	1
27	PAHZZ	60380	TRC1220	SEAT,BEARING.....	2
28	PAHZZ	73342	6836117	RING,RETAINING.....	1
29	PAHZZ	73342	23C18102	GEAR,SPUR.....	1
30	PAHZZ	73342	6834512	RING,RETAINING.....	1
31	PAHZZ	73342	23C18101	DRUM,CARRIER,TRANSM.....	1
32	PAHZZ	73342	23C18095	SHAFT,SHOULDERED.....	1
33	PAHZZ	73342	23C18139	GEAR,INTERNAL.....	1
34	PAHZZ	73342	23C18282	BEARING,WASHER,THRU.....	1
35	PAHZZ	73342	23C18178	RING,RETAINING.....	1
36	PAHDD	73342	23C18010	GEAR CLUSTER,SPUR.....	1
37	PADZZ	73342	23C18008	.BEARING,SLEEVE.....	2
38	XADZZ	73342	23C18009	.GEAR,CTR SUN.....	1
39	PAHDD	73342	6831676	CARRIER ASSEMBLY.....	1
40	KDDZZ	73342	6831679	.PIN PART CF KIT P/N 5703230.....	4
41	XAHZZ	73342	6831677	.CARRIER,CENTER.....	1
42	KDDZZ	73342	6839376	.BEARING,WASHER,THRU PART OF KIT P/N	8

SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY	
43	KDDZZ	73342	6831680	5703230..... .SEAT,BEARING PART OF KIT P/N	8	
44	KDDZZ	60380	Q8308	5703230..... .ROLLER,BEARING PART OF KIT P/N	76	
45	KDDZZ	73342	23C45483	5703230..... .PINION ASSY,MATCHED PART OF KIT P/N	1	
46	PAHZZ	73342	23C18100	5703230..... HOUSING,PISTON.....	1	
47	PAHZZ	73342	23011456	SEAL,PLAIN.....	1	
48	PAHZZ	73342	23C11475	SEAL.....	1	
49	PAHZZ	73342	6834817	PISTON.....	1	
50	PAHZZ	73342	23C18299	SPRING,HELICAL,CCMP.....	12	
51	PAHZZ	73342	6834129	RING,SPRING RETAINE.....	1	
52	PAHZZ	24617	5429473	PUSH ON NUT.....	4	

END OF FIGURE

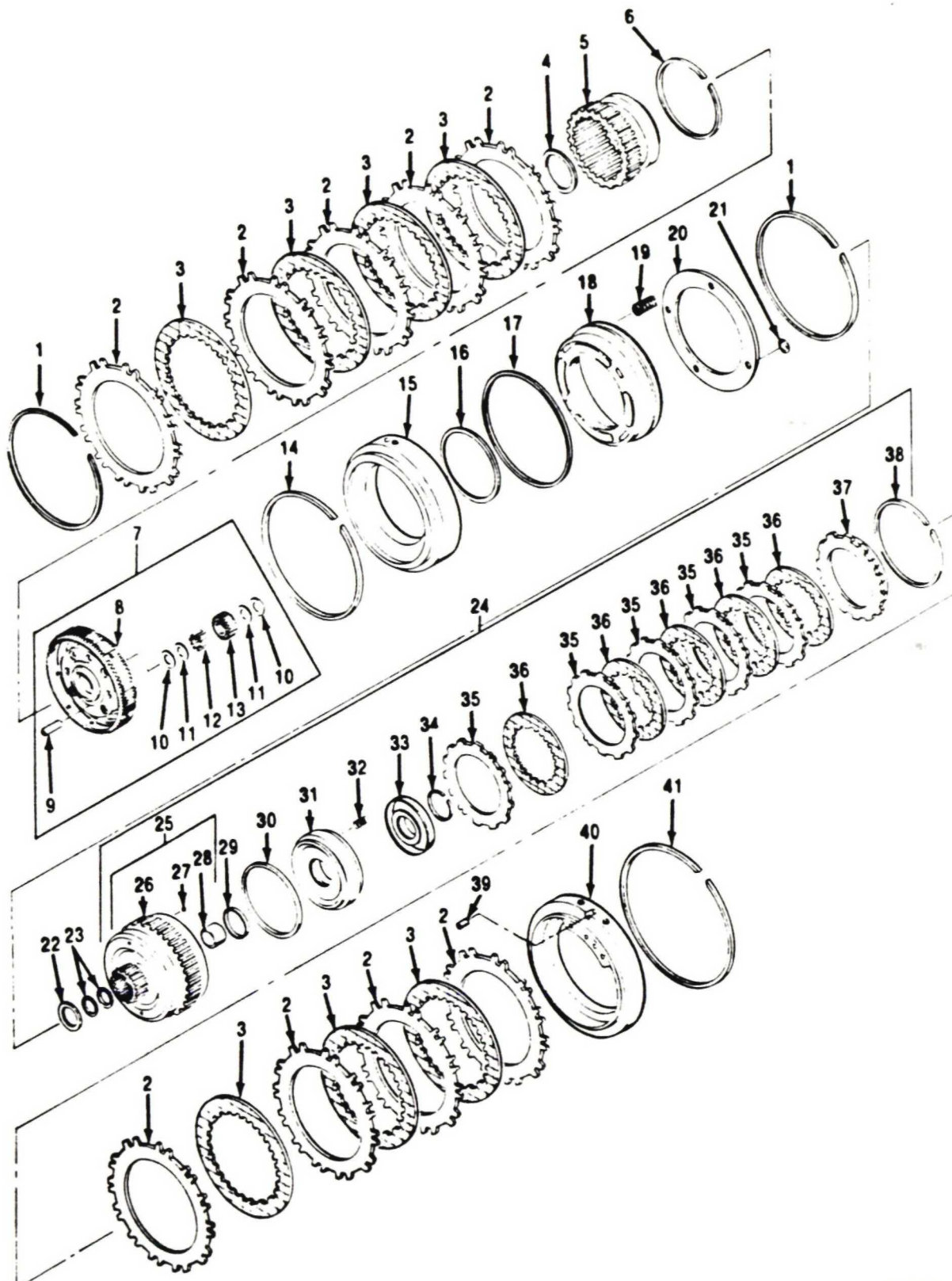


Figure 18. 2nd and 3rd Clutch, Front Carrier, 4th and Reverse Clutch

TM 9-2520-272-34&amp;P



SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY	
GROUP 0713 INTERMEDIATE CLUTCH						
FIG. 18 2ND AND 3RD CLUTCH, FRONT CARRIER, 4TH AND REVERSE CLUTCH						
1	PAHZZ	73342	6884274	RING, RETAINING.....	V	
1	PAHZZ	73342	6884273	RING, RETAINING.....	V	
1	PAHZZ	73342	6884275	RING, RETAINING.....	V	
1	PAHZZ	73342	6884276	RING, RETAINING.....	V	
2	PAHZZ	73342	23C18099	DISK, CLUTCH.....		9
3	PAHZZ	73342	23C18225	DISK, CLUTCH.....		7
4	PAHZZ	73342	6831673	BEARING, WASHER, THRU.....		1
5	PAHZZ	73342	6831675	GEAR, INTERNAL.....		1
6	PAHZZ	73342	6755007	RING, RETAINING.....		1
7	PAHDD	73342	23C46074	CARRIER ASSEMBLY, FR.....		1
8	XADZZ	73342	23C46075	. FLANGE AND CARRIER.....		1
9	KDDZZ	73342	6834309	. SHAFT, STRAIGHT PART OF KIT P/N		4
				5703228.....		
10	KDDZZ	73342	6839514	. BEARING, WASHER, THRU PART OF KIT P/N		8
				5703228.....		
11	KDDZZ	73342	6833591	. WASHER, PIN THRUST PART OF KIT P/N		8
				5703228.....		
12	KDDZZ	60380	Q8C36	. ROLLER, BEARING PART OF KIT P/N		80
				5703228.....		
13	KDDZZ	73342	23045481	. PINION ASSY, MATCHED PART OF KIT P/N		1
				5703228.....		
14	PAHZZ	73342	6884275	RING, RETAINING.....		1
15	PAHZZ	73342	23C18100	HOUSING, PISTON.....		1
16	PAHZZ	73342	23C11475	SEAL.....		1
17	PAHZZ	73342	23C11456	SEAL, PLAIN.....		1
18	PAHZZ	73342	6834817	PISTON.....		1
19	PAHZZ	73342	23018299	SPRING, HELICAL, COMP.....		12
20	PAHZZ	73342	6834129	RING, SPRING RETAIN.....		1
21	PAHZZ	24617	5429473	PUSH ON NUT.....		4
22	PAHZZ	73342	23C13453	WASHER, THRUST.....		1
23	PAHZZ	73342	6836264	SEAL RING, METAL.....		2
24	AHHHH	73342	23C45115	CL ASSY, FWD & REV.....		1
25	PAHDD	73342	23C18006	. HOUSING, CLUTCH.....		1
26	XAHZZ	73342	23C18007	. HOUSING, 4TH CL.....		1
27	XADZZ	73342	6622757	. BALL.....		2
28	PADZZ	73342	23C18008	. BEARING, SLEEVE.....		1
29	PAHZZ	73342	6623102	. SEAL, INNER.....		1
30	PAHZZ	73342	6623101	. SEAL, OUTER.....		1
31	PAHZZ	73342	23047366	. PISTON, DIAPHRAGM, CL.....		1
32	PAHZZ	73342	23C45233	. SPRING, HELICAL COMP.....		16
33	PAHZZ	73342	23047191	. PLATE, RETAINING, BRG.....		1
34	PAHZZ	73342	6884730	. RING, SNAP.....		1
35	PAHZZ	73342	6836518	. DISK, CLUTCH.....		5
36	PAHZZ	73342	23C46713	. DISK, CLUTCH.....		5
37	PAHZZ	73342	23C18084	. DISK, CLUTCH.....		1
38	PAHZZ	73342	23C15985	. RING, RETAINING.....		1

SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UDC)		
39	PAHZZ	24617	141190	PIN, STRAIGHT, HEADLE.....	1	
40	PAHZZ	73342	23C18098	DISK, CLUTCH.....	1	
41	PAHZZ	73342	6836108	RING, RETAINING.....	1	

END OF FIGURE

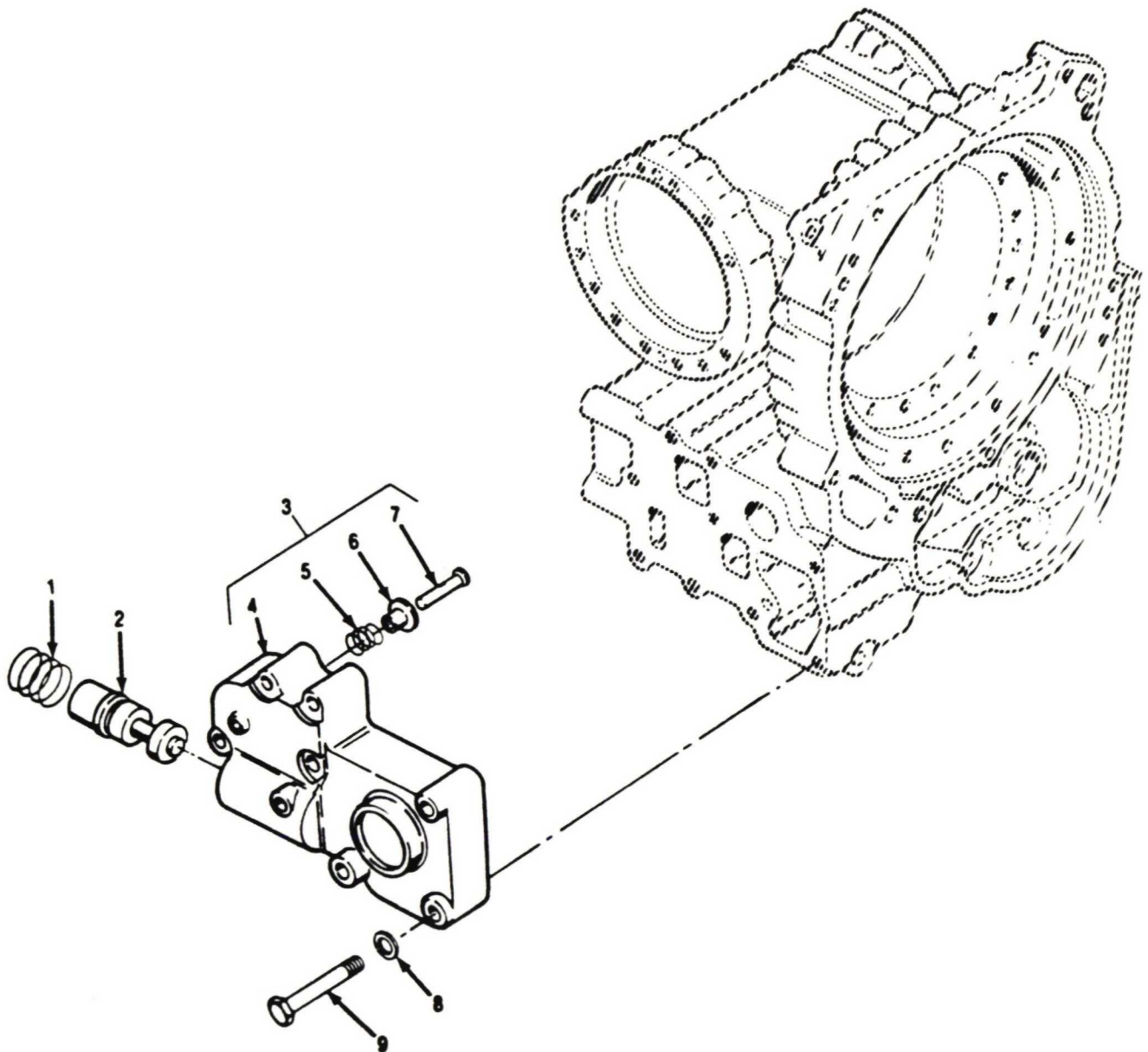


SECTION II			TM9-2520-272-34&P		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY	
GROUP 0714 SERVC UNIT						
FIG. 22 CCNTROL VALVE						
1	PAFZZ	24617	5422846	WASHER,FLAT.....	17	
2	PAFZZ	24617	5415287	BOLT,MACHINE.....	5	
3	PAFZZ	24617	54C9015	BOLT,SELF-LOCKING.....	4	
4	PAFZZ	73342	5431456	BOLT,SELF-LOCKING.....	6	
5	PAFDD	73342	23C17904	VALVE ASSY,CCNTROL.....	1	
6	PAFFF	54906	4C900	.SOLENOID,TRANSMISSI.....	5	
7	PAFZZ	7706C	12C20381	..NYLON INSULATOR.....	1	
8	PAFZZ	7706C	2573515	..TERMINAL,QUICK DISC.....	1	
9	PAFZZ	24617	5440986	.BOLT,MACHINE.....	2	
10	PADZZ	24617	54C9253	.BOLT,SELF-LOCKING.....	4	
11	PADZZ	24617	5422845	.WASHER,FLAT.....	18	
12	PADZZ	73342	23C17886	.COVER,REAR-SHIFT VA.....	1	
13	PADZZ	24617	9432105	.BOLT,SELF-LOCKING.....	2	
14	PADZZ	73342	23017884	.PLATE,SEPARATOR.....	1	
15	PADZZ	73342	23C18273	.VALVE PLATE,HYDRAUL.....	1	
16	PADZZ	73342	23C17888	.GASKET.....	1	
17	PAFZZ	24617	5440988	.BOLT,MACHINE.....	3	
18	PAFZZ	73342	23C47359	.RETAINER,SPRING.....	1	
19	PADDD	73342	23017929	.COVER ASSEMBLY,VAL.....	1	
20	XADZZ	73342	23017930	..COVER,CCNT VALVE.....	1	
21	PADZZ	92555	PLEA2501220	..PLUG.....	1	
22	PADZZ	73342	23C17928	.GASKET.....	1	
23	PAFZZ	24617	5440584	.BOLT,MACHINE.....	1	
24	PAFZZ	24617	5440987	.BOLT,MACHINE.....	4	
25	PADZZ	24617	54C9062	.BOLT,SELF-LOCKING.....	15	
26	PADZZ	73342	23C17927	.PLUG,VALVE,LOCKUP T.....	2	
27	PADZZ	73342	23C17926	.SLIDE,DIRECTIONAL C.....	1	
28	PADZZ	73342	6778C16	.SPRING,HELICAL,COMP.....	4	
29	PADZZ	73342	23C45303	.SPACER,PLATE.....	V	
30	PADZZ	73342	6836140	.SPRING,HELICAL,COMP.....	1	
31	PADZZ	73342	23C17924	.SLIDE,DIRECTIONAL C.....	2	
32	PADZZ	73342	23017910	.SLIDE,DIRECTIONAL C.....	3	
33	PADZZ	73342	23C17891	.PLUG,SIGNAL,VALVE.....	1	
34	PADZZ	73342	23017920	.SLIDE,DIRECTIONAL C.....	1	
35	PADZZ	73342	23017919	.SPRING,HELICAL,COMP.....	V	
36	PADZZ	73342	23C17892	.PLUG,VALVE,TRANSMIS.....	1	
37	PADZZ	73342	23017922	.SLIDE,DIRECTIONAL C.....	1	
38	PADZZ	73342	23C17923	.SPRING,HELICAL,COMP.....	1	
39	PADZZ	73342	23C17905	.BODY,CONTROL VALVE.....	1	
40	PADZZ	73342	23C17921	.PLUG,SIGNAL,VALVE.....	1	
41	PADZZ	73342	23C17890	.PLUG,SIGNAL,VALVE.....	1	
42	PADZZ	73342	6836144	.SPRING,HELICAL,COMP.....	1	
43	PADZZ	73342	23017914	.SLIDE,DIRECTIONAL C.....	1	
44	PADZZ	73342	23017915	.PLUG,FORWARD REVERS.....	1	
45	PADZZ	73342	23C17889	.GASKET.....	1	
46	PBDZZ	73342	23C17887	.HOUSING,SHIFT,VALVE.....	1	
47	PADZZ	73342	6833544	.SPRING,HELICAL,COMP.....	1	
48	PADZZ	73342	23C17913	.SLIDE,DIRECTIONAL C.....	1	



SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM NO	SMR CODE	FSCM	PART NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QT	
49	PADZZ	73342	23017911	.PISTCN,VALVE.....	2	
50	PADZZ	73342	23017912	.TRIMMER PLUG,TRANSM.....	2	
51	PADZZ	73342	6833940	.SPRING,HELICAL,COMP.....	2	
52	PADZZ	73342	6837122	.STOP,VALVE.....	2	
53	PADDD	73342	23017906	.VALVE,STOP-CHECK.....	1	
54	XADZZ	19207	8355864	..RETAINER,SPRING.....	1	
55	XADZZ	73342	2222688	..SPRING.....	1	
56	XADZZ	24617	145639	..BALL.....	1	
57	XADZZ	73342	23017907	..VALVE,THRCTLLE.....	1	
58	PADZZ	73342	23017908	..STOP,THRCTLLE VALVE.....	1	
59	PADZZ	73342	23017909	.SPRING,HELICAL,COMP.....	1	
60	PADZZ	73342	23017916	.GASKET.....	1	
61	PADDD	73342	23017917	.COVER ASSEMBLY,VAL.....	1	
62	PADZZ	92555	PLEA2501220	..PLUG.....	1	
63	XADZZ	73342	23017918	..COVER,VALVE.....	1	

END OF FIGURE



TM485803

Figure 23. Push Start Valve

SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE CN CODES(UOC)	QTY	
GROUP 0714 SERVO UNIT						
FIG. 23 PUSH START VALVE						
1	PAHZZ	73342	23018059	SPRING,HELICAL,COMP.....	1	
2	PAHZZ	73342	23018058	SLIDE,DIRECTIONAL C.....	1	
3	PAHDD	73342	23018055	VALVE,CHECK.....	1	
4	XADZZ	73342	23018056	.BODY,PUSH-START.....	1	
5	PADZZ	73342	23018057	.SPRING,HELICAL,COMP.....	1	
6	PADZZ	73342	23018047	.SPACER,SLEEVE.....	1	
7	PADZZ	73342	23018048	.PIN,STRAIGHT,HEADED.....	1	
8	PAHZZ	24617	5422846	WASHER,FLAT.....	9	
9	PAHZZ	73342	54C9621	BOLT,SELF-LOCKING.....	9	

END OF FIGURE



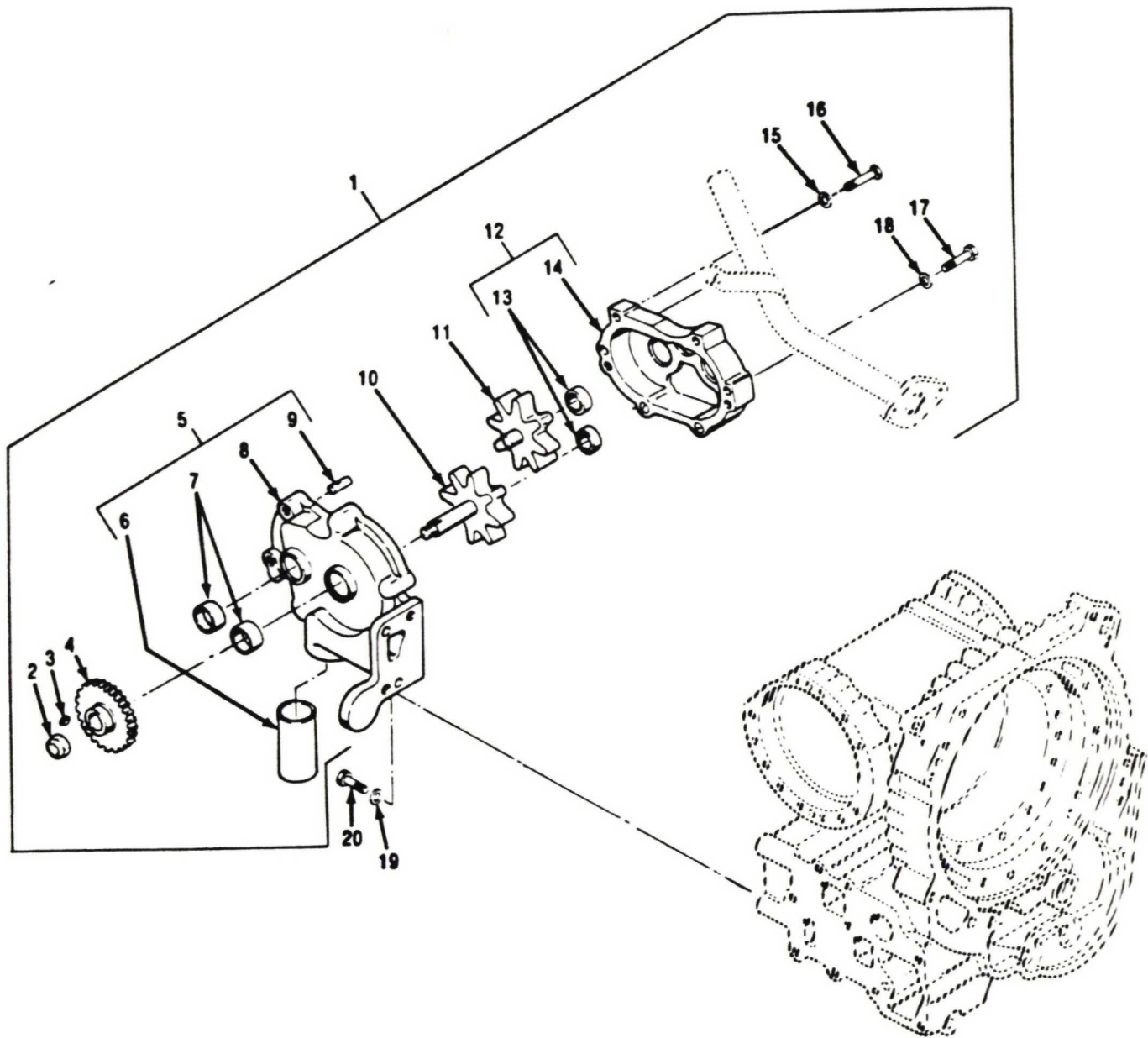


Figure 24. Output Oil Pump

SECTION II			TM9-2520-272-34EP		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY	

GROUP 0721 COOLERS, PUMPS, MOTORS

FIG. 24 OUTPUT CIL PUMP

1	PAHDD	73342	23018062	PUMP, OUTPUT CIL.....	1
2	PADZZ	19207	11649930	.NUT, SELF-LOCKING, HE.....	1
3	PADZZ	96906	MS35756-3	.KEY, WOODRUFF.....	1
4	PADZZ	73342	23018070	.GEAR, SPUR.....	1
5	PADDD	73342	23018067	.COVER, OUTPUT CIL PU.....	1
6	PBDZZ	73342	23018068	..STRAINER ELEMENT, SE.....	1
7	PADZZ	24617	457249	..BEARING, RCLLER, NEED.....	2
8	XADZZ	73342	23018069	..COVER, CUT PUMP.....	1
9	PADZZ	24617	141195	..PIN, STRAIGHT, HEADLE.....	2
10	PADZZ	73342	23018065	.GEARSHAFT, SPUR.....	1
11	PADZZ	73342	23018066	.GEAR, SPUR.....	1
12	PADDD	73342	23018063	.BCDY, CIL PUMP OUTPU.....	1
13	PADZZ	24617	457249	..BEARING, RCLLER, NEED.....	2
14	XADZZ	73342	23018064	..BCDY, OUTPUT CIL.....	1
15	PAHZZ	24617	9422846	.WASHER, FLAT.....	1
16	PAHZZ	83386	9409224	.BOLT.....	1
17	PADZZ	24617	9409225	.BOLT, SELF-LOCKING.....	5
18	PADZZ	24617	9422846	.WASHER, FLAT.....	5
19	PAHZZ	90407	12084P11	.WASHER, FLAT.....	2
20	PAHZZ	63005	9409030	.SCREW, CAP, HEXAGCN H.....	2

END OF FIGURE

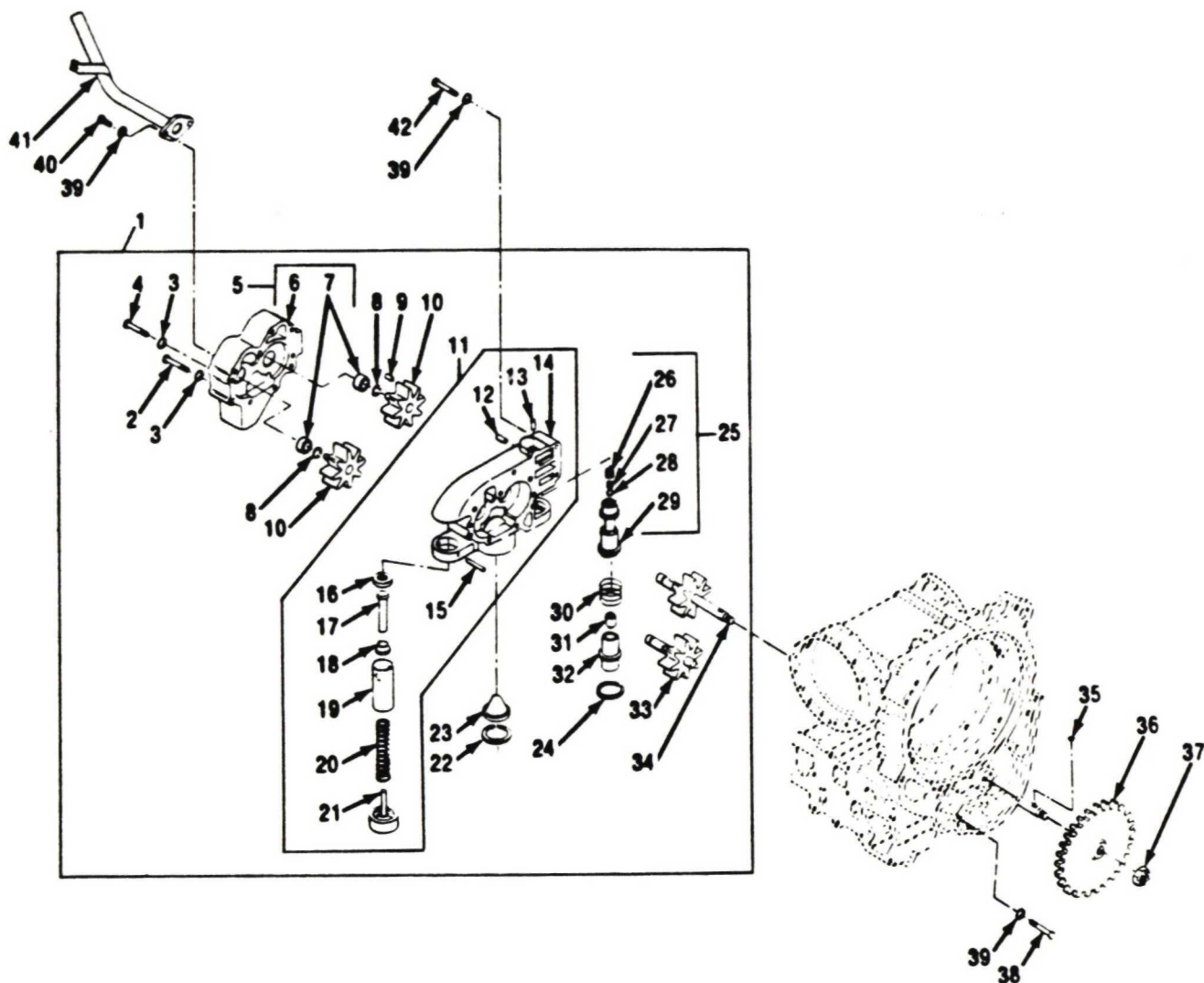


Figure 25. Scavenge and Input Pump



SECTION II			TM9-2520-272-34&P		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY	
GROUP 0721 COOLERS,PUMPS,MOTORS						
FIG. 25 SCAVENGE AND INPUT PUMP						
1	PAHDD	73342	23046126	PUMP ASSEMBLY,SCAVE.....	1	
2	PADZZ	83386	5409224	.BOLT.....	2	
3	PADZZ	24617	5422846	.WASHER,FLAT.....	5	
4	PADZZ	24617	5415287	.BOLT,MACHINE.....	3	
5	PADDD	73342	23046123	.COVER ASSEMBLY,SCAV.....	1	
6	XADZZ	73342	23046122	..COVER,SCAVANGE.....	1	
7	PADZZ	60380	B1210XOH	..BEARING,RCLLER,NEED.....	2	
8	PADZZ	73342	23046127	.RING,RETAINING.....	2	
9	PADZZ	73342	23018297	.ROLLER,BEARING.....	1	
10	PADZZ	73342	23046119	.GEAR,SPUR.....	2	
11	PADDD	73342	23046125	.HOUSING ASSEMBLY,SC.....	1	
12	PADZZ	24617	141195	..PIN,STRAIGHT,HEADLE.....	2	
13	PADZZ	24617	141105	..PIN,STRAIGHT,HEADLE.....	1	
14	XADZZ	73342	23046124	..HOUSING,SCV,IN PUMP.....	1	
15	PADZZ	24617	273541	..PIN,SPRING.....	1	
16	PADZZ	73342	23045679	..SEAT,VALVE.....	1	
17	PADZZ	73342	23045681	..DISK,VALVE.....	1	
18	PADZZ	73342	23045680	..SPACER,SLEEVE.....	1	
19	PADZZ	73342	23045682	..BUSHING,SLEEVE.....	1	
20	PADZZ	73342	23045684	..SPRING,HELICAL,COMP.....	1	
21	PBDZZ	73342	23045683	..COVER,HIGH PRESSURE.....	1	
22	PAHZZ	96906	MS16625-162	.RING,RETAINING.....	1	
23	PAHZZ	73342	23017974	.STRAINER ELEMENT,SE.....	1	
24	PADZZ	96906	MS16625-150	.RING,RETAINING.....	1	
25	PADDD	73342	23017975	.CARTRIDGE,CHECK VAL.....	1	
26	PADZZ	73342	6757428	..DASHPOT.....	1	
27	PADZZ	19207	8351525	..SPRING,HELICAL,COMP.....	1	
28	PADZZ	96906	MS19059-2414	..BALL,BEARING.....	1	
29	XADZZ	73342	23017976	..VALVE,MAIN RGLTR.....	1	
30	PADZZ	73342	6836136	.SPRING,HELICAL,CO.....	1	
31	PADZZ	73342	23017978	.SLIDE,DIRECTIONAL C.....	1	
32	PADZZ	73342	23017977	.HOUSING,REVERSE BOO.....	1	
33	PADZZ	73342	23046121	.GEAR,SPUR.....	1	
34	PADZZ	73342	23046120	.GEARSHAFT,SPUR.....	1	
35	PAHZZ	96906	MS35756-3	KEY,WCCDRUFF.....	1	
36	PAHZZ	73342	23017877	GEAR,SPUR.....	1	
37	PAHZZ	19207	11649930	NUT,SELF-LOCKING,HE.....	1	
38	PAHZZ	73342	5431456	BOLT,SELF-LOCKING.....	7	
39	PAHZZ	24617	5422846	WASHER,FLAT.....	9	
40	PAHZZ	24617	5425096	BOLT.....	2	
41	PAHZZ	73342	23046133	TUBE ASSEMBLY,METAL.....	1	
42	PAHZZ	72582	5405126	BOLT,SELF-LOCKING.....	2	

END OF FIGURE

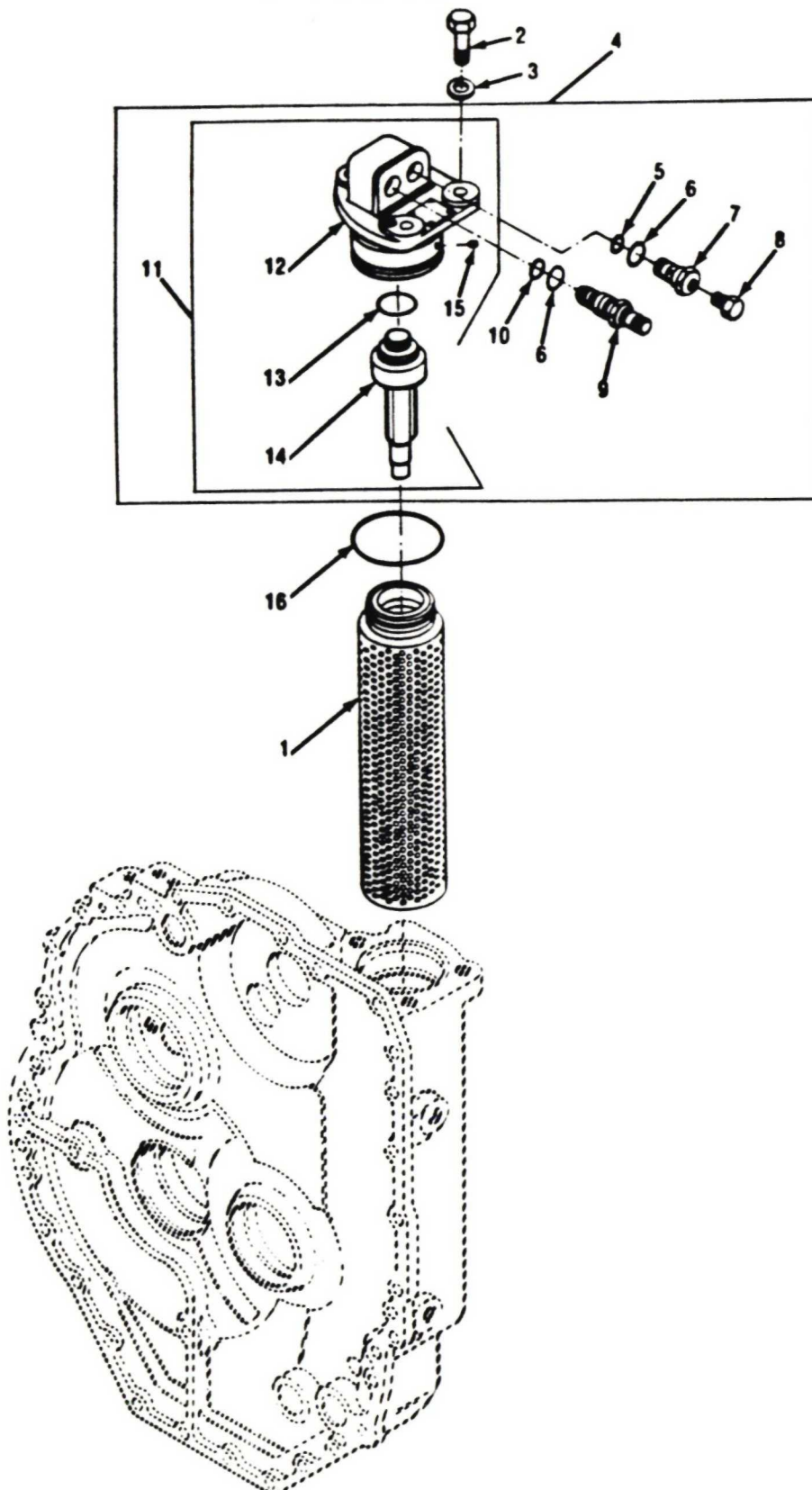


Figure 26. Filter Cover Assy and Filter Element

SECTION II			TM9-2520-272-348P	(5)	(6)
(1)	(2)	(3)	(4)		
ITEM	SMR		PART	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
NO	CODE	FSCM	NUMBER		
GROUP 0721 COOLERS, PUMPS, MOTORS					
FIG. 26 FILTER COVER ASSEMBLY AND FILTER ELEMENT					
1	KFOZZ	73342	23C17868	ELEMENT ASSY, FILTER PART OF KIT P/N 5703232.....	1
2	PAOZZ	24617	54C9C82	BOLT, SELF-LOCKING.....	3
3	PAOZZ	73342	23C18196	WASHER, FLAT.....	3
4	PAODD	73342	23045145	COVER ASSEMBLY, FILT.....	1
5	PAOZZ	73342	6836134	.PACKING, PREFORMED.....	1
6	PAOZZ	73342	6882689	.PACKING, PREFORMED.....	2
7	PAOZZ	73342	23046415	.BOLT, FLUID PASSAGE.....	1
8	PAOZZ	73342	23C18206	.PLUG, PIPE.....	1
9	PAOZZ	98087	150OPT129	.SWITCH, PRESSURE-THE.....	1
10	PAOZZ	81345	M83248/1-016	.PACKING, PREFORMED.....	1
11	PAODD	73342	23017875	.HEAD, FLUID FILTER.....	1
12	PADZZ	90005	1742943	..HEAD.....	1
13	PADZZ	81345	M83248/1-028	..PACKING, PREFORMED.....	1
14	PADZZ	90005	1742584	..STEM, FLUID VALVE.....	1
15	PADZZ	90005	1742599	..SETSCREW.....	1
16	KFOZZ	73342	23018260	PACKING, PREFORMED PART OF KIT P/N 5703232.....	2

END OF FIGURE



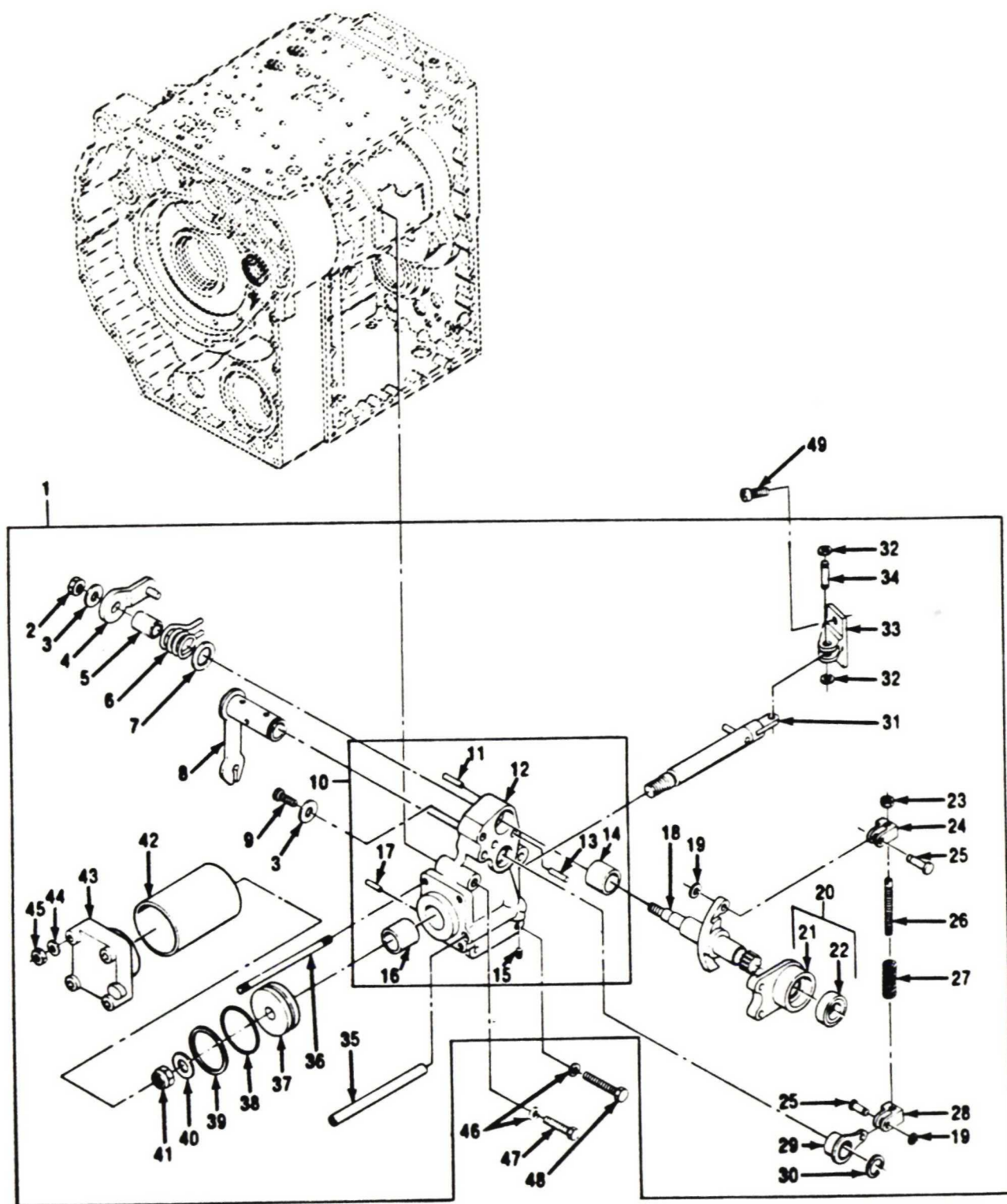


Figure 27. Steer Control Assembly

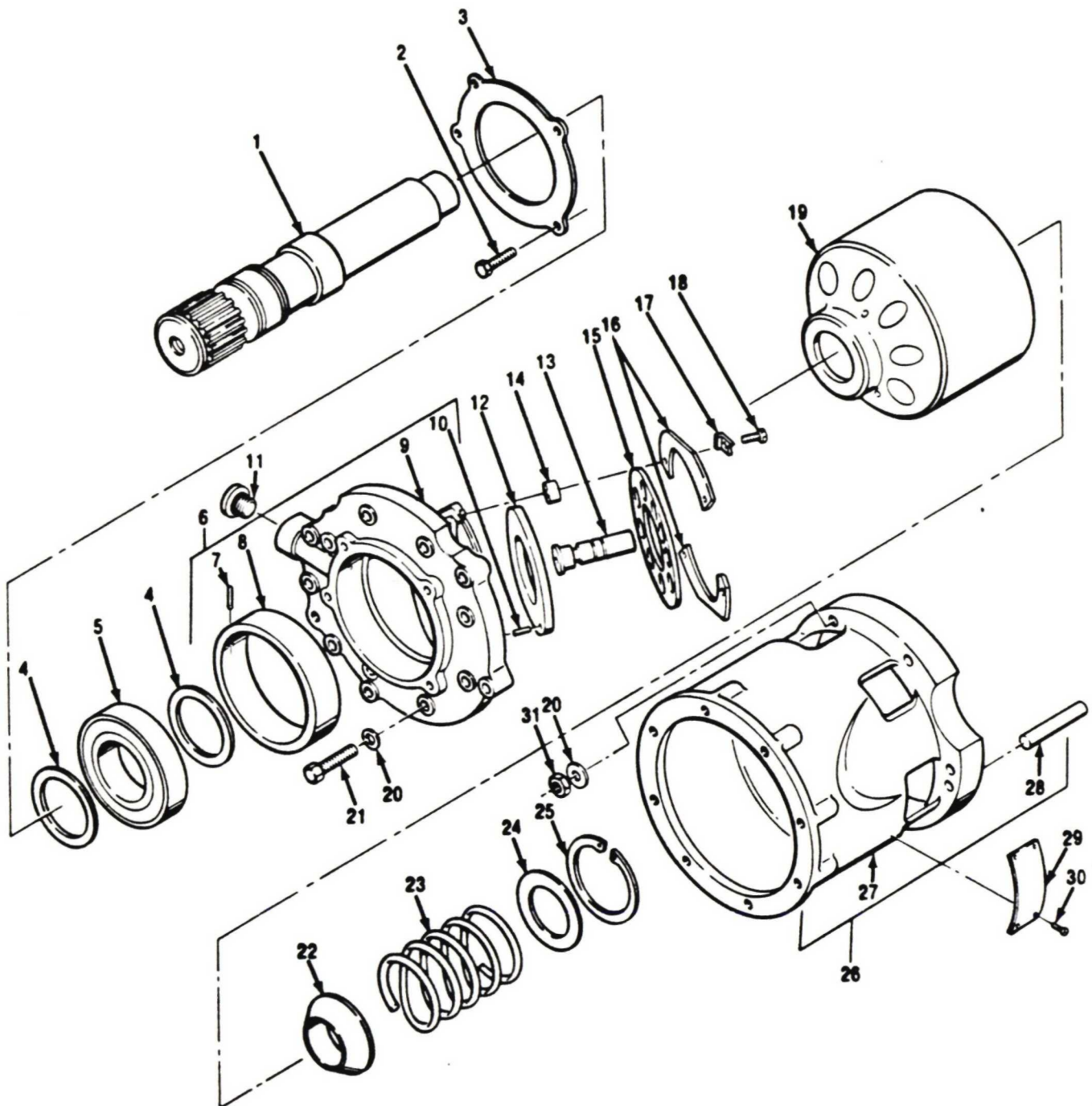
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SECTION II			TM9-2520-272-34EP		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PART	DESCRIPTION AND USABLE ON CODES(UOC)	QTY	
NO	CODE	FSCM	NUMBER			
GROUP 0721 COCLERS,PUMPS,MOTORS						
FIG. 27 STEER CONTROL ASSEMBLY						
1	ADHDD	90166	830710	CONTROL ASSY,STEER.....	1	
2	PADZZ	02892	87C705	.NUT,SELF-LOCKING,HE.....	1	
3	PADZZ	90166	842854	.WASHER,PLAIN HARD.....	3	
4	PADZZ	90166	83C665	.LEVER CENTERING.....	1	
5	PADZZ	90166	842633	.BUSHING,SLEEVE.....	1	
6	PADZZ	90166	842669	.SPRING,HELICAL,TORS.....	1	
7	PADZZ	90166	842635	.WASHER,FLAT.....	1	
8	PADZZ	90166	83C661	.VALVE ASSEMBLY,SERV.....	1	
9	PADZZ	24617	54C9225	.BOLT,SELF-LOCKING.....	2	
10	PADDD	90166	842650	.HOUSING,CONTROL.....	1	
11	PADZZ	90166	872979	.PIN,STRAIGHT,HEADLE.....	2	
12	XADZZ	90166	85C238	.HOUSING,CONTROL.....	1	
13	PADZZ	90166	872578	.PIN,STRAIGHT HEADLE.....	2	
14	XADZZ	90166	842628	.BUSHING,INPUT SHAFT.....	1	
15	PADZZ	43491	67A641	.SETSCREW.....	1	
16	XADZZ	90166	85C247	.BUSHING,CONTROL.....	1	
17	PADZZ	90166	872991	.PIN,STRAIGHT,HEADLE.....	1	
18	PADZZ	90166	842885	.SHAFT,SHOULDERED.....	1	
19	PADZZ	90166	871941	.RING,RETAINING.....	2	
20	PADDD	90166	830666	.RETAINER ASSEMBLY,S.....	1	
21	XADZZ	90166	842683	.RETAINER,SEAL(MACH).....	1	
22	PADZZ	02892	87C115	.SEAL,LIP,PLATE ASSY.....	1	
23	PADZZ	02892	87C561	.NUT,PLAIN,HEXAGON.....	1	
24	PADZZ	90166	842449	.CLEVIS,ROD END.....	1	
25	PADZZ	90166	842451	.PIN,STRAIGHT HEADED.....	2	
26	PADZZ	90166	842638	.STUD,STEPPED.....	1	
27	PADZZ	90166	842639	.SPRING,INPUT ADJUST.....	1	
28	PADZZ	90166	842448	.CLEVIS,ROD END.....	1	
29	PADZZ	90166	83C713	.SLEEVE ASSY,VALVE.....	1	
30	PADZZ	90166	872866	.RING,RETAINING.....	1	
31	PADZZ	90166	830663	.CONNECTOR,ROD END.....	1	
32	PADZZ	02892	870100	.RING,RETAINING.....	2	
33	PADZZ	90166	842643	.LEVER,CAM.....	1	
34	PADZZ	90166	840C59	.PIN,GROOVED,HEADLES.....	1	
35	PADZZ	90166	842632	.TUBE,TRANSFER.....	1	
36	PADZZ	90166	842637	.STUD,PLAIN.....	4	
37	PADZZ	90166	84C257	.PISTON ASSY,PUMP.....	1	
38	PADZZ	90166	871129	.PACKING,PREFORMED.....	1	
39	PADZZ	90166	871254	.RING,PISTON.....	1	
40	PADZZ	90166	870539	.WASHER,FLAT.....	1	
41	PADZZ	90166	87C7C9	.NUT,SELF-LOCKING,HE.....	1	
42	PADZZ	90166	842634	.TUBE,CYLINDER.....	1	
43	PBDZZ	90166	842666	.COVER,ACCESS.....	1	
44	PADZZ	90166	842461	.WASHER,FLAT.....	4	
45	PADZZ	90166	8707C3	.NUT,SELF-LOCKING,HE.....	4	
46	PAHZZ	90166	842854	.WASHER,PLAIN HARD.....	4	
47	PAHZZ	73342	54C9621	.BOLT,SELF-LOCKING.....	2	
48	PAHZZ	24617	54C9014	.BOLT,SELF-LOCKING.....	2	

SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	Q*
49	PAHZZ	90166	870888	SCREW.....	2

END OF FIGURE



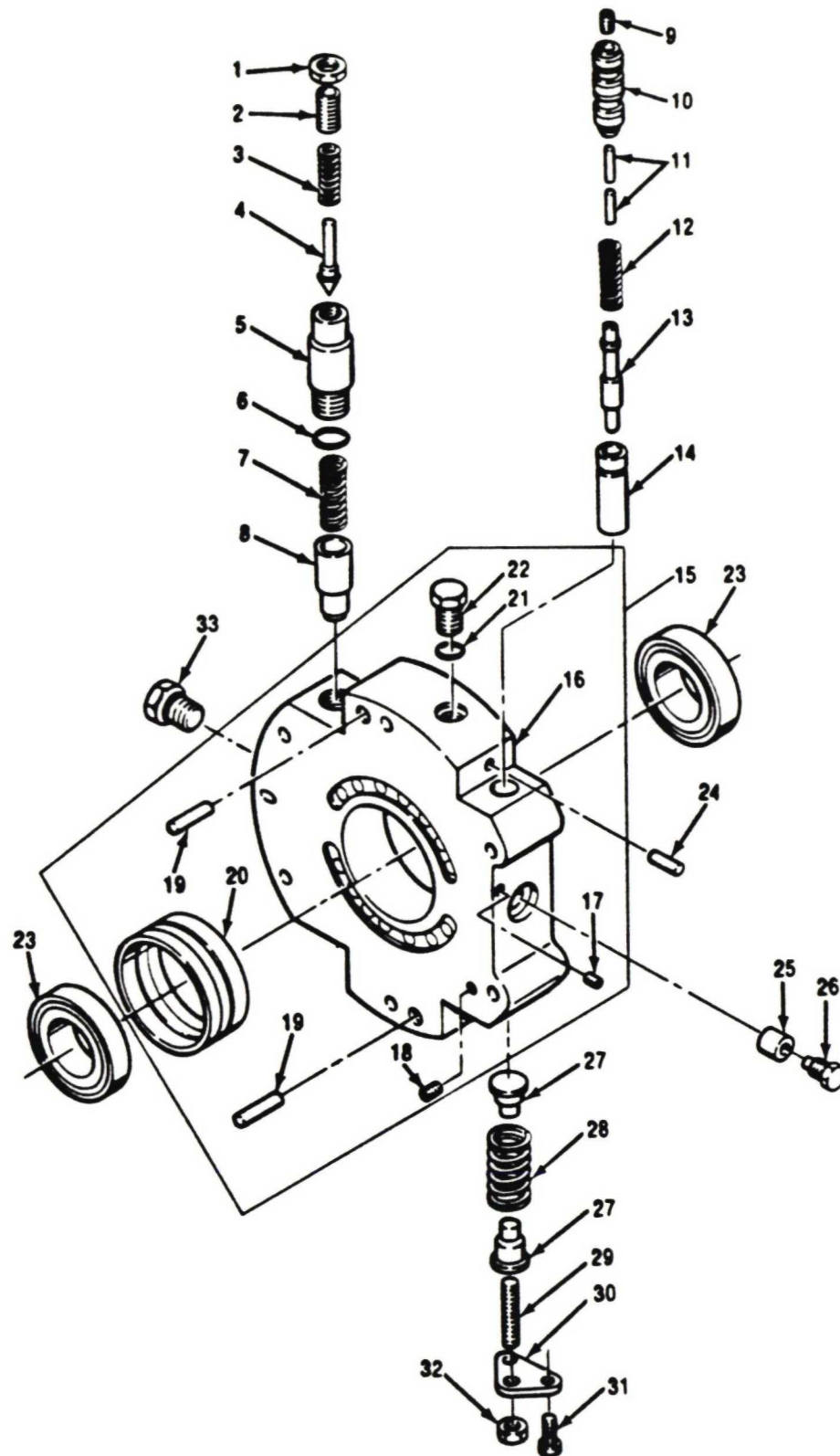


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Figure 28. Motor Components Parts

SECTION II			TM9-2520-272-346P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY	
GROUP 0721 COOLERS, PUMPS, MOTORS						
FIG. 28 MOTOR COMPONENT PARTS						
1	PADZZ	90166	842679	SHAFT, MOTOR.....	1	
2	PADZZ	24617	8409011	BOLT, SELF-LOCKING.....	4	
3	PADZZ	90166	842657	PLATE, RETAINING, BEA.....	1	
4	PADZZ	90166	870102	RING, RETAINING.....	2	
5	PADZZ	90166	870642	BEARING, BALL, ANNULA.....	1	
6	PADDD	90166	842688	HEAD, HYDRAULIC MOTOR.....	1	
7	PADZZ	90166	870068	.PIN, SPRING.....	1	
8	PADZZ	90166	842656	.BEARING, SLEEVE.....	1	
9	XADZZ	90166	850236	.FLANGE, MOUNTING.....	1	
10	PADZZ	02892	870045	.PIN.....	1	
11	PADZZ	90166	873017	PLUG, MACHINE THREAD.....	1	
12	PADZZ	90166	841226	PLATE, PUMP.....	1	
13	PADZZ	90166	830652	PISTON ASSEMBLY.....	9	
14	PADZZ	90166	842626	SPACER, GUIDE.....	4	
15	PADZZ	02892	840898	PLATE, PISTON, PUMP.....	1	
16	PADZZ	02892	840899	CLIP.....	2	
17	PADZZ	02892	841163	WASHER, KEY.....	4	
18	PADZZ	90166	870151	BOLT.....	4	
19	PADZZ	90166	842717	BLOCK, CYLINDER.....	1	
20	PADZZ	90166	842463	WASHER, FLAT.....	14	
21	PADZZ	96906	MS35764-236	BOLT, SELF-LOCKING.....	6	
22	PADZZ	90166	842742	RETAINER, SHAFT, SPRI.....	1	
23	PADZZ	90166	840022	SPRING, STEERING GEA.....	1	
24	PADZZ	90166	840023	WASHER, FLAT.....	1	
25	PADZZ	02892	870103	RING.....	1	
26	PADDD	90166	830664	HOUSING, ASSEMBLY, MC.....	1	
27	XADZZ	90166	842689	.HOUSING, MOTOR (MACH).....	1	
28	PADZZ	90166	872578	.PIN, STRAIGHT HEADLE.....	2	
29	XADZZ	90166	842702	NAMEPLATE (SEE FIG 11 FOR NEXT HIGHER ASSEMBLY).....	1	
30	PADZZ	90166	872885	SCREW, DRIVE.....	4	
31	PADZZ	90166	842627	NUT, SELF-LOCKING, HE.....	6	

END OF FIGURE



TM 9-2520-272-34&P

Figure 29. Manifold Components Parts



SECTION II			TM9-2520-272-34EP			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY	
GROUP 0721 COOLERS,PUMPS,MOTORS						
FIG. 29 MANIFOLD COMPONENT PARTS						
1	PADZZ	90166	871298	NUT,ADJ,SCREW LOCK.....	2	
2	PADZZ	90166	842705	SETSCREW.....	2	
3	PADZZ	90166	841233	SPRING,PILCT VALVE.....	2	
4	PADZZ	90166	842430	VALVE,PILOT.....	2	
5	PADZZ	90166	830659	PLUG ASSY,CHECK.....	2	
6	PADZZ	02892	871508	PACKING.....	2	
7	PADZZ	02892	840036	SPRING,SPECIAL.....	2	
8	PADZZ	90166	842649	PLUNGER,CHECK VALVE.....	2	
9	PADZZ	02892	872492	PLUG,PIPE.....	1	
10	PADZZ	90166	842651	BODY,PRESSURE SENSE.....	1	
11	PADZZ	90166	871049	PIN,STRAIGHT,HEADLE.....	2	
12	PADZZ	90166	840687	SPRING,VALVE BLOCK.....	1	
13	PADZZ	90166	842063	SPOOL,VALVE.....	1	
14	PADZZ	90166	842171	SLEEVE,VALVE.....	1	
15	PADDD	90166	842697	MANIFOLD ASSEMBLY.....	1	
16	XADZZ	90166	850231	.MANIFOLD.....	1	
17	PADZZ	90166	872994	.SETSCREW.....	2	
18	PADZZ	90166	872992	.SETSCREW.....	2	
19	XADZZ	90166	842704	.BUSHING,SLUG.....	2	
20	XADZZ	90166	842648	.DISTRIBUTOR,CHARGE.....	1	
21	PADZZ	90166	871904	.PACKING,PREFORMED.....	2	
22	PADZZ	02892	840146	.PLUG.....	2	
23	PADZZ	90166	872821	BEARING,RCLLER,CYLI.....	2	
24	PADZZ	90166	872976	PIN,STRAIGHT,HEADLE.....	1	
25	PADZZ	90166	871902	PACKING,PREFORMED.....	1	
26	PADZZ	90166	842653	STOP,PLUG.....	1	
27	PADZZ	90166	840206	SEAT,HELICAL COMPRE.....	2	
28	PADZZ	90166	840726	SPRING,HORSEPOWER.....	1	
29	PADZZ	90166	872977	SETSCREW.....	1	
30	PADZZ	90166	842625	VALVE PLATE,HYDRAUL.....	1	
31	PADZZ	19207	54C9C88	SCREW,SELF-LOCKING.....	2	
32	PADZZ	19200	76C0222	NUT,PLAIN,HEXAGON.....	1	
33	PADZZ	90166	873017	PLUG,MACHINE THREAD.....	1	

END OF FIGURE

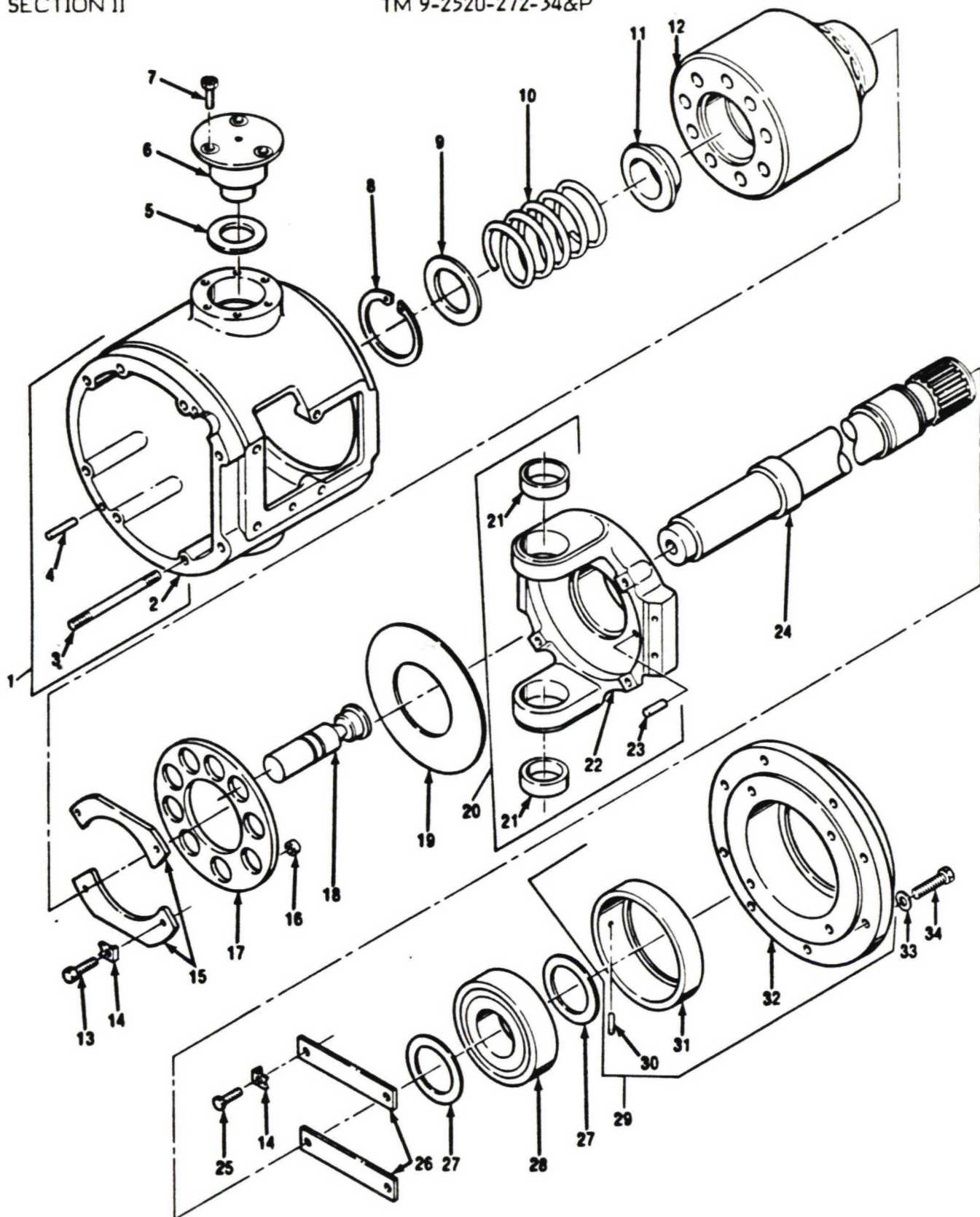


Figure 30. Pump Components Parts



SECTION II			TM9-2520-272-34&P		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)		QTY
GROUP 0721 COOLERS, PUMPS, MOTORS						
FIG. 30 PUMP COMPONENT PARTS						
1	PADDD	90166	830657	HOUSING ASSEMBLY, PU.....		1
2	XADZZ	90166	842686	.HOUSING (MACH).....		1
3	PADZZ	90166	842623	.STUD, PLAIN.....		6
4	PADZZ	90166	872978	.PIN, STRAIGHT HEADLE.....		2
5	PADZZ	90166	840029	BEARING, WASHER, THRU.....		2
6	PADZZ	90166	842678	TRUNNION, CAM.....		2
7	PADZZ	24617	8409067	BOLT.....		6
8	PADZZ	02892	870103	RING.....		1
9	PADZZ	90166	840023	WASHER, FLAT.....		1
10	PADZZ	90166	840022	SPRING, STEERING GEA.....		1
11	PADZZ	90166	842742	RETAINER, SHAFT, SPRI.....		1
12	PADZZ	90166	842717	BLOCK, CYLINDER.....		1
13	PADZZ	90166	870181	BOLT.....		4
14	PADZZ	02892	841163	WASHER, KEY.....		8
15	PADZZ	02892	840899	CLIP.....		2
16	PADZZ	90166	842621	SPACER, GUIDE.....		4
17	PADZZ	02892	840898	PLATE, PISTON, PUMP.....		1
18	PADZZ	90166	830692	PISTON ASSEMBLY.....		9
19	PADZZ	90166	841226	PLATE, PUMP.....		1
20	PADDD	02892	830245	CAM ASSEMBLY.....		1
21	PADZZ	90166	870647	.BEARING, ROLLER, CYLI.....		2
22	XADZZ	90166	841185	.CAM (MACH).....		1
23	PADZZ	02892	870045	.PIN.....		1
24	PADZZ	90166	842675	SHAFT, PUMP.....		1
25	PADZZ	02892	870140	SCREW, CAP, HEXAGON H.....		4
26	PADZZ	90166	842618	PLATE, CAM STOP.....		2
27	PADZZ	90166	870102	RING, RETAINING.....		2
28	PADZZ	90166	870642	BEARING, BALL, ANNULA.....		1
29	PADDD	90166	842684	HEAD, HYDRAULIC MOTO.....		1
30	PADZZ	90166	870068	.PIN, SPRING.....		1
31	PADZZ	90166	842642	.BEARING, SLEEVE.....		1
32	XADZZ	90166	850233	.FLANGE, MOUNTING.....		1
33	PADZZ	90166	842646	WASHER, FLAT.....		8
34	PADZZ	90166	872981	BOLT, SELF-LOCKING.....		8

END OF FIGURE



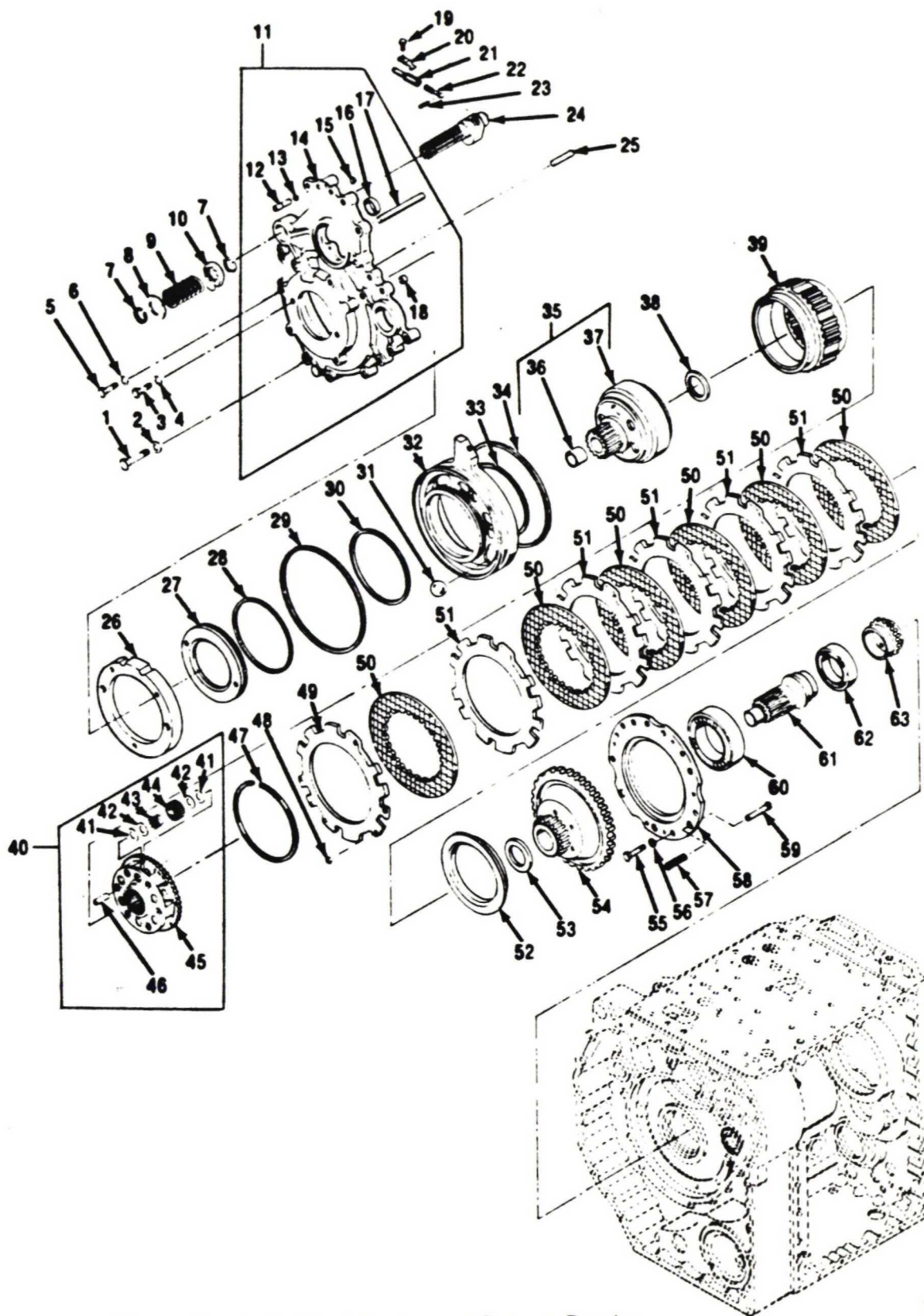


Figure 31. Left Hand Brake and Output Carrier

SECTION II			TM9-2520-272-34EP		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PART	DESCRIPTION AND USABLE ON CODES(UOC) QTY		
NO	CODE	FSCM	NUMBER			
GROUP 0726 BRAKES						
FIG. 31 LEFT HAND BRAKE AND OUTPUT CARRIER						
1	PAHZZ	24617	5416011	BOLT, SELF-LOCKING.....	15	
2	PAHZZ	24617	5422848	WASHER, FLAT.....	15	
3	PAHZZ	24617	54C9074	BOLT, SELF-LOCKING.....	2	
4	PAHZZ	24617	5422845	WASHER, FLAT.....	2	
5	PAHZZ	63005	94C9012	SCREW, SELF-LOCKING.....	3	
6	PAHZZ	24617	5422846	WASHER, FLAT.....	3	
7	PAHZZ	73342	67CC736	RING, RETAINING.....	2	
8	PAHZZ	73342	23018148	WASHER, FLAT.....	1	
9	PAHZZ	73342	23018146	SPRING, HELICAL, TORS.....	1	
10	PAHZZ	73342	23018145	CAM, CONTROL.....	1	
11	PAHHH	73342	23018029	SPIDER, BRAKE.....	1	
12	PAHZZ	73342	23C18280	.PIN, STRAIGHT, HE.....	2	
13	PAHZZ	73342	23018281	.RING, RETAINING.....	2	
14	XAHZZ	73342	23018030	.SUPPCRT, LH BRAKE.....	1	
15	PAHZZ	73342	23C45348	.PLUG, VALVE.....	1	
16	PAHZZ	60380	B1880H	.BEARING, RCLLR, NEED.....	1	
17	PAHZZ	73342	23C18031	.PIN, STRAIGHT, HE.....	1	
18	PAHZZ	24617	141275	.PIN, STRAIGHT, HEADLE.....	2	
19	PAHZZ	24617	54C9C72	BOLT, SELF-LOCKING.....	1	
20	PAHZZ	73342	23C18144	CLIP, SPRING TENSION.....	2	
21	PAHZZ	73342	23018143	LINK, BRAKE ADJUSTIN.....	1	
22	PAHZZ	73342	23C18142	LINK, BRAKE ADJUSTIN.....	1	
23	PAHZZ	24617	455675	PIN, SPRING.....	1	
24	PAHZZ	73342	23C18023	CAM, CCNTRCL.....	1	
25	PAHZZ	73342	23C18114	PIN, STRAIGHT, HEADLE.....	4	
26	PAHZZ	73342	23C18110	CAM, BRAKE APPLY-STA.....	1	
27	PAHZZ	73342	23C18109	RETAINER, PACKING.....	1	
28	PAHZZ	73342	6836113	SEAL RING, METAL.....	1	
29	PAHZZ	73342	6836128	SEAL RING, METAL.....	1	
30	PAHZZ	73342	6836127	RING, RETAINING.....	1	
31	PAHZZ	72582	453621	BALL, BEARING.....	8	
32	PAHZZ	73342	23C18083	CAM, BRAKE, TRANSMISS.....	1	
33	PAHZZ	73342	23046647	PACKING, PREFORMED.....	1	
34	PAHZZ	73342	23C46648	PACKING, PREFORMED.....	1	
35	PAHDD	73342	23C18014	GEAR CLUSTER, SPUR.....	1	
36	PADZZ	73342	23018008	.BEARING, SLEEVE.....	1	
37	XAHZZ	73342	23C18015	.GEAR, STR RING.....	1	
38	PAHZZ	73342	23C18237	BEARING, WASHER, THRU.....	1	
39	PAHZZ	73342	23C18078	DRUM, BRAKE, CLUTCH.....	1	
40	PAHDD	73342	23C18275	CARRIER ASSEMBLY.....	1	
41	KDDZZ	73342	6839514	.BEARING, WASHER, THRU PART OF KIT P/N 5703231.....	12	
42	KDDZZ	73342	6833591	.WASHER, PIN THRUST PART OF KIT P/N 5703231.....	12	
43	KDDZZ	60380	Q8036	.ROLLER, BEARING PART OF KIT P/N 5703231.....	120	
44	KDDZZ	73342	23C45484	.PINION ASSY, MATCHED PART OF KIT P/N	1	



SECTION II			TM9-2520-272-346P		(5)	(6)		
(1)	(2)	(3)	(4)					
ITEM	SMR		PART	DESCRIPTION AND USABLE ON CODES(UOC) QT				
NO	CODE	FSCM	NUMBER					
45	PADZZ	73342	23018276	5703231.....		1		
46	KDDZZ	73342	6834309	.FLANGE AND CARRIER.....		6		
				.SHAFT,STRAIGHT PART OF KIT P/N				
47	PAHZZ	73342	6836110	5703231.....		1		
48	PAHZZ	11862	274612	RING,RETAINING.....		6		
49	PAHZZ	73342	23018082	RING,RETAINING.....		1		
50	PAHZZ	73342	23046537	DISK,CLUTCH.....		6		
51	PAHZZ	73342	23046681	DISK,CLUTCH.....		5		
52	PAHZZ	73342	23018080	PLATE,CL REACTION.....		1		
53	PAHZZ	73342	23018236	SEAL,BRAKE COOLANT.....		1		
54	PAHZZ	73342	23018108	BEARING,WASHER,THRU.....		1		
55	PAHZZ	72582	6409028	GEAR CLUSTER,SPUR.....		5		
56	PAHZZ	73342	6769636	BOLT,SELF-LOCKING.....		5		
57	PAHZZ	73342	23018081	WASHER,FLAT.....		6		
58	PAHZZ	73342	23018079	SPRING,HELICAL,COMP.....		1		
59	PAHZZ	73342	23018156	PLATE,BACKING,BRAKE.....		6		
60	PAHZZ	43334	BU61918L-15	PIN,STRAIGHT,HEADLE.....		1		
61	PAHZZ	73342	23018105	BEARING,ROLLER,CYLI.....		1		
62	PAHZZ	43334	3L14LR1214A	SHAFT,SHOULDERED.....		1		
63	PAHZZ	73342	23018071	BEARING,BALL,ANNULA.....		1		
				GEAR,SPUR.....				

END OF FIGURE



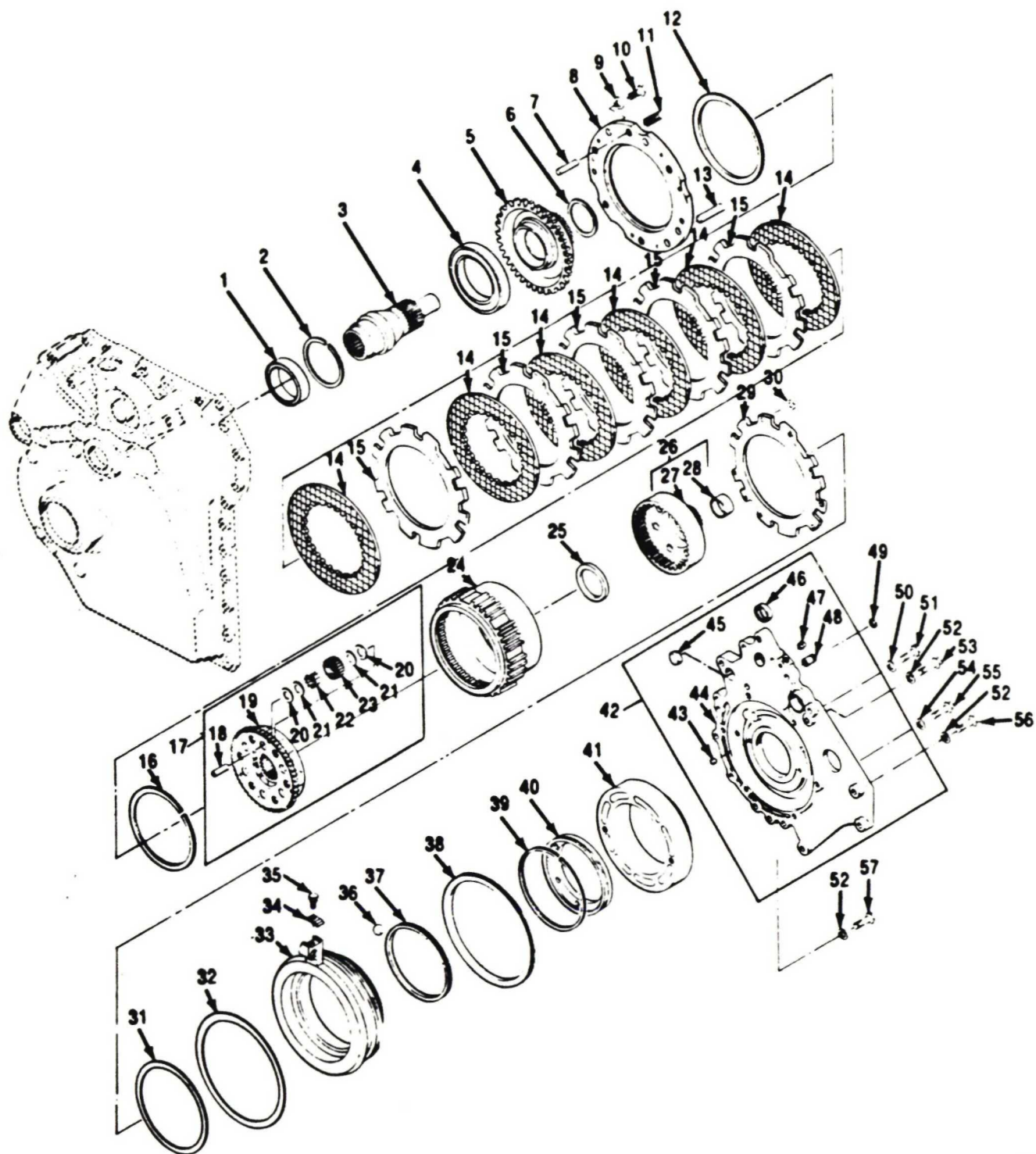


Figure 32. Right Hand Brake and Output Carrier

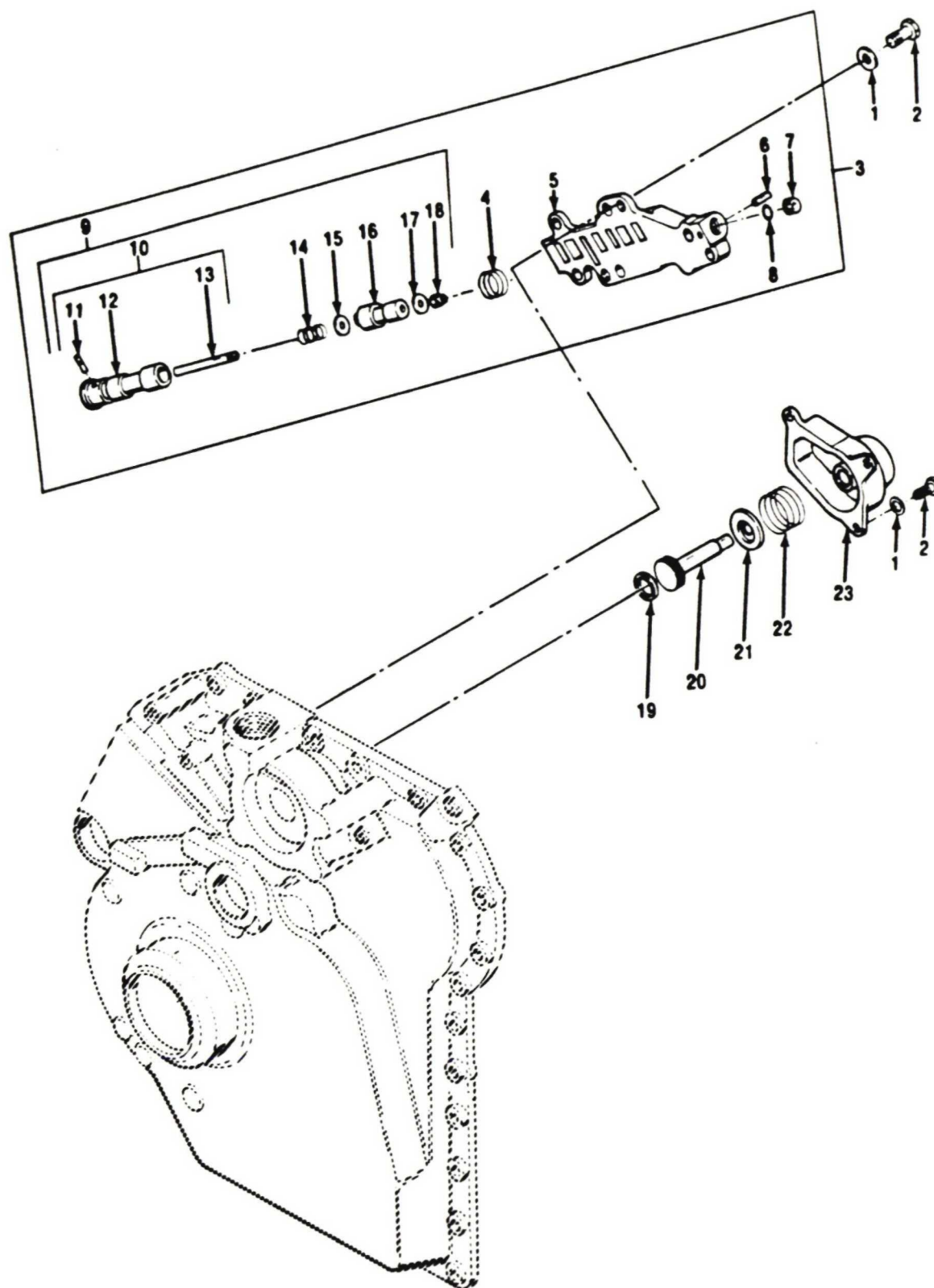
SECTION II			TM9-2520-272-34&P		(5)	(6)
(1)	(2)	(3)	(4)			
ITEM	SMR		PART	DESCRIPTION AND USABLE ON CODES(UOC)	QTY	
NO	CODE	FSCM	NUMBER			
GROUP 0726 BRAKES						
FIG. 32 RIGHT HAND BRAKE AND OUTPUT CARRIER						
1	PAHZZ	43334	3L13LR1214A	BEARING,BALL,ANNULA.....	1	
2	PAHZZ	73342	23C45232	RING,RETAINING.....	1	
3	PAHZZ	73342	23C17955	SHAFT,SHOULDERED.....	1	
4	PAHZZ	43334	BU61918L-15	BEARING,ROLLER,CYLI.....	1	
5	PAHZZ	73342	23C18107	GEAR CLUSTER,SPUR.....	1	
6	PAHZZ	73342	23C18236	BEARING,WASHER,THRU.....	1	
7	PAHZZ	73342	23C18156	PIN,STRAIGHT,HEADLE.....	6	
8	PAHZZ	73342	23C18079	PLATE,BACKING,BRAKE.....	1	
9	PAHZZ	73342	6769636	WASHER,FLAT.....	4	
10	PAHZZ	72582	94C9C28	BOLT,SELF-LOCKING.....	4	
11	PAHZZ	73342	23018081	SPRING,HELICAL,COMP.....	6	
12	PAHZZ	73342	23C18080	SEAL,BRAKE COOLANT.....	1	
13	PAHZZ	73342	23C18114	PIN,STRAIGHT,HEADLE.....	4	
14	PAHZZ	73342	23C46537	DISK,CLUTCH.....	6	
15	PAHZZ	73342	23C46681	PLATE,CL REACTION.....	5	
16	PAHZZ	73342	6836110	RING,RETAINING.....	1	
17	PAHDD	73342	23C18275	CARRIER ASSEMBLY.....	1	
18	KDDZZ	73342	6834309	.SHAFT,STRAIGHT PART OF KIT P/N	6	
				5703231.....		
19	XADZZ	73342	23C18276	.FLANGE AND CARRIER.....	1	
20	KDDZZ	73342	6839514	.BEARING,WASHER,THRU PART OF KIT P/N	12	
				5703231.....		
21	KDDZZ	73342	6833991	.WASHER,PIN THRUST PART OF KIT P/N	12	
				5703231.....		
22	KDDZZ	60380	QEC36	.ROLLER,BEARING PART OF KIT P/N	120	
				5703231.....		
23	KDDZZ	73342	23C45484	.PINION ASSY,MATCHED PART OF KIT P/N	1	
				5703231.....		
24	PAHZZ	73342	23C18078	.DRUM,BRAKE,CLUTCH.....	1	
25	PAHZZ	73342	23C18237	BEARING,WASHER,THRU.....	1	
26	PAHDD	73342	23C18014	GEAR CLUSTER,SPUR.....	1	
27	XAHZZ	73342	23018015	.GEAR,STR RING.....	1	
28	PADZZ	73342	23C18008	.BEARING,SLEEVE.....	1	
29	PAHZZ	73342	23C18082	DISK,CLUTCH.....	1	
30	PAHZZ	24617	274612	RING,RETAINING.....	6	
31	PAHZZ	73342	23C46647	PACKING,PREFORMED.....	1	
32	PAHZZ	73342	23C46648	PACKING,PREFORMED.....	1	
33	PAHZZ	73342	23C18083	CAM,BRAKE,TRANSMISS.....	1	
34	PAHZZ	73342	23C18144	CLIP,SPRING TENSION.....	2	
35	PAHZZ	24617	54C9072	BOLT,SELF-LOCKING.....	1	
36	PAHZZ	72582	453621	BALL,BEARING.....	8	
37	PAHZZ	73342	6836127	RING,RETAINING.....	1	
38	PAHZZ	73342	6836128	SEAL RING, METAL.....	1	
39	PAHZZ	73342	6836113	SEAL RING, METAL.....	1	
40	PAHZZ	73342	23C18109	RETAINER,PACKING.....	1	
41	PAHZZ	73342	23018110	CAM,BRAKE APPLY-STA.....	1	
42	PAHHH	73342	23018037	SUPPORT ASSEMBLY,BR.....	1	



SECTION II			TM9-2520-272-34&P			
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QT	
43	PAHZZ	24617	141275	.PIN,STRAIGHT,HEADLE.....	2	
44	XAHZZ	73342	23C18038	.SUPPORT,RH BRK.....	1	
45	XAHZZ	73342	23018028	.BUSHING BLANK.....	1	
46	PAHZZ	60380	B1880H	.BEARING,RCLLER,NEED.....	1	
47	PAHZZ	24617	444687	.PLUG,PIPE.....	1	
48	PBHZZ	73342	23018039	.COUPLING,TUBE.....	1	
49	PAHZZ	73342	23C18233	SEAL RING,METAL.....	1	
50	PAHZZ	24617	5422848	WASHER,FLAT.....	14	
51	PAHZZ	24617	5409513	BOLT,SELF-LOCKING.....	2	
52	PAHZZ	24617	5422846	WASHER,FLAT.....	3	
53	PAHZZ	83386	5409224	BOLT.....	1	
54	PAHZZ	24617	5422845	WASHER,FLAT.....	2	
55	PAHZZ	24617	5409074	BOLT,SELF-LOCKING.....	2	
56	PAHZZ	24617	5416011	BOLT,SELF-LOCKING.....	12	
57	PAHZZ	63005	5409012	SCREW, SELF-LOCKING.....	2	

END OF FIGURE





TM485813

Figure 33. Right Brake Apply and Brake Coolant Valve Body

SECTION II			TM9-2520-272-34EP	(5)	(6)
(1)	(2)	(3)	(4)		
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 0726 BRAKES

FIG. 33 RIGHT BRAKE APPLY VALVE  
BODY AND BRAKE COOLANT  
VALVE BODY

1	PAHZZ	24617	5422846	WASHER,FLAT.....	8
2	PAHZZ	63005	54C9012	SCREW,SELF-LOCKING.....	8
3	PAHHH	73342	23C17986	BODY ASSEMBLY,BRAKE.....	1
4	PAHZZ	73342	23017996	.SPRING,HELICAL,COMP.....	1
5	XAHZZ	73342	23C17987	.BODY,BRK APPLY REG.....	1
6	PAHZZ	24617	455675	.PIN,SPRING.....	1
7	PAHZZ	73342	23C45125	.PLUG.....	1
8	PAHZZ	73342	23C45126	.PACKING,PREFORMED.....	1
9	PAHDD	73342	23017989	.VALVE BRAKE REGULAT.....	1
10	ADDDD	73342	23017990	..VALVE ASSY,BRK.....	1
11	PADZZ	24617	455141	...PIN,SPRING.....	1
12	PADZZ	73342	23017991	...VALVE,REGULATING,FL.....	1
13	PADZZ	73342	23C17992	...PIN,GROOVED,HEADLES.....	1
14	PADZZ	73342	23C17993	..SPRING,HELICAL,COMP.....	1
15	PADZZ	73342	23C17994	..SHIM.....	V
16	PADZZ	73342	23C17995	..SLIDE,DIRECTIONAL C.....	1
17	PADZZ	24617	5422845	..WASHER,FLAT.....	1
18	PADZZ	19207	77C8C35	..NUT,SLEEVE.....	1
19	PAHZZ	73342	23C18234	RETAINER,PACKING.....	1
20	PAHZZ	73342	23017982	STEM,TRANSMISSION.....	1
21	PAHZZ	73342	23C17983	DISK,VALVE.....	1
22	PAHZZ	73342	6836252	SPRING,HELICAL,COMP.....	1
23	PAHZZ	73342	23C18155	BODY,BRAKE COOLANT,.....	1

END OF FIGURE

TM 9-2520-272-34&P



**Figure 34. Transmission Shipping and Storage Container**



SECTION II			TM9-2520-272-34&P	(5)	(6)
(1)	(2)	(3)	(4)		
ITEM	SMR		PART	DESCRIPTION AND USABLE CN CODES(UOC)	QTY
NO	CODE	FSCM	NUMBER		

# GROUP 33 SPECIAL PURPOSE KITS

## GROUP 3301 REUSABLE SHIPPING CONTAINERS

### FIG. 34 TRANSMISSION SHIPPING AND STORAGE CONTAINER

1	PAFHD	19207	11650169	CONTAINER,X200 TRAN.....	1
2	PBFZZ	19207	11650252	.TOP WELDMENT.....	1
3	PAHZZ	19207	12344383	.ACCESS PCRT.....	1
4	PAHZZ	19207	12302146	.VALVE,VACUUM REGULA.....	1
5	PAHZZ	00334	SK2155	.INDICATOR,HUMIDITY.....	1
6	PBHZZ	19207	7573325	.PLATE,IDENTIFICATIO.....	1
7	PAHZZ	96906	MS21318-46	.SCREW,DRIVE.....	4
8	PBHZZ	19207	1165C193	.MARKER,IDENTIFICATI.....	1
9	PAFZZ	96906	MS51567-14	.NUT,PLAIN,HEXAGCN.....	22
10	PAFZZ	96906	MS90726-117	.SCREW,CAP,HEXAGON H.....	4
11	PAFZZ	96906	MS35338-48	.WASHER,LOCK.....	4
12	PAFZZ	19207	11650188	.CAP,PILLCW BLOCK.....	2
13	PAFZZ	19207	1165C186	.BASE,SUPPCRT CRADLE.....	1
14	PAHZZ	96906	MS35338-48	.WASHER,LOCK.....	28
15	PAHZZ	96906	MS90727-108	.SCREW,CAP,HEXAGON H.....	20
16	PAFZZ	19207	1165C251	.RUBBER,SHEET,SCLID.....	1
17	PBFZZ	19207	1165C183	.BOTTOM WELDMENT.....	1
18	PAFZZ	96906	MS90728-111	.SCREW,CAP,HEXAGON H.....	22
19	PAFZZ	96906	MS20913-65	.PLUG,PIPE.....	1
20	PAHZZ	96906	MS90725-128	.SCREW,CAP,HEXAGON H.....	8
21	PAHZZ	19207	12302107-4	.SKID WOOD.....	4
22	PAHZZ	96906	MS51567-14	.NUT,PLAIN,HEXAGCN.....	8
23	PAHZZ	19207	11650184	.SHEAR MCUNT.....	4
24	PAHZZ	96906	MS51095-410	.SCREW,CAP,HEXAGCN H.....	16
25	PAFZZ	19207	1165C189	.HOUSING,BEARING UNI.....	1
26	PBHZZ	19207	1165C185	.FRAME,MCUNTING.....	1
27	PAHZZ	88044	AN427-5-10	.RIVET.....	4
28	PAHZZ	80205	NAS1C31AX8	.NUT,SELF-LOCKING,PL.....	2
29	PBFZZ	19207	11650187-2	.BRACKET,MCUNTING.....	1
30	PBFZZ	19207	1165C187-1	.BRACKET,MCUNTING.....	1
31	PAFZZ	96906	MS27183-18	.WASHER,FLAT.....	2
32	PAFZZ	96906	MS90727-112	.SCREW,CAP,HEXAGON H.....	2
33	AAAAA	19207	1165C190	.SACKED ITEM.....	1
34	PAFZZ	19207	1C890481	.BAG,MAIL.....	1
35	PAFZZ	96906	MS51522-21	.NUT,SELF-LOCKING,HE.....	6
36	PAFZZ	96906	MS90727-64	.SCREW,CAP,HEXAGON H.....	6
37	PAFZZ	96906	MS27183-14	.WASHER,FLAT.....	6

END OF FIGURE

SECTION II			TM9-2520-272-34EP		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QT

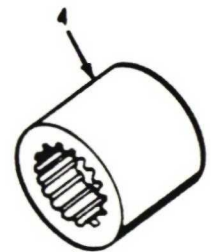
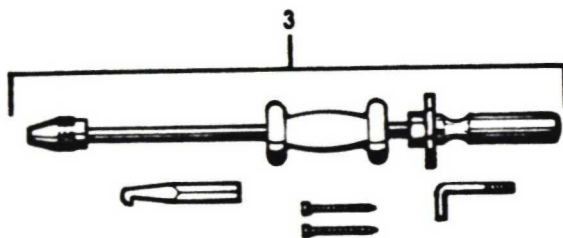
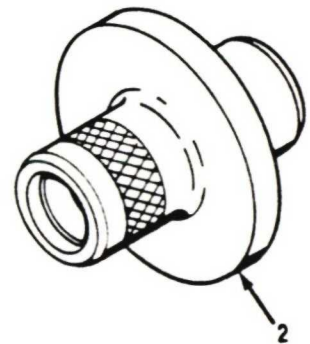
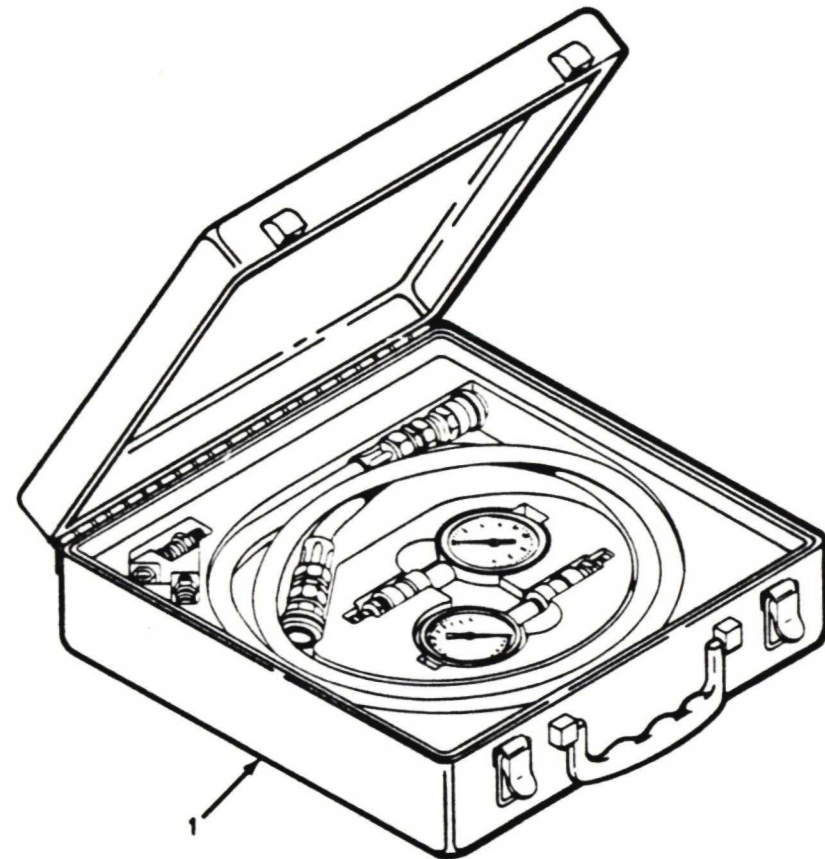
GROUP 94 SPECIAL PURPOSE KITS

GROUP 9401 REPAIR KITS

FIG KITS

1	PADZZ	19207	57C3228	PARTS KIT,DRIVING A..... V
				BEARING,WASHER,THRU( 8) 18-10
				PINION ASSY,MATCHED( 1) 18-13
				ROLLER,BEARING ( 80) 18-12
				SHAFT,STRAIGHT ( 4) 18-9
				WASHER,PIN THRUST ( 8) 18-11
2	PADZZ	19207	57C3229	PARTS KIT,DRIVING A..... V
				BEARING,RCLLER,NEED( 72) 17-19
				PINION ASSY,MATCHED( 1) 17-20
				SEAT,BEARING ( 8) 17-17
				SHAFT,STRAIGHT ( 4) 17-15
				WASHER,THRUST ( 8) 17-18
3	PADZZ	73342	57C3230	PARTS KIT,DRIVING A..... V
				BEARING,WASHER,THRU( 8) 17-42
				PIN ( 4) 17-40
				PINION ASSY,MATCHED( 1) 17-45
				ROLLER,BEARING ( 76) 17-44
				SEAT,BEARING ( 8) 17-43
4	PADZZ	19207	57C3231	PARTS KIT,DRIVING A..... V
				BEARING,WASHER,THRU( 12) 31-41
				PINION ASSY,MATCHED( 1) 31-44
				ROLLER,BEARING (120) 31-43
				SHAFT,STRAIGHT ( 6) 31-46
				WASHER,PIN THRUST ( 12) 31-42
5	PADZZ	19207	57C3231	PARTS KIT,DRIVING A..... V
				BEARING,WASHER,THRU( 12) 32-20
				PINION ASSY,MATCHED( 1) 32-23
				ROLLER,BEARING (120) 32-22
				SHAFT,STRAIGHT ( 6) 32-18
				WASHER,PIN THRUST ( 12) 32-21
6	PAOZZ	19207	5703232	PARTS KIT,FLUID PRE..... V
				ELEMENT ASSY,FILTER( 1) 26-1
				PACKING,PREFORMED ( 2) 26-16

END OF FIGURE



TAM 85815

Figure 35. Special Tools



SECTION III			TM9-2520-272-34&P	(5)	(6)
(1)	(2)	(3)	(4)		
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 26 TCCLS AND TEST EQUIPMENT

GROUP 2604 SPECIAL TOOLS

FIG. 35 SPECIAL TOOLS

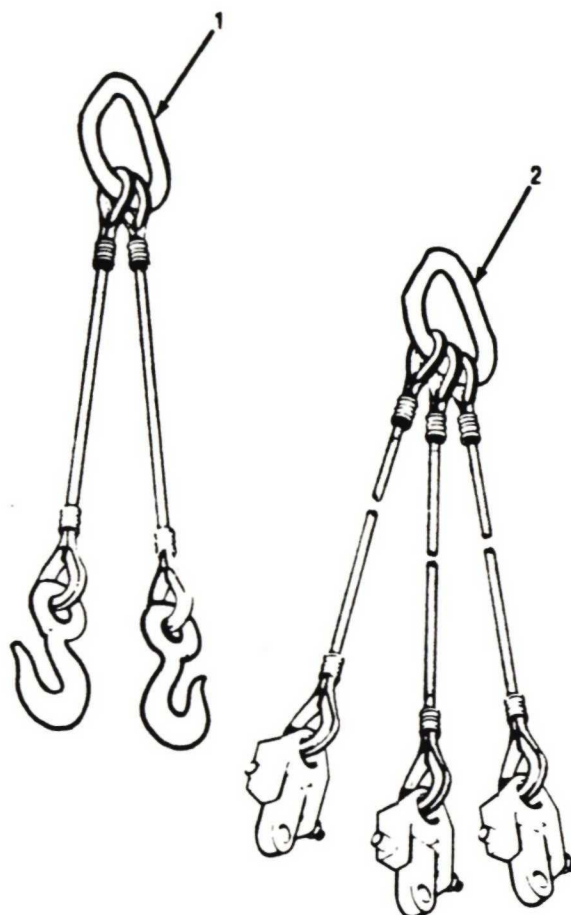
1	PEOZZ	19207	11650182
2	PEOZZ	19207	11650176
3	PEOZZ	33287	J24171
4	PEOZZ	19207	8355955

PRESSURE GAGE KIT	QTY PER SET 1....
INSTALLER,CUTPUT	QTY PER SET 1.....
PULLER KIT,UNIVERSA	QTY PER SET 1..
SOCKET,SOCKET WRENC	QTY PER SET 1..

END OF FIGURE

SECTION III

TM 9-2520-272-34&P

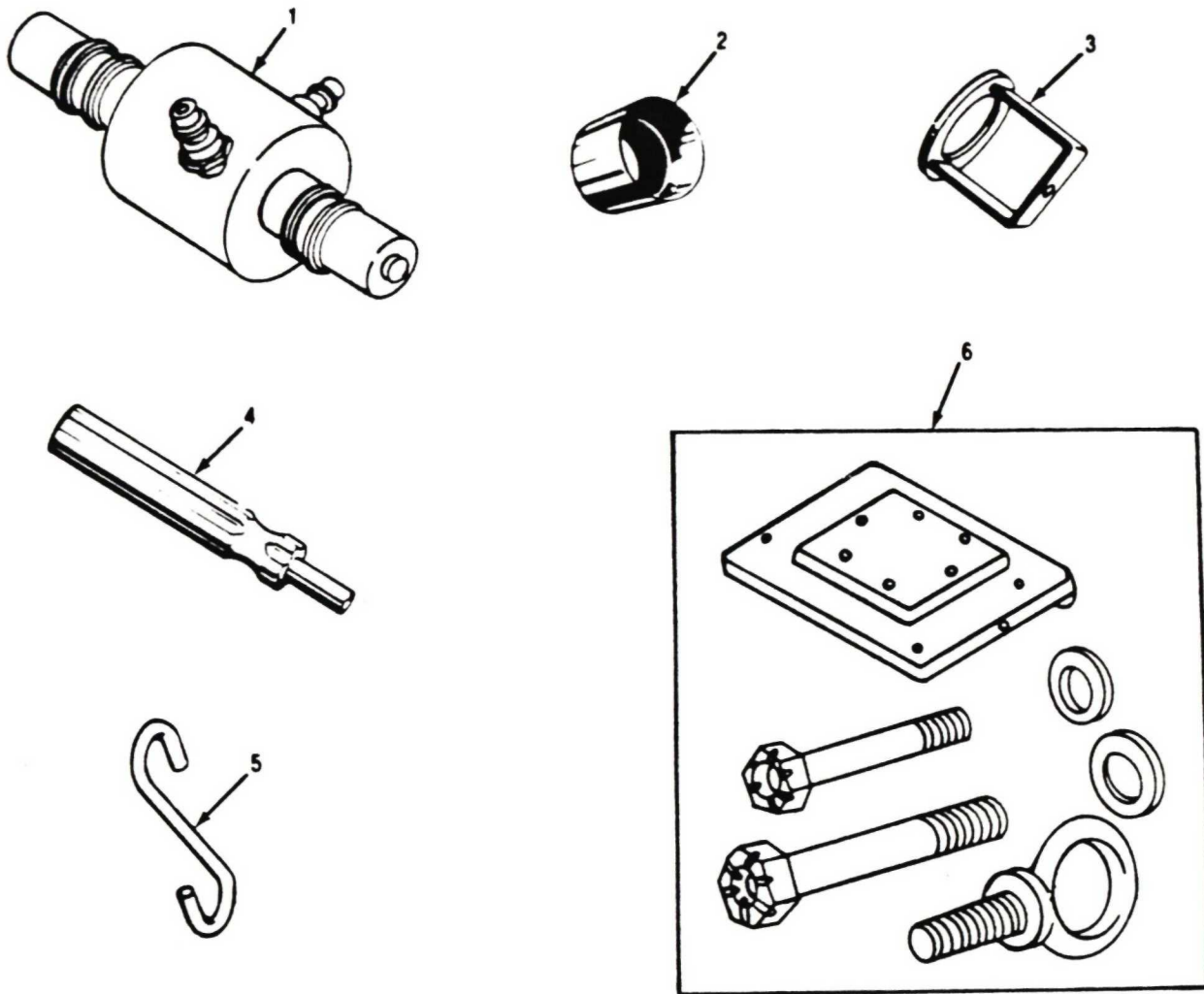


TM485816

Figure 36. Special Tools

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UDC)	(6) QTY
GROUP 2604 SPECIAL TOOLS					
FIG. 36 SPECIAL TOOLS					
1	PEFZZ	19207	12268037	SLING,ENGINE AND TR	QTY PER SET 1..
2	PEFZZ	19207	12268036	SLING,MULTIPLE LEG	QTY PER SET 1...

END OF FIGURE



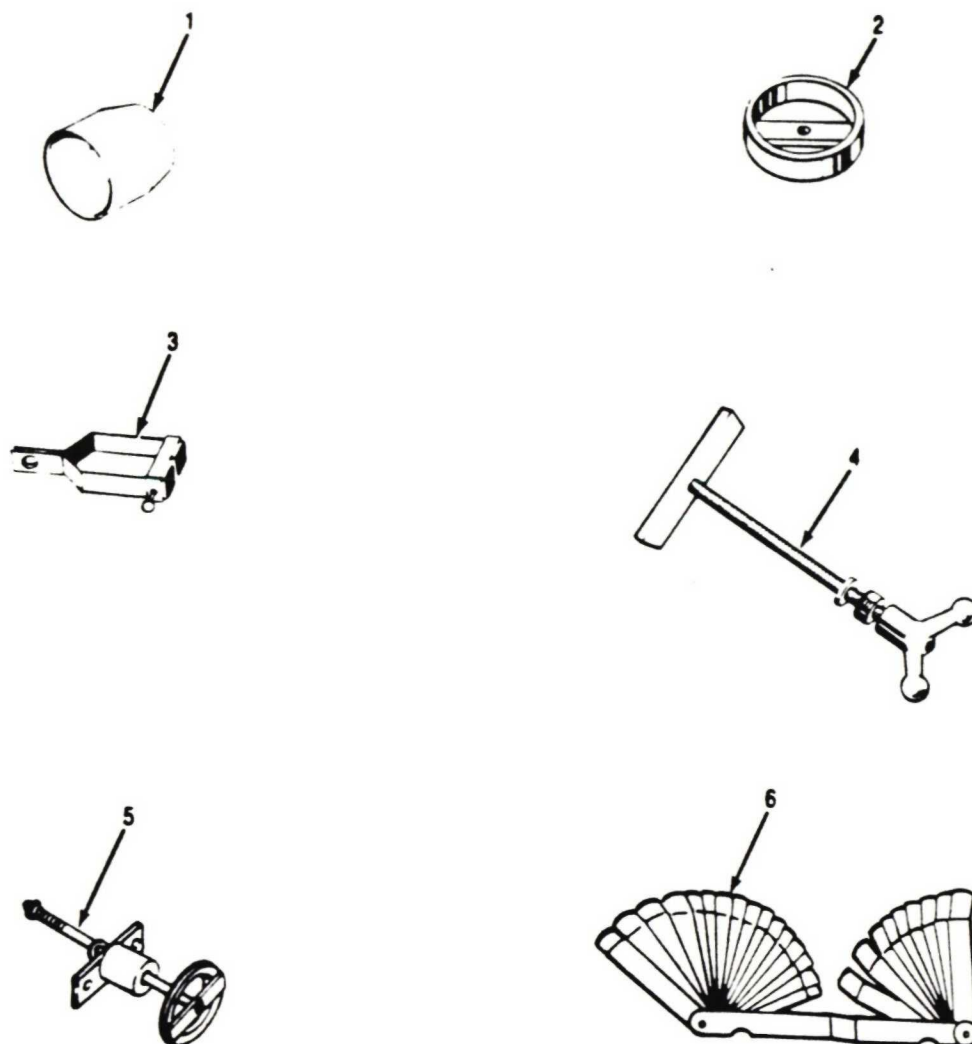
TAA85E17

Figure 37. Special Tools

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 2604 SPECIAL TOOLS					
FIG. 37 SPECIAL TOOLS					
1	PEHZZ	19207	11650178	FIXTURE ASSEMBLY, LE	QTY PER SET 1..
2	PEHZZ	25341	J21362	PROTECTOR, INNER SEA	QTY PER SET 1..
3	PEHZZ	25341	J23616	CLUTCH SPRING CCMR	QTY PER SET 1..
4	PEHZZ	33287	J24453	INSTALLER, LOCK RING	QTY PER SET 1..
5	PEHZZ	19207	11650102	HOOK, CHAIN, S	QTY PER SET 2.....
6	PEHZZ	19207	11650180	KIT, ADAPTER PLATE	QTY PER SET 1....

END OF FIGURE





TAM55504

Figure 38. Special Tools

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE CN CODES (UOC)	(6) QTY
GROUP 2604 SPECIAL TOOLS					
FIG. 38 SPECIAL TOOLS					
1	PEHZZ	19207	12268021	SLEEVE, PISTON AND S	QTY PER SET 1..
2	PEHZZ	33287	J24452	COMPRESSOR, SPRING, C	QTY PER SET 1..
3	PEHZZ	33287	J24473	LIFTER, PUMP SUPPORT	QTY PER SET 1..
4	PEHZZ	33287	J242C4-2	BAR AND STUD ASSEMB	QTY PER SET 1..
5	PEHZZ	25341	J23630-02	SPRING COMPRESSOR	QTY PER SET 1....
6	PEHZZ	55715	FB300A	GAGE, THICKNESS	QTY PER SET 1.....

END OF FIGURE

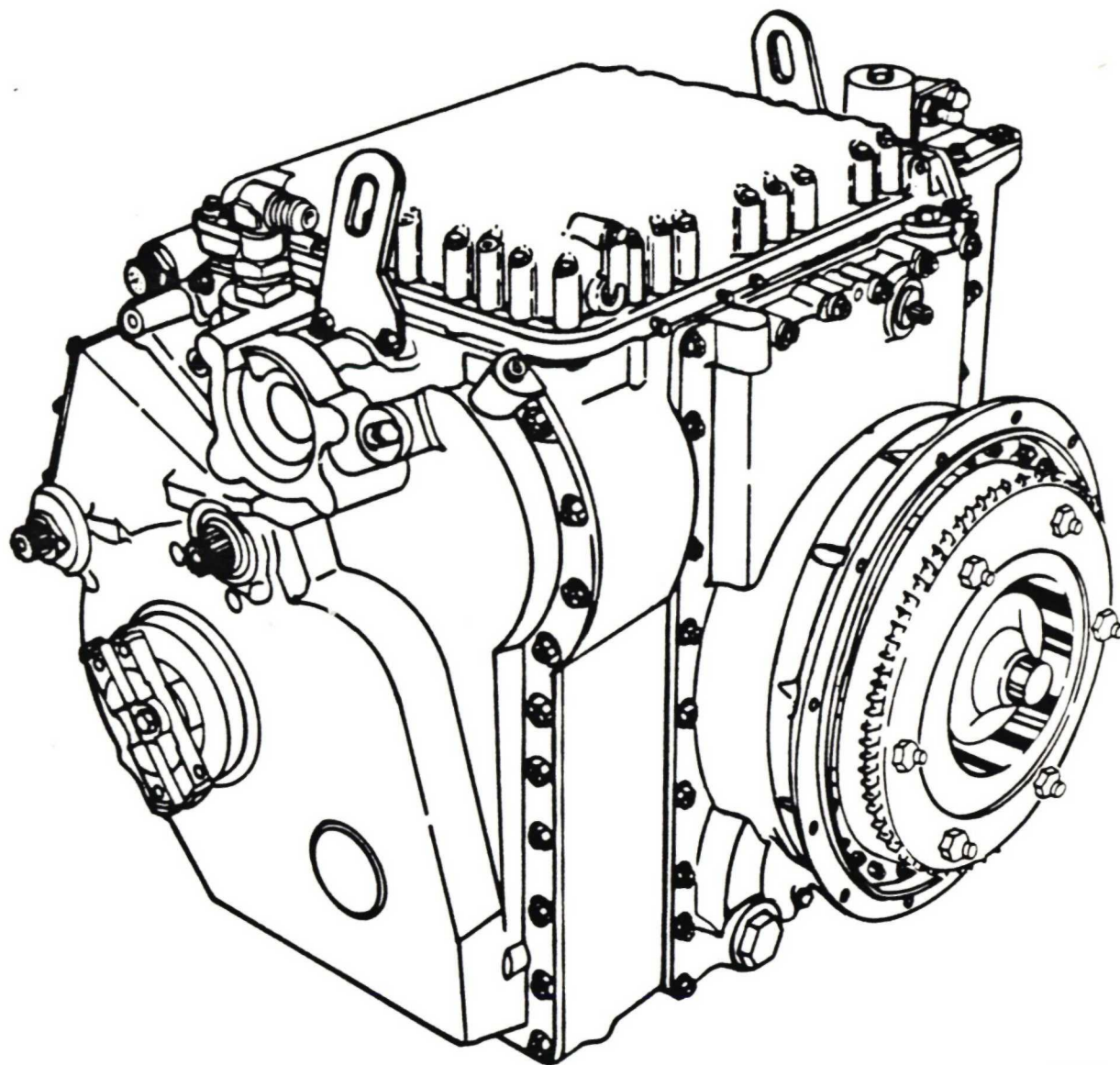
## HOW TO USE THIS MANUAL (Continued)

### ALPHABETICAL INDEX

The alphabetical index provides an alphabetical listing of parts, assemblies and subjects located throughout the manual. If you do not find what you are looking for, think of some other way your subject may be listed and try that in the index.

### INSIDE THE BACK COVER

A table of THE METRIC SYSTEM AND EQUIVALENTS is located inside the back cover of the manual. You will find metric information for linear measure, weights, liquid measure, square measure, cubic measure, temperature and approximate conversion factors for changing to and from metrics.



TA485300

Fig. 1-1. Hydromechanical Cross Drive Transmission, Model X200-4  
Right Front External View



## SECTION IV

TM9-2520-272-34&amp;P

## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER INDEX		NATIONAL STOCK NUMBER INDEX	
STOCK NUMBER	FIG. ITEM	STOCK NUMBER	FIG. ITEM
5330-00-001-4903	16 11	5330-00-167-5110	4 12
	18 29	5310-00-168-6412	21 8
5330-00-001-4904	16 12	5360-00-169-8367	29 7
	18 30	5306-00-169-8389	30 13
5305-00-001-5017	27 49	2520-00-172-1951	17 39
5330-00-003-0887	27 22	5360-00-177-9190	25 27
3120-00-005-5880	18 4	5306-00-206-1533	31 19
5365-00-007-2969	17 25		32 35
	18 1	2835-00-211-9468	17 51
	18 14		18 20
5315-00-014-1105	25 13	4730-00-221-2140	34 19
5315-00-014-1195	12 3	5365-00-252-4746	25 24
	24 9	5305-00-253-5625	34 7
	25 12	5305-00-269-3240	34 36
5315-00-014-1210	12 13	5310-00-274-8041	3 28
5315-00-014-1240	12 7		6 9
5315-00-014-1262	11 33		11 21
5315-00-014-1275	31 18		12 28
	32 43		12 30
4730-00-018-9566	12 8		13 15
	32 47		19 6
5315-00-044-3767	11 31		24 19
5360-00-044-3945	12 21	3110-00-277-0559	11 30
5305-00-051-4078	7 5		15 36
5305-00-071-1781	34 20		31 16
5305-00-071-2067	34 18		32 46
5365-00-079-2212	15 5	5365-00-282-5312	25 22
5310-00-080-6004	34 37	5365-00-282-7017	7 6
5310-00-088-0553	7 23	5330-00-285-9842	14 11
3110-00-089-1688	31 62	5340-00-290-4518	11 38
3110-00-100-6151	25 28	5320-00-291-0925	34 27
3110-00-100-6170	31 31	5305-00-297-2962	27 15
	32 36	5306-00-400-5542	20 17
3120-00-104-0635	30 5	5310-00-402-5220	24 2
5821-00-104-9823	29 27		25 37
5821-00-111-8054	27 37	9905-00-409-8948	34 6
5305-00-125-9966	31 5	3110-00-427-6591	12 33
	32 57	3020-00-432-1255	18 5
	33 2	5330-00-450-1942	9 4
3110-00-138-6426	12 48	8105-00-477-3716	34 34
5315-00-151-8888	28 10	5315-00-480-4453	11 23
	30 23	3110-00-488-3879	12 36
5340-00-152-0116	28 16	5365-00-498-2864	28 4
	30 15		30 27
5365-00-152-0311	28 25	4320-00-518-1237	30 20
	30 8	5306-00-543-5696	25 42
5330-00-152-3049	29 6	3110-00-554-3248	28 5
5330-00-165-1943	4 1		30 28
5330-00-166-0992	26 10	5365-00-557-5794	17 13
5330-00-166-1030	26 13	5365-00-557-5835	17 30

## SECTION IV

TM9-2520-272-34&amp;P

## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER INDEX		NATIONAL STOCK NUMBER INDEX	
STOCK NUMBER	FIG. ITEM	STOCK NUMBER	FIG. ITEM
2520-00-557-6220	7 25	5330-00-816-3546	15 49
2520-00-557-6619	8 11	5330-00-821-449C	9 3
5310-00-562-3932	28 17	5306-00-822-2118	12 16
	30 14		20 27
4730-00-566-9952	29 9	5365-00-838-8045	18 6
5306-00-577-5533	22 2	3110-00-839-9145	7 15
	25 4	3120-00-841-0271	7 9
5310-00-584-5272	34 11	5306-00-843-6398	12 43
	34 14		31 1
5306-00-589-8167	20 9		32 56
3110-00-592-9967	14 22	5306-00-845-1526	31 3
	32 1	5306-00-896-7228	32 51
5365-00-610-6325	29 22	3110-00-902-1657	12 4
5305-00-613-8875	29 29		25 7
6685-00-618-1822	34 5	5305-00-903-7794	34 24
5330-00-631-8125	7 19	5120-00-906-1051	35 4
5306-00-638-2362	24 17	5360-00-909-0313	28 23
	27 9		30 10
2520-00-679-6972	7 20	3110-00-913-8113	15 17
2520-00-679-6974	9 5	5315-00-935-9034	27 34
3120-00-679-706E	9 7	5310-00-935-9041	28 24
5340-00-679-9787	3 14		30 9
3110-00-684-5541	17 27	3110-00-939-6843	7 14
5315-00-687-521E	24 3	5306-00-940-9011	28 2
	25 35	5306-00-940-9028	2 2
3110-00-69C-8987	30 21		11 10
5305-00-719-524C	34 10		15 22
5305-00-725-0154	34 32		31 55
2520-00-733-4742	7 8		32 10
2520-00-736-026E	7 10	5306-00-940-9062	21 37
2520-00-736-0271	7 12		22 25
5310-00-760-0222	29 32	5306-00-944-6812	20 23
2520-00-767-5417	9 2		27 48
3110-00-770-6097	24 7	5310-00-959-1488	34 35
	24 13	5305-00-990-0695	34 15
5365-00-770-7326	15 27	4820-01-006-9636	21 16
	31 7		22 52
3110-00-770-7842	7 11	5365-01-014-4453	14 4
5310-00-770-8035	33 18	5365-01-017-2652	10 8
5310-00-776-767C	11 6	5306-01-017-9962	28 18
	31 56	5365-01-028-8203	9 1
	32 9	5210-01-029-8448	38 6
3110-00-788-1406	17 26	2520-01-030-6696	7 21
3110-00-789-1842	12 23	4320-01-032-8166	28 15
5310-00-799-491C	14 19		30 17
	15 24	4320-01-033-1825	28 12
5305-00-801-4506	20 36		30 19
4730-00-804-5052	15 51	4730-01-040-1798	15 39
5310-00-805-5958	34 31	5306-01-045-6594	22 3
5305-00-813-4495	29 31	5180-01-048-2153	35 3



## SECTION IV

TM9-2520-272-34&amp;P

## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX		STOCK NUMBER	
		FIG.	ITEM	FIG.	ITEM
5120-01-048-2158	38	4	5310-01-092-5496	14	9
4730-01-048-9371	12	5		20	21
5120-01-054-4050	37	4		21	36
5120-01-054-4056	38	3		22	11
5120-01-054-7221	38	2		31	4
5365-01-057-3309	14	12		32	54
5305-01-057-4264	3	29		33	17
	6	10	5315-01-093-0055	15	40
	24	20	5330-01-094-7880	10	5
	30	34	5315-01-095-3110	8	5
5305-01-058-4612	13	10	5315-01-095-3110	20	6
2520-01-064-8845	17	12	5120-01-096-3493	38	1
5310-01-070-2105	34	9	5305-01-097-7827	30	25
	34	22	5310-01-097-7957	27	23
2520-01-079-3097	17	11	5310-01-097-7994	27	2
5330-01-079-6700	17	10	5310-01-102-3270	20	7
5970-01-080-3153	20	39		20	18
	21	34	5365-01-102-5392	27	32
	22	7	5310-01-112-7932	15	11
5330-01-080-3253	21	7	5315-01-113-0985	15	20
5330-01-080-3254	26	6	8145-01-115-0442	34	21
5940-01-082-6615	20	38	4820-01-115-6463	34	4
	21	33	5306-01-126-4076	24	16
	22	8		25	2
5360-01-083-0004	21	15		32	53
5330-01-083-3065	17	8	2520-01-132-4189	21	32
5360-01-083-5500	22	42		22	6
5306-01-083-6443	11	5	5330-01-135-3789	10	7
	12	29	5306-01-135-5869	30	7
	12	31	4320-01-137-1865	19	5
	13	16	5330-01-145-0697	17	47
	28	21		18	17
5310-01-084-1197	12	15	2520-01-146-1034	17	9
	20	24	5306-01-147-1202	21	3
	21	1		22	4
	22	1		25	38
	23	8	2520-01-160-5655	17	49
	24	15		18	18
	24	18	3120-01-162-7707	18	22
	25	3	5306-01-164-7448	21	2
	25	39		23	9
	31	6		27	47
	32	52	5365-01-171-3392	16	7
	33	1		18	34
5306-01-085-3876	19	7	5120-01-176-3890	37	3
4910-01-086-1681	36	1	5120-01-176-3891	38	5
4910-01-087-0155	36	2	4910-01-178-6551	37	2
5310-01-092-5495	12	42	4030-01-178-7310	37	5
	31	2	5330-01-185-0146	17	48
	32	50		18	16



## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER INDEX		NATIONAL STOCK NUMBER INDEX	
STOCK NUMBER	FIG. ITEM	STOCK NUMBER	FIG. ITEM
5305-01-186-7690	3 8	2520-01-213-8098	22 27
5306-01-186-8893	14 29	2520-01-213-8597	22 58
5365-01-196-5636	31 48	2520-01-213-8598	21 20
	32 30	2520-01-213-8599	21 19
2520-01-198-0491	12 1	2520-01-213-8723	33 21
2520-01-198-0492	12 2	2520-01-214-1475	18 23
2520-01-198-0495	24 1	4730-01-214-1502	14 6
2520-01-198-0496	24 12	4730-01-214-1507	15 37
2520-01-198-0497	24 5	2520-01-214-1558	12 19
2520-01-198-0498	13 9	2520-01-214-1559	12 17
2520-01-198-0499	17 14	4730-01-214-1560	11 24
2520-01-198-0501	18 25	2520-01-214-1561	21 14
2520-01-198-0502	31 40	2520-01-214-1561	22 50
	32 17	2520-01-214-1562	22 33
2520-01-198-0503	22 5	2520-01-214-1604	31 24
2520-01-198-0504	21 4	2520-01-214-1605	15 7
2520-01-198-0505	33 9	2520-01-214-1606	31 10
2520-01-198-0506	16 13	2520-01-214-1607	15 28
3020-01-198-0685	17 36	2520-01-214-1614	25 31
3020-01-198-0690	31 35	2520-01-214-1615	22 32
	32 26	4730-01-214-2366	32 48
2520-01-198-0713	11 22	4730-01-214-2369	14 17
2520-01-201-4784	1 1	4730-01-214-3112	13 4
2520-01-203-9885	12 12	4730-01-214-3115	13 5
3120-01-203-9887	17 4	3040-01-214-3145	17 2
4820-01-204-9941	22 61	2520-01-214-3150	22 14
2520-01-204-9942	22 19	2520-01-214-3151	21 18
4820-01-205-0034	22 53	2520-01-214-3152	21 25
4820-01-205-0035	23 3	2520-01-214-3153	21 9
5315-01-205-5572	25 15	2520-01-214-3154	20 4
5340-01-207-3481	21 28	2520-01-214-3155	20 19
5930-01-207-6350	26 9	2520-01-214-3156	33 20
5315-01-211-6485	18 39	2520-01-214-3157	3 25
4820-01-213-0035	31 15	3040-01-214-3175	13 14
2530-01-213-1625	33 3	3040-01-214-3176	24 10
2530-01-213-1626	32 42	3040-01-214-3184	8 8
2520-01-213-7763	19 1	2520-01-214-3190	23 2
4330-01-213-7794	19 8	2520-01-214-3191	21 10
9905-01-213-7888	3 9	2520-01-214-3192	21 26
4820-01-213-7955	20 34	2520-01-214-3193	20 20
2520-01-213-8017	20 32	2520-01-214-3238	17 21
2520-01-213-8023	25 16		18 2
4320-01-213-8028	7 2	2520-01-214-3239	17 22
4730-01-213-8030	10 3		18 3
	15 34	2520-01-214-3240	17 24
4730-01-213-8031	10 6	2520-01-214-3241	11 8
	14 5	3040-01-214-3841	31 61
2520-01-213-8045	22 40	3020-01-214-3845	12 32
2520-01-213-8050	22 36	2520-01-214-3846	OKIT 2
2520-01-213-8051	22 26	2520-01-214-3847	OKIT 3

## SECTION IV

TM9-2520-272-34&amp;P

## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER INDEX		NATIONAL STOCK NUMBER INDEX	
STOCK NUMBER	FIG. ITEM	STOCK NUMBER	FIG. ITEM
2520-01-214-3854	7 17	3020-01-214-7354	11 18
2520-01-214-3855	13 13	3040-01-214-8965	17 32
2520-01-214-3857	31 45	2520-01-214-9042	33 16
2520-01-214-3858	21 5	3040-01-214-9300	15 1
3020-01-214-3859	17 23	3020-01-214-9301	14 24
2520-01-214-3860	17 31	2520-01-214-9303	OKIT 6
2520-01-214-3861	17 46	2520-01-214-9333	7 7
	18 15	2520-01-214-9334	20 26
2520-01-214-3863	31 39	4820-01-214-9335	21 13
	32 24		22 49
3040-01-214-3864	31 26	2520-01-214-9336	22 12
	32 41	3010-01-214-9337	14 20
2520-01-214-3865	31 32	3010-01-214-9337	15 25
	32 33	2520-01-214-9338	26 4
2520-01-214-3866	15 10	2520-01-214-9339	33 23
	31 22	2520-01-214-9340	3 24
2520-01-214-3867	15 9	2520-01-214-9341	3 27
	31 21	2520-01-214-9342	25 21
2520-01-214-3868	22 41	2520-01-214-9383	3 10
2520-01-214-3869	20 10	2520-01-214-9385	31 50
3040-01-214-3915	25 34		32 14
3040-01-214-3916	25 33	2520-01-214-9388	22 37
2520-01-214-3917	6 7	2520-01-214-9389	22 31
2520-01-214-3927	22 15	4730-01-214-9392	3 19
2520-01-214-3928	21 22	3020-01-214-9394	17 33
3020-01-214-3935	25 10	3020-01-214-9396	24 11
2520-01-214-3944	18 40	3020-01-214-9397	17 29
2520-01-214-4014	22 39	3020-01-214-9398	15 18
4810-01-214-4015	20 1	3020-01-214-9399	15 16
2520-01-214-4317	19 2	3020-01-214-9400	32 5
2520-01-214-4318	25 32	2520-01-214-9408	31 49
2520-01-214-4408	22 48		32 29
2520-01-214-4409	22 43	2520-01-214-9409	16 4
2520-01-214-4410	22 34		18 35
2520-01-214-5763	15 33	2520-01-214-9410	18 37
2520-01-214-5782	20 37	2520-01-214-9417	16 5
2520-01-214-5785	24 6	2520-01-214-9429	25 17
3020-01-214-5786	17 1	3040-01-215-0645	15 21
3020-01-214-5787	13 18	3020-01-215-3344	11 16
2520-01-214-5792	31 58	3020-01-215-3345	31 54
	32 8	2520-01-215-4323	22 44
2520-01-214-5793	7 16	5365-01-215-7400	25 18
4710-01-214-6835	3 18	5315-01-215-7506	31 59
2520-01-214-7116	OKIT 1		32 7
2520-01-214-7117	OKIT 4	5315-01-215-7507	31 12
	OKIT 5	5315-01-215-7509	17 5
2520-01-214-7166	25 25	5315-01-215-7510	15 8
4730-01-214-7325	25 23		31 23
3020-01-214-7352	24 4		33 6
3020-01-214-7353	11 20	5315-01-215-7511	15 3



## SECTION IV

TM9-2520-272-346P

## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER INDEX					
STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5315-01-215-7512	13	12	3120-01-216-1423	18	28
5315-01-215-7513	8	6		31	36
5315-01-215-7514	11	32		32	28
	15	41	3120-01-216-1435	31	53
	31	17		32	6
5315-01-215-7515	19	3	3120-01-216-1440	31	38
5360-01-215-7689	22	35		32	25
5360-01-215-7689	23	5	5340-01-216-1465	11	3
5360-01-215-7690	23	1	5315-01-216-1504	21	6
3020-01-215-8825	25	36	5315-01-216-1505	33	11
3020-01-215-8826	31	63	5365-01-216-1705	31	13
5306-01-215-9129	20	22	5340-01-216-1737	11	35
5360-01-215-9193	12	11	5340-01-216-1737	14	16
5330-01-215-9503	31	29		15	43
	32	38	5330-01-216-2809	6	4
5365-01-215-9687	31	30	5330-01-216-2815	14	3
	32	37	5330-01-216-2816	26	5
3120-01-215-9776	7	13	5365-01-216-2824	12	24
5365-01-215-9831	33	15	5365-01-216-2825	12	25
5340-01-215-9845	15	31	5365-01-216-2826	12	26
5360-01-215-9935	31	9	3120-01-216-2869	11	29
5306-01-216-0230	20	8	5360-01-216-3265	3	26
	22	13		12	18
5360-01-216-0828	22	30	5360-01-216-3266	12	10
5360-01-216-0829	20	3	5360-01-216-3267	17	50
5360-01-216-0830	33	14		18	19
5360-01-216-0831	25	20	5360-01-216-3269	31	57
4710-01-216-1159	14	28		32	11
5306-01-216-1322	21	35	5360-01-216-3270	33	22
	22	23	5360-01-216-3271	15	6
5306-01-216-1333	2	9	5340-01-216-3299	31	20
	5	7		32	34
	6	8	5330-01-216-3701	5	1
	26	2	3110-01-216-3718	20	28
5306-01-216-1334	22	10	3120-01-216-3726	25	19
5310-01-216-1354	12	49	5340-01-216-3810	20	2
5310-01-216-1365	2	3	3020-01-216-3952	4	8
	2	5	5306-01-216-3992	15	29
	5	3	5306-01-216-3993	2	1
	5	6	5330-01-216-4005	8	3
	6	5	5330-01-216-4006	14	8
	26	3		15	46
5310-01-216-1366	31	8	5330-01-216-4009	33	8
5310-01-216-1367	11	2	5330-01-216-4012	11	4
	15	30	5330-01-216-4013	22	45
5310-01-216-1368	21	12	5330-01-216-4014	22	22
5310-01-216-1369	15	4	5330-01-216-4015	2	7
5310-01-216-1370	15	14	3110-01-216-4031	3	16
3120-01-216-1423	16	14		11	12
	17	37	3110-01-216-4032	31	60



## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
3110-01-216-4032	32	4	2520-01-216-8475	8	2
3110-01-216-4033	11	19	2520-01-216-8564	20	29
	15	15	2520-01-216-8565	14	7
3110-01-216-4086	12	34	2520-01-216-8566	4	6
5360-01-216-4462	21	17	3020-01-216-8591	4	4
5360-01-216-4463	21	24	3020-01-216-8592	3	17
5330-01-216-5698	8	10	3020-01-216-8593	3	5
5330-01-216-5702	12	40	5306-01-216-9845	21	31
5330-01-216-5703	13	6		22	24
5330-01-216-5704	11	9	5365-01-217-0856	11	25
5330-01-216-5705	11	7	5365-01-217-0857	15	12
5330-01-216-5711	3	23	5365-01-217-0858	3	3
5330-01-216-5711	33	19	5315-01-217-0937	12	22
3110-01-216-5736	4	9		23	7
3110-01-216-5737	3	4	5340-01-217-0960	33	7
5365-01-216-5750	10	1	5360-01-217-1017	8	7
	15	38	5365-01-217-1021	7	18
5360-01-216-5972	22	47		12	35
4810-01-216-6485	33	12	5365-01-217-1022	16	1
4710-01-216-6623	3	31		18	38
4710-01-216-6624	3	21	5365-01-217-1023	11	14
4710-01-216-6625	3	7	3040-01-217-1122	32	3
4710-01-216-6626	3	13	5365-01-217-2069	14	23
5330-01-216-6654	15	32		32	2
5330-01-216-6657	7	1	5340-01-217-2162	20	14
5330-01-216-6765	13	8	5306-01-217-2173	5	4
5340-01-216-6785	13	2	5330-01-217-2201	6	2
5340-01-216-6786	13	7	5330-01-217-2202	22	16
5360-01-216-6995	33	4	5365-01-217-2208	12	37
5360-01-216-7059	22	51	5365-01-217-2209	12	38
5306-01-216-7364	20	25	5365-01-217-2210	12	39
	22	9	3110-01-217-2235	3	1
5306-01-216-7365	22	17		4	5
5306-01-216-7375	11	1	3120-01-217-2250	15	19
5305-01-216-7378	14	18	3110-01-217-2262	7	3
	15	23	5315-01-217-2270	12	20
5330-01-216-7424	31	52	3130-01-217-2284	14	21
	32	12		15	26
5360-01-216-7437	22	38	5365-01-217-2303	31	47
3020-01-216-7603	4	11		32	16
3020-01-216-7604	4	10	5340-01-217-2305	7	4
3020-01-216-7605	3	2	5340-01-217-2317	11	39
2520-01-216-7640	14	1		14	14
2520-01-216-7646	16	2	5306-01-217-2908	8	14
5360-01-216-8210	22	59	5306-01-217-2909	8	15
5310-01-216-8261	17	52	5306-01-217-2915	8	12
	18	21	5365-01-217-2966	12	45
3120-01-216-8283	4	2	5365-01-217-2967	12	46
	16	6	5365-01-217-2968	12	47
	17	34	5315-01-217-3032	31	25

## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER INDEX			NATIONAL STOCK NUMBER INDEX		
STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5315-01-217-3032	32	13	5340-01-220-9246	22	21
5365-01-217-3072	18	1		22	62
5365-01-217-3075	13	21	3110-01-221-3077	15	13
5365-01-217-3076	17	35	4730-01-221-713E	11	13
5365-01-217-3077	11	15		11	27
5306-01-217-3992	8	13		14	2
5305-01-217-4004	4	7		20	31
5330-01-217-4041	8	1		26	8
5330-01-217-4042	20	35	2520-01-221-9177	14	27
5330-01-217-4043	22	60		32	49
5330-01-217-4047	12	44	3040-01-222-0265	12	50
5330-01-217-4048	31	27	3110-01-222-3354	12	41
5330-01-217-4048	32	40	4730-01-223-2518	26	7
5365-01-217-4051	13	11	5365-01-223-3673	10	4
5365-01-217-4052	13	20	2940-01-224-4361	26	11
5365-01-217-4075	12	9	3040-01-225-9023	3	15
	23	6	3110-01-226-9562	25	9
5340-01-217-4175	21	23	4820-01-227-1151	26	14
5365-01-217-4262	17	28	5360-01-231-0481	25	30
5365-01-217-4263	18	1	5365-01-231-9152	15	45
5365-01-217-4264	18	41	5305-01-232-7458	26	15
5365-01-217-4661	22	29	2520-01-232-7727	34	26
5365-01-217-5032	17	7	2915-01-233-1613	25	1
5340-01-217-5074	11	36	2520-01-234-1898	27	10
5306-01-217-6970	14	10	2520-01-235-9590	9	6
5330-01-217-7013	6	3	2520-01-235-9591	34	1
5330-01-217-7014	21	27	2520-01-235-9594	25	11
2530-01-217-8136	31	11	5330-01-235-9595	25	5
5306-01-218-0700	6	6	2520-01-235-9596	30	1
5360-01-218-0793	21	21	2520-01-235-9597	28	26
	22	28	2520-01-235-9598	27	8
5365-01-218-0796	18	1	2520-01-235-9599	27	20
5330-01-218-1565	31	28	2520-01-235-9600	18	7
	32	39	4320-01-235-9644	28	6
3110-01-218-1566	12	27	5340-01-237-2414	25	26
5330-01-218-3387	14	26	3110-01-237-2758	20	33
3110-01-218-3395	11	11	2520-01-237-2872	16	3
5330-01-218-7143	20	41		18	36
5330-01-219-2452	14	25	5330-01-237-2967	31	34
5330-01-219-2545	3	30		32	32
5330-01-219-2546	3	20	5330-01-238-4613	13	17
5330-01-219-2547	3	6	5330-01-238-5879	31	33
5330-01-219-2548	3	12		32	31
2520-01-220-0115	3	22	4730-01-238-6996	4	13
5315-01-220-5201	33	13	4320-01-238-7053	29	30
2520-01-220-6737	8	4	4710-01-238-7100	13	3
4730-01-220-9163	4	14	4820-01-238-7961	29	5
5340-01-220-9246	20	12	2520-01-238-8759	22	46
	20	15	2520-01-238-8767	27	39
	21	29	3040-01-238-8773	28	1



## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX		STOCK NUMBER	
FIG.	ITEM	FIG.	ITEM	FIG.	ITEM
2520-01-238-8783	27	35	5340-01-242-6798	37	6
2520-01-238-8784	29	14	5340-01-242-6799	5	5
2520-01-238-8826	27	4	5340-01-242-6800	2	4
2520-01-238-8827	27	33	5340-01-242-7146	27	28
2520-01-238-8831	27	42	2520-01-243-0614	34	30
2520-01-238-9843	28	13	2110-01-243-3798	17	6
	30	18	3130-01-243-3876	34	12
4810-01-238-9855	29	13	5365-01-243-5289	27	19
4710-01-239-2199	25	41	5340-01-244-1473	27	24
7690-01-239-2312	34	8	5315-01-245-3673	27	25
2520-01-239-6835	29	15	5365-01-245-4124	30	26
4320-01-239-6930	30	29	5330-01-245-7162	15	47
3040-01-240-3080	27	18	2940-01-245-7557	26	12
5310-01-241-2675	27	41	5305-01-245-8750	29	17
5310-01-241-2676	27	45	5940-01-246-2086	20	40
5310-01-241-2677	28	31	2520-01-246-2952	31	51
5310-01-241-2687	27	44		32	15
5310-01-241-2688	28	20	5310-01-246-5785	27	40
3120-01-241-2850	30	31	2520-01-246-6418	27	29
3120-01-241-2851	27	5	2520-01-247-2974	34	17
3110-01-241-2943	28	3	5365-01-247-6952	28	11
5360-01-241-3246	27	27		29	33
5360-01-241-3247	29	28	5315-01-247-6955	29	11
5360-01-241-3264	27	6	2520-01-247-7927	34	29
5365-01-241-3265	25	8	5310-01-247-8212	27	7
5340-01-241-4282	27	31	5360-01-248-1587	16	9
3040-01-241-4695	30	24		18	32
5306-01-241-5066	13	1			
5306-01-241-5072	25	40			
5307-01-241-5171	30	3			
5307-01-241-5172	27	36			
5307-01-241-5173	27	26			
2520-01-241-5567	30	6			
2520-01-241-5636	28	22			
	30	11			
5310-01-241-6355	34	28			
2520-01-241-6851	28	19			
	30	12			
2520-01-241-7029	29	10			
5310-01-242-0672	30	33			
5365-01-242-0827	30	16			
5365-01-242-0828	28	14			
2520-01-242-1049	29	4			
5305-01-242-2638	29	2			
5340-01-242-2796	27	43			
3130-01-242-4213	34	25			
2520-01-242-6794	34	13			
6695-01-242-6795	35	1			
5120-01-242-6796	35	2			
2520-01-242-6797	37	1			



## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
88044	AN427-5-1C	5320-00-291-0925	34	27
43334	BU1008L-21	3110-01-216-4031	3	16
			11	12
43334	BU1012L-18	3110-01-217-2235	3	1
			4	5
43334	BU610C7L-16	3110-01-216-4033	11	19
			15	15
43334	BU61015L-16	3110-01-216-5737	3	4
43334	BU61918L-15	3110-01-216-4032	31	60
			32	4
60380	B1210XOH	3110-00-902-1657	12	4
			25	7
60380	B1880H	3110-00-277-0559	11	30
			15	36
			31	16
			32	46
55719	FB300A		38	6
60038	JM207C45JM207010	3110-00-138-6426	12	48
60038	JM511546JM511910	3110-00-488-3879	12	36
60038	JM612949JM612910	3110-00-427-6591	12	33
25341	J21362	4910-01-178-6551	37	2
25341	J23616	5120-01-176-3890	37	3
25341	J2363C-C2	5120-01-176-3891	38	5
33287	J24171	5180-01-048-2153	35	3
33287	J24204-2	5120-01-048-2158	38	4
33287	J24452	5120-01-054-7221	38	2
33287	J24453	5120-01-054-4050	37	4
33287	J24473	5120-01-054-4056	38	3
33287	J35223		35	5
60038	LM603C49LM603011	3110-00-789-1842	12	23
96906	MS14314-52	4730-01-048-9371	12	5
96906	MS16625-150	5365-00-252-4746	25	24
96906	MS16625-162	5365-00-282-5312	25	22
96906	MS19055-2414	3110-00-100-6151	25	28
96906	MS20913-65	4730-00-221-2140	34	19
96906	MS21318-46	5305-00-253-5625	34	7
96906	MS27183-14	5310-00-080-6004	34	37
96906	MS27183-18	5310-00-809-5998	34	31
96906	MS28778-1C	5330-00-285-9842	14	11
96906	MS28778-2C	5330-00-816-3546	15	49
96906	MS35338-48	5310-00-584-5272	34	11
			34	14
96906	MS35756-3	5315-00-687-5218	24	3
			25	35
96906	MS35764-236	5306-01-083-6443	11	5
			12	29
			12	31
			13	16
			28	21
96906	MS51055-41C	5305-00-903-7794	34	24
96906	MS5184C-27	5365-01-057-3309	14	12

## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
96906	MS51922-21	5310-00-959-1488	34	35
96906	MS51967-14	5310-01-070-2105	34	9
			34	22
96906	MS90725-128	5305-00-071-1781	34	20
96906	MS90726-117	5305-00-719-5240	34	10
96906	MS90727-108	5305-00-990-0695	34	15
96906	MS90727-112	5305-00-725-0154	34	32
96906	MS90727-36	5305-00-051-4078	7	5
96906	MS90727-64	5305-00-269-3240	34	36
96906	MS90728-111	5305-00-071-2067	34	18
81349	M83248/1-C16	5330-00-166-0992	26	10
81349	M83248/1-C28	5330-00-166-1030	26	13
80205	NAS1031AXE	5310-01-241-6355	34	28
60380	NTA-365C	3110-00-939-6843	7	14
60380	NTA122C	3110-00-788-1406	17	26
92555	PLEA25C122C	5340-01-220-9246	20	12
			20	15
			21	29
			22	21
			22	62
60380	Q8036		18	12
			31	43
			32	22
60380	Q8308		17	44
43334	R61010WB-17	3110-01-216-5736	4	9
00334	SK2155	6685-00-618-1822	34	5
60380	TRC122C	3110-00-684-5541	17	27
60380	TRD-364E	3110-00-839-9149	7	15
19207	108904E1	8105-00-477-3716	34	34
19207	1164953C	5310-00-402-5220	24	2
			25	37
19207	116501C2	4030-01-178-7310	37	5
19207	116501E5	2520-01-235-9591	34	1
19207	11650176	5120-01-242-6796	35	2
19207	11650178	2520-01-242-6797	37	1
19207	116501E0	5340-01-242-6798	37	6
19207	116501E2	6695-01-242-6795	35	1
19207	116501E3	2520-01-247-2974	34	17
19207	116501E4		34	23
19207	116501E5	2520-01-232-7727	34	26
19207	116501E6	2520-01-242-6794	34	13
19207	116501E7-1	2520-01-243-0614	34	30
19207	116501E7-2	2520-01-247-7927	34	29
19207	116501E8	3130-01-243-3876	34	12
19207	116501E9	3130-01-242-4213	34	25
19207	116501SC		34	33
19207	116501S3	7690-01-239-2312	34	8
19207	11650251		34	16
19207	11650252		34	2
19207	11650255		7	24
77060	120203E1	5970-01-080-3153	21	34

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
77060	120203E1	5970-01-080-3153	22	7
90407	12084P11	5310-00-274-8041	3	28
			6	9
			11	21
			12	28
			12	30
			13	15
			19	6
			24	19
43334	1209WB-HC	3110-00-913-8113	15	17
19207	12268C21	5120-01-096-3493	38	1
19207	12268C36	4910-01-087-0155	36	2
19207	12268C37	4910-01-086-1681	36	1
19207	123021C7-4	8145-01-115-0442	34	21
19207	12302146	4820-01-115-6463	34	4
19207	123443E3		34	3
24617	141105	5315-00-014-1105	25	13
24617	141190	5315-01-211-6485	18	39
24617	141195	5315-00-014-1195	12	3
			24	9
			25	12
24617	141210	5315-00-014-1210	12	13
72750	141217	5315-01-093-0059	15	40
24617	141223	5315-01-215-7515	19	3
24617	141240	5315-00-014-1240	12	7
72582	141242	5315-00-480-4453	11	23
24617	141255	5315-01-215-7512	13	12
24617	141262	5315-00-014-1262	11	33
24617	141275	5315-00-014-1275	31	18
			32	43
73342	145372	5305-01-186-7690	3	8
24617	145635		22	56
98087	1500P1125	5930-01-207-6350	26	9
24617	159184	5305-00-801-4506	20	36
90005	17425E4	4820-01-227-1151	26	14
90005	1742555	5305-01-232-7458	26	15
90005	1742943	2940-01-245-7557	26	12
24617	150139	5310-00-088-0553	7	23
73342	222268E		22	55
73342	23011456	5330-01-145-0697	17	47
			18	17
73342	23011475	5330-01-185-0146	17	48
			18	16
73342	23011665	2520-01-146-1034	17	9
73342	23013453	3120-01-162-7707	18	22
73342	23015337	5306-01-186-8893	14	29
73342	230155E5	5365-01-217-1022	16	1
			18	38
73342	23016564	5330-00-631-8125	7	19
73342	23017ECC		1	2
73342	23017E53	5365-01-217-0856	11	25



## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23017E54	4730-01-214-1560	11	24
73342	23017E55	4710-01-214-6839	3	18
73342	23017E56	2520-01-220-0119	3	22
73342	23017E57	2520-01-214-9340	3	24
73342	23017E59	2520-01-214-4317	19	2
73342	23017E61	2520-01-213-7763	19	1
73342	23017E68		26	1
73342	23017E75	2940-01-224-4361	26	11
73342	23017E77	3020-01-215-8825	25	36
73342	23017E78	3110-01-218-3395	11	11
73342	23017E8C	5330-01-216-4012	11	4
73342	23017E81	5340-01-215-9845	15	31
73342	23017E82	5330-01-216-6654	15	32
73342	23017E84	2520-01-214-3150	22	14
73342	23017E86	2520-01-214-9336	22	12
73342	23017E87	2520-01-238-8759	22	46
73342	23017E8E	5330-01-217-2202	22	16
73342	23017E8S	5330-01-216-4013	22	45
73342	23017E9C	2520-01-214-3868	22	41
73342	23017E91	2520-01-214-1562	22	33
73342	23017E92	2520-01-213-8050	22	36
73342	23017E94	5340-01-216-3810	20	2
73342	23017E9S	2520-01-214-5783	20	37
73342	230179C1	2520-01-213-8017	20	32
73342	230179C2	4820-01-213-7959	20	34
73342	230179C4	2520-01-198-0503	22	5
73342	230179C5	2520-01-214-4014	22	39
73342	230179C6	4820-01-205-0034	22	53
73342	230179C7		22	57
73342	230179C8	2520-01-213-8597	22	58
73342	230179C9	5360-01-216-8210	22	59
73342	2301791C	2520-01-214-1615	22	32
73342	23017911	4820-01-214-9335	21	13
			22	49
73342	23017912	2520-01-214-1561	21	14
			22	50
73342	23017913	2520-01-214-4408	22	48
73342	23017914	2520-01-214-4409	22	43
73342	23017915	2520-01-215-4323	22	44
73342	23017916	5330-01-217-4043	22	60
73342	23017917	4820-01-204-9941	22	61
73342	23017918		22	63
73342	23017919	5360-01-215-7688	22	35
73342	2301792C	2520-01-214-4410	22	34
73342	23017921	2520-01-213-8049	22	40
73342	23017922	2520-01-214-9388	22	37
73342	23017923	5360-01-216-7437	22	38
73342	23017924	2520-01-214-9389	22	31
73342	23017926	2520-01-213-8098	22	27
73342	23017927	2520-01-213-8051	22	26
73342	23017928	5330-01-216-4014	22	22

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23017525	2520-01-204-9942	22	19
73342	23017530		22	20
73342	23017531	2520-01-198-0504	21	4
73342	23017532	2520-01-214-3858	21	5
73342	23017533	2520-01-213-8598	21	20
73342	23017534	2520-01-213-8599	21	19
73342	23017535	2520-01-214-3151	21	18
73342	23017536	5360-01-216-4462	21	17
73342	23017537	5310-01-216-1368	21	12
73342	23017538	2520-01-214-3191	21	10
73342	23017539	5340-01-217-4179	21	23
73342	23017540	2520-01-214-3192	21	26
73342	23017541	2520-01-214-3152	21	25
73342	23017542	5360-01-216-4463	21	24
73342	23017543	2520-01-214-3153	21	9
73342	23017544	2520-01-214-3928	21	22
73342	23017545	5330-01-217-7014	21	27
73342	23017546	5340-01-207-3481	21	28
73342	23017547		21	30
73342	23017549	2520-01-220-6737	8	4
73342	23017551	5315-01-215-7513	8	6
73342	23017552	3040-01-214-3184	8	8
73342	23017553	5360-01-217-1017	8	7
73342	23017554	3020-01-214-9301	14	24
73342	23017555	3040-01-217-1122	32	3
73342	23017574	4730-01-214-7329	25	23
73342	23017575	2520-01-214-7166	25	25
73342	23017576		25	29
73342	23017577	2520-01-214-4318	25	32
73342	23017578	2520-01-214-1614	25	31
73342	23017580	3020-01-214-5787	13	18
73342	23017581	4320-01-213-8028	7	2
73342	23017582	2520-01-214-3156	33	20
73342	23017583	2520-01-213-8723	33	21
73342	23017586	2530-01-213-1625	33	3
73342	23017587		33	5
73342	23017589	2520-01-198-0505	33	9
73342	23017590		33	10
73342	23017591	4810-01-216-6489	33	12
73342	23017592	5315-01-220-5201	33	13
73342	23017593	5360-01-216-C830	33	14
73342	23017594	5365-01-215-9831	33	15
73342	23017595	2520-01-214-9042	33	16
73342	23017596	5360-01-216-6995	33	4
73342	23017598	3010-01-214-9337	14	20
			15	25
73342	23017599	2520-01-214-1607	15	28
73342	23018000	3020-01-214-3845	12	32
73342	23018006	2520-01-198-0501	18	25
73342	23018007		18	26
73342	23018008	3120-01-216-1423	16	14



## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23018CC8	3120-01-216-1423	17	37
			18	28
			31	36
			32	28
73342	23018CC9		17	38
73342	23018C1C	3020-01-198-0689	17	36
73342	23018C11	2520-01-198-0506	16	13
73342	23018C14	3020-01-198-0690	31	35
			32	26
73342	23018C15		31	37
			32	27
73342	23018C2C	2520-01-198-0498	13	9
73342	23018C21	2520-01-214-3855	13	13
73342	23018C22	3040-01-214-3175	13	14
73342	23018C23	2520-01-214-1604	31	24
73342	23018C24	2520-01-214-1605	15	7
73342	23018C25	2520-01-214-3157	3	25
73342	23018C26	2520-01-214-3917	6	7
73342	23018C27		10	2
73342	23018C28	5365-01-216-5750	10	1
			15	38
			32	45
73342	23018C29	2530-01-217-8136	31	11
73342	23018C3C		31	14
73342	23018C31	5315-01-215-7514	11	32
			15	41
			31	17
73342	23018C34	5330-01-216-2809	6	4
73342	23018C36	5365-01-231-9152	15	45
73342	23018C37	2530-01-213-1626	32	42
73342	23018C38		32	44
73342	23018C39	4730-01-214-2366	32	48
73342	23018C42	2520-01-216-8565	14	7
73342	23018C44	2520-01-216-8566	4	6
73342	23018C45	2520-01-198-0491	12	1
73342	23018C46		12	6
73342	23018C47	5365-01-217-4079	12	9
			23	6
73342	23018C48	5315-01-217-0937	12	22
			23	7
73342	23018C49	5360-01-216-3265	3	26
			12	18
73342	23018C5C	2520-01-214-1558	12	19
73342	23018C51	2520-01-214-1559	12	17
73342	23018C52	5315-01-217-2270	12	20
73342	23018C53	2520-01-203-9885	12	12
73342	23018C54		12	14
73342	23018C55	4820-01-205-0035	23	3
73342	23018C56		23	4
73342	23018C57	5360-01-215-7689	23	5
73342	23018C58	2520-01-214-3190	23	2



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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23018C55	5360-01-215-7690	23	1
73342	23018C62	2520-01-198-0495	24	1
73342	23018C63	2520-01-198-0496	24	12
73342	23018C64		24	14
73342	23018C65	3040-01-214-3176	24	10
73342	23018C66	3020-01-214-9396	24	11
73342	23018C67	2520-01-198-0497	24	5
73342	23018C68	2520-01-214-5785	24	6
73342	23018C69		24	8
73342	23018C70	3020-01-214-7352	24	4
73342	23018C71	3020-01-215-8826	31	63
73342	23018C72	5330-01-216-4015	2	7
73342	23018C73	5330-01-217-7013	6	3
73342	23018C74	3020-01-215-3344	11	16
73342	23018C75	2520-01-214-9333	7	7
73342	23018C76	5330-01-216-3701	5	1
73342	23018C78	2520-01-214-3863	31	39
			32	24
73342	23018C79	2520-01-214-5792	31	58
			32	8
73342	23018C80	5330-01-216-7424	31	52
			32	12
73342	23018C81	5360-01-216-3269	31	57
			32	11
73342	23018C82	2520-01-214-9408	31	49
			32	29
73342	23018C83	2520-01-214-3865	31	32
			32	33
73342	23018C84	2520-01-214-9410	18	37
73342	23018C85	5365-01-223-3673	10	4
73342	23018C86	2520-01-214-9341	3	27
73342	23018C87	4710-01-216-1159	14	28
73342	23018C89	3020-01-216-8591	4	4
73342	23018C94	2520-01-214-9417	16	5
73342	23018C95	3040-01-214-8969	17	32
73342	23018C96	3040-01-214-3145	17	2
73342	23018C97		17	3
73342	23018C98	2520-01-214-3944	18	40
73342	23018C99	2520-01-214-3238	17	21
			18	2
73342	23018100	2520-01-214-3861	17	46
			18	15
73342	23018101	2520-01-214-3860	17	31
73342	23018102	3020-01-214-9397	17	29
73342	23018103	5365-01-217-0858	3	3
73342	23018104	3020-01-216-7605	3	2
73342	23018105	3040-01-214-3841	31	61
73342	23018106	3020-01-216-8593	3	5
73342	23018107	3020-01-214-9400	32	5
73342	23018108	3020-01-215-3345	31	54
73342	23018109	5330-01-217-4048	31	27

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23018105	5330-01-217-4048	32	40
73342	23018110	3040-01-214-3864	31	26
			32	41
73342	23018111	3040-01-225-9023	3	15
73342	23018112	3020-01-214-9399	15	16
73342	23018113	3020-01-214-7353	11	20
73342	23018114	5315-01-217-3032	31	25
			32	13
73342	23018115	3020-01-214-7354	11	18
73342	23018116	3020-01-216-8592	3	17
73342	23018117	2520-01-214-5793	7	16
73342	23018119	3110-01-222-3354	12	41
73342	23018120	5310-01-216-1354	12	49
73342	23018121	5330-01-217-4047	12	44
73342	23018122	5365-01-217-2208	12	37
73342	23018123	5365-01-217-2209	12	38
73342	23018124	5365-01-217-2210	12	39
73342	23018125	5365-01-217-2966	12	45
73342	23018126	5365-01-217-2967	12	46
73342	23018127	5365-01-217-2968	12	47
73342	23018128	5365-01-216-2824	12	24
73342	23018129	5365-01-216-2825	12	25
73342	23018130	5365-01-216-2826	12	26
73342	23018131	3110-01-216-4086	12	34
73342	23018132	3110-01-218-1566	12	27
73342	23018135	3020-01-214-3859	17	23
73342	23018136	2520-01-198-0499	17	14
73342	23018137		17	16
73342	23018139	3020-01-214-9394	17	33
73342	23018142	2520-01-214-3866	15	10
			31	22
73342	23018143	2520-01-214-3867	15	9
			31	21
73342	23018144	5340-01-216-3299	31	20
			32	34
73342	23018145	2520-01-214-1606	31	10
73342	23018146	5360-01-215-9935	31	9
73342	23018147		15	2
73342	23018148	5310-01-216-1366	31	8
73342	23018149	3110-01-221-3077	15	13
73342	23018150	5365-01-217-0857	15	12
73342	23018151	5360-01-216-3271	15	6
73342	23018152	3020-01-214-9398	15	18
73342	23018153	3040-01-215-0645	15	21
73342	23018154	3120-01-217-2250	15	19
73342	23018155	2520-01-214-9339	33	23
73342	23018156	5315-01-215-7506	31	59
			32	7
73342	23018157	3020-01-216-3952	4	8
73342	23018158	3020-01-216-7603	4	11
73342	23018159	3020-01-216-7604	4	10



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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23018163	4730-01-214-9392	3	19
73342	23018165	2520-01-214-3854	7	17
73342	23018167	2520-01-214-3240	17	24
73342	23018168	3120-01-203-9887	17	4
73342	23018172	2520-01-214-3241	11	8
73342	23018176	5365-01-217-3076	17	35
73342	23018179	5365-01-017-2652	10	8
73342	23018185	5340-01-216-6786	13	7
73342	23018186	5340-01-216-6785	13	2
73342	23018187	5330-01-217-2201	6	2
73342	23018188	5365-01-217-4051	13	11
73342	23018190	3120-01-215-9776	7	13
73342	23018191	5330-01-216-6657	7	1
73342	23018192		16	16
73342	23018194	5340-01-217-2305	7	4
73342	23018195	3110-01-217-2262	7	3
73342	23018196	5310-01-216-1365	2	3
			2	5
			5	3
			5	6
			6	5
			26	3
73342	23018198	4730-01-214-2369	14	17
73342	23018199	5310-01-216-1367	11	2
			15	30
73342	23018202	5330-01-219-2452	14	25
73342	23018204		11	28
73342	23018205		11	26
			15	35
			15	48
73342	23018206	4730-01-221-7138	11	13
			11	27
			14	2
			20	31
			26	8
73342	23018207	4730-01-213-8031	10	6
			14	5
73342	23018208	4730-01-214-1502	14	6
73342	23018209	4730-01-213-8030	10	3
			15	34
			15	37
73342	23018211	4730-01-214-1507	11	3
73342	23018221	5340-01-216-1465	19	4
73342	23018222		17	22
73342	23018225	2520-01-214-3239	18	3
			16	2
73342	23018231	2520-01-216-7648	15	1
73342	23018232	3040-01-214-9300	14	2
73342	23018233	2520-01-221-9177	32	49
			3	23
73342	23018234	5330-01-216-5711	33	19



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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23018235	5330-01-238-4613	13	17
73342	23018236	3120-01-216-1439	31	53
			32	6
73342	23018237	3120-01-216-1440	31	38
			32	25
73342	23018243	5360-01-215-9193	12	11
73342	23018245	5330-01-216-5702	12	40
73342	23018247	5330-01-216-5703	13	6
73342	23018254	5365-01-217-1021	7	18
			12	35
73342	23018255	5365-01-217-3075	13	21
73342	23018256	5365-01-217-4052	13	20
73342	23018257	3020-01-214-5786	17	1
73342	23018260		26	16
73342	23018262	5310-01-216-1370	15	14
73342	23018270		8	9
73342	23018271	5340-01-217-5074	11	36
73342	23018273	2520-01-214-3927	22	15
73342	23018274	5365-01-217-5032	17	7
73342	23018275	2520-01-198-0502	31	40
			32	17
73342	23018276	2520-01-214-3857	31	45
			32	19
73342	23018279	5306-01-217-6970	14	10
73342	23018280	5315-01-215-7507	31	12
73342	23018281	5365-01-216-1705	31	13
73342	23018282	3120-01-216-8283	4	2
			16	6
			17	34
73342	23018284		15	44
73342	23018285		15	42
73342	23018288		14	15
73342	23018289		14	13
73342	23018291	2520-01-214-5763	15	33
73342	23018292	2520-01-216-7640	14	1
73342	23018297	3110-01-226-9562	25	9
73342	23018299	5360-01-216-3267	17	50
			18	19
73342	23018611		20	13
73342	23018612		20	16
73342	23018613	5340-01-217-2162	20	14
73342	23018614	2520-01-214-3193	20	20
73342	23018615	2520-01-214-3869	20	10
73342	23018616		20	30
73342	23018617	2520-01-216-8564	20	29
73342	23018618		20	11
73342	23018619	2520-01-214-9334	20	26
73342	23018622		20	5
73342	23018623	4810-01-214-4015	20	1
73342	23018624	2520-01-214-3155	20	19
73342	23018717	5330-01-217-4042	20	35

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23018753	5330-01-219-2548	3	12
73342	2301896C		17	18
73342	23040579	5330-01-219-2546	3	20
73342	2304058C	5330-01-219-2547	3	6
73342	23040581	5330-00-167-5110	4	12
73342	23040582	5330-01-219-2545	3	30
73342	23045026	2520-01-198-0713	11	22
73342	23045027		11	34
73342	23045028		11	37
73342	23045114	2520-01-216-8479	8	2
73342	23045115		18	24
73342	23045116		4	3
73342	23045119		6	1
73342	2304512C	2520-01-198-0492	12	2
73342	23045125	5340-01-217-0960	33	7
73342	23045126	5330-01-216-4009	33	8
73342	23045129	5330-01-217-4041	8	1
73342	2304513C		2	8
73342	23045131		2	6
73342	23045132		5	2
73342	23045145	2520-01-214-9338	26	4
73342	23045151	3130-01-217-2284	14	21
			15	26
73342	23045232	5365-01-217-2069	14	23
			32	2
73342	23045233	5360-01-248-1587	16	9
			18	32
73342	23045247	4330-01-213-7794	19	8
73342	23045269	5360-01-216-0829	20	3
73342	230453C3	5365-01-217-4661	22	29
73342	23045348	4820-01-213-0035	31	15
73342	23045374	4730-01-220-9163	4	14
73342	23045386	3110-01-216-3718	20	28
73342	23045388	3110-01-237-2758	20	33
73342	230454C5	4710-01-216-6624	3	21
73342	230454C6	4710-01-216-6625	3	7
73342	230454C7	4710-01-216-6623	3	31
73342	230454C8	4710-01-216-6626	3	13
73342	23045447	5365-01-014-4453	14	4
73342	23045477	5330-01-216-2815	14	3
73342	23045481		18	13
73342	23045482		17	20
73342	23045483		17	45
73342	23045484		31	44
			32	23
73342	23045679	2520-01-213-8023	25	16
73342	2304568C	5365-01-215-7400	25	18
73342	23045681	2520-01-214-9429	25	17
73342	23045682	3120-01-216-3726	25	19
73342	23045683	2520-01-214-9342	25	21
73342	23045684	5360-01-216-0831	25	20

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	23045917	3040-01-222-0265	12	50
73342	23046057	4710-01-238-7100	13	3
73342	23046064	4730-01-238-6996	4	13
73342	23046074	2520-01-235-9600	18	7
73342	23046075		18	8
73342	23046115	3020-01-214-3935	25	10
73342	23046120	3040-01-214-3915	25	34
73342	23046121	3040-01-214-3916	25	33
73342	23046122		25	6
73342	23046123	5330-01-235-9595	25	5
73342	23046124		25	14
73342	23046125	2520-01-235-9594	25	11
73342	23046126	2915-01-233-1613	25	1
73342	23046127	5365-01-241-3265	25	8
73342	23046133	4710-01-239-2199	25	41
73342	23046164		7	22
73342	23046165	2520-01-235-9590	9	6
73342	23046166		9	8
73342	23046415	4730-01-223-2518	26	7
73342	23046537	2520-01-214-9385	31	50
			32	14
73342	23046647	5330-01-238-5879	31	33
			32	31
73342	23046648	5330-01-237-2967	31	34
			32	32
73342	23046681	2520-01-246-2952	31	51
			32	15
73342	23046713	2520-01-237-2872	16	3
			18	36
73342	23046813		10	9
73342	23046916	5340-01-242-6799	5	5
73342	23046917	5340-01-242-6800	2	4
73342	23047080		15	50
73342	23047081	4730-00-804-5092	15	51
73342	23047151		16	8
			18	33
73342	23047355		22	18
73342	23047366		16	10
			18	31
81487	23601-00160	5310-00-168-6412	21	8
24617	2436161	5310-01-102-3270	20	7
			20	18
73342	2677565	2520-01-214-9383	3	10
24617	273541	5315-01-205-5572	25	15
24617	274612	5365-01-196-5636	31	48
			32	30
77060	2973915	5940-01-082-6615	20	38
			21	33
			22	8
77060	2984568	5970-01-080-3153	20	39
77060	2989521	5940-01-246-2086	20	40



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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
30780	3/8 HP-SS	4730-01-040-1798	15	39
43334	3L10NR1214A	3110-01-243-3798	17	6
43334	3L13LR1214A	3110-00-592-9967	14	22
			32	1
43334	3L14LR1214A	3110-00-089-1688	31	62
90555	343001	4320-01-137-1865	19	5
54906	40900	2520-01-132-4189	21	32
			22	6
24617	443318	5310-01-112-7932	15	11
24617	443767	5315-00-044-3767	11	31
30379	444335		3	11
24617	444687	4730-00-018-9566	12	8
			32	47
73242	445567	5306-00-400-5542	20	17
63005	445568	5306-00-589-8167	20	9
43334	45212hVL15C3A		13	19
24617	452692	5340-00-290-4518	11	38
72582	453621	3110-00-100-6170	31	31
			32	36
24617	454465	5305-01-216-7378	14	18
			15	23
24617	455141	5315-01-216-1505	33	11
24617	45516C	5315-01-113-0985	15	20
24617	455531	5305-01-217-4004	4	7
24617	455675	5315-01-215-7510	15	8
			31	23
			33	6
72582	455862	5315-01-095-3110	8	5
			20	6
24617	456641	5315-01-215-7509	17	5
24617	456826	5315-01-216-1504	21	6
24617	457249	3110-00-770-6097	24	7
			24	13
80201	50426C	5330-01-216-4005	8	3
80201	544306	5330-01-216-5698	8	10
19207	5703227	2520-01-201-4784	1	1
19207	570322E	2520-01-214-7116	OKIT	1
19207	570322S	2520-01-214-3846	OKIT	2
73342	570323C	2520-01-214-3847	OKIT	3
19207	5703231	2520-01-214-7117	OKIT	4
			OKIT	5
			OKIT	6
19207	5703232	2520-01-214-9303	OKIT	6
43491	67A641	5305-00-297-2962	27	15
73342	67C0736	5365-00-770-7326	15	27
			31	7
73342	675015S	5365-00-282-7017	7	6
73342	6751633	5365-00-079-2212	15	5
73342	6752556	5310-00-799-4910	14	19
			15	24
73342	67550C7	5365-00-838-8049	18	6
73342	67566C6	5340-00-679-9787	3	14

## SECTION IV

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	675677E	2520-00-679-6972	7	20
73342	6756782	3120-00-679-7068	9	7
73342	675742E	5340-01-237-2414	25	26
73342	675803E	2520-00-679-6974	9	5
73342	676564E	3110-00-770-7842	7	11
73342	676963E	5310-00-776-7670	11	6
			31	56
			32	9
73342	6769825	5360-00-044-3945	12	21
73342	677082C	5330-00-821-4490	9	3
73342	6770822	5330-00-450-1942	9	4
73342	6770845	2520-00-767-5417	9	2
73342	67710C5	5330-01-080-3253	21	7
73342	677801E	5360-01-218-0793	21	21
			22	28
73342	6831673	3120-00-005-5880	18	4
73342	6831675	3020-00-432-1255	18	5
73342	683167E	2520-00-172-1951	17	39
73342	6831677		17	41
73342	6831675		17	40
73342	68316EC		17	43
73342	683231C	3120-01-216-2869	11	29
73342	6832517	5330-00-165-1943	4	1
73342	683255C	5330-01-218-7143	20	41
73342	6832575	5365-01-217-3077	11	15
73342	6832592	5330-01-094-7880	10	5
73342	683394C	5360-01-216-7059	22	51
73342	6833944	5360-01-216-5972	22	47
73342	6833945	5360-01-083-0004	21	15
73342	6833951		18	11
			31	42
			32	21
73342	6833953	5365-00-557-5794	17	13
73342	6834125	2835-00-211-9468	17	51
			18	20
73342	68343C5		18	9
			31	46
			32	18
73342	6834335	2520-01-064-8849	17	12
73342	6834512	5365-00-557-5835	17	30
73342	6834817	2520-01-160-5655	17	49
			18	18
73342	6834915		17	19
73342	68353C7		21	11
73342	6835314	2520-01-030-6696	7	21
73342	6835567		17	15
73342	68361C2	5310-01-216-1369	15	4
73342	68361CE	5365-01-217-4264	18	41
73342	683611C	5365-01-217-2303	31	47
			32	16
73342	6836111	5365-01-217-1023	11	14

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	6836112	5330-01-218-3387	14	26
73342	6836113	5330-01-218-1565	31	28
			32	39
73342	6836115	5330-01-216-6765	13	8
73342	6836117	5365-01-217-4262	17	28
73342	6836127	5365-01-215-9687	31	30
			32	37
73342	6836128	5330-01-215-9503	31	29
			32	38
73342	6836129	5330-01-216-5704	11	9
73342	6836130	5330-01-216-5705	11	7
73342	6836134	5330-01-216-2816	26	5
73342	6836135	5360-01-216-3266	12	10
73342	6836136	5360-01-231-0481	25	30
73342	6836137	5330-01-245-7162	15	47
73342	6836140	5360-01-216-0828	22	30
73342	6836144	5360-01-083-5500	22	42
73342	6836252	5360-01-216-3270	33	22
73342	6836264	2520-01-214-1479	16	23
73342	6836518	2520-01-214-9409	16	4
			18	35
73342	6836676	5365-01-028-8203	9	1
73342	6836873	2520-00-557-6220	7	25
73342	6837122	4820-01-006-9636	21	16
			22	52
73342	6837385	2520-01-214-3154	20	4
73342	6839079	5330-01-135-3789	10	7
73342	6839375		17	17
73342	6839376		17	42
73342	6839514		18	10
			31	41
			32	20
73342	6880251	2520-01-079-3097	17	11
73342	6881100	9905-01-213-7888	3	9
73342	6882689	5330-01-080-3254	26	6
73342	6883031	5330-01-083-3065	17	8
73342	6883033	5330-01-079-6700	17	10
73342	6883657	5330-01-216-4006	14	8
			15	46
73342	6884273	5365-01-218-0796	18	1
73342	6884274	5365-01-217-3072	18	1
73342	6884275	5365-00-007-2969	17	25
			18	1
			18	14
			18	1
73342	6884276	5365-01-217-4263	16	7
73342	6884730	5365-01-171-3392	18	34
19200	7600222	5310-00-760-0222	29	32
19207	7708035	5310-00-770-8035	33	18
19207	7973325	9905-00-409-8948	34	6
02892	830245	4320-00-518-1237	30	20



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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
90166	830657	2520-01-235-9596	30	1
90166	830655	4820-01-238-7961	29	5
90166	830661	2520-01-235-9598	27	8
90166	830663	5340-01-241-4282	27	31
90166	830664	2520-01-235-9597	28	26
90166	830665	2520-01-238-8826	27	4
90166	830666	2520-01-235-9599	27	20
90166	830692	2520-01-238-9843	28	13
			30	18
90166	830710		27	1
90166	830713	2520-01-246-6418	27	29
19207	8351366	2520-00-736-0271	7	12
19207	8351525	5360-00-177-9190	25	27
19207	8351717	2520-00-733-4742	7	8
19207	8351718	3120-00-841-0271	7	9
19207	8351725	2520-00-736-0268	7	10
19207	8355864		22	54
19207	8355555	5120-00-906-1051	35	4
90166	840022	5360-00-909-0313	28	23
			30	10
90166	840023	5310-00-935-9041	28	24
			30	9
90166	840025	3120-00-104-0635	30	5
02892	840036	5360-00-169-8367	29	7
90166	840055	5315-00-935-9034	27	34
02892	840146	5365-00-610-6325	29	22
90166	840206	5821-00-104-9823	29	27
90166	840297	5821-00-111-8054	27	37
90166	840687		29	12
90166	840726	5360-01-241-3247	29	28
02892	840898	4320-01-032-8166	28	15
			30	17
02892	840895	5340-00-152-0116	28	16
			30	15
02892	841163	5310-00-562-3932	28	17
			30	14
90166	841185		30	22
90166	841226	4320-01-033-1825	28	12
			30	19
90166	841233		29	3
90166	842063	4810-01-238-9855	29	13
90166	842171	2520-01-238-8784	29	14
90166	842430	2520-01-242-1049	29	4
90166	842448	5340-01-242-7146	27	28
90166	842445	5340-01-244-1473	27	24
90166	842451	5315-01-245-3673	27	25
90166	842461	5310-01-241-2687	27	44
90166	842463	5310-01-241-2688	28	20
90166	842618	5365-01-245-4124	30	26
90166	842621	5365-01-242-0827	30	16
90166	842623	5307-01-241-5171	30	3

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
90166	842625	4320-01-238-7053	29	30
90166	842626	5365-01-242-0828	28	14
90166	842627	5310-01-241-2677	28	31
90166	842628		27	14
90166	842632	2520-01-238-8783	27	35
90166	842633	3120-01-241-2851	27	5
90166	842634	2520-01-238-8831	27	42
90166	842635	5310-01-247-8212	27	7
90166	842637	5307-01-241-5172	27	36
90166	842638	5307-01-241-5173	27	26
90166	842639	5360-01-241-3246	27	27
90166	842642	3120-01-241-2850	30	31
90166	842643	2520-01-238-8827	27	33
90166	842646	5310-01-242-0672	30	33
90166	842648		29	20
90166	842649		29	8
90166	842651	2520-01-241-7029	29	10
90166	842653		29	26
90166	842656		28	8
90166	842657	3110-01-241-2943	28	3
90166	842666	5340-01-242-2796	27	43
90166	842669	5360-01-241-3264	27	6
90166	842675	3040-01-241-4695	30	24
90166	842678	2520-01-241-5567	30	6
90166	842679	3040-01-238-8773	28	1
90166	842683		27	21
90166	842684	4320-01-239-6930	30	29
90166	842686		30	2
90166	842688	4320-01-235-9644	28	6
90166	842689		28	27
90166	842690	2520-01-234-1898	27	10
90166	842697	2520-01-239-6835	29	15
90166	842702		28	29
90166	842704		29	19
90166	842705	5305-01-242-2638	29	2
90166	842717	2520-01-241-6851	28	19
			30	12
90166	842742	2520-01-241-5636	28	22
			30	11
90166	842885	3040-01-240-3080	27	18
90166	842894		27	3
			27	46
			29	16
90166	850231		30	32
90166	850233		28	9
90166	850236		27	12
90166	850238		27	10
90166	850247		16	11
73342	8622757		18	27
			16	12
73342	8623101	5330-00-001-4904	18	30

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
73342	8623102	5330-00-001-4903	16	11
			18	29
73342	862765C	2520-00-557-6619	8	11
02892	870045	5315-00-151-8888	28	10
			30	23
90166	87C06E		28	7
			30	30
02892	87010C	5365-01-102-5392	27	32
90166	870102	5365-00-498-2864	28	4
			30	27
02892	870103	5365-00-152-0311	28	25
			30	8
02892	870115	5330-00-003-0887	27	22
02892	87014C	5305-01-097-7827	30	25
90166	87C151	5306-01-017-9962	28	18
90166	87C181	5306-00-169-8389	30	13
90166	87C535	5310-01-246-5785	27	40
02892	870561	5310-01-097-7957	27	23
90166	870642	3110-00-554-3248	28	5
			30	28
90166	870647	3110-00-690-8987	30	21
90166	87C703	5310-01-241-2676	27	45
02892	870705	5310-01-097-7994	27	2
90166	870705	5310-01-241-2675	27	41
90166	87C88E	5305-00-001-5017	27	49
90166	871045	5315-01-247-6955	29	11
90166	871125		27	38
90166	871254	2520-01-238-8767	27	39
90166	871258		29	1
90166	871902		29	25
90166	871904		29	21
02892	871908	5330-00-152-3049	29	6
90166	871941	5365-01-243-5289	27	19
02892	872452	4730-00-566-9952	29	9
90166	872821		29	23
90166	87286E		27	30
90166	872885		28	30
90166	87297E		29	24
90166	872977	5305-00-613-8875	29	29
90166	87297E		27	13
			28	28
			30	4
90166	872975		27	11
90166	872981	5305-01-057-4264	30	34
90166	872991		27	17
90166	872992		29	18
90166	872994	5305-01-245-8750	29	17
90166	873017	5365-01-247-6952	28	11
			29	33
90166	893025		11	17
24617	9408952	5306-01-217-2173	5	4



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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
24617	9408953	5306-01-218-0700	6	6
24617	9409000	5306-01-217-2915	8	12
24617	9409011	5306-00-940-9011	28	2
63005	9409012	5305-00-125-9966	31	5
			32	57
			33	2
24617	9409014	5306-00-944-6812	20	23
			27	48
24617	9409015	5306-01-045-6594	22	3
72582	9409028	5306-00-940-9028	2	2
			11	10
			15	22
			31	55
			32	10
63005	9409030	5305-01-057-4264	3	29
			6	10
			24	20
72582	9409060	5305-01-058-4612	13	10
24617	9409062	5306-00-940-9062	21	37
			22	25
24617	9409067	5306-01-135-5869	30	7
24617	9409072	5306-00-206-1533	31	19
			32	35
24617	9409074	5306-00-845-1526	31	3
			32	55
24617	9409076	5306-00-822-2118	12	16
			20	27
24617	9409082	5306-01-216-1333	2	9
			5	7
			6	8
			26	2
19207	9409088	5305-00-813-4495	29	31
72582	9409128	5306-00-543-5696	25	42
83386	9409224	5306-01-126-4076	24	16
			25	2
			32	53
24617	9409225	5306-00-638-2362	24	17
			27	9
73342	9409235	5306-01-085-3876	19	7
24617	9409253	5306-01-216-1334	22	10
24617	9409513	5306-00-896-7228	32	51
73342	9409621	5306-01-164-7448	21	2
			23	9
			27	47
24617	9410714	4730-01-214-3112	13	4
24617	9411180	4730-01-214-3115	13	5
24617	9415972	5306-01-215-9129	20	22
24617	9416011	5306-00-843-6398	12	43
			31	1
			32	56
24617	9419287	5306-00-577-5533	22	2

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## NATIONAL STOCK NUMBER AND PART NUMBER INDEX

FSCM	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
24617	9419287	5306-00-577-5533	25	4
24617	9421003	5315-01-215-7511	15	3
24617	9422845	5310-01-092-5496	14	9
			20	21
			21	36
			22	11
			31	4
			32	54
			33	17
24617	9422846	5310-01-084-1197	12	15
			20	24
			21	1
			22	1
			23	8
			24	15
			24	18
			25	3
			25	39
			31	6
			32	52
			33	1
24617	9422848	5310-01-092-5495	12	42
			31	2
			32	50
24617	9425029	5340-01-217-2317	11	39
			14	14
24617	9425031	5340-01-216-1737	11	35
			14	16
			15	43
24617	9425094	5306-01-216-3992	15	29
24617	9425096	5306-01-241-5072	25	40
24617	9427637	5306-01-217-2908	8	14
24617	9429473	5310-01-216-8261	17	52
			18	21
24617	9430187	5306-01-241-5066	13	1
73342	9431456	5306-01-147-1202	21	3
			22	4
			25	38
24617	9432105	5306-01-216-0230	20	8
			22	13
24617	9434184	5306-01-216-3993	2	1
73342	9440903	5306-01-216-7375	11	1
24617	9440984	5306-01-216-1322	21	35
			22	23
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## APPENDIX C

## EXPENDABLE SUPPLIES AND MATERIALS LIST

## Section I. INTRODUCTION

## C-1. SCOPE.

This appendix lists expendable supplies and material you will need to operate and maintain the transmission. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

## C-2. EXPLANATION OF COLUMNS.

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the supplies list to identify the material (e.g., "Petrolatum [item 14, appendix C]").

b. Column (2) - Level. This item identifies the lowest level of maintenance that requires the listed item.

F - Direct Support Maintenance  
H - General Support Maintenance

c. Column (3) - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN, PR). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.



## Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	F	7510-00-205-1438	Bands, rubber, No. 19	LB
2	F		Blocks, wooden, 2 x 4 x 16 inches Make from item 11	EA
3	F		Blocks, wooden, 4 x 4 x 16 inches Make from item 12	EA
4	H	6830-00-247-0619	Carbon Dioxide, technical (dry ice) (81348), BB-C-104	LB
5	F	5350-00-221-0872	Cloth, abrasive, crocus, 50 sheet pkg (81348), P-C-458	SH
6	F	8305-00-286-5461	Cloth, batiste, lint-free, white, 39-1/2 inches wide (81349), MIL-C-4919	YD
7	F	6850-00-264-6572	Desiccant, activated, bag (81349), MIL-D-3464, Class 1	DR
8	F	6850-00-285-8011	Dry-cleaning Solvent, Type II (81348), P-D-680	GL
9	F	9150-00-944-8953	Grease, high temperature (81349), MIL-G-3545A	LB
10	F	9150-00-189-6727	Lubricating Oil, engine (81349), OE-HDO #10	QT
11	F	5510-00-134-3961	Lumber, softwood, 2 x 4 x 8 ft (81348), MM-L-751	BF
12	F	5510-00-274-5298	Lumber, softwood, 4 x 4 x 8 ft (81348), MM-L-751	BF
13	F	7520-00-973-1059	Marker, tube type, black	DZ
14	F	9150-00-250-0926	Petrolatum, technical (81348), VV-P-236	LB

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
15	F	7920-00-205-1711	Rag, wiping, 50-lb bale (58536), A-A-531	YD
16	F	8030-00-111-2762	Sealant, lubricating, thread locking (81349), MIL-S-46163	CC
17	F	8030-00-291-1787	Sealing Compound, gasket, hydrocarbon, fluid and water resistant (81349), MIL-S-45180	OZ
18	F		Shim Stock, 1/32 inch thick	IN
19	F		Sodium Phosphate, tribasic, anhydrous, O-S-642	LB
20	F	7510-00-266-6706	Tape, masking, pressure sensitive adhesive, 2-inch (81349), MIL-T-23397 (Fed. Spec. PPP-T-60)	FT
21	F	4020-00-291-5901	Twine, cotton, 6-ply	LB

# APPENDIX D

## ILLUSTRATED LIST OF MANUFACTURED ITEMS

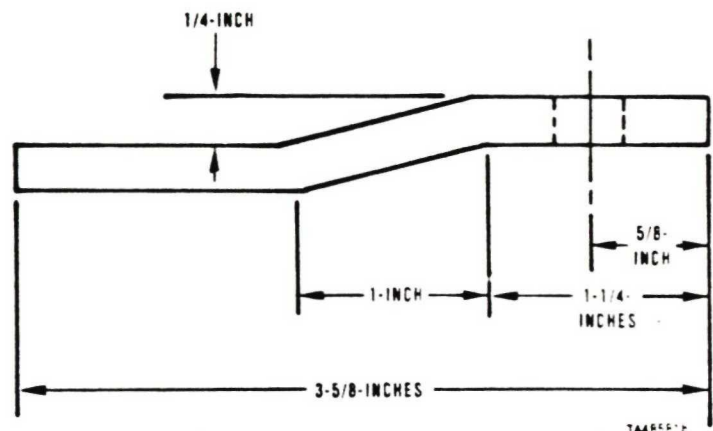
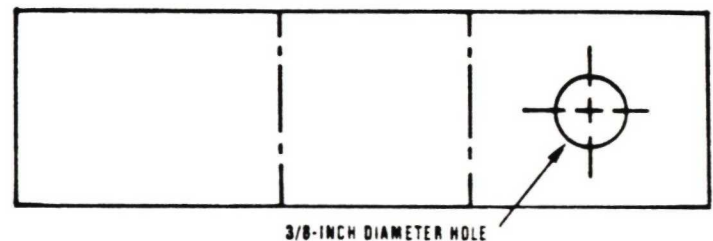
This appendix contains the instructions for making the simple tools used in some maintenance tasks. The tasks requiring the use of these tools have the tool listed under the heading FABRICATED TOOLS. The tools shown in this appendix are listed in paragraph number order.

Para. No.	Title	Fabricated Tool
4-8	Remove Left End Cover Assembly	

Make fixture from 1/4 x 1-inch steel bar stock. Grind off burrs and sharp corners.

Material: Steel

RETAINING FIXTURE



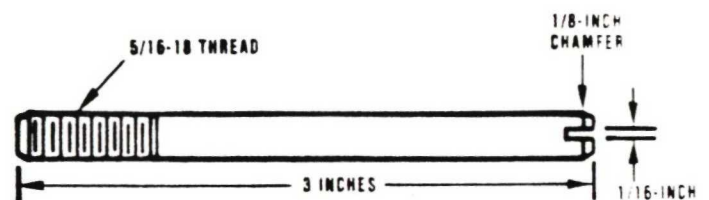
TAB 55-12

4-14	Install Converter Element Components	
------	--------------------------------------	--

Make guide pin by cutting head off 5/16-18 x 3-inch bolt. Cut 1/16-inch slot for screwdriver. Grind off all burrs.

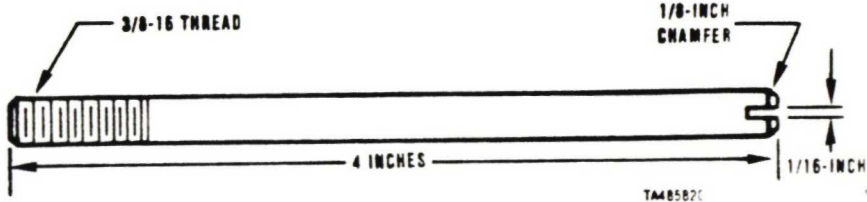
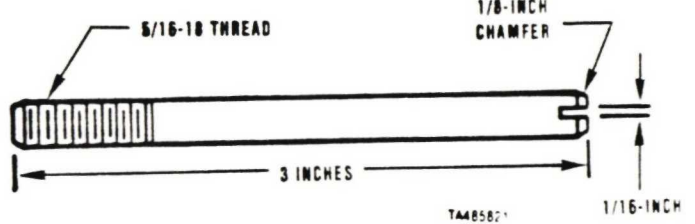
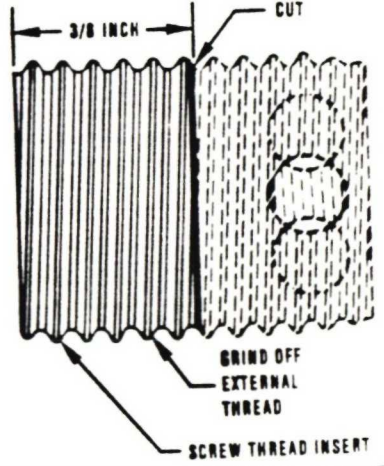
Material: Steel

GUIDE PIN



TAB 55-14

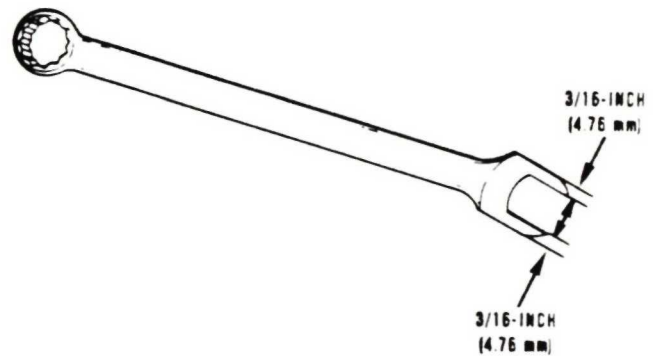


Para. No.	Title	Fabricated Tool
4-15	Install Left End Cover Assembly	<p>GUIDE PIN</p> <p>Make guide pin by cutting head off 3/8-16 x 4-inch bolt. Cut 1/16-inch slot for screwdriver. Grind off all burrs.</p> <p>Material: Steel</p>  <p>3/8-16 THREAD</p> <p>1/8-INCH CHAMFER</p> <p>4 INCHES</p> <p>1/16-INCH</p> <p>TA485820</p>
4-18	Install Transmission Top Components	<p>GUIDE PIN</p> <p>Make guide pin by cutting head off 5/16-18 x 3-inch bolt. Cut 1/16-inch slot for screwdriver. Grind off all burrs.</p> <p>Material: Steel</p>  <p>5/16-18 THREAD</p> <p>1/8-INCH CHAMFER</p> <p>3 INCHES</p> <p>1/16-INCH</p> <p>TA485821</p>
4-23 4-29	Repair Center Housing Components	<p>SPACER</p> <p>Make spacer from same part number insert as the one to be removed:</p> <ul style="list-style-type: none"> <li>9425029 5/16-18 thread</li> <li>9425031 3/8-16 thread</li> <li>23018271 1/1-13 thread</li> </ul> <p>Cut a 3/8 inch (12 mm) long section from the undrilled end of the insert. Screw the cut off section onto a bolt and grind off the external threads.</p> <p>Material: Steel</p>  <p>3/8 INCH</p> <p>CUT</p> <p>GRIND OFF EXTERNAL THREAD</p> <p>SCREW THREAD INSERT</p> <p>TA485822</p>

Para. No.	Title	Fabricated Tool
5-3	Adjust Left Hand Brake	

OPEN END WRENCH,  
THIN WALL

Make thin wall open end wrench by grinding down 11/16-inch combination wrench. Open end sides must be approximately 3/16-inch (4.76 mm) each.



TAM5550

## GLOSSARY

### Section I. ABBREVIATIONS

#### A

ACLDB  
AOAP  
app  
AR

Army Central Logistics Data Bank  
Army Oil Analysis Program  
appendix  
Army Regulation

#### C

C  
cc  
CCW  
CM  
cont  
CSK  
CT  
CW  
C1  
C2  
C3  
C4  
C5

Celsius  
cubic centimeters  
counterclockwise  
Commodity Manager  
continued  
countersunk  
closed throttle  
clockwise  
forward clutch  
fourth and reverse clutch  
third clutch  
second clutch  
first clutch

#### D

DA PAM  
DCAS  
DDA  
deg  
delta P ( P)  
dia  
DMWR  
DoD

Department of the Army Pamphlet  
Defense Contract Administration Services  
Detroit Diesel Allison  
degree  
differential pressure  
diameter  
Depot Maintenance Work Requirements  
Department of Defense

#### E

EA  
ECP  
EIR

each  
Engineering Change Proposal  
Equipment Improvement Recommendations

#### F

F  
fig  
FSCM  
ft

Fahrenheit  
figure  
Federal Supply Code for Manufacturers  
foot



<b>G</b>	
GMC	General Motors Corporation
GMI	General Maintenance Instructions
gpm	gallon per minute
GVW	gross vehicle weight
G1	governor 1
G2	governor 2
<b>H</b>	
h	hour
Hg	Mercury
hp	horsepower
<b>I</b>	
ID	inside diameter
in.	inch
<b>K</b>	
kg	kilogram
km	kilometers
km/h	kilometers per hour
kN	kilonewton
kPa	kilopascals
kW	kilowatt
<b>L</b>	
L	left, counterclockwise
lb	pound
lb-ft	pound-foot
lb-in	pound-inch
LH	left hand
lpm	liters per minute
ltr	letter
LU	lockup
lube	lubrication
<b>M</b>	
max.	maximum
MIL	Military (specification)
min	minimum
mm	millimeter
mph	miles per hour
MWO	Modification Work Order
MTOE	Modified Table of Organization and Equipment

N

N  
N·m  
NSN

Newton, neutral  
Newton meter  
National Stock Number

O

OD  
OIP

outside diameter  
Overhaul Inspection Procedure

P

PA  
PA/CM  
PN (P/N)  
P.O.  
ppm  
PSA  
psi  
psid

Procuring Activity  
Procuring Activity/Commodity Manager  
part number  
Post Office  
parts per million  
Preshop Analysis  
pounds per square inch  
pounds per square inch differential

Q

QA  
QA/QC  
QAR  
QC  
QDR  
qty

Quality Assurance  
Quality Assurance/Quality Control  
Quality Assurance Representative  
Quality Control  
Quality Deficiency Report  
quantity

R

R  
ref  
REV  
RFD/W  
RH  
RISE  
rms  
rpm  
RPSTL  
RIC  
RIL  
R2C  
R2L

reverse, right, clockwise  
reference  
reverse  
Request for Deviation/Waiver  
right hand  
Reliability Improvement of Selected Equipment  
root mean square  
revolutions per minute  
Repair Parts and Special Tools List  
first range reverse converter  
first range reverse lockup  
second range reverse converter  
second range reverse lockup

S

SAE  
sec

Society of Automotive Engineers  
second

TACOM  
TAMMS  
TB  
TC  
TM  
TV  
typ

T

U.S. Army Tank-Automotive Command  
The Army Maintenance Management System  
Technical Bulletin  
torque converter  
technical manual  
throttle valve  
typical

U

UNF

Unified National Fine Thread

W

WOT

wide open throttle

X

X (X200-4)

Cross-Drive (transmission)

1

1C  
1L

first range converter  
first range lockup

2

2C  
2L

second range converter  
second range lockup

3

3C  
3L

third range converter  
third range lockup

4

4C  
4L

fourth range converter  
fourth range lockup



## Section II. WORDS AND TERMS

### A

**AXIAL** - Situated around, in the direction of, on, or along an axis.

### B

**BURR** - Local rise of material forming a protruding sharp point or high spot.

### C

**CORROSION** - Chemical reaction between surfaces of material and environment to which it is subjected. Generally appears as rust on steel, or as a light-colored powdery coating on aluminum or magnesium. Advanced forms of corrosion will result in pitting.

**CRACKS (BREAKS)** - Surface or material breakage caused by stress which results in partial or complete separation of material.

### D

**DISTORTION** - Loss of original shape, either local or over an area. Includes bends, twisting, warping, dents, flattening, crushing, or kinking.

### E

**ELONGATION** - Stretching or lengthening of original dimensions, usually applies to bolt holes.

### G

**GOUGES** - Grooves in or breakdown of metal surface from foreign contact under heavy pressure. Usually loss of material, rather than displacement.

### L

**LEAKAGE** - Any evidence of a fluid beyond its container.

### N

**NEWTON** - Metric term for force.

**NEWTON METER** - Metric term for torque.

**NICKS** - Small grooves or notches. Usually displacement of material, rather than loss.

### O

**OVERHEATING** - A condition indicated by discoloration of parts which usually results in a loss of hardness. Usually caused by a lack of lubrication, malfunction of parts, or excessive wear.

P

PHYSICAL - Method of inspecting parts requiring action.

PITTING - A material surface cavity usually with defined rough edges. Usually caused by corrosion.

R

RANGE PACK - The area of the transmission consisting of the planetary gearing and clutches. It basically consists of the parts and assemblies which function individually or collectively to vary speed and power output or to change forward-reverse direction.

S

SCORING - Deep tears or breaks in material surfaces from foreign contact under pressure. May show temperature effects from high friction.

SCRATCHES - Slight tears or breaks in material surface from momentary foreign object contact.

SURFACE ABRASIONS - A surface condition where surface material is displaced or removed.

V

VISUAL - Method of inspecting parts using unaided human eye.

W

WEAR - A loss of material from contacting surfaces. Normal wear is the slow loss of material from contacting surfaces. Wear has a polished finish and leaves a pronounced pattern.

### Section III. SYMBOLS

±	Plus or Minus
°	Degree, Temperature or Angular
%	Percent
*	Footnote
**	Footnote

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TM 9-2520-272-34&P

T (continued)

Troubleshooting Procedures

Tubes and Loose Components, right end

install

remove

Turnover Stand

install transmission on

remove transmission from

U, V

Valve Assembly

G2 backup

install

remove

lockup control

install

remove

main control

install

remove

priority

install

remove

Valve Components

Brake Apply Regulator

install

remove

Brake Coolant

install

remove

Equalizer

install

remove

W, X, Y, Z

Wiring Harness

install

remove

2-1

4-64

4-23

4-13

4-73

4-86

4-10

4-88

4-9

4-89

4-8

4-87

4-10

4-143

4-98

4-142

4-99

4-64

4-23

4-84

4-7





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Co. B 1<sup>st</sup> Tracked Vehicle BN  
3<sup>rd</sup> MARDIV FMF  
4<sup>th</sup> FPO San Francisco, CA 96602

DATE SENT

6 June 1987

PUBLICATION NUMBER

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PUBLICATION DATE

PUBLICATION TITLE

DIRECT SUPPORT AND GENERAL SUPPORT  
MAINTENANCE X200-4 TRANSMISSION ASSEMBLY

BE EXACT PIN-POINT WHERE IT IS

PAGE  
NOPARA  
GRAPHFIGURE  
NOTABLE  
NO

4-107 4-19

IN THIS SPACE TELL WHAT IS WRONG  
AND WHAT SHOULD BE DONE ABOUT IT:

Clarify location of snapping groove  
in 1<sup>st</sup> piece of art.

4-235 4-30

NOTE at top of page, change to read:  
Leave hoist and S-hook attached  
to hydrostat so that you can  
raise and turn hydrostat as  
necessary to align bolt holes.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

Carter, R. Sgt 378-4187

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R. Carter, Sgt.

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



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GRAPH

FIGURE  
NO

TABLE  
NO

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DA FORM 2028-2  
JUL 79

PREVIOUS EDITIONS  
ARE OBSOLETE

PS...IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR  
RECOMMENDATION MAKE A CARBON COPY OF THIS  
AND GIVE IT TO YOUR HEADQUARTERS

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PAGE  
NO

PARA-  
GRAPH

FIGURE  
NO

TABLE  
NO

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AND WHAT SHOULD BE DONE ABOUT IT:

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## 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

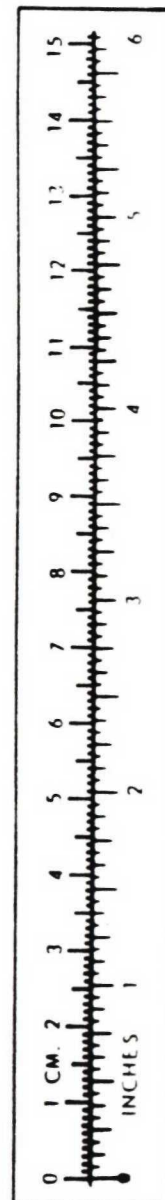
### TEMPERATURE

$\frac{5}{9}(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
 212° Fahrenheit is equivalent to 100° Celsius  
 90° Fahrenheit is equivalent to 32.2° Celsius  
 32° Fahrenheit is equivalent to 0° Celsius  
 $\frac{9}{5}^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

## 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



TA08999